APPENDIX B

Preliminary Design Report

Michael Baker INTERNATIONAL

We Make a Difference

PRELIMINARY DESIGN REPORT

Quail Valley Subarea 4
Public Sewer Improvements and Septic to Sewer Conversion

PREPARED FOR

EASTERN MUNICIPAL WATER DISTRICT

2270 Trumble Road
Perris, California 92572-8300

Michael Baker Project No.: 196454

REV. DATE	SUMMARY
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1. EXECUTIVE SUMMARY

The primary objective of this Preliminary Design Report is to present the design basis for a system that would replace failing septic systems located within Quail Valley Sub-Area 4 (SA4) with a reliable sewer collection system. SA4 is one of the nine subareas located within Quail Valley, which is within the service area of Eastern Municipal Water District (EMWD). Quail Valley has faced septic system failures, which threaten public health, water quality, and nearby Canyon Lake. SA4 is the second phase of improvements, following the upgrades made to Subarea 9 (SA9) in 2019. The rolling hills and varied topography in SA4 limit the design of a collection system that is entirely gravity-based. As a result, this Preliminary Design is focused on a hybrid system that combines gravity-based wastewater conveyance with lift stations to ultimately provide service to the entirety of SA4. The design includes five (5) sewer lift stations, comprising of one regional lift station and four smaller lift stations. This document dated January 10, 2025 presents the findings of the field investigations, results of the hydraulic model, and the preliminary design.

1.1 Field Investigation

Field crews from Michael Baker International, in conjunction with Boudreau Pipeline and Wright Septic, located existing septic systems within SA4. They used various extraction methods to expose and measure the depths of the laterals. Data was recorded in a GIS map portal, which included the approximate location of the laterals and other relevant parcel and project information. This GIS map portal served and shall continue to serve as the centralized design center for data gathering. After field inspections, survey crews collected the precise location and elevation data for each lateral. This survey data was then used to develop plan and profile drawings of the proposed gravity collection system.

1.2 Constructability – Field and Subsurface Conditions

SA4's septic to sewer conversion process faces several constructability challenges due to existing field conditions. The area's rolling hills and variable terrain result in a sewer system that is steep and deep in some areas. This challenging topography also requires the construction of cross lot connector pipes through private properties, requiring EMWD to initiate property acquisitions. Additionally, these private properties affected by connector pipe construction may need grading and erosion control plans.

Narrow, one-way streets limit the space available for sewer system construction. The narrow streets, deep sewer lines, and existing obstructions such as utility poles mean that most streets will require complete pavement replacement and areas for spoils and materials stockpile outside the right of way will be required. Private properties to be acquired by EMWD for connector pipe construction could also be used for stockpiling spoils and materials.

Service lateral construction on private properties presents additional challenges as existing structures and hardscape improvements require individual service lateral evaluations prior to construction.

Subsurface conditions within SA4 further complicate deep sewer construction. Two geotechnical investigations — one performed as part of the Feasibility Analysis, and another performed by Verdantas in conjunction with this preliminary design — found variable subsurface conditions in the area. Shallow bedrock in some locations makes excavation more challenging. Areas with highly weathered bedrock can typically be excavated with conventional equipment and good working condition. However, areas that encountered shallow, less weathered bedrock as well as auger refusal present concern and may require special rock breaking techniques. These challenges should be considered and possibly further investigated in detailed design.

1.3 Environmental Concerns

High-level environmental and biological constraints also present concern for project design and construction. Wetland vegetation communities within the project area may fall under jurisdiction of several research agencies, requiring wetland delineation, permits, and potential mitigation such as habitat restoration and biological monitoring. Additionally, the identification of western burrowing owl habitats within the SA4 and the surrounding area in a 2020 study may necessitate habitat restoration, biological monitoring, focused surveys, pre-construction take avoidance surveys, mitigation measures and monitoring.

EMWD will conduct a separate programmed Environmental Impact Report (EIR) to address these constraints.

1.4 Hydraulic Modeling

The gravity sewer and force main alignment was developed considering various factors such as site topography, existing utilities, subsurface conditions, biological constraints, and septic lateral data. A comprehensive hydraulic model of the system was created to validate the proposed sizing and alignment for the gravity sewer. Two scenarios were analyzed in the model, the first being existing conditions and the second evaluating buildout conditions of the fully developed proposed sewer system of SA4. A Medium High Density land use was considered in the model with an ADW for 211.5 gdp/du, peaking factor of 2.87, resulting in a total design value of 607 gpd per parcel. A minimum pipe size of 8 inches was used, and some gravity segments were upsized to 12 inches when additional capacity was needed.

A separate and parallel Lift Station Evaluation report located in Appendix M also included a hydraulic model of the lift station and force main system. This model included all five (5) lift stations in SA4 and was used to generate system curves necessary for pump sizing. Hydraulic calculations, conducted separately from the model, was used to provide preliminary force main sizing. A combination of 3-inch and 4-inch force mains were recommended for the smaller lift stations, while a dual 6-inch force main size were recommended for the regional lift station.

1.5 Sewer Collection System Design

The 30% design for SA4 comprises over ten (10) miles of 8-inch and 12-inch PVC gravity main pipe, more than 1.1 miles of force mains, 247 manholes, 23 connector pipes, a regional lift station (LS-1), and four smaller lift stations (LS-2, LS-3, LS-4 and LS-5). Construction of SA4 sewer system was divided into a series of nine phases to ensure effectiveness and financial viability. A summary of the sewer phasing system of this project is provided in Table 1.1 below:

Table 1.1: Summary of Sewer System Elements and Construction Cost by Phase

Phase	Length of Sewer (LF)	Length of Force Main (LF)	Lift Stations	Number of Manholes	No. of Septic Systems	Probable Construction Cost
Phase 1	6568	3241	LS-1	27	80	$16,712,996
Phase 2	7504	0	-	29	84	$12,303,527
Phase 3	8426	0	-	42	86	$12,659,886
Phase 4	8740	0	-	45	83	$13,726,860
Phase 5	8631	0	-	45	75	$13,546,615
Phase 6	3994	994	LS-2	18	36	$8,689,072
Phase 7	4770	1598	LS-3, LS-4	24	53	$13,099,452
Phase 8	4280	283	LS-5	17	28	$8,617,033
Phase 9	Design on California Place to be the responsibility of the developer					

Note: The phased cost is limited to construction costs only and assumes escalation up to 2027 only. This cost excludes soft costs such as property acquisitions, engineering, inspections, project administration, electrical service upgrades, CEQA mitigation costs, permitting costs, etc.

The construction phasing is preliminary and may be adjusted based on grant funding, stakeholder participation, and EMWD CIP implementation. Project construction costs were broken down by phase, resulting in an estimated construction cost of $99,355,439. The cost is limited to construction costs only and assume escalation up to 2027, even though the project is expected to span over 20 years. The total project costs, combining construction costs and soft costs, is estimated at approximately $135,355,441.

1.6 Potential Adjustments in Final Design

Septic system information was collected over the course of this preliminary design project. However, access limitations, such as locked gates or lack of right of entry agreements, prevented field investigation of some parcels believed to have a septic system. Despite these limitations, the data collected was presumed to provide a representative dataset of existing conditions sufficient to support the Preliminary Design.

The initial approach to the project involved locating existing septic laterals and measuring their depths. Once the locations and depths were determined, the design of the gravity sewer commenced. During pothole fieldwork, Michael Baker developed assumptions based on typical sewer installation depths and placed these in an AutoCAD Civil 3D model of SA4. As actual depths were recorded during ground survey, these assumptions were updated with real data.

Over the past year, field investigations have identified, located, and measured exiting septic service laterals throughout SA4. As more laterals were measured, an increasing level of confidence was developed that the assumptions would be sufficient for the preliminary design.

This Preliminary Design Report presents the findings to date. Some minor changes and refinements will be required as the design advances into final design and more data becomes available. However, significant changes in the Preliminary Design are not anticipated.

2. PROJECT OVERVIEW

2.1 Introduction

This report has been prepared by Michael Baker International to present the preliminary design of public sewer improvements within Quail Valley Subarea 4 (SA4). The project aims to enhance the community's wastewater infrastructure and quality of life by replacing existing private septic systems with a modernized sewer system. Quail Valley is situated in the western part of the City of Menifee east of Canyon Lake and south of the City of Perris. Geographically, SA4 is bounded by San Jacinto Road to the north, California Place to the south, Palm Drive to the east, and Mountain View Place to the west. The proposed improvements include the establishment of a gravity sewer system to replace existing private septic systems. Additionally, sewer lift stations will be located at strategic locations to accommodate the rolling hills topography of the area. By transitioning to a public sewer system, SA4 will benefit from enhanced sanitation and reduced potential for surface water commination.

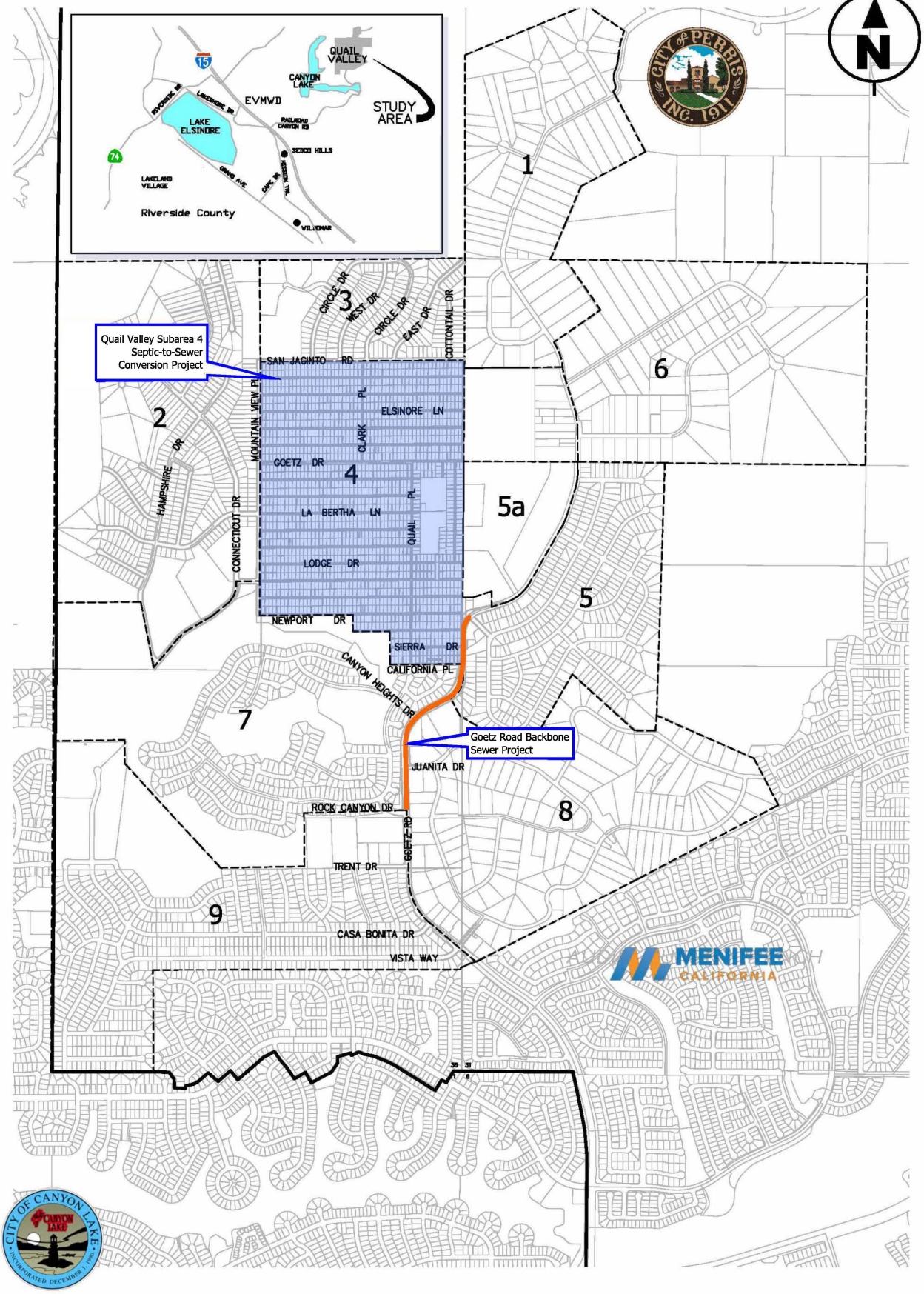
The Quail Valley community, situated within the service area of the Eastern Municipal Water District (EMWD), has encountered persistent private septic system failures. These failures pose a threat to public health and water quality, both within the community and downstream in Canyon Lake. As a vital water source, community, and recreational area, Canyon Lake serves the public in multiple capacities. In response to these challenges, EMWD and other key stakeholders—including Riverside County, the California Department of Public Health, the Elsinore Valley Municipal Water District (EVMWD), the City of Canyon Lake, and the City of Menifee—have collaboratively explored solutions. The objective of this effort is to establish a robust and comprehensive community-wide sewer collection system. The initiative aims to safeguard public health, protect water resources, and enhance the overall well-being of Quail Valley residents.

Eastern Municipal Water District (EMWD) has undertaken a series of comprehensive studies to explore the feasibility of implementing a public sewer system for the Quail Valley Community. The initiative has focused on solutions to address the history of septic system failures. The previous studies leading up to this report include:

- In October 2005, an initial study titled the "Quail Valley Sewer Improvements Alternatives Study" identified nine distinct subareas within Quail Valley.
- A phased approach then commenced with the first phased work focused on Subarea 9. Construction of public sewer improvements in Subarea 9 were completed in 2019
- SA4 has been selected for the second phase of public sewer improvements and is the subject of this Preliminary Design Report (PDR).
- A feasibility study specifically dedicated to SA4—entitled the "Quail Valley Subarea 4 Sewerage Feasibility Study" (Feasibility Study)—was successfully concluded in April 2022.

The PDR builds upon the finding from the Feasibility Study and presents the preliminary design basis for SA4 public sewer improvements and the associated septic-to-sewer conversion for the residential septic systems. Quail Valley and the sub-areas are shown in Figure 1.

QUAIL VALLEY SUB-AREA 4 SEWER PROJECTS



SEWER SUBAREA BASIN BOUNDARY
EMWD SERVICE AREA BOUNDARY
GOETZ ROAD BACKBONE SEWER
SUB-AREA 4 (SA4) PROJECT BOUNDARY

emwd EASTERN MUNICIPAL WATER DISTRICT

Michael Baker INTERNATIONAL

FIGURE 1
QUAIL VALLEY SUB-AREAS

2.2 Project Purpose and Scope

Michael Baker International (MBI) has been retained by Eastern Municipal Water District (EMWD) to provide professional engineering services for the preliminary design of a modern sewer collection system for Quail Valley SA4. This project aims to replace existing septic systems with a reliable hybrid sewer system. The rolling hills of SA4 complicate the design and implementation of a gravity sewer system. The preceding Feasibility Study identified several options for overcoming the challenges associated with the terrain. The scope of this Preliminary Design is to provide the implementation and 30% design of a hybrid sewer system, based on recommendations in the 2022 SA4 Feasibility Study. The hybrid system combines a gravity system for wastewater transport across varying elevations where possible. Lift stations are strategically placed at depressed areas using pre-packaged pumping equipment and a shared force main to covey flows to an EMWD small lift station that serves SA4.

The scope of work include the following:

1. Conduct a document review of past studies and reports on Quail Valley, as-built drawings for existing infrastructure and EMWD design guidelines to incorporate relevant information into the preliminary design of Sub-Area 4.
2. Conduct a field investigation to understand the existing site conditions and preliminary design constraints.
3. Conduct a supplemental geotechnical investigation to understand subsurface conditions, such as ability to excavate, presence of groundwater and design criteria for construction at 20 new locations.
4. Prepare 30% sewer plan and profile drawings using District standard sheet layouts.
5. Perform a hydraulic analysis of the proposed sewer system, taking into consideration District design standards.
6. Perform a lift station siting study and pumping equipment sizing and evaluation.
7. Evaluate constructability of the sewer system and develop a preliminary construction sequence narrative (Construction Sequencing and Phasing Plan).
8. Provide property and easement acquisition assistance to EMWD.
9. Prepare a Preliminary Design Report and an opinion of probable construction cost for the SA4 project.
10. Develop an optimal implementation timeline for the project.

The scope of work is depicted in Figure 2. This figure presents a flow chart that outlines the major work elements and how the work will be performed.

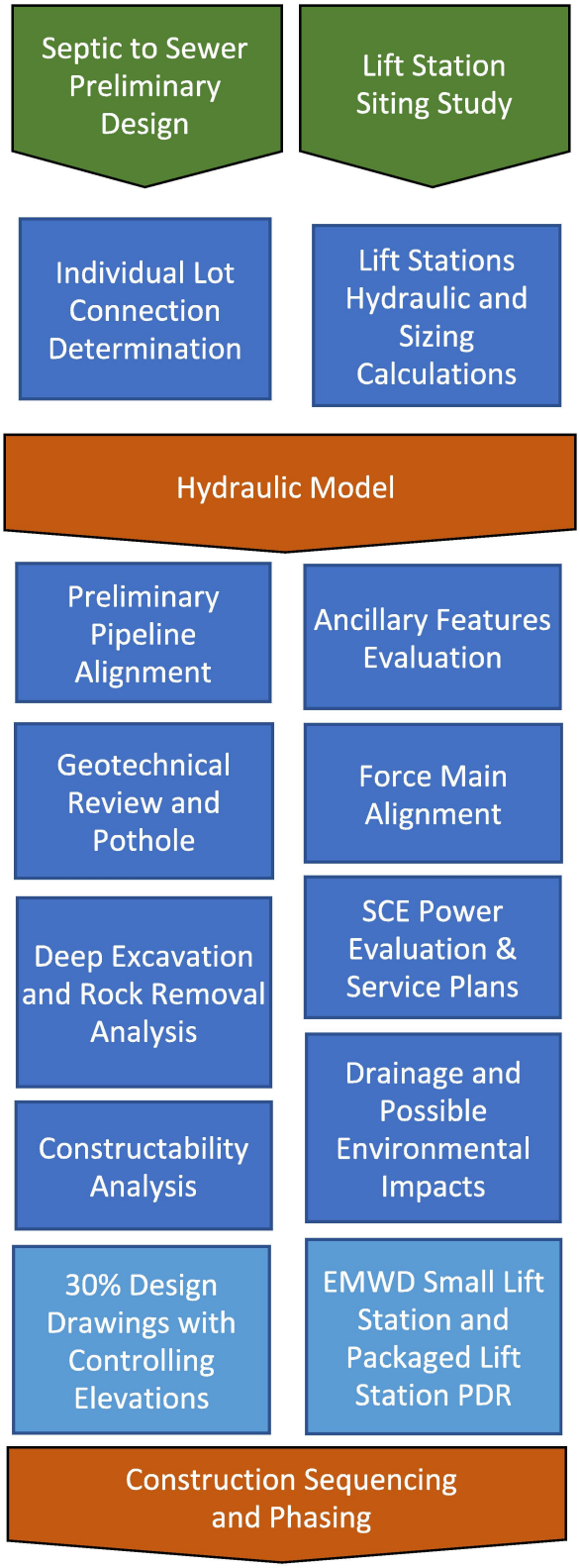


Figure 2: Quail Valley SA4 Preliminary Design Road Map

3. FEASIBILITY STUDY

3.1 Summary of Findings

The Feasibility Study completed by Engineering Resources of Southern California (ERSC) in 2022 reviewed possible solutions for providing public sewerage for SA4. Section 2.0 focused on design considerations and identified four viable solutions for SA4. These were:

i. Conventional Gravity with Lift Stations System
ii. Vacuum Sewer System
iii. Clustered Low-Pressure Grinder Sewer System
iv. Combination/Hybrid system

The findings and recommendations from the feasibility study are summarized below.

Conventional Gravity with Lift Stations Alternative

The preliminary design for the SA4 sewer system involved a hybrid approach due to inconsistent street profiles across the rolling topography. It found that gravity lines would need to be routed across unoccupied lots, connecting parallel streets in order to maintain an adequate gradient in some areas. Five lift stations were planned, each requiring property acquisition and coordination with Southern California Edison for electrical capacity upgrades.

EMWD has established guidelines for small sewer lift stations, that range from 120 to 500 gallons per minute. However, lift stations required for SA4 would fall below the minimum threshold, even in the built-out scenario. To address this, smaller capacity lift stations that do not necessarily meet the EMWD standard design will be required.

Vacuum Sewer System Alternative

As another possible solution, an analysis of a vacuum sewer system was conducted. In this alternative, four homes would discharge into a “pit” with vacuum valves. In the full build-out scenario, approximately 1,197 homes would connect to the vacuum system, requiring around 300 valve pit assemblies. During operation, when the pit reaches a certain depth, the vacuum valve opens, evacuating effluent into vacuum lines. These lines, equipped with diversion valves, traverse SA4 streets and lead to a central vacuum station. The vacuum station, co-located with lift station 2, collects effluent in a tank and discharges it via a force main to the Goetz Road backbone. Property acquisition by EMWD is necessary for the vacuum station sites and coordination with Southern California Edison is essential for electrical capacity upgrades.

An easement may be necessary on one or a combination of the contributing lots. Additionally, if an effluent level monitoring system is required for all valve pits, additional space may be needed for power, backup power, and communication hardware. Coordination with Southern California Edison (SCE) will be necessary if power is needed at the valve pits. Upgrades to existing power infrastructure are not essential to sustain the valve pits.

Homes located in a localized depression area will be required to drain by gravity to low-pressure grinder stations. Low-pressure force mains would discharge into individual buffer tanks, which act as larger, multi-valve pits. Each buffer tank and lift station will require property or easement acquisition by EMWD. If power is needed at the buffer tanks, coordination with SCE will be necessary, although existing power infrastructure upgrades are not mandatory for sustaining the valve pits or low-pressure grinder stations.

Clustered Low-Pressure Grinder Sewer System Alternative

The low-pressure sewer system analyzed for SA4 involved several components. Gravity lines would be used to transport flows to grinder pump stations that are connected to a shared force main. The preliminary layout included 42 stations, strategically placed in low spots throughout SA4. This alternative was based on the E/One (Environmental One Corporation) stations that collect effluent and house grinder pumps. Each E/One station would be located on an individual lot with necessary elements such as service access, backup generator, control panel, and odor control system. Flow considerations—existing versus build-out forecasts—will guide the deployment of pumps. For example, larger stations may start with duplex pumps and later expand to triplex or quadplex capacity. In some cases, side-by-side pump stations could be required to meet pumping capacity requirements and to provide redundancy.

The clustered low-pressure grinder sewer system has potential for shallower bury depths. It also gives the potential for the installation of smaller diameter gravity lines and for the gravity line and low-pressure force main to be installed in the same trench. However, it would require maintenance of numerous stations. Additionally, a significant number of lot acquisitions would be required for the 42 proposed E-one sites.

Combination/Hybrid System Alternative

The conventional sewer option for SA4 relied on EMWD small municipal lift stations. However, forecasted flows for subbasins were found to fall below the minimum threshold of 120 gallons per minute per EMWD's Small Sewage Lift Station Guidelines. As an alternative, a Hybrid System was analyzed. This approach involved clustered low-pressure grinder pump stations throughout subbasins within SA4 in combination with conventional sewer option with cross-lot connections. The hybrid system interconnects both gravity and low-pressure grinder pump alternatives. Low-pressure grinder pump stations (E/One) in subbasins would share a common force main, discharging to a collection manhole in Mountain View Place, which then ties into an EMWD standard lift station. Coordination with Southern California Edison (SCE) would be necessary for electrical capacity upgrades.

The hybrid system emerged as the optimal combination of alternatives. It retains the conventional gravity system while incorporating low-pressure grinder stations and lift stations where appropriate. Unlike the oversized EMWD standard lift stations proposed in Alternative 1, the approach featured smaller low-pressure grinder stations, minimizing the number of E/One stations. Although numerous lot acquisitions would be necessary, the reduced number of E/One stations are anticipated to make operation and maintenance more manageable for EMWD staff. Anticipated power infrastructure upgrades are expected to be less demanding due to the smaller-sized low-pressure grinder stations and only one lift station.

3.2 Feasibility Study Conclusion

The Feasibility Study concluded all system alternatives to be feasible. However, the Combination/Hybrid alternative was identified as the preferred alternative for SA4. The hybrid system combined the benefits of both the *Conventional Gravity with Lift Stations Alternative* and the *Clustered Low-Pressure Grinder Sewer Alternative*. The feasibility study also presented preliminary phasing for the improvements as well as a life cycle cost analysis. These have served as the foundation of the work presented in this preliminary design.

3.3 Deviations from Feasibility Study

The Feasibility Report recommended a hybrid alternative that combines the conventional gravity system with lift stations and clustered low-pressure grinder sewers. This approach predominantly serves SA4 by gravity, using one EMWD standard small lift station, while introducing 12 low-pressure grinder sewer systems where smaller lift stations are still needed. However, as the project progressed into preliminary design, a deviation from the feasibility study recommendation occurred. This preliminary design maintains the hybrid approach, utilizing a gravity system with one EMWD standard small lift station and multiple smaller lift stations. Notably, the number of smaller lift stations is reduced to four. This adjustment enhances the sewer system's economy by minimizing property acquisitions and the overall number of facilities to maintain. A separate and parallel report, located in Appendix M, outlines the sizes, types, and recommendations for these lift stations.

As the design advances into detailed design, it is possible that the number of lift stations in the design may increase. These would be driven by the following factors:

1. Future Geotechnical investigation identifies areas of rock that impact the gravity sewer design.
2. Property acquisition or easements for the cross-lot connections cannot be negotiated.
3. Environmental constraints limit the ability to develop the property for installation of lift stations or cross-lot connections.
4. This PDR does not include California Place because there are no current developments. An additional small lift station will be required for the southernmost portion of SA4.

As the design advances and additional information is received, the overall layout and number of facilities may be adjusted.

4. FIELD INVESTIGATION

4.1 Overview

The Feasibility Report identified potential locations for lift stations and areas where gravity sewage would likely not be possible. The findings were based solely on topographical surface elevations. To complete the preliminary design, the location and depth of the sewer laterals was required. When combined with the topographical surface elevations, the required depth and subsurface profile of the gravity sewer can be determined. This information then allows the location of the lift stations to be confirmed. The first step of the preliminary design was to conduct a field investigation to locate and measure the sewer laterals.

The project area is comprised of 652 parcels believed to have existing septic systems and an additional 1000 vacant parcels without known septic systems. All parcels within the project area, including the vacant ones, will ultimately be provided with service connections to the proposed sewer mains. Michael Baker International (MBI), in collaboration with Boudreau Pipeline Corporation (Boudreau) and Wright Septic, conducted field investigations to locate each septic tank, expose the tank lateral and measure the location and depth. The following steps outline this process:

1. **Right of Entry (ROE)**: EMWD obtained ROEs from each parcel to facilitate access for inspections.
2. **Parcel Identification and Notification**: MBI selected parcels for investigation at least one week in advance and placed door hangers to notify the residents of the planned property entry. EMWD also placed calls to notify the residents.
3. **Tank Location**: Wright Septic conducted initial inspections to locate each septic tank and, if possible, each lateral.
4. **Data Collection Methods**: MBI and Boudreau field crews employed various excavation methods to expose and measure the depth below surface of the laterals.
5. **Survey Crew Notification**: Following field inspections, an MBI team member delivered door hangers to residents, informing them of the survey crew's upcoming visit later that same week.
6. **Survey Data Collection**: The MBI survey crew collected a precise location and elevation of each lateral on a weekly basis using a precise GPS device or Total Station tied to survey control points.

The Boudreau field crew was tasked with excavating each septic tank and lateral. Various methods were employed to complete this task, although the primary methods employed were hand digging and vacuum extraction. The choice of method depended on property accessibility, considering that the air excavation and vacuum rig could not reach all locations. Safety remained paramount during fieldwork, and several considerations were considered. These included:

1. **Presence of Dogs**: Crew members assessed whether there were dogs on the property.
2. **Gate Locks**: Even if an ROE (Right of Entry) was obtained, the crew checked if entrance gates were locked.
3. **Occupancy**: Crew members determined if anyone was home.

Throughout the fieldwork, the entire team remained vigilant, using sound judgment when approaching properties. If occupants refused entry, a dog was present, or gates were locked, the crew would reschedule visits to ensure safety for all parties involved.

4.2 Data Collection

Michael Baker collected data on all parcels visited during the field investigation. A Geographic Information System (GIS) system was used to record measurements and track the progress of each parcel. An iPad tablet was used to access and update the GIS portal using ESRI Field Maps application. All data was accessible for viewing and reporting online using an ESRI Field Maps portal. The primary data fields included:

- Pothole Status
- Address
- Primary Owner
- ROE Received Date
- ROE Expiration Date
- Date of Inspection
- GPS Septic Depth (in)
- GPS Lateral Depth (in)
- Controlling Location (Yes/No)
- Parcel Developed (Yes/No)
- Septic System Present (Yes/No)
- Access Restriction Note
- Dog or Animals Note
- General Notes

4.2.1 GIS Webportal

The GIS Webportal served as a powerful visual overview of the project. It is an interactive map that displays the project area and property boundaries. Each parcel represents a distinct feature that houses the collected data fields. The webportal provided a visual snapshot of the project status and allowed the MBI team, EMWD and other stakeholders to track real-time data.

Figures 3 through 5 are screenshots of the GIS webportal showing a snapshot of the overall project status. Additionally, GIS Exhibits 1 through 4 shown at the end of this subsection contain similar data and provide a better visual map of the project status. Note that these GIS figures provide a snapshot in time for a specific day and will continue to be updated.

The figures indicate that for Quail Valley SA4, there is a total of 652 project parcels – these are unique assessor parcels that are believed to have septic system present. Of those 652 project parcels, 485 right-of-entries have been received and 167 right-of-entries are still outstanding. Additionally, there are 11 parcels within SA4, but were not categorized as a project parcels; however, the field crew attempted to field investigate these. Including these 11 non-project parcels, the total right-of-entries amounts to 496. The webportal continues to break down the status of the 496 ROEs received, which is summarized below.

Table 4.1: Field Data Summary

			Survey Complete	Could not Locate	Could not access	Pothole Complete	Door Hanger Hung	ROE Hung	No Information
Project Parcels	**ROEs Received**	485	443	31	5	3	3	0	0
	ROEs Outstanding	167	4	0	0	0	0	130	33
Non-Project Parcels	**ROEs Received**	11	7	1	0	1	1	0	0
	No ROEs	711	4	0	0	0	0	0	0

Below is a concise breakdown of the meanings of each field used by the field crew:

- ROE Received: EMWD received a signed right of entry allowing property access.
- ROE Outstanding: No signed ROE; MBI left a packet for resident to sign.
- ROE Hung: Micheal Baker placed a ROE packet at the property to help secure signatures.
- Door Hanger Hung: Property scheduled for septic locating; advance notice given. 4 parcels remain in this status because field crew made multiple attempts to access them but was unable to gain entry.
- Could Not Access: 5 properties inaccessible due to locked gates, dogs, or other barriers to entry.
- Could Not Locate: 32 properties with hidden or obstructed septic tanks, or Wright Septic was unable to physically locate the septic tank and/or lateral
- Pothole Complete: Lateral found and staked. 4 parcels remain in this status because the survey crew was unable to access for survey.
- Survey Complete: Lateral surveyed, or the crew confirmed in the field that no septic system is present.
- Included: Project parcels believed to have a septic system present
- Not Included: Project parcels believed to be undeveloped and lacking septic systems; No EMWD water account.

As indicated on the GIS webportal, there are 458 parcels marked as survey complete, 4 parcels marked as pothole complete, 5 parcels marked as could not access, 32 parcels marked as could not locate, and 4 parcels marked as door hanger hung. However, as data collection progressed, it became difficult to categorize these parcels distinctly. For clarity, the following list provides a detailed breakdown of the categories:

- Of the 458 parcels marked as survey complete:
    - 359 parcels have surveyed laterals with horizontal and vertical data.
    - Five parcels have surveyed laterals but are not part of Quail Valley SA4 (and are instead part of the Goetz Rd sewer backbone project).
    - 82 parcels have no septic system, confirmed on field.
    - Two parcels have unconfirmed septic systems, where field crew was unable to confirm whether septic system existed or not.
        - APNs: 350192035, 350262033

- Ten parcels have missing survey data.
  - APNs: 350112040, 350113043, 350202006, 350214051, 350222055, 350231038, 350252013, 350253009, 350261065, 350263003

4.2.2 Defining Parcels versus Lots

Understanding the distinction between ‘lots’ and ‘parcels’ is important for understanding the information presented in this PDR. In this project, a parcel refers to a property with legal defined boundaries, while a lot refers to a smaller subdivision of a parcel. In Quail Valley SA4, some parcels are large enough to encompass multiple lots.

GIS data was collected for each parcel, not each lot. The gravity sewer loading criteria in the hydraulic model was generally based on the lots that could be developed, noting that there are more lots than parcels. The lift station loading criteria was determined using the number of parcels instead of lots, along with the 20% increase in peak flow per EMWD criteria to account for unknowns.

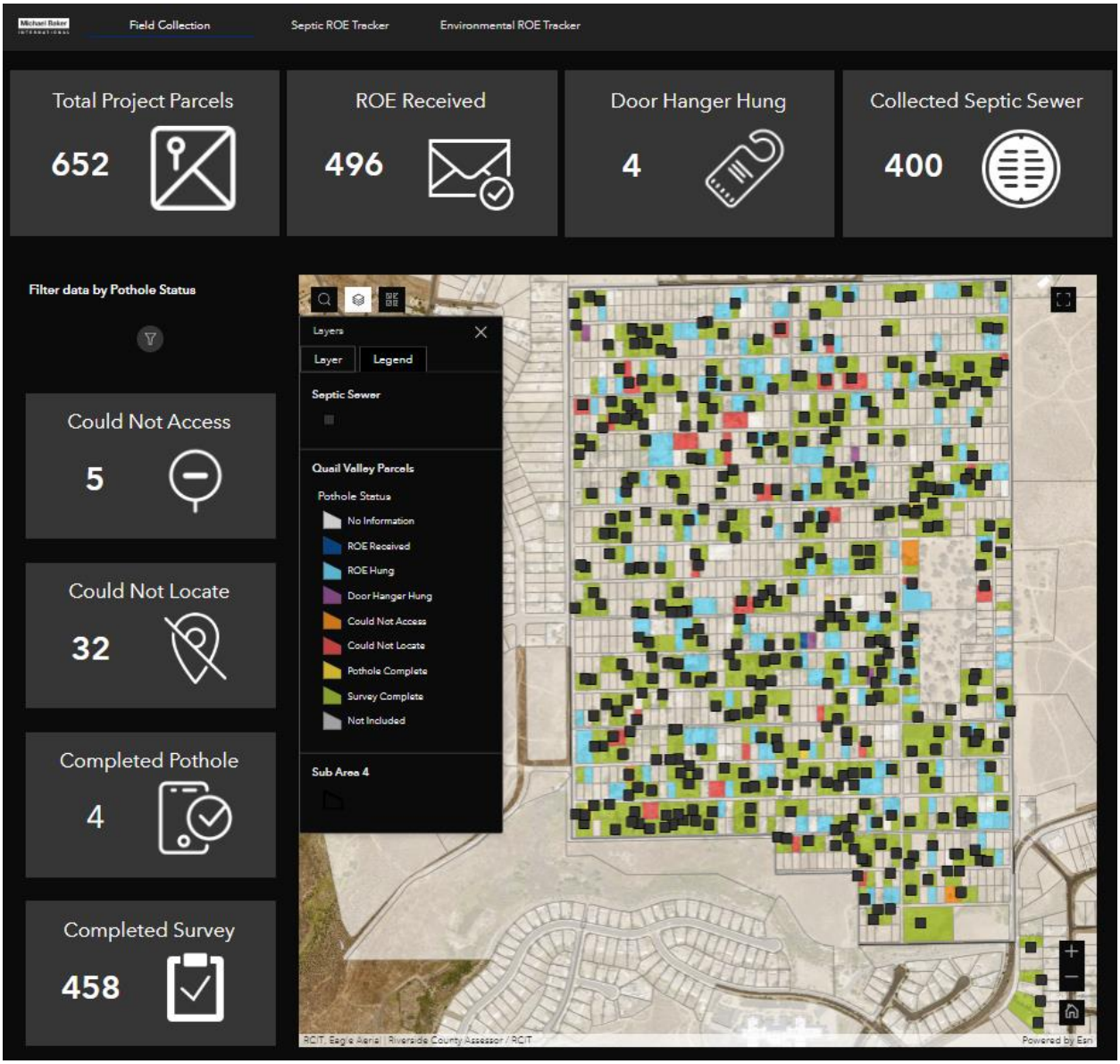


Figure 3: Quail Valley GIS Webportal – Project Snapshot

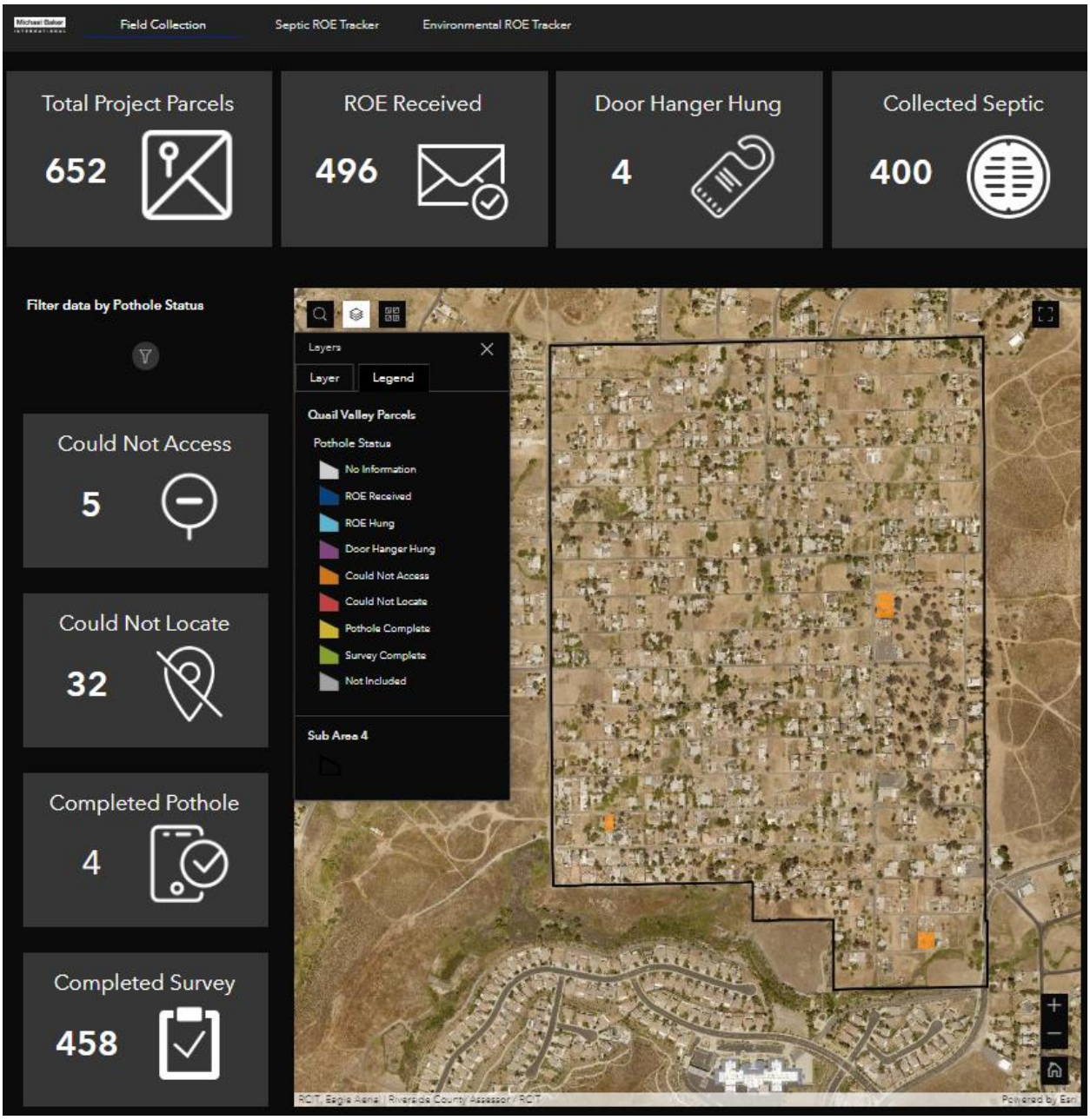


Figure 4: Quail Valley GIS Webportal – Could Not Access Parcels

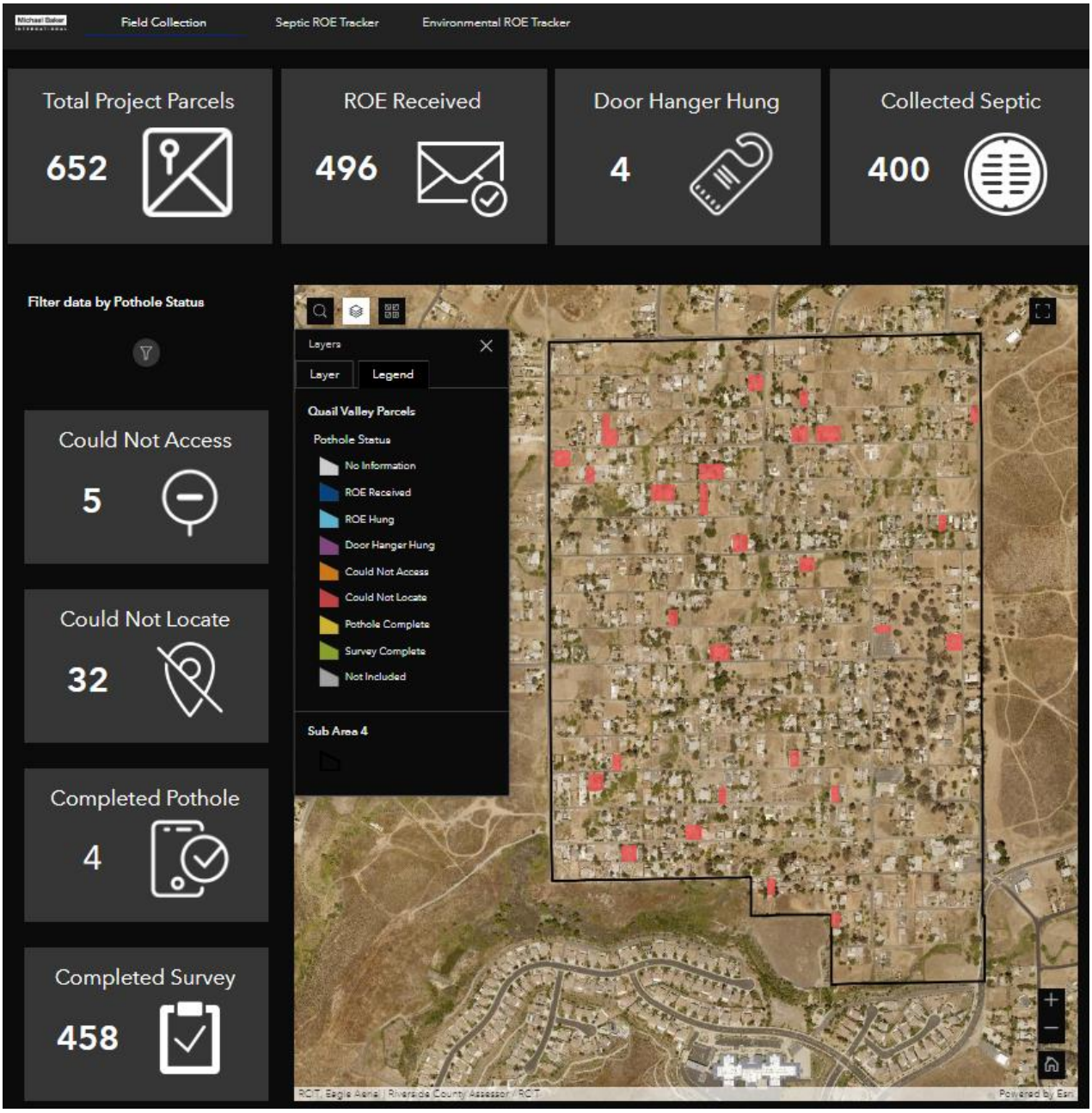
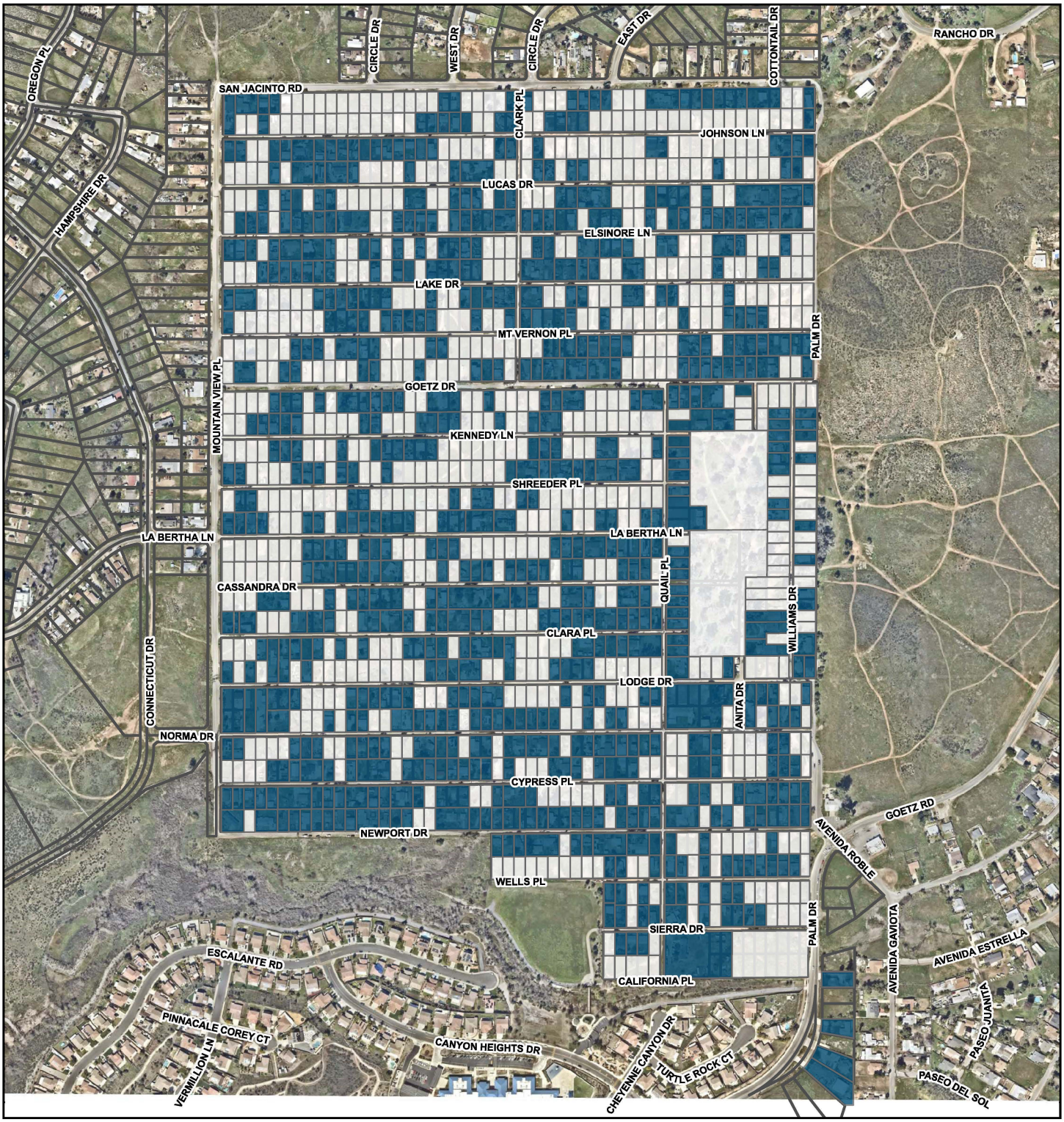


Figure 5: Quail Valley GIS Webportal – Could Not Locate Parcels



Legend

Parcel Inclusion

Included

Not Included

Property Line

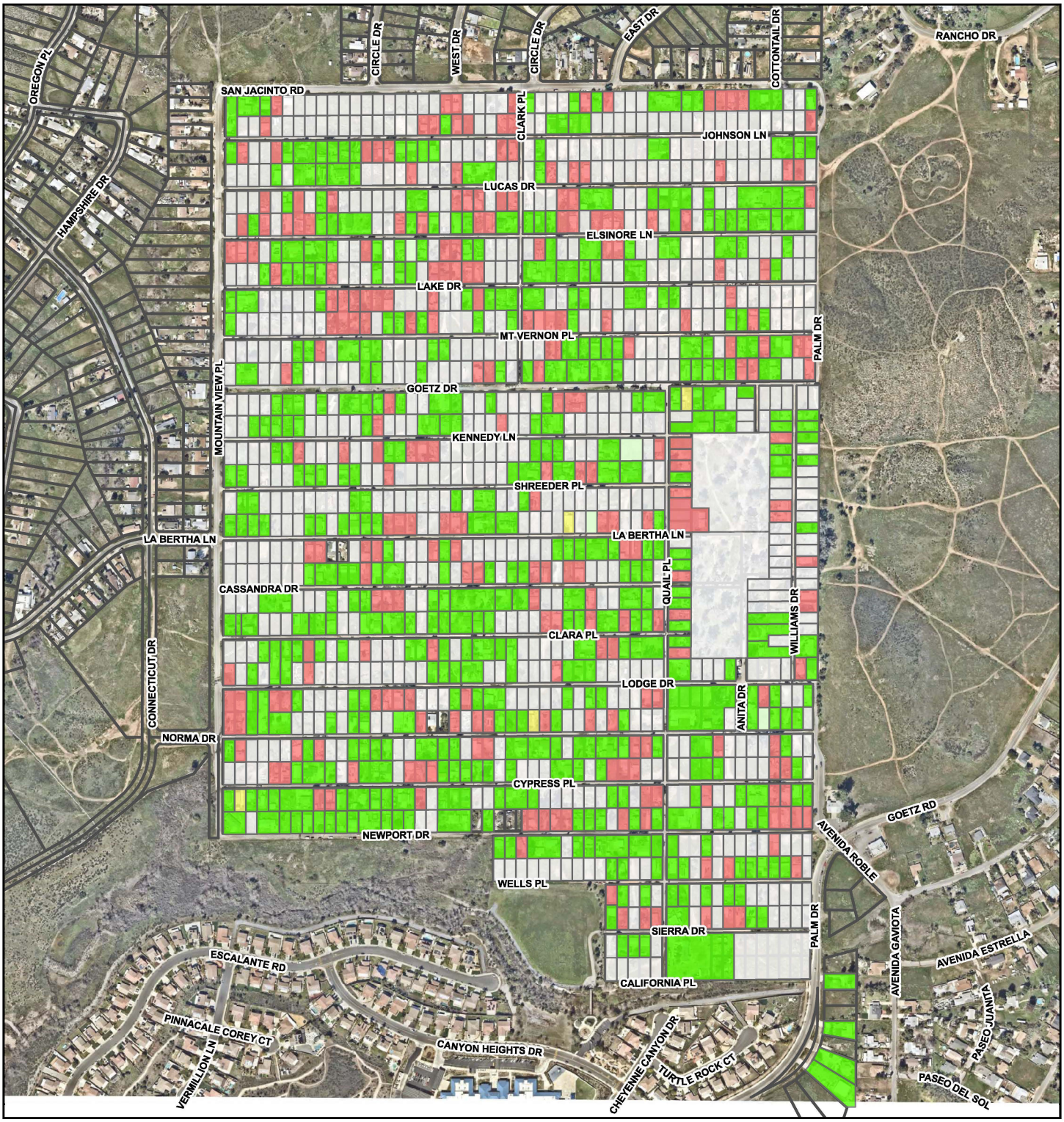
Michael Baker INTERNATIONAL

0 250 500 Feet

Source: ESRI, Michael Baker International

QUAIL VALLEY
SEPTIC TO SEWER CONVERSION

GIS Exhibit 1 - Parcel Inclusion



Legend

Pothole Status

- Not Complete
- Pothole Complete
- Survey Complete
- Not Included
- Property Line

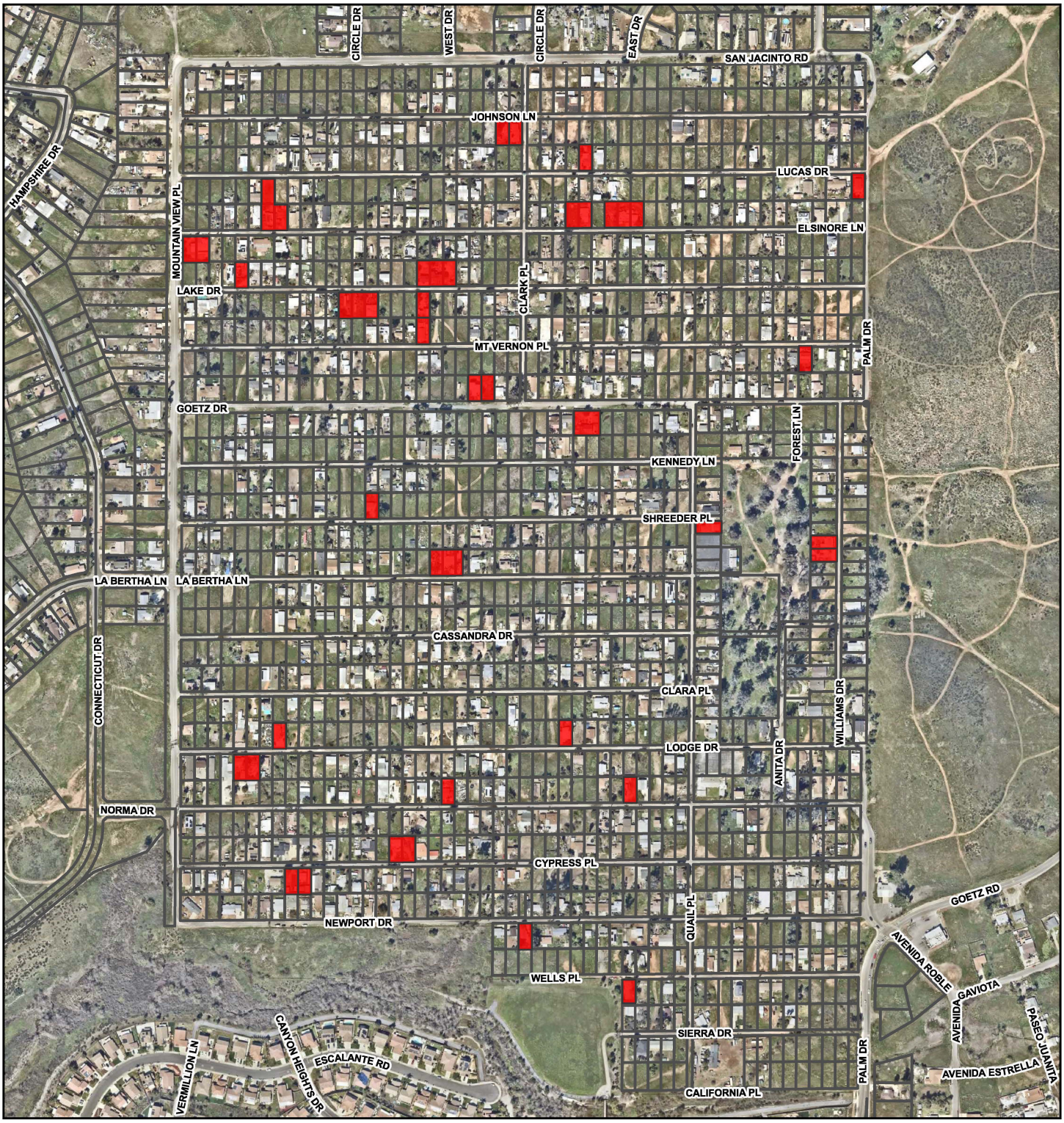
Michael Baker INTERNATIONAL

0 250 500 Feet

Source: ESRI, Michael Baker International

QUAIL VALLEY
SEPTIC TO SEWER CONVERSION

GIS Exhibit 2 - Potholing Status



Legend

- Could Not Locate
- Property Line

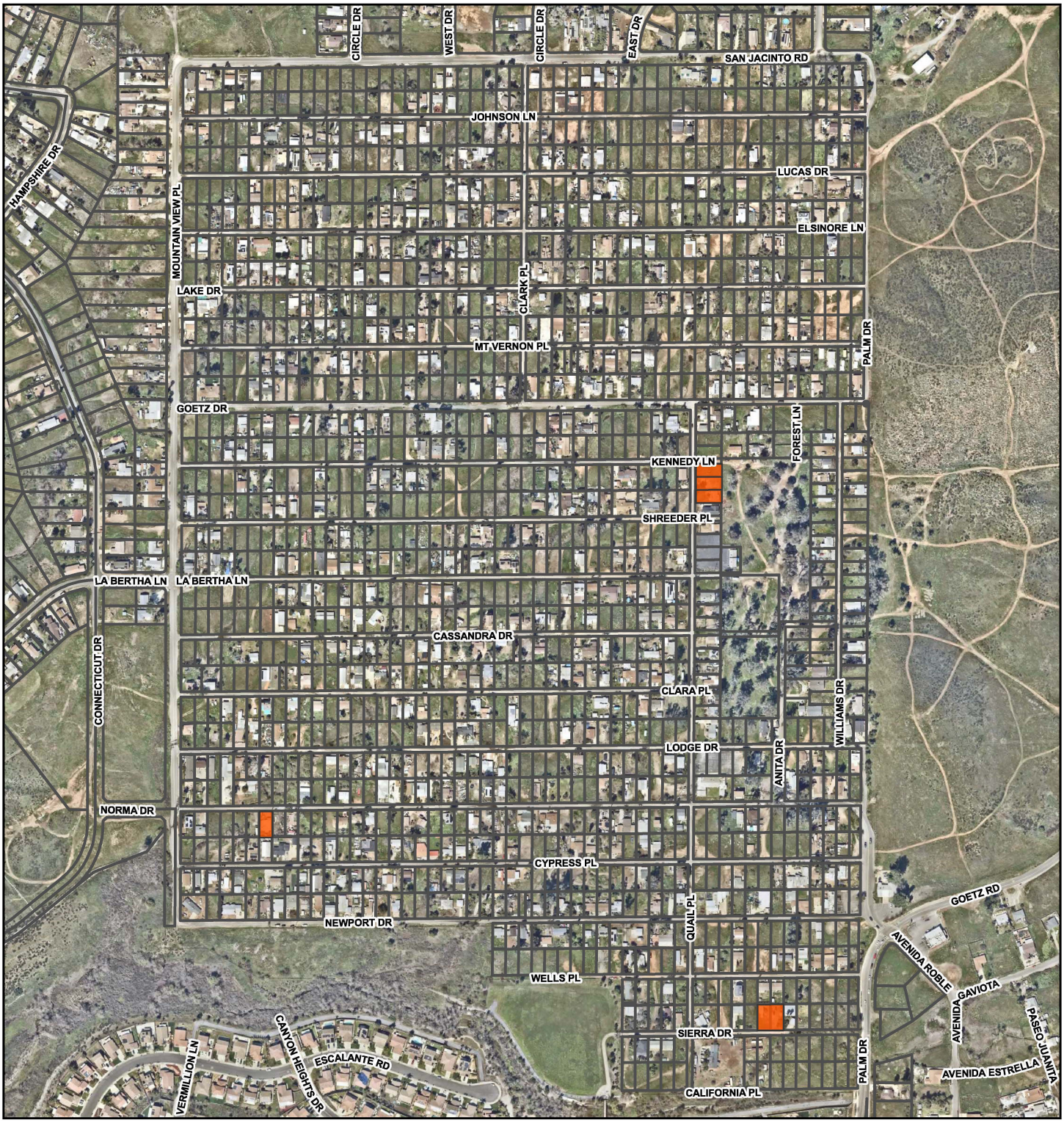
Michael Baker INTERNATIONAL

0 250 500 Feet

Source: ESRI, Michael Baker International

QUAIL VALLEY
SEPTIC TO SEWER CONVERSION

GIS Exhibit 3 - Non-Locatable Parcels



Legend

- Could Not Access
- Property Line

Michael Baker INTERNATIONAL

0 250 500 Feet

Source: ESRI, Michael Baker International

QUAIL VALLEY
SEPTIC TO SEWER CONVERSION

GIS Exhibit 4 - Non-Accessible Parcels

4.3 Existing Sewer Backbone Infrastructure

The existing homes in Quail Valley SA4 rely solely on septic systems for sewer handling. Backbone sewer infrastructure currently exists in Goetz Road, with an upstream endpoint at a manhole near the intersection of Goetz Road and Rock Canyon Drive. The Goetz Road Trunk Sewer Project, developed by Hunsaker and Associates, will extend the existing backbone sewer north towards SA4. The upstream endpoint located at the intersection of Avenida Roble and Goetz Road. This extension will assist in the Quail Valley sewer conversion and is currently in final design. Once the design and construction are completed, the CMH-1 (SA4 improvements) located on Wells Place will connect to the SSMH (Goetz Rd backbone sewer improvements) on Goetz Road and Palm Dr. Refer to the orange line in Figure 1 and EMWD Draft Record Drawing D-71448 dated July 12, 2024 located in Appendix K.

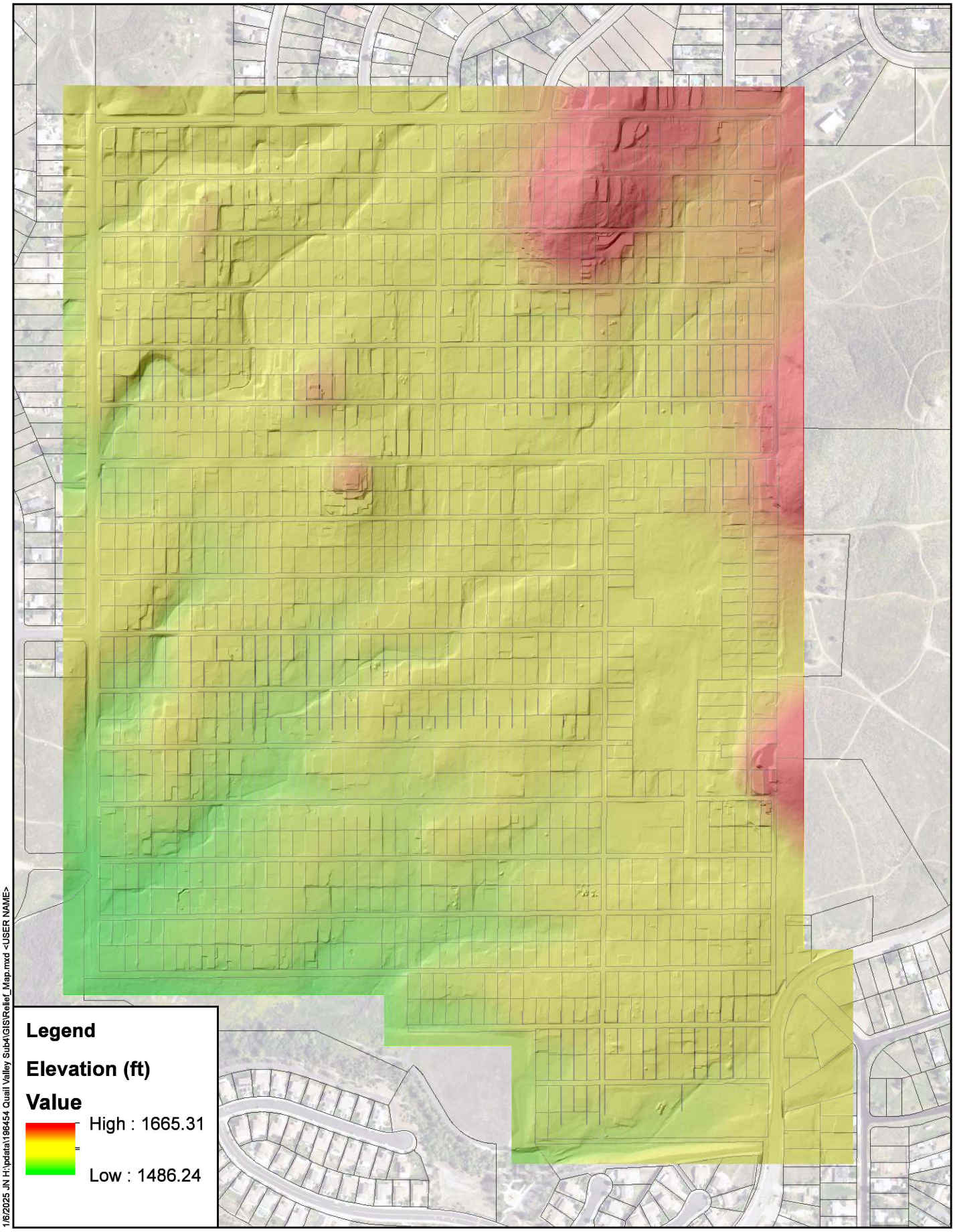
5. CONSTRUCTABILITY CONSTRAINTS

5.1 Field Conditions

SA4 features a mix of development, primarily consisting of small single-family residences and manufactured homes. Some occupied parcels have natural vegetation and scattered trees with minimal site improvements, while others include mature trees, landscaping, walls, pavers, decorative concrete, patio structures, and outdoor storage structures. These improvements can complicate connecting these homes to the future sewer system. The undeveloped areas of SA4 are characterized by moderate vegetation, exposed earth and rock, natural grasses, shrubs, and scattered trees.

5.1.1 Topography Challenges

The topography of SA4 is characterized by variable, undulating terrain with rolling hills, which presents challenges for designing a gravity sewer system. The steep streets in this area may cause gravity lines to exceed the maximum slope recommended by EMWD standards. To ensure effective gravity flow and minimize the need for lift stations, gravity lines may need to be routed between parallel streets and through private properties. These gravity main connections, which cross private properties, are designated as “connector pipes” in this PDR. Additionally, some residences are significantly lower in elevation than their neighbors or the streets they front, adding further complexity to the design. These constraints are taken into account in the preliminary design. For more details, refer to GIS Exhibit 5 for an elevation map of SA4.



1/6/2025 JN H:\pdata\196454 Quail Valley Sub4\GIS\Relief_Map.mxd <USER NAME>

Michael Baker INTERNATIONAL

Source:

0 125 250 500 Feet

QUAIL VALLEY SUBAREA 4 - SEPTIC TO SEWER CONVERSION

Elevation Map

GIS Exhibit 5

5.1.2 Shallow Bedrock Concerns

Exposed subsurface rock can be observed at road cuts and lot grading in some areas of SA4. These rock formations exhibit characteristics of shallow bedrock. Constructing a deep sewer system in areas with shallow bedrock presents another challenge. Further discussion can be found in Section 5.3.

5.1.3 Narrow Streets Constraints

Many streets in SA4 are narrow, one-way streets which limits the design and construction of a sewer system. Key considerations include:

- **Spatial Constraints from Existing Water Lines**: The presence of existing water lines within the narrow right-of-way limits the possibility of maintaining a 10-foot clearance between the existing water lines and the proposed sewer system.
- **Limited Vehicle and Equipment Access**: The narrow streets in SA4 makes access to and from the sewer construction site challenging for vehicles and equipment.
- **Street Reconstruction Requirements**: At a minimum, per City of Menifee standards, trench excavation repairs must be at least 5 feet wide (assuming 3 feet of trenching and 1 foot of street repair on each side) and require a minimum of 10 feet of cold milling. However, the entire street pavement may be destroyed during construction, requiring street reconstruction throughout all of SA4. The trenching process, combined with the use of heavy excavation equipment, could weaken the road's surface. It is assumed that after sewer is installed, replacement of the entire paved surface will be required. Therefore, the project will require street improvement plans for the road reconstruction.
- **Staging and Spoils Areas**: Due to the narrow right-of-way, construction staging will be challenging, and proper management of spoils will be necessary.
- **Lift Station Placement Constraints:** The restricted street width and narrow lots limit suitable locations for lift stations. Operational and maintenance vehicles may encounter difficulties when accessing lift station sites.

5.1.4 Existing Structures and Hardscape Improvement on Private Properties

The presence of existing structures and hardscape improvements on private properties presents significant challenges for sewer lateral construction on some parcels. To address these complexities, each property must be individually evaluated to understand the specific constraints related to each sewer lateral before construction begins. It is essential to analyze existing conditions, such as building footprints, retaining and landscape walls, landscaping, and utility layouts. Proper abandonment procedures for existing septic systems is also crucial to ensure a seamless transition while meeting County requirements. Further discussion on the septic system conversion process can be found in Section 11.

5.2 Environmental Concerns

In August 2020, RECON Environmental, Inc. conducted a Biological Constraints Report for Quail Valley SA4. This section provides a summary of key findings from the detailed report, which is included in Appendix E for reference. The study identified potential biological constraints within the project area including a 500-foot offsite buffer. These constraints include sensitive vegetation communities, plant and wildlife species, and jurisdictional wetlands and water bodies.

To facilitate planning, the biological constraints were categorized into three levels: low, moderate, and high. These levels of constraint determine the necessary monitoring, mitigation, and restoration efforts

during and after sewer construction. In particular, wetland vegetation communities and western burrowing owl suitable habitats were identified as high-level constraints that raise concern for the design and construction of the sewer system. The spatial extents of these constraints are displayed in Exhibit 1 – Proposed Sewer Improvements, with a full sized exhibit included in Appendix A. The impacts of these constraints are summarized in the subsections below.

EMWD plans to further investigate the potential environmental or biological impacts the improvements may cause. A field survey will be conducted at each property impacted by connector pipes or lift stations to better understand the specific impacts. Additionally, EMWD will conduct a programmed Environmental Impact Report (EIR) to address these impacts and outline necessary mitigation efforts.

5.2.1 Potential Jurisdictional Wetlands and Waters

The wetland vegetation communities within the project area may fall under the jurisdiction of several resource agencies, including the United States Army Corps of Engineers (USACE), the Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW). Consequently, construction activities in these areas may require permits from these agencies.

A formal jurisdictional wetland/waters delineation will need to be conducted if construction will be done in these areas. If jurisdictional wetlands/waters are identified, any impacts to these areas will likely require a Section 404 permit from the USACE, a Section 401 Water Quality Certification from the RWQCB, and a Section 1602 Streambed Alteration Agreement from the CDFW. Additionally, mitigation such as habitat restoration and biological monitoring may be required.

5.2.2 Western Burrowing Owl Suitable Habitat

The western burrowing owl is a CDFW species of special concern. Any work within their suitable habitat may require focused surveys, pre-construction take avoidance surveys, mitigation measures and monitoring.

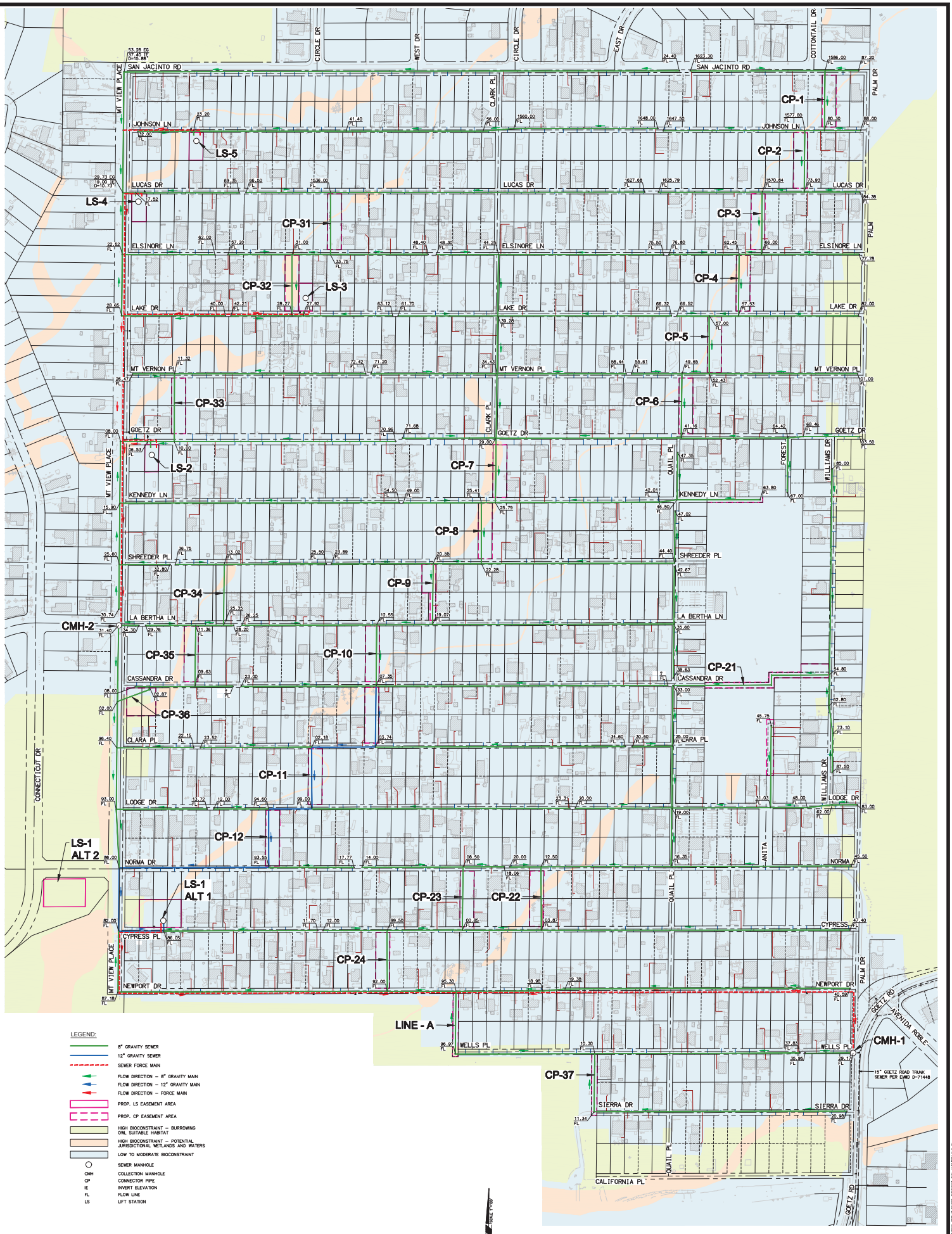

SAN JACINTO RD
JOHNSON LN
LUCAS DR
ELSINORE LN
LAKE DR
MT VERNON PL
GOETZ DR
KENNEDY LN
SHREEDER PL
LA BERTHA LN
CASSANDRA DR
CLARA PL
LODGE DR
NORMA DR
CYPRESS PL
NEWPORT DR
WELLS PL
SIERRA DR
CALIFORNIA PL
MT VIEW PLACE
CLARK PL
QUAIL PL
FOREST
WILLIAMS DR
ANITA
PALM DR
CIRCLE DR
WEST DR
EAST DR
COTTONTAIL DR
CONNECTICUT DR
GOETZ RD
AVENIDA ROBLE
CP-1
CP-2
CP-3
CP-4
CP-5
CP-6
CP-7
CP-8
CP-9
CP-10
CP-11
CP-12
CP-21
CP-22
CP-23
CP-24
CP-31
CP-32
CP-33
CP-34
CP-35
CP-36
CP-37
LS-1 ALT 1
LS-1 ALT 2
LS-2
LS-3
LS-4
LS-5
CMH-1
CMH-2
LINE - A
15" GOETZ ROAD TRUNK SEWER PER EMWD D-71448
LEGEND:
8" GRAVITY SEWER
12" GRAVITY SEWER
SEWER FORCE MAIN
FLOW DIRECTION – 8" GRAVITY MAIN
FLOW DIRECTION – 12" GRAVITY MAIN
FLOW DIRECTION – FORCE MAIN
PROP. LS EASEMENT AREA
PROP. CP EASEMENT AREA
HIGH BIOCONSTRAINT – BURROWING OWL SUITABLE HABITAT
HIGH BIOCONSTRAINT – POTENTIAL JURISDICTIONAL WETLANDS AND WATERS
LOW TO MODERATE BIOCONSTRAINT
SEWER MANHOLE
CMH COLLECTION MANHOLE
CP CONNECTOR PIPE
IE INVERT ELEVATION
FL FLOW LINE
LS LIFT STATION
SCALE: 1"=100'
100 50 0 100 200 300
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EXHIBIT 1
QUAIL VALLEY SUBAREA 4
PROPOSED SEWER IMPROVEMENTS

5.3 Subsurface Conditions

5.3.1 Geotechnical Investigation

Verdantas Inc. (Verdantas) conducted a geotechnical exploration for the design and construction of the proposed pipeline in July 2024. The report, titled "Geotechnical Exploration Quail Valley Sewer – Subarea 4" documents the findings. This report also incorporates pertinent data from a previous 2020 geotechnical investigation report by Inland Foundation Engineering, Inc. (IFE). This earlier report, titled "Geotechnical Investigation Report EMWD Quail Valley Sub-Area 4 Sewerage Feasibility Study and Sewer System Backbone Preliminary Design Report," was originally prepared for the 2022 Feasibility Study and will be referred to as the 2020 IFE report herein.

The complete 2024 Verdantas report can be found in Appendix F and is summarized as follows:

1. The 2024 Verdantas report includes 16 hollow stem auger borings drilled along the proposed pipeline alignment (LB-25 to LB-44). Borings LB-36, -37, -38, and -41 were not performed due to conflict with existing underground and overhead utilities. The 2024 Verdantas report also incorporates data from the 2020 IFE report, including 24 hollow stem auger borings (B-1 to B-24) and four seismic refraction lines, with 22 borings and three seismic refraction lines located within SA4.

   Exhibit 2 – 2024 Geotechnical Exploration – illustrates the locations of the boreholes and seismic refraction lines. Boring depths for LB-25 to LB-44 reached up to 26 feet, though some were terminated prematurely due to auger refusal. Similarly, boring depths for B-1 to B-24 reached up to 20 feet, but some were also terminated prematurely due to auger refusal.

2. Table 5.1 provides a summary of the borehole results within SA4. These results reveal that SA4 exhibits varying subsurface conditions. Specifically:

   - Boring LB-26 on Newport Drive encountered artificial fill and is generally associated with existing pavement and associated subgrade soils.
   - Borings LB-25 through LB-44 encountered Very Old Alluvium. Generally, they consisted of dense silty sand (SM) and sandy gravel (GW-GM). More silt and clay content (SC/CL) was observed in this alluvium along the southern portion of the site close to existing drainage (B-01, B-02, and LB-26)
   - Borings LB-25, LB-27 through LB-29, LB-31 through LB-35, and LB-40 encountered phyllite.
   - Borings LB-30, LB-39, and LB-42 through LB-44 encountered metasedimentary rock.
   - Borings B-01 through B-06, located south of Norma Drive, encountered deeper bedrock composed of metasedimentary sandstone and phyllite.
   - Borings B-07 through B-22, located north of Norma Drive, encountered shallower bedrock consisting of metasedimentary sandstone and phyllite, at depths ranging approximately 0.5 to 9.5 feet below ground surface.

Table 5.1: Geotechnical Borings from 2024 Verdantas Report

Boring	Street	Depth (ft, Hollow Stem Auger)	Bedrock Depth (ft)	Groundwater Depth (ft)
LB-25	Wells Pl	25.8	5	Not Encountered
LB-26	Newport Dr	25.3	5	23.8
LB-27	Clara Pl	15 (refusal)	5	13.8
LB-28	Cassandra Dr	15.3 (refusal)	5	Not Encountered
LB-29	La Bertha Ln	25.4	5	Not Encountered
LB-30	Kennedy Ln	25	5	Not Encountered
LB-31	Goetz Dr	25.9	10	3.2
LB-32	Mount Vernon Pl	20.1 (refusal)	10	13.2
LB-33	Lake Dr	25.4	5	Not Encountered
LB-34	Elsinore Ln	24.2 (refusal)	5	Not Encountered
LB-35	Lucas Dr	26.5	5	16.3
LB-39	San Jacinto Rd	7 (refusal)	5	Not Encountered
LB-40	San Jacinto Rd	25.3	5	Not Encountered
LB-42	Lucas Dr	26.3	10	Not Encountered
LB-43	Elsinore Ln	15.4 (refusal)	4	Not Encountered
LB-44	Williams Dr	20.3 (refusal)	5	18.8
B-01	Sierra Dr	20	19	Not Encountered
B-02	Newport Dr	21	20	12
B-03	Newport Dr	20	-	Not Encountered
B-04	Cypress Pl	20	-	15
B-05	Cypress Pl	20	-	19
B-06	Norma Dr	20	15	Not Encountered
B-07	Norma Dr	20	2	19
B-08	Lodge Dr	20	5.5	Not Encountered
B-09	Quail Pl (between Cassandra & La Bertha)	13 (refusal)	1.5	Not Encountered
B-10	Cassandra Dr	20	3	Not Encountered
B-11	La Bertha Ln	20	2	Not Encountered
B-12	La Bertha Ln	18 (refusal)	9.5	Not Encountered
B-13	Shreeder Pl	20	2.5	Not Encountered
B-14	Kennedy Ln	20	1	Not Encountered
B-15	Goetz Dr	3.5 (refusal)	0.5	Not Encountered
B-16	Goetz Dr	21	3.5	Not Encountered
B-17	Lake Dr	20	2	Not Encountered
B-18	Lake Dr	6 (refusal)	1.3	Not Encountered
B-19	Lake Dr	20	1.3	Not Encountered
B-20	Lucas Dr	20	2	Not Encountered
B-21	Johnson Ln	15 (refusal)	0.5	Not Encountered
B-22	Johnson Ln	13 (refusal)	3	9.8

3. Groundwater was encountered at borings B-02, B-04, B-05, B-07, B-22, LB-26, LB-27, LB-31, LB-32, LB-35, and LB-44 at depths ranging from approximately 3 feet to 23 feet below ground surface. These borings were conducted during a period of limited precipitation in the region. Historical groundwater data recorded in EMWD well #12800 (California DWR, 2024) 2 miles SE of Qual Valley measured a depth to groundwater of 7.38 feet in April of 1995. However, the groundwater depth is seasonally variable based on precipitation patterns.

   During construction excavation, the presence of groundwater poses challenges for both construction and sewer operation. Trench stability can be compromised if groundwater infiltrates from sidewalls in alluvial soils or from the base, potentially leading to base heave. In the constructed condition, groundwater may cause "piping" to occur in the granular pipe bedding material. Groundwater will likely be encountered within the proposed pipeline zone, as indicated by the boring explorations. Additionally, proposed lift stations are expected to be constructed in low areas of the site and deep excavation will likely encounter groundwater. If groundwater is encountered, control measures, such as dewatering, will be required.

   To address these issues, consider the following mitigation measures during construction:

   - The contractor's selected groundwater control method should be able to effectively mitigate for bottom heave and stabilize subgrade soils during construction/backfilling.
   - Deep groundwater drawdown should be avoided to reduce the potential for damaging adjacent structures if applicable.
   - Dewatering flow/volume will vary based on the specific geologic conditions and the depth and geometry of the excavated trench.
   - Where groundwater or very moist soils are encountered or the subgrade is impacted due to localized seepage/surface water or caused by the removal of dense core-stones, the contractor should excavate the disturbed or saturated soils and replace with suitable materials to provide a stable trench bottom. Final design should consider if the use of trench dams is necessary.

   Additionally, utilizing materials that are resistant to corrosion and cracking, along with incorporating pipe anchors in the final engineering design, will help protect sewer pipes and prevent them from floating.

4. A seismic refraction survey was performed in three locations as part of the 2020 IFE report: near borings B-12, B-21, and east on Lodge Drive. Exhibit 2 – 2024 Geotechnical Exploration – depicts the approximate seismic refraction line locations.

   It is reported that soils yielding seismic velocities greater than 4,000 feet per second (fps) to 4,500 fps pose significant excavation difficulties. Table 5.2 summarizes the "weighted average" seismic velocities for each layer of the seismic refraction lines. The conclusions made by IFE regarding the results are summarized as follows:

   a. S-1 & S-3 – Difficult excavation may occur within one foot of the ground surface.
   b. S-2 – Expect moderate excavation to a depth of 1-12 feet, with potential for breaking or blasting beyond seven feet.

Detailed discussion regarding the seismic refraction survey can be found in the 2024 Verdantas report in Appendix F. The use of heavier equipment and blasting may be infeasible due to the narrow rights-of-way and the close proximity to existing utilities and residences, so this should be considered in instances where the sewer system proposes deeper excavations and seismic velocities greater than 4,000 fps are anticipated.

Table 5.2: Summary of Seismic Refraction Results from 2020 IFE Report

Seismic Line	Location	V1 Layer		V2 Layer		V3 Layer	
		Velocity (fps)	Depth from GS (ft)	Velocity (fps)	Depth from GS (ft)	Velocity (fps)	Depth from GS (ft)
S-1	Johnson Ln	1,325	0 – 4	4,112	1+	-	-
S-2	Mtn View Ave	1,989	0 – 3	3,855	1 – 12	6,557	7+
S-3	Lodge Dr	1,949	0 – 3	4,425	1+	-	-

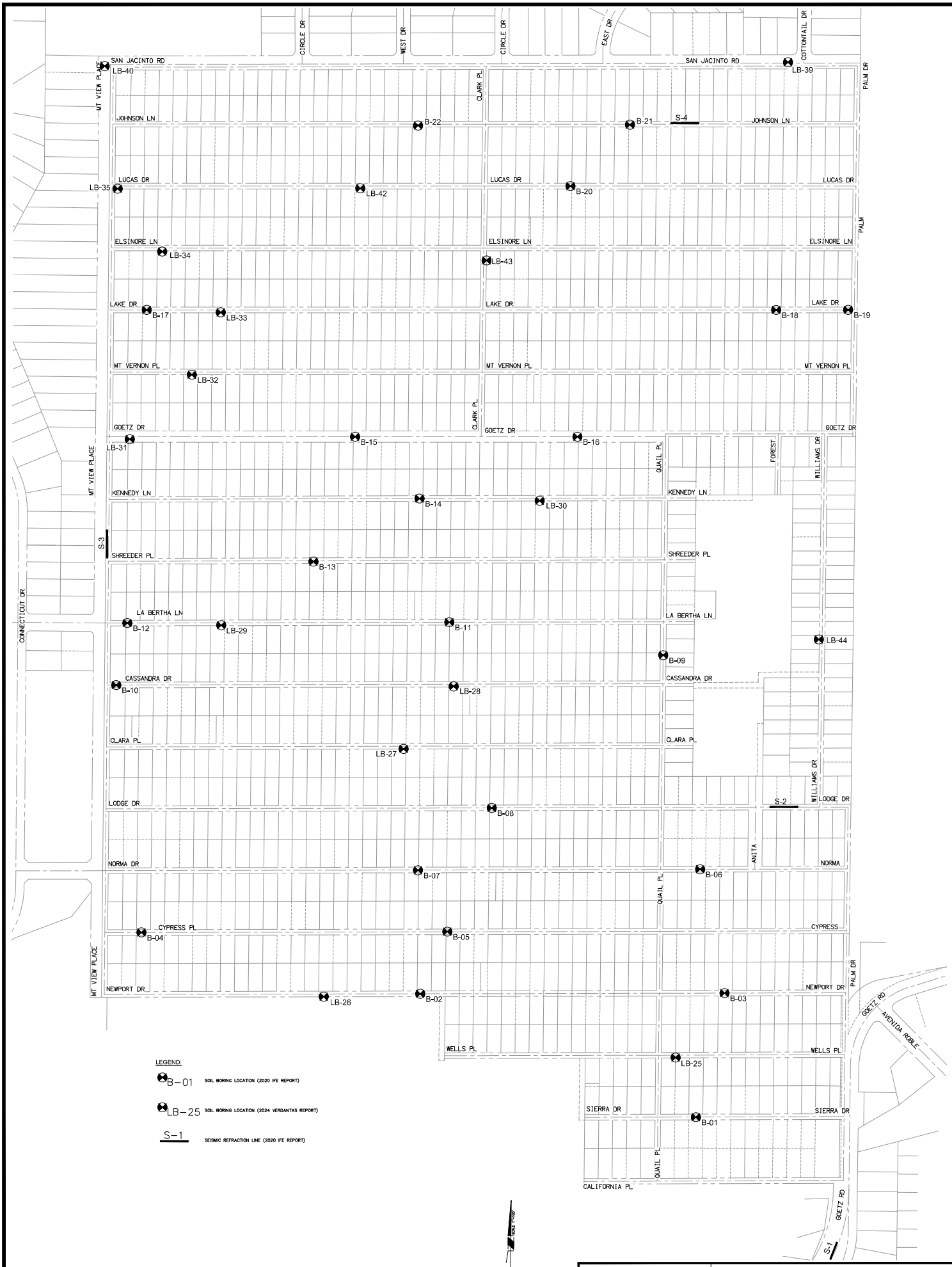

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EXHIBIT - 2

QUAIL VALLEY SUBAREA 4

2024 GEOTECHNICAL EXPLORATION

5.3.1.1 Design Implications

During sewer profile design, certain scenarios arise where the pipeline and lift stations encounter bedrock or in an area where auger refusal occurred. These challenges vary across different streets, with geotechnical issues more prevalent in the areas north of Norma. Exhibit 3 – 2024 Existing Boring Results – offers an overview of the locations where the sewer gravity mains may encounter bedrock or auger refusal. The boring profiles indicating depth of bedrock and groundwater are shown in the 30% design drawings. Sewer profiles facing these concerns are presented in the following subsections.

Shallow bedrock presents challenges to excavation. Excavation/rippability characteristics of bedrock are site-specific and are evaluated based on the boring logs and seismic refraction lines. Generally, bedrock within the upper five to ten feet below ground surface (BGS) is expected to be excavatable for most of SA4. However, resistant, non-weathered core deposits are still anticipated at shallow depths.

- Highly weathered bedrock should generally be excavatable using conventional heavy-duty earthmoving/excavation equipment in good working condition.
- Less weathered rock in some areas of the site depending on design depth and location will likely be encountered in trench excavation and is anticipated to be marginally indestructible. Where less weathered rock is encountered, it is anticipated to be marginally to non-rippable and may require special excavation techniques such as hydraulic hammers, jackhammers, blasting, or other specialized equipment. However, the degree of trenching difficulty shall be evaluated by the contractor based on means and methods or capabilities of contractor's excavation equipment.
- Oversized rocks should be anticipated during excavation depending on the relative weathering and fracture patterns of the rock encountered.

5.3.1.1.1 Pipeline Design

Figures 6 through 8 below show select areas along the pipeline where auger refusal at shallow bedrock was encountered. The two borehole locations on Lake Drive shown in Figure 6 demonstrate the site-specific nature of the bedrock in SA4. At the westerly bore location, the auger encountered resistance at a depth of six feet due to bedrock and could not proceed further. In contrast, approximately 250 feet to the east, the geotechnical bore successfully drilled to full depth through shallow bedrock starting at approximately 1.3 feet. Additionally, the boreholes shown in Figure 7 on San Jacinto Road and Figure 8 on Goetz Drive encountered auger refusal at seven feet and 3.5 feet BGS, respectively. Auger refusal in these areas may be due to resistant, non-weathered core-stones.

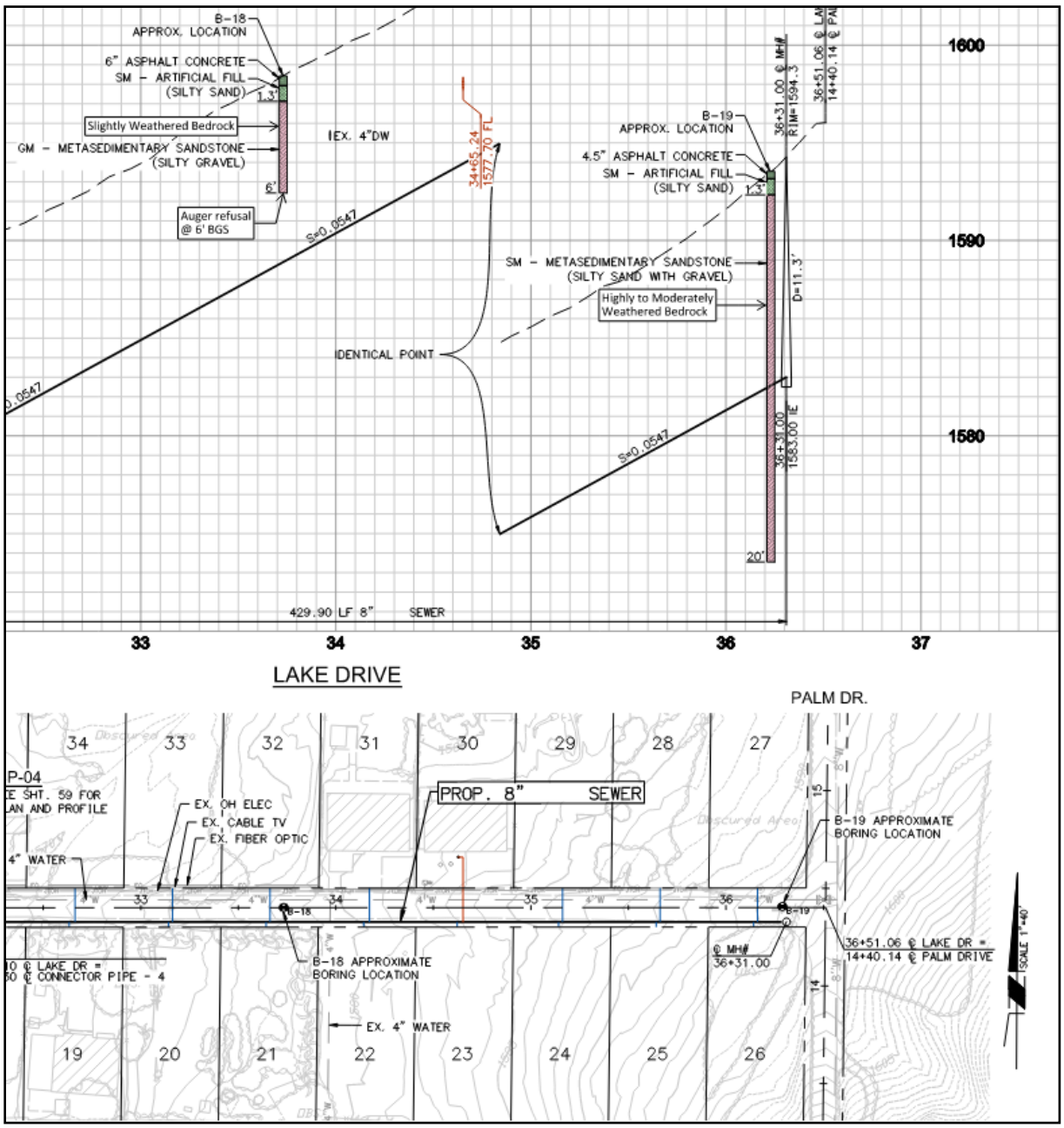


Figure 6: Example of Geotechnical Concern – Lake Drive

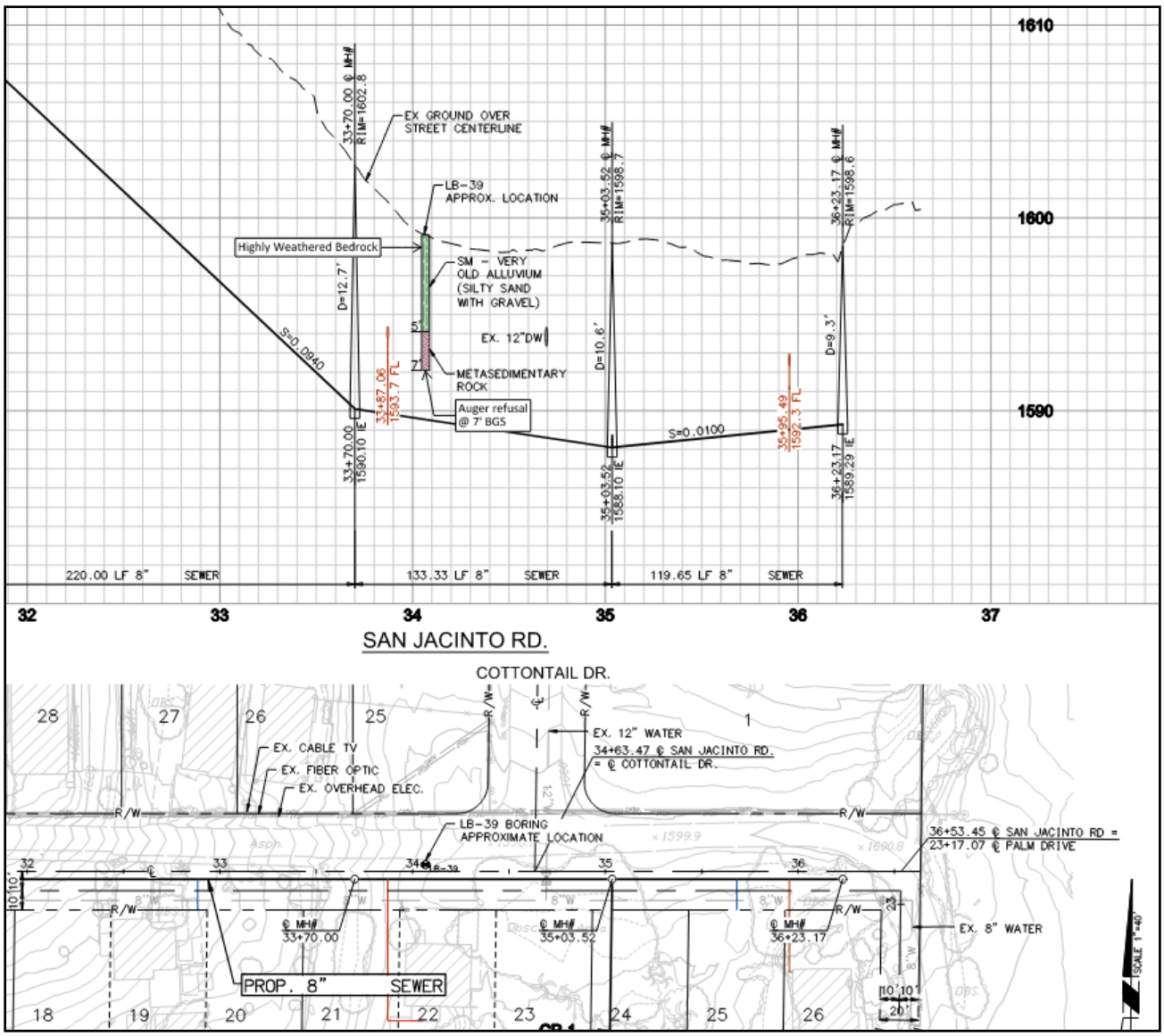


Figure 7: Example of Geotechnical Concern – San Jacinto Rd.

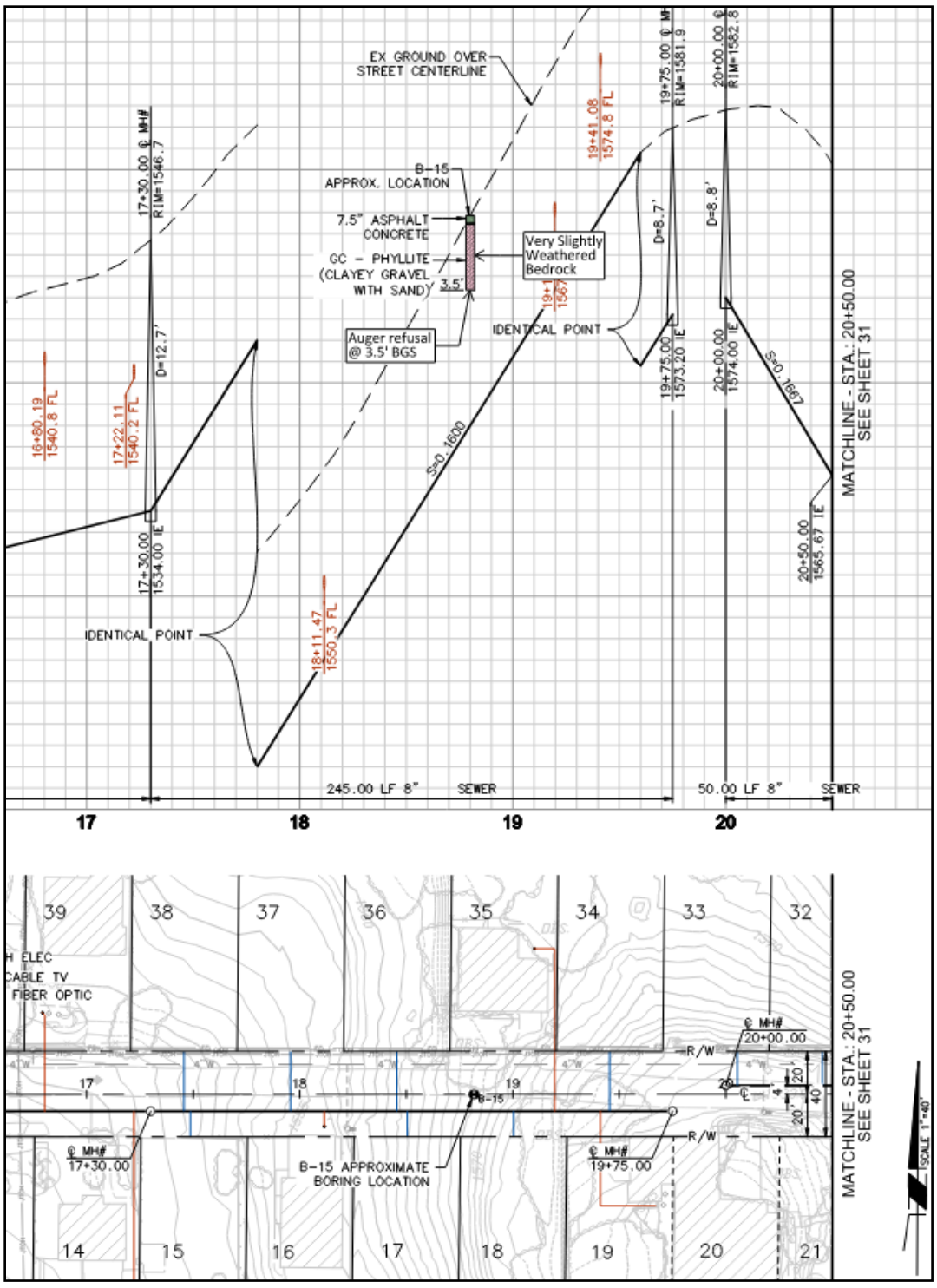


Figure 8: Example of Geotechnical Concern – Goetz Drive

Backfill

Verdantas provided information and recommendations for pipe backfill. Alluvium located in some areas of the site, especially in the southern portion near existing drainage (B-01, B-02, and LB-26), were found to contain higher silt and clay content (SC/CL). The clayey soil may pose a challenge to the contractor to be reused as compacted fill in trench backfill, and it is recommended that minimum cover of 12 inches of bedding material should be provided above the top of the pipe. As an alternative, crushed rock per EMWD Standards (SB-157) can be used as pipe bedding and pipeazone backfill. aOver the pipe bedding zone, native soils are generally considered suitable as backfill materials over the pipe bedding zone, however, should follow the recommendations of 3.2.5 from the 2024 geotechnical investigation. Prior to backfilling, pipes should be bedded in and covered with a uniform, granular material with a Sand Equivalent (SE) or 30 or greater, and gradation meeting requirements of the pipe manufacturer.

5.3.1.1.2 Lift Station Excavation

Verdantas recommended locating the proposed lift stations in areas with deeper alluvium exist to facilitate more efficient excavation. However, the sewer design approach prioritized placing the lift stations at low points on the site to ensure gravity flow, regardless of the depth of the alluvium. The logs of borings near each LS were analyzed to evaluate characteristics of the underlying rock and determine geotechnical impacts on construction. Specifically, the degrees of bedrock weathering were analyzed to determine rippability/excavation conditions. In summary:

- LS-1 Alternative 1 did not encounter bedrock and appears to have favorable geotechnical and excavation conditions. However, if Alternative 2 is selected, additional geotechnical investigation should be conducted given the absence of subsurface data at the proposed site.
- LS-2 encountered completely weathered bedrock suggesting generally excavatable conditions with conventional excavation equipment in good working condition.
- LS-3 did not have borings near the proposed site, however the presence of moderately weathered bedrock of the nearest boring suggested potential difficulty for excavation. An additional bore is required during final design.
- LS-4 encountered groundwater and completely weathered bedrock suggesting generally excavatable conditions with conventional excavation equipment and groundwater control in good working conditions.
- LS-5 did not have borings near the proposed site, however completely weathered bedrock encountered at the nearest boring suggested generally excavatable conditions with conventional excavation equipment in good working conditions. An additional bore is required during final design.

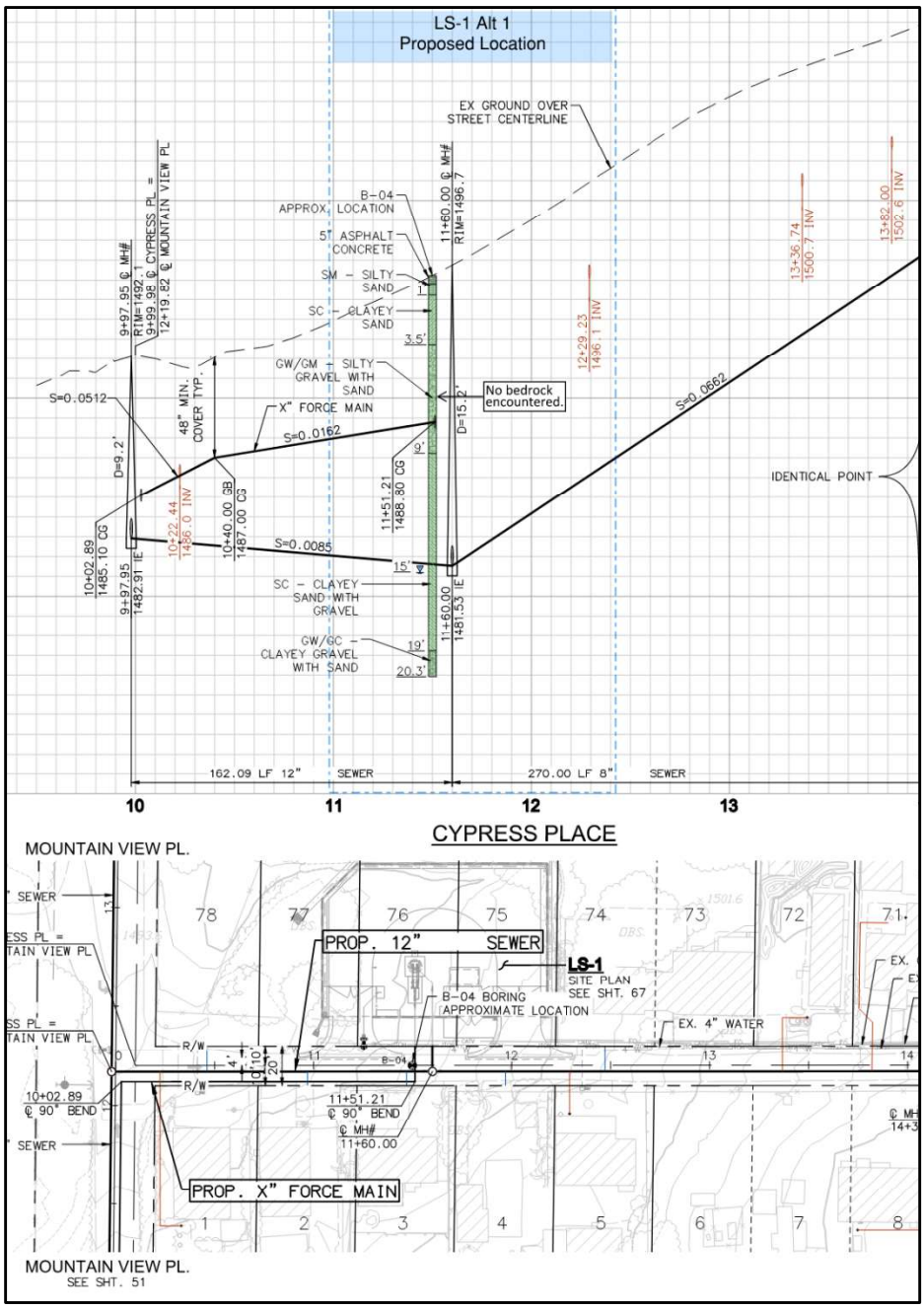


Figure 9: LS-1 Boring Results

The proposed site location of LS-1 Alternative 1 appears to be in favorable excavational conditions given the absence of bedrock encountered in boring B-04. Groundwater control will be required.

However, there was no boring near LS-1 Alternative 2. If this alternative is desired, excavation/rippability conditions cannot be confirmed until additional geotechnical investigations are performed.

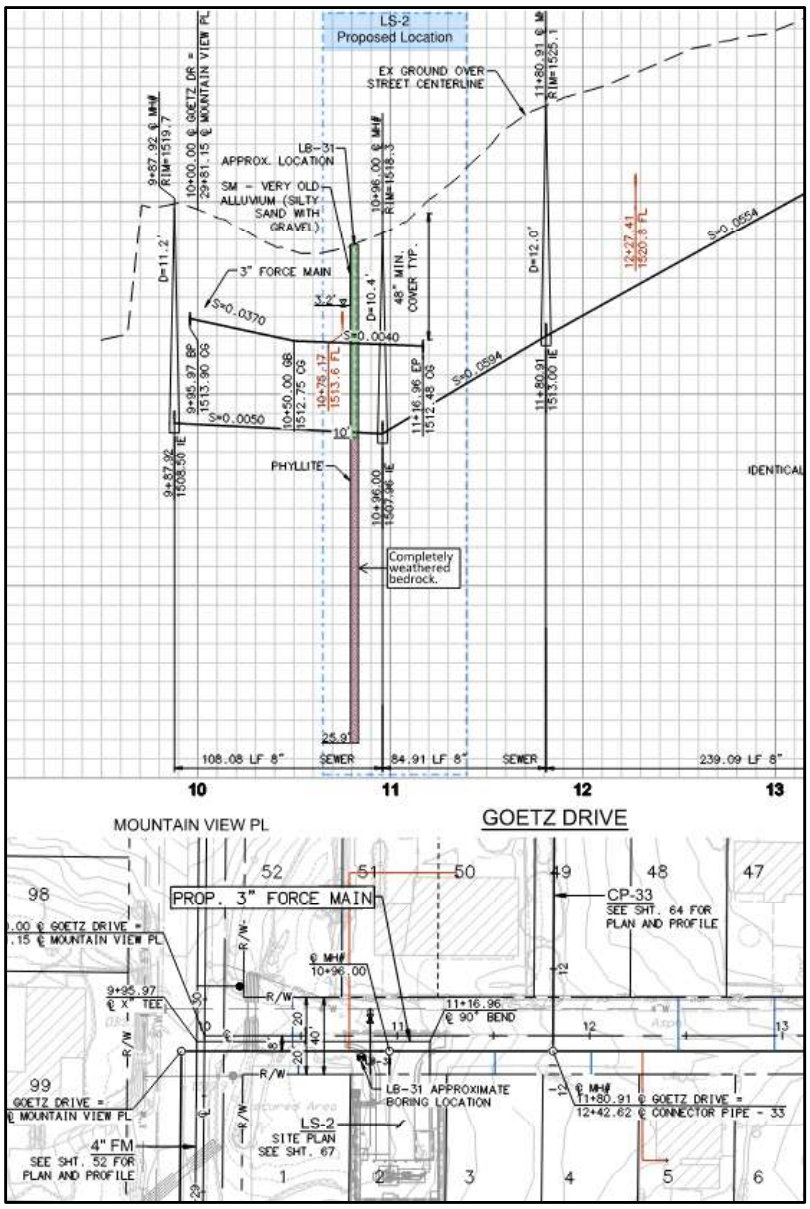


Figure 10: LS-2 Boring Results

The boring near the proposed site location of LS-2, LB-31 encountered completely weathered bedrock at 10 feet BGS and did not experience auger refusal. Therefore, LS-2 should generally be excavatable with conventional heavy-duty earthmoving/excavation equipment in good working condition.

No borings were drilled near the proposed location of LS-3. However, the closest boring was analyzed. LB-33 was drilled approximately 200 feet west from the proposed site, encountered shallow bedrock of 5 feet BGS, and did not experience refusal. Difficult excavation conditions may be encountered past 15 feet BGS due to presence of moderately weathered bedrock. This boring may represent similar conditions to soils near LS-3, however varying topography throughout the Quail Valley subarea cannot ensure that these results are reflective of the geotechnical conditions at the proposed site and an additional bore is required in final design.

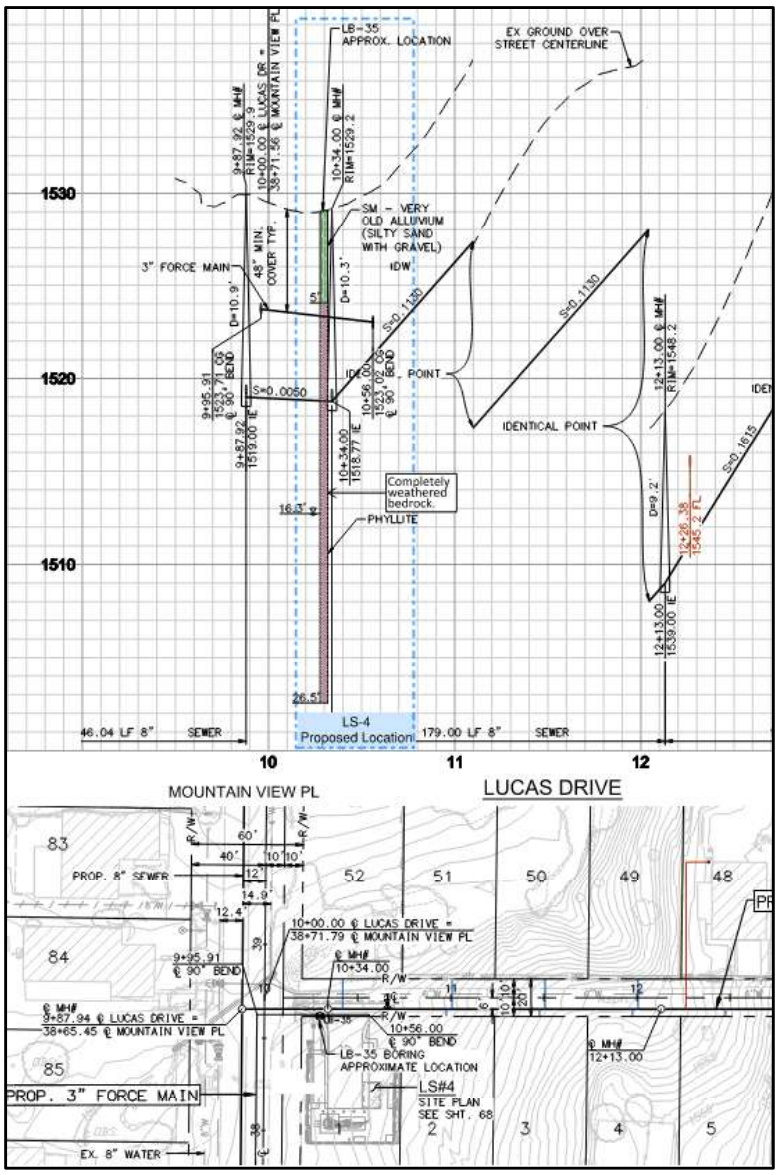
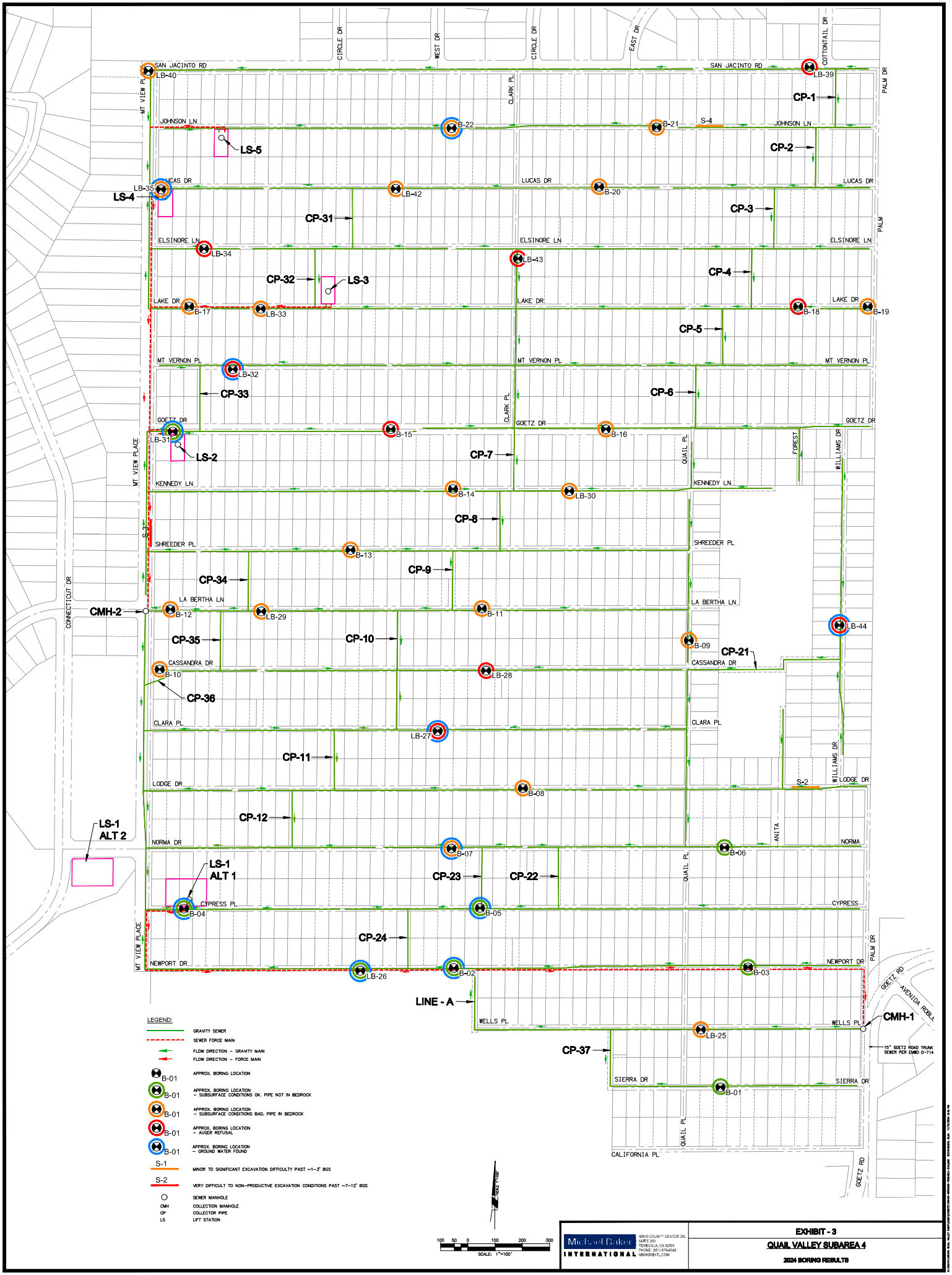


Figure 11: LS-4 Boring Results

The boring near LS-4 encountered completely weathered bedrock at 5 feet BGS, groundwater at 16.3 feet BGS, and did not experience auger refusal. Therefore, LS-4 should generally be excavatable with conventional heavy-duty earthmoving/excavation equipment and groundwater control in good working condition.

No borings were drilled near the proposed location of LS-5; the closest boring was used to investigate conditions. LB-35 on located the adjacent street, Lucas Dr, approximately 300 ft from the proposed site location encountered completely weathered bedrock at 5 feet BGS, groundwater at 16.3 feet BGS, and did not experience auger refusal. Assuming similar conditions to LB-35, the site should generally be excavatable with conventional heavy-duty earthmoving/excavation equipment and groundwater control in good working condition.


SAN JACINTO RD
LB-40
LB-39
CIRCLE DR
WEST DR
CIRCLE DR
EAST DR
COTTONTAIL DR
PALM DR
MT VIEW PL
CLARK PL
CP-1
JOHNSON LN
B-22
B-21
S-4
LS-5
CP-2
LUCAS DR
LB-35
LS-4
LB-42
B-20
CP-3
CP-31
ELSINORE LN
LB-34
LB-43
CP-4
CP-32
LS-3
LAKE DR
B-17
LB-33
B-18
B-19
CP-5
MT VERNON PL
LB-32
CP-33
CP-6
GOETZ DR
LB-31
LS-2
B-15
B-16
CP-7
QUAIL PL
FOREST
WILLIAMS DR
MT VIEW PLACE
KENNEDY LN
B-14
LB-30
CP-8
S-3
SHREEDER PL
B-13
CP-9
CP-34
CONNECTICUT DR
LA BERTHA LN
CMH-2
B-12
LB-29
B-11
LB-44
CP-35
CP-10
B-09
CP-21
CASSANDRA DR
B-10
LB-28
CP-36
CLARA PL
LB-27
CP-11
LODGE DR
B-08
S-2
LS-1
ALT 2
CP-12
NORMA DR
ANITA
B-07
B-06
LS-1
ALT 1
CP-23
CP-22
QUAIL PL
CYPRESS PL
B-04
B-05
CYPRESS
CP-24
NEWPORT DR
LB-26
B-02
B-03
LINE - A
WELLS PL
CMH-1
LB-25
CP-37
SIERRA DR
B-01
QUAIL PL
CALIFORNIA PL
GOETZ RD
AVENIDA ROBLE
15" GOETZ ROAD TRUNK SEWER PER EMWD D-714
LEGEND:
GRAVITY SEWER
SEWER FORCE MAIN
FLOW DIRECTION – GRAVITY MAIN
FLOW DIRECTION – FORCE MAIN
APPROX. BORING LOCATION
APPROX. BORING LOCATION – SUBSURFACE CONDITIONS OK, PIPE NOT IN BEDROCK
APPROX. BORING LOCATION – SUBSURFACE CONDITIONS BAD, PIPE IN BEDROCK
APPROX. BORING LOCATION – AUGER REFUSAL
APPROX. BORING LOCATION – GROUND WATER FOUND
MINOR TO SIGNIFICANT EXCAVATION DIFFICULTY PAST ~1–3' BGS
VERY DIFFICULT TO NON-PRODUCTIVE EXCAVATION CONDITIONS PAST ~7–12' BGS
SEWER MANHOLE
CMH COLLECTION MANHOLE
CP COLLECTOR PIPE
LS LIFT STATION
SCALE 1"=100'
100 50 0 100 200 300
Michael Baker INTERNATIONAL
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TEMECULA, CA 92591
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MBAKERINTL.COM
EXHIBIT - 3
QUAIL VALLEY SUBAREA 4
2024 BORING RESULTS

6. DESIGN CRITERIA

The sewer collection system design is based on criteria reported in several district references. However, given the distinctive topography of the project area – characterized by small lots and narrow streets– the design may need to deviate from typical standards to assure constructability and deliver the most cost-effective solution.

1. "EMWD Guidelines for Sewer System Plan", Eastern Municipal Water District, Rev April 1, 2021
2. "Sanitary Sewer System Planning & Design", Eastern Municipal Water District, Rev September 1, 2006
3. "Eastern Municipal Water District Small Sewage Lift Station Guidelines, Standard Drawings, and Specifications", Krieger & Stewart, Rev June 21, 2021.
4. "Development Services Department & Facility Design Guidelines", Eastern Municipal Water District, Rev October 5, 2023.
5. "Quail Valley Sewer Improvements Alternatives Study", PBS&J, prepared for Eastern Municipal Water District, October 2005
6. "Quail Valley Sewer Improvements Subarea 9 – Preliminary Design Report", Atkins, prepared for Eastern Municipal Water District, February 2010
7. "Quail Valley Sewer Improvements Subarea 9 (Basin A – Phase 1) – Preliminary Design Report", Atkins, prepared for Eastern Municipal Water District, June 2015
8. "Quail Valley Subarea 4 Sewerage Feasibility Study", Engineering Resources of Southern California, prepared for Eastern Municipal Water District, April 2022
9. "Quail Valley Water Usage", Eastern Municipal Water District, July 2020

Table 6.1 summarizes the key design criteria for the development of the sewer collection system. These design criteria encompass critical aspects, such as pipe capacities, pipe roughness coefficient, minimum slope, and other essential design requirements.

Table 6.1: Design Criteria

Design Criteria	Requirements
Manning's Coefficient (n) for Gravity Sewer Mains	0.015
Velocity for Gravity Sewer Mains	Minimum: 2 fps Preferred: 3 fps Maximum:10 fps
Pipeline Maximum Depth of Flow to Pipe Diameter Ratio (D/d) for Gravity Sewer Mains	8-inch to 12-inch: 0.5 15-inch or larger: 0.7
Slope for Gravity Sewer Mains	
8-inch	Ordinary Minimum: 0.40% Maximum (Not Mandatory): 12%
10-inch	Ordinary Minimum: 0.32% Maximum (Not Mandatory): 8.5%
12-inch	Ordinary Minimum: 0.24% Maximum (Not Mandatory): 6.6%
Sewer Pipe Capacity:	
8-inch	318 EDU (Max) – 214,475[2]
10-inch	516 EDU (Max) – 348,016[2]
12-inch	726 EDU (Max) – 489,650[2]

Design Criteria	Requirements
15-inch	1,811 EDU (Max) –1,221,429[2]
Hazen-Williams Coefficient for Force Mains	100
Velocity for Force Mains	Minimum: 2 fps Maximum: 6 fps

[1] From EMWD's Development Services Department & Facility Design Guidelines
[2] Flow based on 235 GPD/EDU and a peaking factor of 2.87

6.1 Wastewater Flow Generation

The design flows are calculated based on the average dry weather flow (ADWF) and peaking factor (PF) of the project. The design flow equation is as follows: Q_{design} = ADWF x Peaking Factor. Detailed discussion on each parameter can be found below. Based on the values used for each parameter, the design flow per development in SA4 is 607 gpd.

6.1.1 ADWF

The ADWF is calculated by multiplying the number of Equivalent Dwelling Unit (EDU) per land parcel by a rate of 235 gdp/EDU – EMWD's criteria use for regional planning. The EDU is dependent on land use or average residential density as shown in the development densities table – Table 6.3. This table is taken from EMWD's Development Services Department & Facility Guidelines; it is provided at the end of this section for reference.

SA4 is a residential area that comprises of parcels typically ranging between 5,000 SF to 5,500 SF, with some homes built on parcels that incorporate multiple lots. This results in an average residential density of eight to nine dwelling units per acre. It's worth noting that this density may be even lower, considering that in certain areas, a single home can span multiple lots, parcels, or both. An aerial map of Quail Valley SA4 is shown in GIS Exhibit 6 at the end of this section. Considering the development densities table, SA4 could fall in one of three classifications: High Density (12 Du/Acre), Mobile Home Park (10 DU/Arce) or Medium High Density (6 DU/Acre). For flow capacity estimation, the more conservative approach was taken, and the Medium High Density land use category was chosen. The Medium High Density land use corresponds to an EDU/Du factor of 0.9. Consequently, each parcel is calculated to generate an ADWF of approximately 211.5 gpd/du.

For comparison, the 2022 Feasibility Study opted to use an ADWF of 150 gdp/du. The feasibility study based their flow calculations on EMWD's 2019 water usage data and assuming 85% of water returns to the sewer.

6.1.2 Peaking Factor

In this design, Michael Baker opted for a more conservative approach by utilizing the maximum peaking factor of 2.87. Typically, the peaking factor is calculated using the equation $PF=2.13Q^{-0.13}$, where Q=Average Dry Weather Flow and PF=Peaking Factor, per the Development Services Department & Facility Design Guidelines. The peaking factor was not discussed in the 2022 Feasibility Study, so it appears that peak flow was not included.

Michael Baker used the maximum peaking factor because some of the lift station tributary areas are small, and the phased construction will divide the areas into small groups. Smaller flow areas typically have larger peaking factors, as identified by the use of the peaking factor equation.

6.1.3 Comparing Design Flow to Previous Study

A comparison of the design flow criteria used in this preliminary design report versus the 2022 Feasibility Study is provided in Table 6.2.

Table 6.2: Design Flow Parameters Comparison

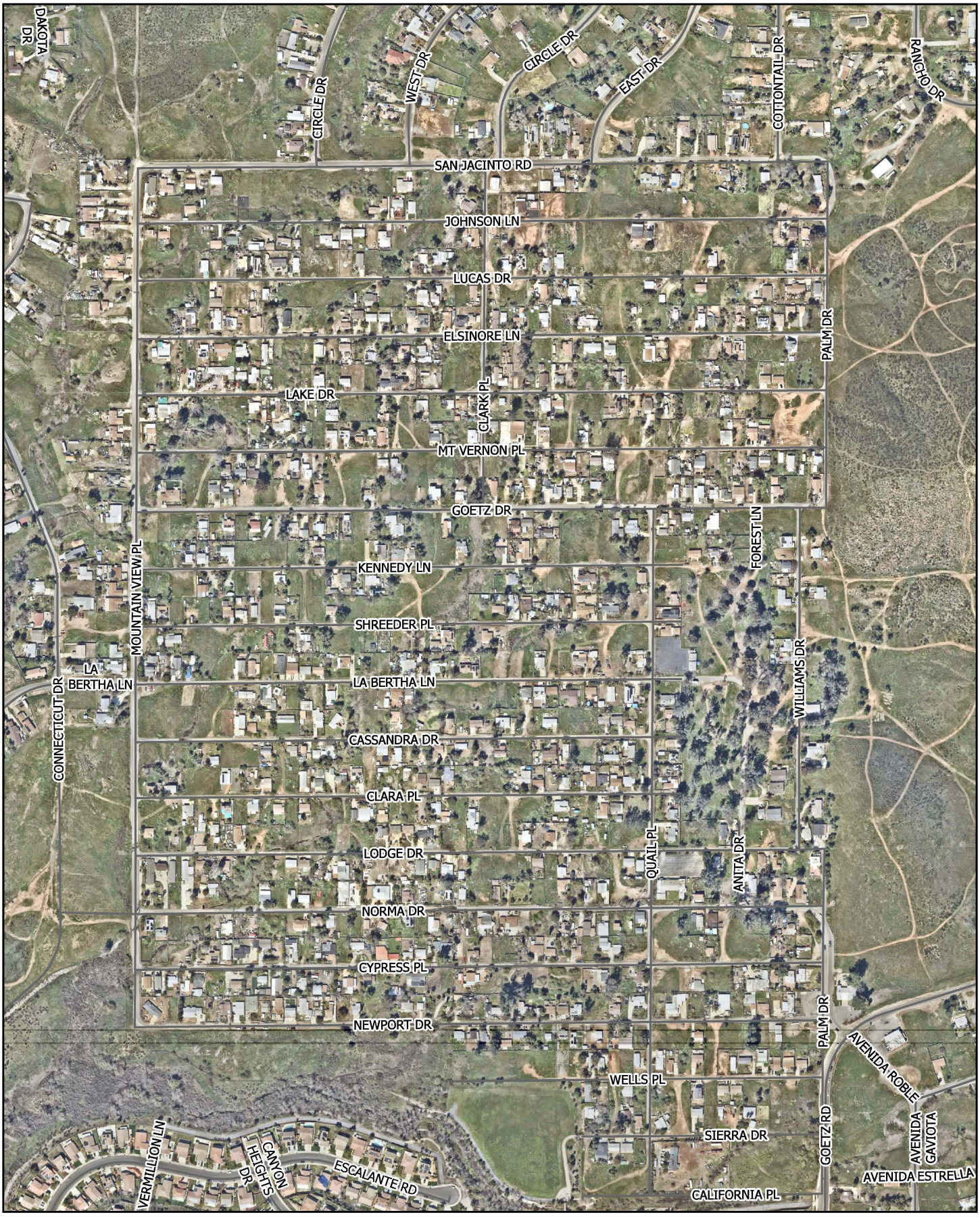
Report	Method Used	Land Use	ADWF	Peaking Factor	Design Flow Used
Preliminary Design Report	Development Services Dept & Facility Design Guidelines	Medium High Density	211.5 gpd/du	2.87[1]	607 gpd per development
2022 Feasibility Study	2019 Water Usage Data	Very High Density or Mobile Home Park	150 gpd/du	Not included	150 gpd per development

[1] The most conservative peaking factor of 2.87 is used in this report. For reference, peaking factor would be 2.5 if the PF equation from EMWD's Development Services Department & Facility Design Guidelines was used. This would have resulted in a design flow of 528.75 gpd per parcel.

The approach presented in Table 6.2 provides a more conservative assumption that will accommodate flows with additional safety factor. This approach uses a baseline calculation that is approximately 40% higher than the 2019 Water Usage Data.

Table 6.3: Densities Table Excerpt

LAND USE CATEGORY	UNITS	AVERAGE RESIDENTIAL DENSITY (DU/ACRE)	RESIDENTIAL (EDU/DU)	DEVELOPMENT DENSITY (EDU/ACRE)
Residential Land Use				
Estate Density	DU	0.5	1.5	0.8
High Density	DU	12	0.8	8.4
Low Density	DU	2	1.3	2.6
Mobile Home Park	DU	4.5	1	4.5
Rural Mountainous[1]	DU	0.1	3	0.3
Rural[1]	DU	0.2	3	0.6
Very High Density	DU	17	0.65	11.1
Very Low Density[1]	DU	1	1	1.5
Non-Residential Use				
Agriculture (1)	acre			0
Business Park/Light Industrial	acre			5
Business Park/Light Industrial /Warehouse	acre			1.25
Commercial Office	acre			5
Commercial Retail	acre			5
Heavy Industrial	acre			7.5
Hospital	acre			5
Mixed Use Policy Area	acre			5
Open Space (Conservation, Landscape, Recreation, Rural, or Water	acre			5
Public Facilities (Municipal or School)	acre			5
1) The following uses were assumed to be served by septic systems and do not contribute flow to the wastewater collection system: Rural Mountainous, Rural Very Low Density, and Agriculture, and Open Space.				



QUAIL VALLEY
SEPTIC TO SEWER CONVERSION

GIS Exhibit 6 - Aerial Map

Michael Baker INTERNATIONAL

0 250 500 Feet

Source: ESRI, Michael Baker International

6.1.4 ADWF Sensitivity Analysis

An Average Dry Weather Flow (ADWF) sensitivity analysis was conducted to evaluate its impact on lift station sizing. By altering the baseline ADWF, this analysis demonstrated how significant changes in this parameter can greatly affect the sizing requirements for the lift stations. Given that most of the gravity collection lines are already at the minimum size of 8 inches, it is anticipated that the largest impacts will be observed in the lift stations. Consequently, this analysis focuses exclusively on lift station sizing, rather than gravity sewer sizing.

Please note that the purpose of this section is to understand ADWF sensitivity and not the design methodology and sizing calculations for the lift stations. For further details on the lift station design and calculations, please refer to the supplemental report titled “Quail Valley Subarea 4 Lift Station Evaluation” in Appendix M.

Two ADWF values were considered:

- Scenario A: Used the calculated ADWF of 211.5 gpd/du with peaking factor of 2.87 from this PDR
- Scenario B: Used the ADWF of 150 gpd/du with peaking factor of 2.87 from the 2022 Feasibility Study.

The results are shown in Table 6.4 through 6.7. and summarized below for both existing and buildout conditions.

Existing conditions:

- For scenario A using 211.5 gpd/du ADWF, the time to fill ranges from 24-27 minutes, time to drain ranges from seven to eight minutes and pump cycle time ranges from 27-31 minutes.
- For scenario B using 150 gpd/du ADWF, on average, the time to fill range increases to 34-38 minutes, time to drain range increases to 9-11 minutes, and pump cycle time range increases to 36- 43 minutes.

Buildout conditions:

- For Scenario A using 211.5 gpd/du ADWF, the time to fill ranges from 23-30 minutes, time to drain ranges from seven to nine minutes and pump cycle time ranges from 26-35 minutes.
- For Scenario B using 150 gpd/du ADWF, the time to fill range increases to 32-41 minutes, time to drain range increases to nine to 12 minutes and pump cycle time range increases to 37-49 minutes.

In summary, while there are differences in the fill, drain, and pump cycle times based on the baseline ADWF used, the overall impact on the lift stations is not substantial. Regardless of the scenario, the wet-well residence time remains less than 60 minutes, the pump run for a minimum of 5 minutes, and the pump cycle times are greater than 20 minutes.

Table 6.4: Wet Well Characteristics at Existing Conditions – using 211.5 gpd ADWF

Existing Conditions w/ 211.5 gpd ADWF– (based on parcel_typ status; 50% dev)						
Lift Station	**Firm Design Capacity (gpm)**	**Minimum Wet Well Cycle Volume (gal)**	**Design Wet Well Cycle Volume (gal)**	**Time to Fill (Non-Peak) (min)**	**Time to Drain (min)**	**Pump Cycle Time (min)**
LS-5	15	38	100	24	7	27
LS-4	30	75	200	24	7	27
LS-3	25	63	175	24	7	28
LS-2	22	55	170	27	8	31
LS-1	335	838	2500	26	7	30

Note: These are for a sensitivity analysis only and the preliminary values for each lift station are discussed in the lift station PDR.

Table 6.5: Wet Well Characteristics at Existing Conditions – using 150 gpd ADWF

Existing Conditions w/ 150 gdp ADWF– (based on parcel_typ status; 50% dev)						
Lift Station	**Firm Design Capacity (gpm)**	**Minimum Wet Well Cycle Volume (gal)**	**Design Wet Well Cycle Volume (gal)**	**Time to Fill (Non-Peak) (min)**	**Time to Drain (min)**	**Pump Cycle Time (min)**
LS-5	11	28	100	34	9	36
LS-4	22	55	200	34	9	36
LS-3	18	45	175	34	10	39
LS-2	16	40	170	38	11	43
LS-1	239	598	2500	36	10	42

Note: These are for a sensitivity analysis only and the preliminary values for each lift station are discussed in the lift station PDR.

Table 6.6: Wet Well Characteristics at Buildout Conditions – using 211.5 gpd ADWF

Buildout Conditions w/ 211.5 gpd ADWF						
Lift Station	**Firm Design Capacity (gpm)**	**Minimum Wet Well Cycle Volume (gal)**	**Design Wet Well Cycle Volume (gal)**	**Time to Fill (Non-Peak) (min)**	**Time to Drain (min)**	**Pump Cycle Time (min)**
LS-5	35	88	240	24	7	27
LS-4	72	180	470	23	7	26
LS-3	49	123	350	25	7	29
LS-2	53	133	350	23	7	26
LS-1	686	1,715	6000	30	9	35

Note: These are for a sensitivity analysis only and the preliminary values for each lift station are discussed in the lift station PDR.

Table 6.7: Wet Well Characteristics at Buildout Conditions – using 150 gpd ADWF

Buildout Conditions w/ 150 gpd ADWF						
Lift Station	**Firm Design Capacity (gpm)**	**Minimum Wet Well Cycle Volume (gal)**	**Design Wet Well Cycle Volume (gal)**	**Time to Fill (Non-Peak) (min)**	**Time to Drain (min)**	**Pump Cycle Time (min)**
LS-5	25	63	240	34	10	38
LS-4	51	138	470	32	9	37
LS-3	35	88	350	35	10	40
LS-2	38	95	350	32	9	37
LS-1	487	1,218	6000	41	12	49

Note: These are for a sensitivity analysis only and the preliminary values for each lift station are discussed in the lift station PDR.

7. DESIGN METHODOLOGY

The design methodology for the sewer system is a comprehensive process that involves several critical steps to ensure optimal functionality and compliance with EMWD standards. The approach includes the following:

- Develop gravity sewer and force main alignment, considering various factors such as site topography, existing utilities, subsurface characteristics, biological constraints, property acquisitions and O&M access.
- Assess gravity and force main pipeline sizing through hydraulic analysis.
- Develop sewer lateral design for both existing and vacant parcels.
- Evaluate pre-packaged pumping equipment alternatives for the small lift stations that will serve SA4.

7.1 Sewer Alignment Design Methodology

Initially, a basemap was developed, incorporating the topographic base file and mapping base file provided by EMWD. An existing surface was also created from the topographic base file provided. Subsequently, utility research was undertaken to verify the presence of existing utilities. Existing utilities were identified based on as-built reference plans provided by various agencies, including water (EMWD), power (SCE), and communication (Frontier and Spectrum). Detailed maps furnished by SoCal Gas confirm that no existing gas lines cross through SA4. With the basemap established, the sewer alignment was determined.

7.1.1 Horizontal Alignment

The design of the sewer alignment in Subarea 4 (SA4) faced significant challenges due to the narrow right-of-way (ROW) and the presence of existing water lines. Compliance with the 10-foot horizontal separation requirement mandated by Title 22 was particularly difficult in certain areas. Despite these constraints, the alignment was planned to maintain the required separation from the existing water main wherever feasible. The sewer line's position within the ROW was adjusted based on the identified location of the water line, and a detailed survey to confirm the exact location of the existing water mains will need to be conducted during the final design phase. The sewer alignment concludes at Goetz Road, where it connects to the Goetz Road sewer main, a component of Hunsaker and Associates' Goetz Road Trunk Sewer Project (see Section 4.3). Elevation data for the Goetz Road sewer main, provided by Hunsaker and Associates, was utilized to determine the connection point. This connection to the Goetz Road sewer main may be revised in final design.

7.1.2 Vertical Profile

The vertical profile of the gravity sewer system relied heavily on the existing street grades and the pipe inverts of the existing sewer laterals. SA4 features some steep street grades and deep existing sewer laterals. As a result, some gravity pipes exceeded the 12% maximum slope, and a few manhole depths have exceeded 18 feet. Several connecting pipes lack the required minimum coverage of 7.5 feet. This issue can be resolved by grading the existing surface above the connector pipes and raising the ground level using soil excavated from the trenches for the proposed main street sewer line.

7.1.3 Sewer Lateral

The construction of the sewer system for SA4 will include abandonment of existing septic tanks and installation of sewer laterals to each of the existing houses. For vacant parcels, the lateral will terminate at the property line with a stub-out for future connection, pending decisions to be made during final design.

The design of sewer laterals for SA4 involved a systematic process tailored to specific parcel conditions. Below is a step-by-step guide for both parcels with existing septic systems and vacant parcels. This represents the assumptions used by Michael Baker to calculate the required depth of laterals that have not been located, could not be located, or at locations that will require future service.

Parcels with Existing Septic Systems. Typical lateral connections as shown in Exhibit 4 - Design Methodology.

1. Locate the existing service lateral and measure the depth and location.
2. Conduct a detailed survey or on-site observation to determine a feasible alignment for the sewer lateral layout and connection point.
3. Verify that the alignment is in accordance with design standards related to sewer laterals and connections to main sewer line (EMWD Std. Dwg SB-176 and 177)
4. Provide a minimum 2% slope on the proposed sewer lateral starting at the existing lateral or cleanout connection to the right-of-way (ROW) line.
5. Ensure a minimum of 5 feet of pipe cover at the right-of-way line per EMWD SB-177.
6. Invert elevation of the main sewer line is controlled by the proposed sewer lateral. Main sewer invert is set three feet lower than the sewer lateral invert at the ROW.

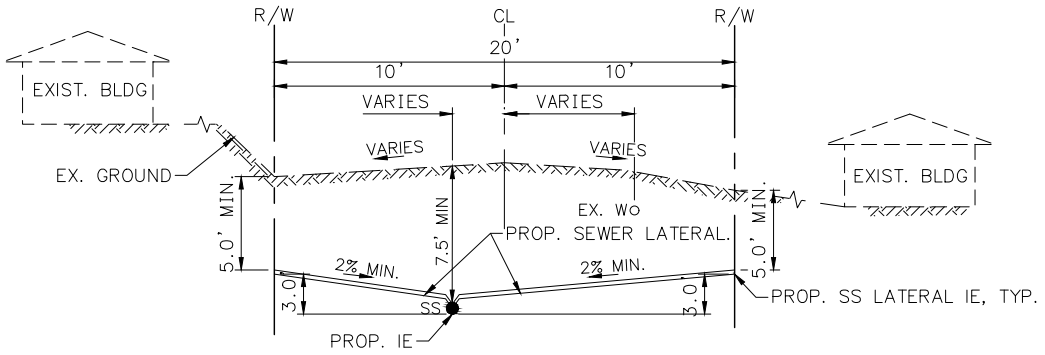
Parcels with Vacant Septic Systems. Typical lateral connections as shown in Exhibit 4 - Design Methodology.

1. The main sewer invert is set per the methodology above and controls the invert elevation of the sewer laterals at these vacant parcels. It is verified that a minimum of five feet of cover at the right-of-way line is provided for the sewer laterals per EMWD SB-177.

It is important to note that in some areas, future surface repair will increase sewer lateral cover at the right-of-way. These surface repairs involve raising the street elevation at the right-of-way as illustrated in the *Vacant Lot Sewer Lateral – Typical Section with Street Surface Repair* on Sheet 4 of the 30% design plans in Appendix L.

7.1.3.1 Developed Parcels Not Accessed

The sewer lateral design could not be completed for several developed parcels because the location and invert information of the septic sewer systems could not be obtained. This was either due to the lack of right-of-entry agreement, which restricted access to the parcels, or due to hardscape improvements that blocked access to the septic systems. Instead, these parcels will be provided with a sewer stub at the right of way line with at least five feet of cover. If a parcel is lower than street grade, its sewer lateral may not be able to connect to the stub via gravity flow.

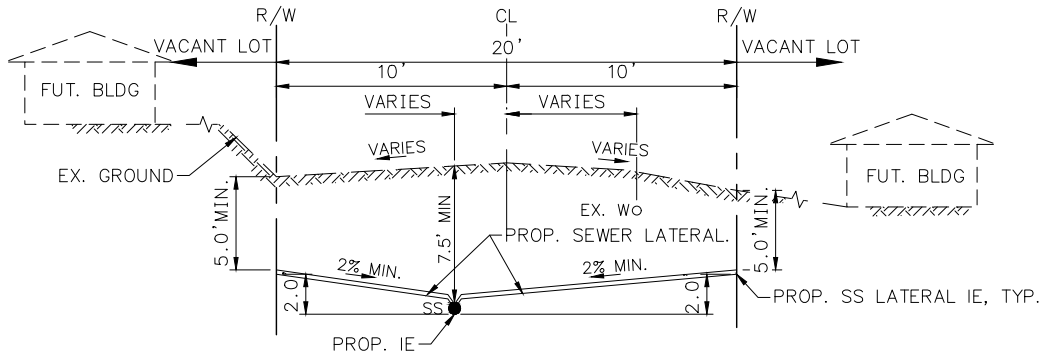


EXISTING HOUSE

PROP. SEWER LATERAL - TYPICAL SECTION

MODIFIED PER STD. NO. SB-177

N.T.S



VACANT LOT

PROP. SEWER LATERAL - TYPICAL SECTION

MODIFIED PER STD. NO. SB-177

N.T.S

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EXHIBIT - 4

QUAIL VALLEY SUBAREA 4

DESIGN METHODOLOGY TYPICAL SECTIONS

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\EXHIBITS\196454-DESIGN METHODOLOGY.DWG FOGARDI, DANA 1/6/2025 5:33 PM

7.1.4 Sewer Pipe Material

The gravity sewer system will utilize Polyvinyl Chloride (PVC) Plastic Pipe, specifically SDR 35 (Green) PVC. This selection is in accordance with the District's Standards and Specifications, specifically specification *Section 02762 - Furnish & Install Plastic Sewer System*, List of Approved Materials, and the 2023 Development Services Department & Facility Design Guidelines.

The district specifies that VCP, HDPE, and PVC SDR-35 are suitable for gravity sewers. PVC is chosen because it meets all necessary standards and specifications set by District, is suitable for the residentially zoned area, and allows ease of installation.

7.2 30% Design Drawings

The 30% design drawings have been developed, showing the proposed horizontal alignments and profiles of the sewer for each street in SA4 and the proposed site plans for the lift stations. They are prepared using District standard sheets, with the base files containing road rights-of-way, lot lines, existing utilities, and other existing features. The 30% design drawings can be found in Appendix L.

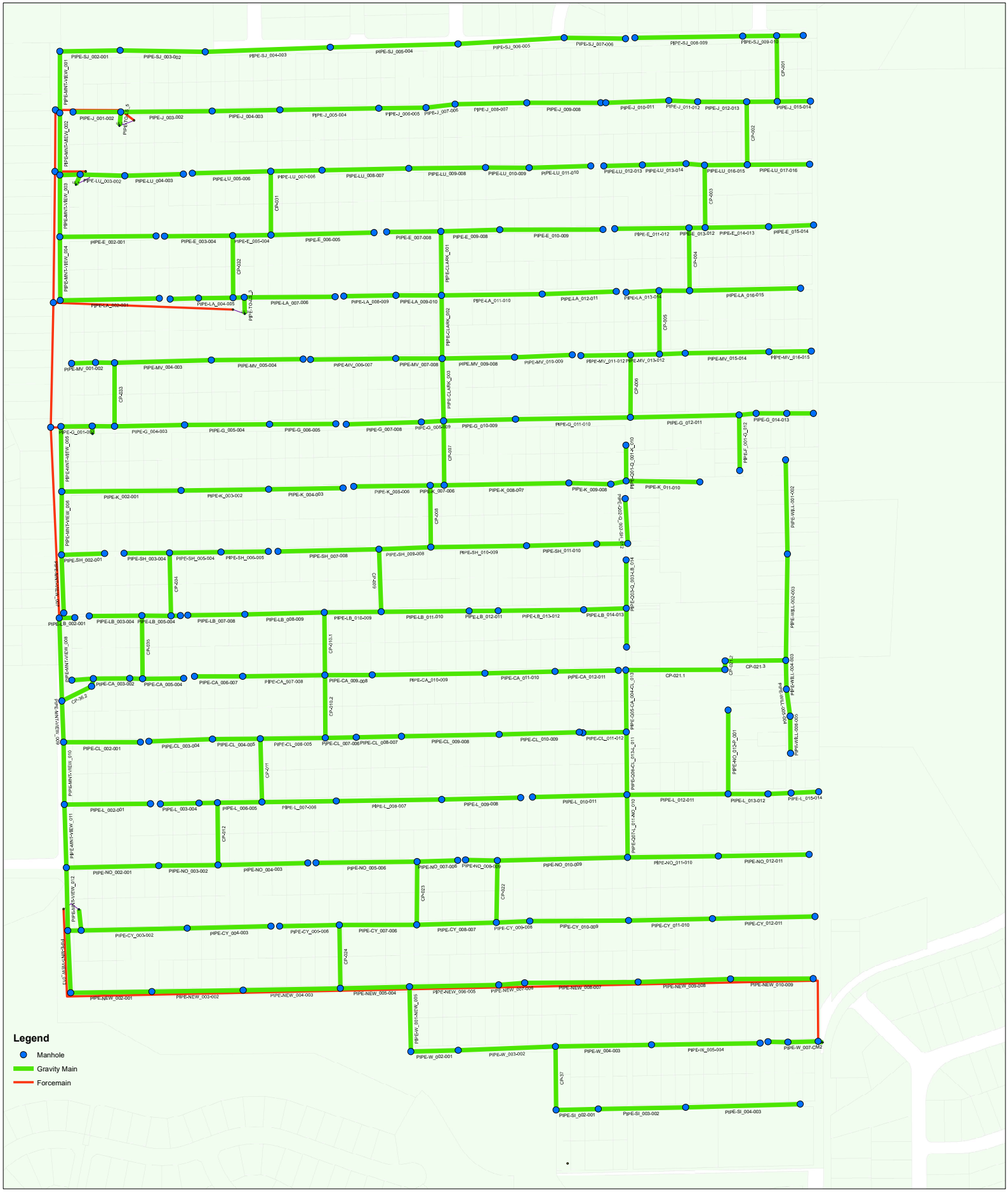
The 30% design for SA4 proposes over 10 miles of gravity mains, more than 1.1 miles of force mains, 247 manholes, 23 connector pipes, one regional lift station (LS-1), and four smaller lift stations (LS-2, LS-3, LS-4 and LS-5). The regional lift station (LS-1) is the central element in the system, handling the majority of the wastewater flows from SA4. To connect the northern and southern portions of SA4 to the regional lift station, 23 connector pipes are proposed to cross private properties and link parallel streets, allowing gravity flow into the regional lift station. In the northwest portion of SA4 where gravity flow cannot be fully achieved, the smaller lift stations (LS-2 through LS-5) will serve as critical elements, pumping wastewater via a shared forcemain to a collection manhole (CMH#2) located at the intersection of La Bertha Lane and Mountain View Place before ultimately discharging to the regional lift station. The regional lift station will pump all collected wastewater flows into another collection manhole (CMH#1) located at the intersection of Wells Place and Goetz Road. CMH#1 will connect to the Goetz Road backbone sewer, which is part of a separate EMWD sewer project. Refer to Exhibit 1 for an overview the proposed sewer system; a full sized exhibit can be found in Appendix A. It is important to note that the current system assumes that LS-1 will be situated on Cypress Place (LS-1 Site Alternative 1). Modifications to the proposed system may need to be made once LS-1 location is selected.

7.3 California Place

Currently, there are no developed parcels along California Place that require connection to the proposed sewer system. However, if sewer service becomes necessary, a small lift station will be required to serve the northern side of California Place. This lift station and its associated sewer lines are not included in this PDR. Instead, it is recommended that the future developer of California Place design and construct the sewer and force main system to service this area. The District plans to install a manhole at the intersection of California Place and Goetz Drive in the future, which will serve as the connection point for the lift station servicing California Place.

8. SEWER COLLECTION SYSTEM – HYDRAULIC MODEL

A comprehensive hydraulic model of the system was created to validate the proposed sizing and alignment for the gravity sewer. The following sections will outline the development of the model and summarize the key results. The sewer system layout is illustrated in Exhibit 1. An overview of the modeled sewer system can be found in Exhibit 5 – Appendix B.



Michael Baker INTERNATIONAL

Exhibit 5

INFOSEWER MODEL LAYOUT

N

0 250 500 1,000 Feet

8.1 Hydraulic Sewer Model Development

Innovyze InfoSewer GIS Professional Suite 8.0 was utilized to perform a steady-state analysis of the sewer system. This analysis was based on peak flow volumes from Section 6.1.

The model was created by converting the proposed sewer linework from AutoCAD into shapefiles that can be processed by InfoSewer's GIS gateway interface. Input parameters, including pipe diameters, lengths, slopes, invert elevations, rim elevations, sewage generation, and roughness coefficients, were manually entered to align with the draft 30% design drawings. The sewer model includes the gravity sewer pipes, manholes, and force mains of the system. However, it is important to note that this model was utilized to analyze the performance of the gravity sewer pipes only. A separate evaluation of the lift stations and associated force mains is included with the supplemental report called "Quail Valley Subarea 4 Lift Station Evaluation".

Output data for the gravity sewer pipes include peak flow rate, velocity, pipe capacity, and ratio of flow depth to pipe diameter (d/D). This output data was analyzed to ensure compliance with velocity and d/D design criteria. Adjustments were made to pipe slope or size as needed, and final pipe slopes and sizes were reflected in the draft 30% plan and profile design.

The following scenarios were analyzed in the model:

1. Scenario 1: Existing Conditions
    - This Existing Conditions scenario evaluated the proposed sewer system under the current developed condition of Quail Valley SA4.
    - Load Distribution: A sewage generation rate (load) was assigned to each existing development using a manual entry process. This involved adding sewage loads for parcels containing dwelling units. In instances where a dwelling unit spanned multiple parcels, these parcels were combined and assigned a single sewage load.
2. Scenario 2: Buildout Conditions
    - This Buildout Conditions scenario evaluated the proposed sewer system under a fully developed condition of Quail Valley SA4.
    - Load Distribution: Assuming all available land in Quail Valley SA4 is fully developed, this Buildout Conditions scenario expands on the Existing Conditions scenario by assigning sewage loads for vacant parcels, in addition to the loads from the existing developments. For vacant parcels encompassing multiple smaller lots, sewage load was assigned to each lot, considering the potential for future subdivision and construction of multiple dwelling units.

8.1.1 Hydraulic Model Assumptions

Because the proposed design is currently at the 30% design phase, certain assumptions were necessary for the sewer model:

1. **Lateral Connections**: Several parcels lack information on the location of lateral connections. For parcels with unknown lateral connections, it is assumed that sewage loading is on the upstream manhole of the nearest pipe. While the specific loading points may change in the 100% final design phase based on additional field data, its overall model impact is expected to be negligible.

2. **Geometry and Dimensions**: All lengths, inverts, and rim elevations align with the draft 30% design plan set.
3. **Potential flows from Subareas 2 and 3**: Based on the 2022 Feasibility Study, SA4 is crucial for connecting SA2 and SA3 to EMWD's sewer collection system. Due to geography, SA2 and SA3 must flow through SA4 to get to the Goetz Road Backbone. However, this preliminary analysis focused solely on flows within the SA4 proposed system and did not account for additional flows from SA2 and SA3.
   The potential flows from SA2 and SA3 are addressed in the Supplemental Lift Station Evaluation Report. This report assumes that the future sewer systems for SA2 and SA3 will directly connect to SA4'S regional lift station. Therefore, sewage flows from SA2 and SA3 were not included in this model, as they are assumed not to impact the gravity mains in the SA4 sewer system.

8.1.2 Gravity Pipe Maximum Slope

Given the area's topography, several pipelines stay below the maximum recommended slope of 12% without requiring excess excavation. Table 8.1 outlines the maximum pipe grade on each street in SA4. This information will aid in understanding the topographical constraints of the sewer design.

Table 8.1: Maximum Pipe Grade on SA4 Streets

Street	Maximum Grade (%)	Maximum MH depth
San Jacinto Road	21.55	15.9'
Johnson Lane	30.19	19.2'
Lucas Drive	22.24	19.6'
Elsinore Lane	12.05	14.2'
Lake Drive	12.91	18.2'
Mt Vernon Place	21.28	13.2'
Goetz Drive	24.44	13.8'
Kennedy Lane	10.15	14.2'
Shreeder Place	16.07	15.2
La Bertha Drive	25.84	18.7'
Cassandra Drive	12.05	13.1'
Clara Place	10.00	15.2'
Lodge Drive	22.96	17.0'
Norma Drive	7.80	15.0'
Cypress Place	6.62	15.2'
Newport Drive	11.23	17.2'
Wells Place	7.33	9.7'
Wells Place (Line 'A')	6.38	22.9'
Sierra Drive	2.56	17.1'
Mountain View Place	10.06	15.8'
Clark Place	3.50	16.1'
Quail Place	4.11	16.3'
Williams Drive	9.47	10.3'
Forest Lane	1.00	9.7'
Anita Drive	5.00	13.1'

8.1.3 Gravity Pipe Size

Given the small area covered by the proposed system, the initial design assumed 8-inch pipes for all gravity pipelines, adhering to the minimum size per the EMWD guidelines. Some gravity pipelines were increased to 12 inches to meet D/d requirements. Additionally, the force main diameter was assumed to be 4-inches. It is important to note that this assumption is not intended for sizing the force mains. Rather, the force mains are included in this model solely to maintain the interconnectedness of the model network. The force main size recommendations are detailed in the Supplemental Lift Station Evaluation Report. Please refer to the supplemental report for a comprehensive discussion on the force main sizing.

8.2 Hydraulic Model Results

For the 30% design phase, the evaluation of the proposed system prioritized two critical factors: pipe D/d ratio and pipe velocities. These indicators will highlight general issues within the proposed system and determine whether specific pipelines requires upsizing, or slope adjustments. The model input and results are provided in tabular form in Appendix B. The model results are summarized in the next subsections.

8.2.1 Pipe Maximum Depth of Flow to Pipe Diameter Ratio (D/d) Results

There are 240 gravity mains within the proposed sewer collection system, nine of which are 12 inches in diameter and the rest are 8 inches in diameter. The results of the system's pipe maximum depth of flow to pipe diameter ratio (D/d) are as follows:

1. Scenario 1: Existing Conditions
    - 240 gravity mains have a D/d between 0.0 to 0.5
    - All the gravity mains meet the required D/d ratio.
2. Scenario 2: Buildout Conditions
    - 240 gravity mains have a D/d between 0.0 to 0.5
    - All the gravity mains meet the required D/d ratio.

The D/d ratio is a critical measure of the sewer system capacity, indicating the depth of flow relative to the pipe diameter. Meeting the required D/d ratio ensures that the system can handle the expected sewage loads without risk of overflow or backup. Both the existing conditions and buildout conditions scenarios demonstrate that the gravity mains meet the required D/d ratio.

8.2.2 Velocity Results

There are 240 gravity mains within the proposed collection system and their velocity are as follows:

1. Scenario 1: Existing Conditions
    - 63 gravity mains have a velocity between 0.0 to 1.0 fps,
    - 89 gravity mains have a velocity between 1.0 to 1.5 fps,
    - 57 gravity mains have a velocity between 1.5 to 2.0 fps,
    - 25 gravity mains have a velocity between 2.0 to 3.0 fps,
    - 6 gravity mains have a velocity between 3.0 to 10.0 fps,

Per Section 6 of this PDR, the gravity sewer velocity criteria require a minimum of 2 feet per second (fps) and a maximum of 10 fps. Maintaining a minimum velocity of 2 fps ensures that solids remain

suspended, reducing sediment buildup. Conversely, limiting the velocity to 10 fps protects the pipes from damage caused by high-velocity flows.

In the existing conditions scenario, 87% (209) of the gravity mains exhibit velocities below the minimum required velocity of 2 fps during peak flows. These low velocities are primarily due to limited sewage loads, as SA4 is only partially developed. Regular cleaning and maintenance of the gravity lines could be required to prevent sediment buildup and blockages.

2. Scenario 2: Buildout Conditions
    - 24 gravity mains have a velocity between 0.0 to 1.0 fps,
    - 60 gravity mains have a velocity between 1.0 to 1.5 fps,
    - 64 gravity mains have a velocity between 1.5 to 2.0 fps,
    - 67 gravity mains have a velocity between 2.0 to 3.0 fps,
    - 25 gravity mains have a velocity between 3.0 to 10.0 fps,

In the buildout conditions scenario, 62% (148) of the gravity mains exhibit velocities below the minimum required velocity of 2 fps during peak flows. These low velocities primarily stem from limited flow within the pipelines. With the minimum 8-inch requirement, the flow through these pipes is not enough to achieve the necessary velocities, even in the fully developed condition of SA4. Terminal manholes, where minimal or no upstream flow contributes to the total flow, exacerbate this issue. There are numerous terminal manholes in SA4 due to its undulating topography.

While increasing the slope of the pipes may mitigate this issue, several pipelines would still fall short of the minimum velocity requirement due to low flows. Increasing the pipe slopes is not recommended as it would result in deeper pipes, and the current pipe depths are already significant. EMWD may need to periodically flush these lines to remove accumulated solids. Refer to Exhibit 5 for the pipe network map and to Appendix B for all output data.

9. SEWER COLLECTION SYSTEM – LIFT STATION EVALUATION

The Quail Valley Subarea 4 Lift Station Evaluation report (Appendix M) identified the need for five (5) sewer lift stations: one regional lift station (LS-1) and four smaller lift stations (LS-2, LS-3, LS-4 and LS-5). The evaluation included estimating current and future incoming sewage flows, determining head requirements for each lift station, and evaluating the hydraulic performance, residence time, and preliminary design for each lift station facility. It also evaluated small pre-packaged lift station systems for the four smaller lift stations and a phased construction approach for the regional pump station LS-1. Table 9.1 below summarizes the flow capacity, pumping head, and wet well capacity requirements of the lift stations. For detailed information, please refer to the supplemental report in Appendix M.

Table 9.1: Lift Station System Sizing – Basis of Design

Lift Station	Flow Design Capacity (gpm)	Pumping Head Requirement (feet)		Wet Well Cycle Volume Requirement (gal)
LS-5	35	Low Head	16.5	240
		High Head	19.1	
LS-4	72	Low Head	31.4	470
		High Head	48.7	
LS-3	49	Low Head	25.1	320
		High Head	35.4	
LS-2	53	Low Head	33.0	360
		High Head	48.0	
LS-1[1]	719	Low Head	varies	3800
		High Head	varies	

[1] These values reflect LS-1 at Phase 8 under ultimate buildout conditions and assume the implementation of Option 2 design alternative with dual 6-inch force mains. LS-1 is a phased lift station, so the flow design capacity and pumping head requirements of LS-1 will vary depending on the construction phase of the project. In addition, the pumping head requirement will change if a different design alternative is chosen in final design.

While the lift station analysis is detailed in the supplemental report, a siting analysis for each of these facilities is provided in Section 10 of this PDR. Exhibit 6 shows the locations of these lift stations and their associated tributary areas.

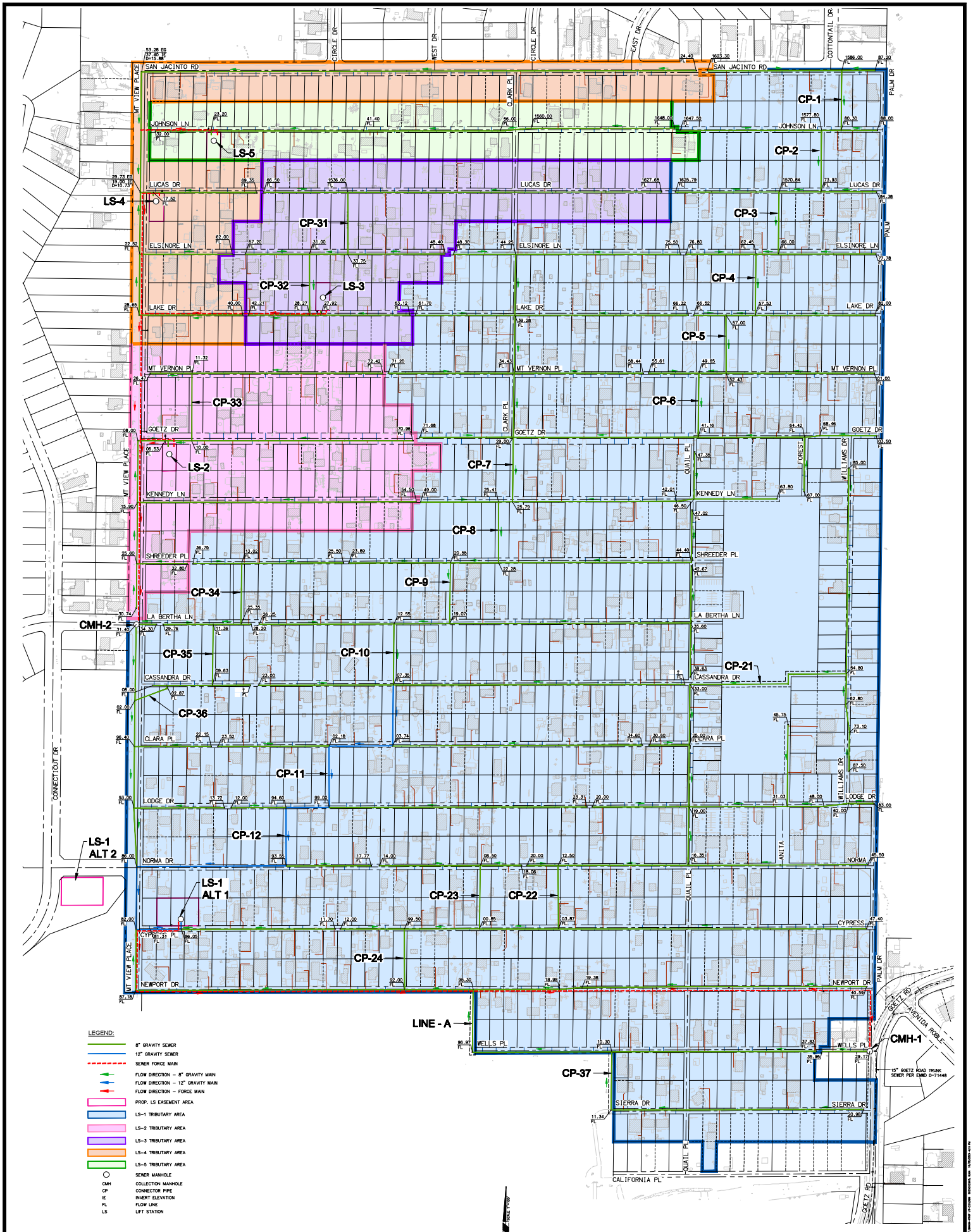

SAN JACINTO RD
JOHNSON LN
LUCAS DR
ELSINORE LN
LAKE DR
MT VERNON PL
GOETZ DR
KENNEDY LN
SHREEDER PL
LA BERTHA LN
CASSANDRA DR
CLARA PL
LODGE DR
NORMA DR
CYPRESS
NEWPORT DR
WELLS PL
SIERRA DR
CALIFORNIA PL
QUAIL PL
CLARK PL
MT VIEW PLACE
CONNECTICUT DR
CIRCLE DR
WEST DR
EAST DR
COTTONTAIL DR
PALM DR
FOREST
WILLIAMS DR
ANITA
GOETZ RD
AVENIDA ROBLE
CP-1
CP-2
CP-3
CP-4
CP-5
CP-6
CP-7
CP-8
CP-9
CP-10
CP-11
CP-12
CP-21
CP-22
CP-23
CP-24
CP-31
CP-32
CP-33
CP-34
CP-35
CP-36
CP-37
LS-1 ALT 1
LS-1 ALT 2
LS-2
LS-3
LS-4
LS-5
CMH-1
CMH-2
LINE - A
15" GOETZ ROAD TRUNK SEWER PER EMWD D-71448
LEGEND:
8" GRAVITY SEWER
12" GRAVITY SEWER
SEWER FORCE MAIN
FLOW DIRECTION – 8" GRAVITY MAIN
FLOW DIRECTION – 12" GRAVITY MAIN
FLOW DIRECTION – FORCE MAIN
PROP. LS EASEMENT AREA
LS-1 TRIBUTARY AREA
LS-2 TRIBUTARY AREA
LS-3 TRIBUTARY AREA
LS-4 TRIBUTARY AREA
LS-5 TRIBUTARY AREA
SEWER MANHOLE
CMH COLLECTION MANHOLE
CP CONNECTOR PIPE
IE INVERT ELEVATION
FL FLOW LINE
LS LIFT STATION
SCALE: 1"=100'
100 50 0 100 200 300
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EXHIBIT - 6
QUAIL VALLEY SUBAREA 4
LIFT STATION - TRIBUTARY AREA

10. LIFT STATION SITING STUDY

Sites have been selected for the regional lift station and the four smaller lift stations within SA4. The proposed locations are shown in Exhibit 1, with a full-sized version provided in Appendix A. The selected sites were chosen based on specific criteria, including property acquisition, easements, operational and maintenance (O&M) access for vehicles and equipment, integration with the sewer system, utility placements, site drainage, topography, community impact, environmental considerations, and overall project costs. Notably, all the sites are undeveloped, and topography was the primary factor influencing their placement.

10.1 Lift Station 1 Site Selection

LS-1, the regional lift station, requires careful evaluation of multiple factors to ensure its functionality and operational accessibility. A critical consideration is the need for additional real estate to accommodate the lift station and designated areas for chemical storage. Providing sufficient space for chemical and maintenance truck access is also a key aspect of the decision-making process. Two alternative locations have been identified for LS-1. Exhibit 1 provides a visual representation of these locations, while Table 10.1 offers a comparison of the advantages and disadvantages of each site.

Table 10.1 : Lift Station 1 Site Alternatives - Benefits Analysis

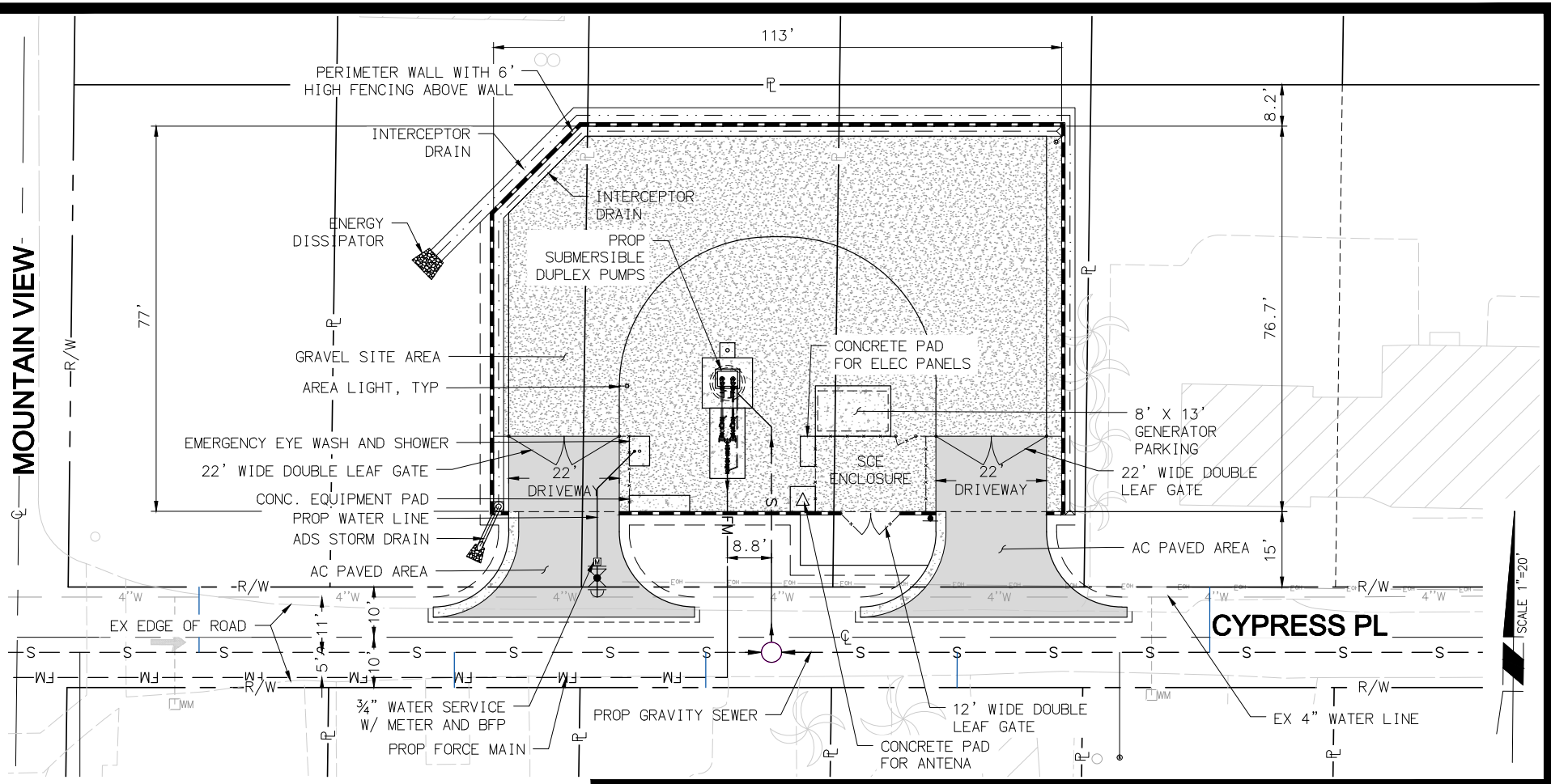
Lift Station 1 - Alternative 1	
Advantages	**Disadvantages**
• Collects most of the gravity sewer from the north and south of SA4 (tributary area of 167+ acres) • Easy connection to main sewer system on Mountain View Place • Located at the relative lowest point in SA4 so gravity sewer anticipated at a practical depth below surface • Within the project boundary of SA4	• Surrounded by developed parcels to the north, east and south • Inadequate sizing for SU-40 design vehicle access as per EWMD guidelines; due to narrow one-way street on Cypress, surrounding developed parcels and adjacent wetland • Spatial constraints during construction • Adjacent to a potential jurisdictional wetlands and waters. May require permit from other agencies, i.e. USACE, if work to be done in the adjacent wetland • Requires acquisition of three parcels • Power pole relocation is necessary • Electrical upgrades are necessary
Lift Station 1 -Alternative 2	
Advantages	**Disadvantages**
• Collects most of the gravity sewer from the north and south of SA4 (tributary area of 167+ acres) • Located in an open space, not adjacent to homes • Positioned on planned streets (Connecticut Rd and Norma Dr) with wider access for SU-40 design vehicle • Potential to serve portions of Subarea 2 • Requires acquisition of only one parcel	• Gravity line depth will be a minimum of 26 feet below the surface, resulting in increased construction effort • Operational and maintenance difficulties due to depth • Roads to the site are currently not paved • Located in western burrowing owl suitable habitat – potential for high biological constraint • Additional 500 feet of pipeline needed to connect lift station to SA4 sewer system • Expansion of water line to street and site required • Electrical upgrades are necessary

10.1.1 Alternative 1 – LS-1 Site

The first location considered (Alternative 1) for LS-1 is situated on Cypress Place, approximately 100 feet east of the intersection of Mountain View Place and Cypress Place. This site selection places LS-1 at the relative lowest point within SA4, allowing it to efficiently collect most of the wastewater flows from SA4, particularly from the north and south, via gravity sewer and additional wastewater flows from LS-2 through LS-5.

Key considerations for this location include:

1. Site Details and Accessibility
    - LS-1 Alternative 1 Site Plan has been prepared and included in the 30% design drawings. An exhibit of the LS-1 Alt 1 site layout has also been prepared as part of the PDR. Refer to Exhibit 7 – Lift Station 1 Alternative 1 Site Plan.
    - Property acquisition of three parcels, each approximately 50 feet by 100 feet in size, is necessary.
    - The site plan optimizes the layout by incorporating wider driveways (22 feet), exceeding the minimum 20-foot driveway requirement specified in EMWD's small lift station design guidelines.
    - Despite the wider driveway, the largest vehicle that can access the lift station is a 30-foot truck and trailer rig (SU-30). However, maneuvering in and out of the site may pose challenges, potentially encroaching into residential driveways.
    - Exhibit 8 – LS-1 Alternative 1 Vehicle Tracking illustrates the turning movements of the SU-30 truck and trailer rig during entry and exit. Notably, the SU-30 truck and trailer rig comes inches from a resident's mailbox as it exits the site.
    - Widening the lift station driveway further could create more driving space for the truck during exit. However, this would necessitate increasing the site size, potentially impacting the potential jurisdictional wetlands and waters to the west of the site. Limited by the narrow one-way street of Cypress Place, surrounding developed parcels, and adjacent wetland, this site plan is unable to meet EMWD's requirements of a SU-40 design vehicle to access the site.
2. Environmental Impact Mitigation
    - Strategically placed just east of a potential jurisdictional wetland and waters to limit community and environmental impacts.
    - A proposed swale around the site facilitates drainage flows back into the existing potential jurisdictional wetland, preserving SA4's drainage patterns.
3. Sewer System Connectivity
    - The backbone of the proposed SA4 sewer system runs along Mountain View Place, providing easy connection to the sewer system.
    - The sewer piping connecting to the lift station will need to cross an existing 4-inch water line.
4. Existing infrastructure upgrades
    - Relocation of an existing power pole required.
    - Electrical upgrades required to provide electrical service to the site.



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SCALE: 1"=20'

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EXHIBIT - 7

QUAIL VALLEY SUB. 4
LS-1 ALTERNATIVE 1
SITE PLAN

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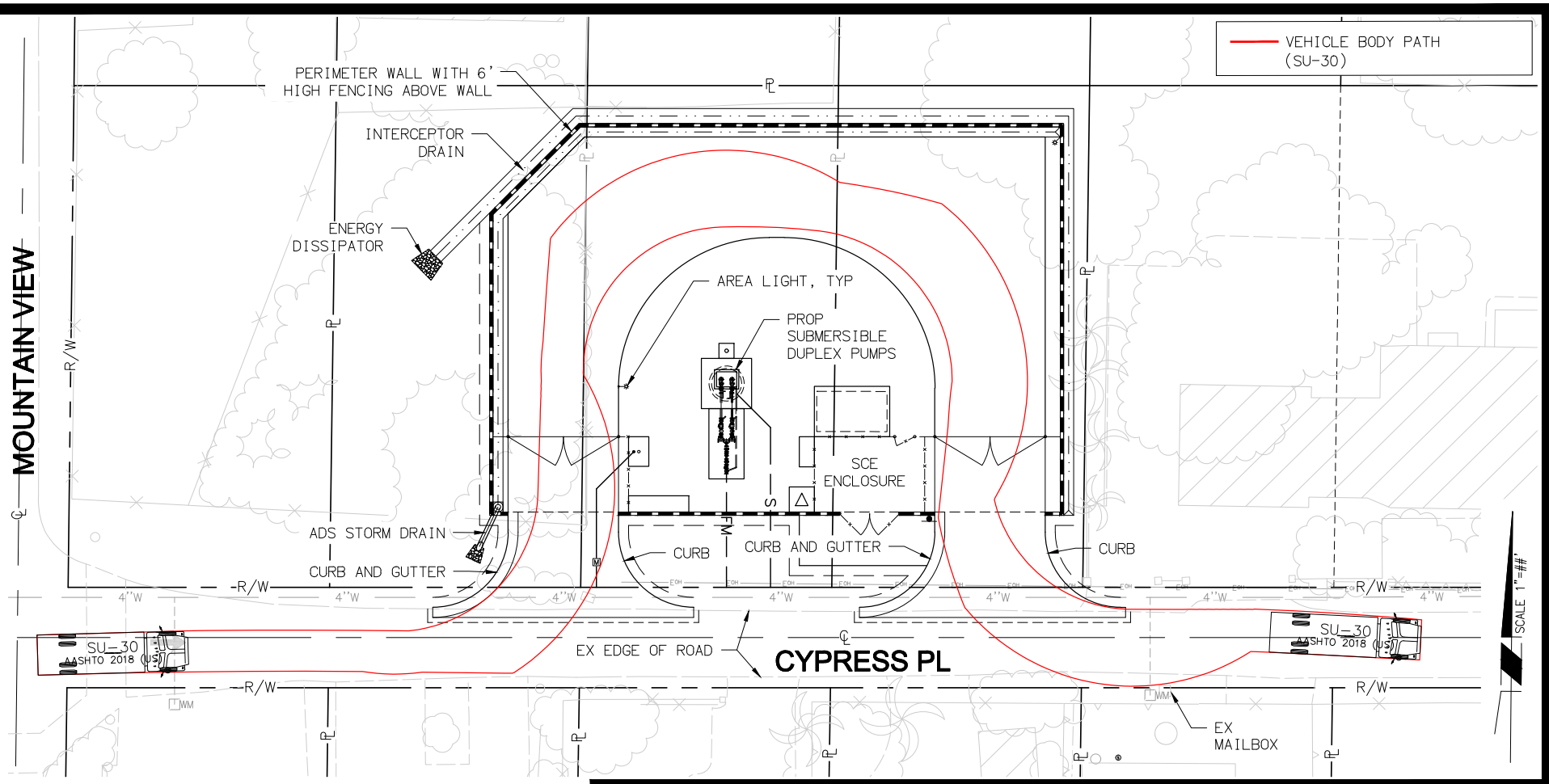

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SCALE: 1"=20'

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EXHIBIT - 8

QUAIL VALLEY SUB. 4
LS-1 ALTERNATIVE 1
VEHICLE TRACKING

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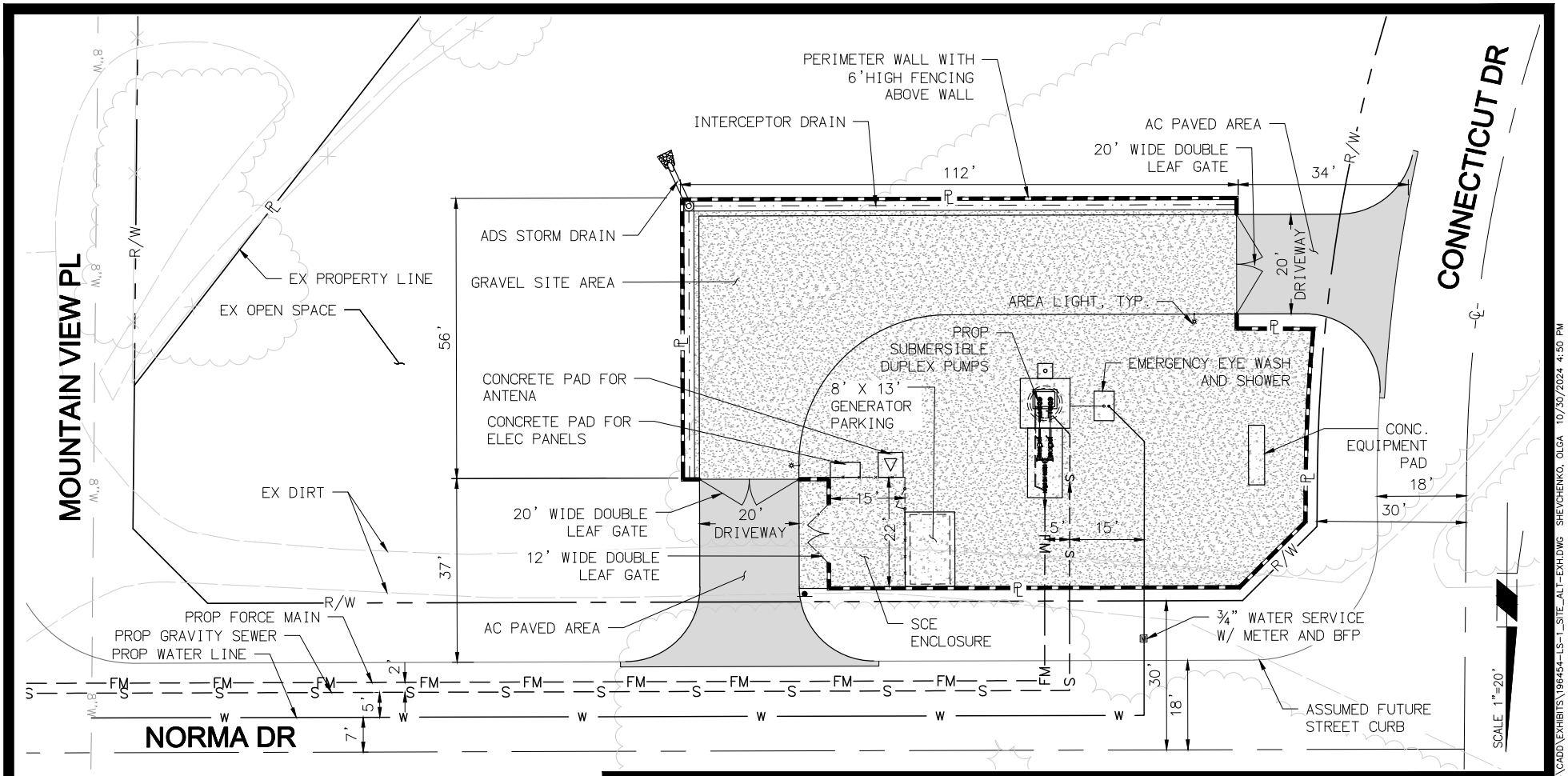
10.1.2 Alternative 2 – LS-1 Site

The second location considered (Alternative 2) for LS-1 lies within Subarea 7, west of the intersection of Norma Drive and Mountain View Place. Unlike Alternative 1, this site sits at a higher elevation. However, it will still be designed to collect most of SA4's wastewater flows via gravity sewer and additional flows from the smaller lift stations. In addition, this site is situated in an area that may allow the lift station to serve portions of Subarea 2.

Key considerations for this location include:

1. Site Details and Accessibility
   - Refer to Exhibit 9 – Lift Station 1 Alternative 2 Site Plan.
   - Property acquisition of the open parcel in Subarea 7 is required.
   - The site layout follows EMWD's small lift station standard, accommodating space for the lift station, chemical storage, and SU-40 design vehicle accessibility.
   - Future access will be via Connecticut Road and Norma Drive, which are planned to be wider streets compared to SA4's streets.
   - Unlike Alternative 1, the absence of space limitations in Alternative 2 enables smooth maneuvering for a SU-40 design vehicle during entry and exit from the site
   - Exhibit 10 – LS-1 Alternative 2 Vehicle Tracking illustrates the turning movements of the SU-40 truck and trailer rig during entry and exit.
2. Environmental Impact Mitigation
   - This site avoids potential jurisdictional wetlands and waters that traverse SA4 and SA2.
   - Located in western burrowing owl suitable habitat – potential for high biological constraint.
   - Positioned in an open space, minimizing community impact.
3. Sewer System Connectivity
   - Connections to the proposed sewer system along Mountain View Place require approximately 640 feet of additional pipe length compared to Alternative 1
   - Anticipated depth of the gravity line at this location is a minimum of 23 feet below the surface, increasing difficulty for construction, operation, and maintenance.
4. Existing infrastructure upgrades
   - Water line extension required to provide service to the site.
   - Electrical upgrades required to provide electrical service to the site.



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SCALE: 1"=20'

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EXHIBIT - 9

QUAIL VALLEY SUB. 4
LS-1 ALTERNATIVE 2
SITE PLAN

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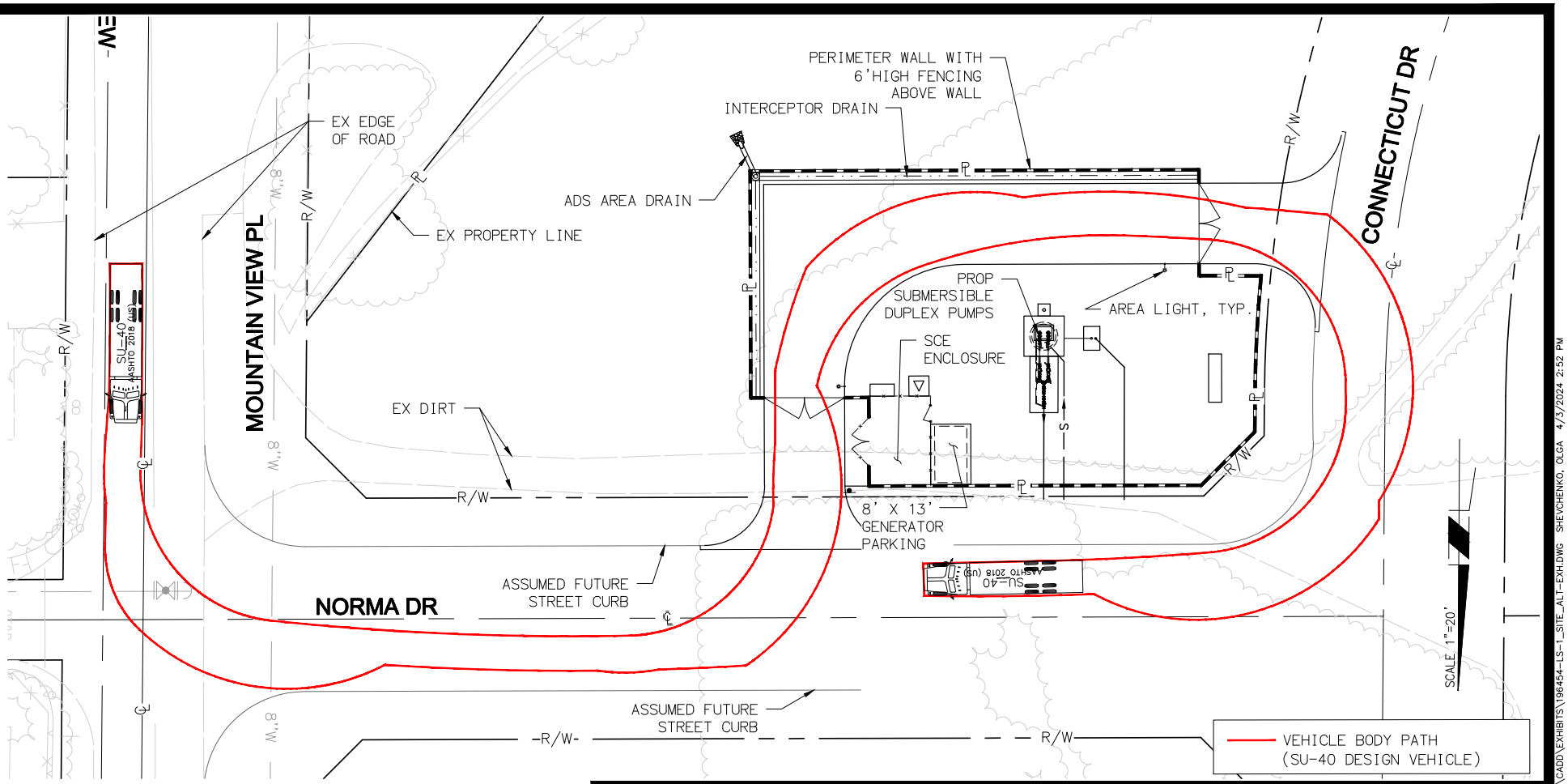

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SCALE: 1"=25'

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EXHIBIT - 10

QUAIL VALLEY SUB. 4
LS-1 ALTERNATIVE 2
VEHICLE TRACKING

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10.2 Lift Station 2 Site Selection

Lift Station 2 site includes a smaller lift station equipped with a pre-packaged pumping system. Positioned east of the intersection of Goetz Drive and Mountain View Place, this site is strategically placed at a low point on Goetz Drive. LS-2 will collect wastewater flows from the lots on the western portion of the streets, including Mt Vernon Place, Goetz Drive, Kennedy Lane, and Shreeder Place.

Key considerations for this location include:

1. Site Details and Accessibility
   - Refer to the draft 30% design drawings for Lift Station 2 Site Layout.
   - LS-2 and the other smaller lift stations have a smaller tributary area, requiring less site footprint than LS-1.
   - Property acquisition of one parcel, approximately 50 feet by 100 feet in size is necessary. A 20-foot driveway allows a heavy-duty service vehicle to enter and exit. It is assumed that a service vehicle that is 14 feet in length will be suitable for operation and maintenance of these smaller lift stations. However, the Autoturn software that models the turning movements of vehicle does not have a United States standard 14-ft vehicle available for modeling. National Association of City Transportation Officials's (NACTO) DL-23 design vehicle (delivery truck) was adopted as the basis for the design instead. The dimensions of the delivery truck can be found in Figure 12.

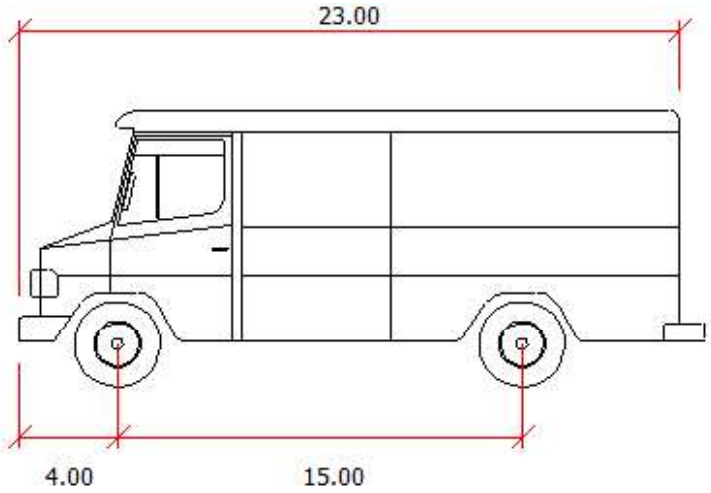


Figure 12: Dimensions of DL-23 Design Vehicle

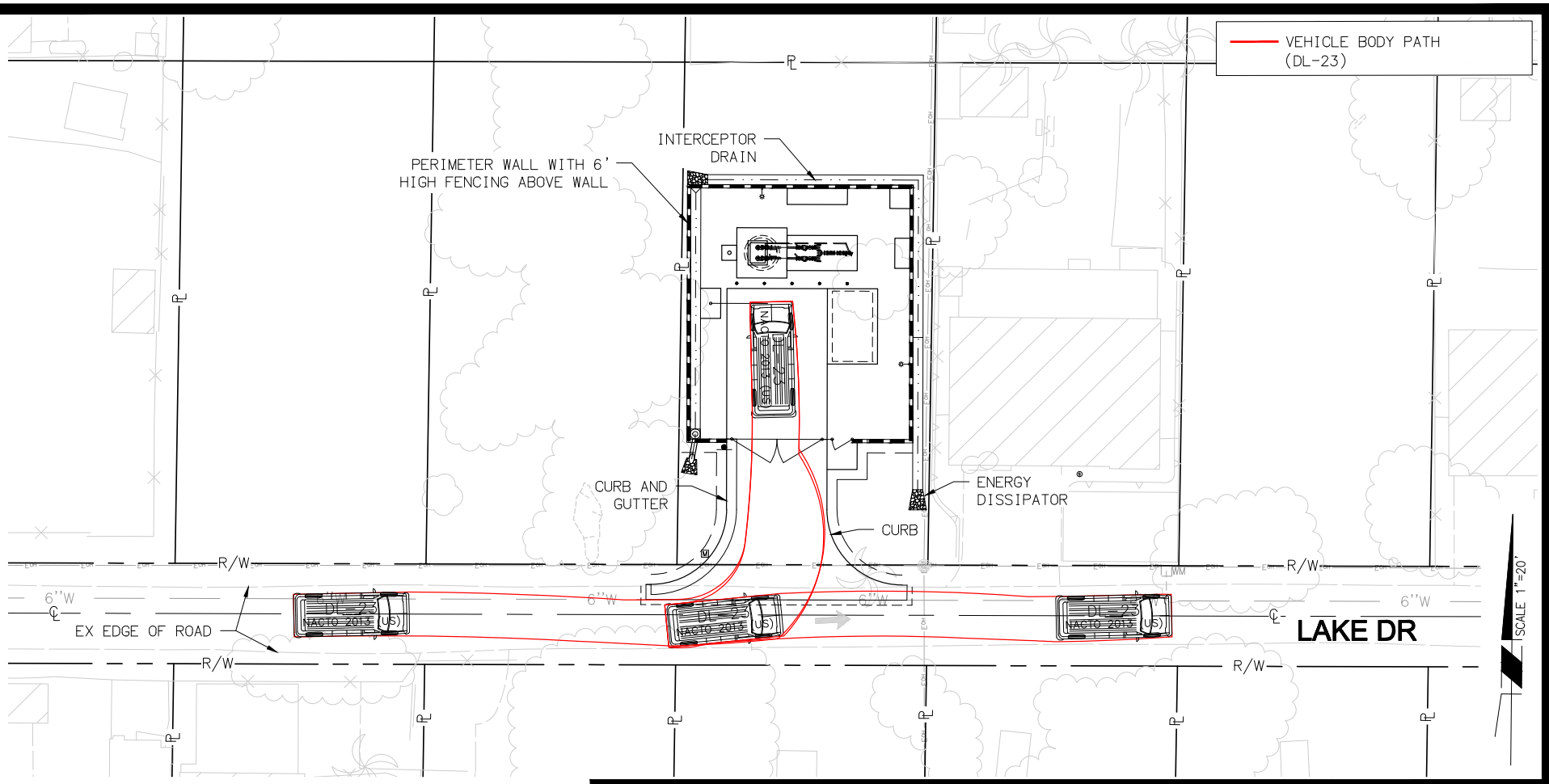
   - Please refer to Exhibit 11 – Lift Station 2-5 Typical Vehicle Tracking. The exhibit shows the turning movements of the 23-foot long truck as it navigates its way in and out of these smaller lift station sites. This is typical for the smaller lift stations, LS-2 through LS-5.

2. Environmental Impact Mitigation
   - LS-2 site is situated away from drainage courses to limit environmental impacts.
   - The site will be surrounded by a perimeter wall to minimize noise and visual impacts on the surrounding residences.

3. Sewer System Connectivity
   - LS-2 is located near the backbone of the proposed SA4 sewer system along Mountain View Place and ensures connection to the sewer system.

- Approximately 140 feet of force main will be required to connect to the main sewer system in Mountain View Place.

4. Existing infrastructure Upgrades
   - No utility conflicts are anticipated, but electrical upgrades are necessary to provide electrical service to the site.



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SCALE: 1"=20'

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EXHIBIT - 11

QUAIL VALLEY SUB. 4
LIFT STATION 2 - 5
TYPICAL VEHICLE TRACKING

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10.3 Lift Station 3 Site Selection

LS-3 site includes a smaller lift station equipped with a pre-packaged pumping system. Positioned at a low point on Lake Drive, this site collects wastewater flows from select lots on Lake Drive, Elsinore Lane, and Lucas Drive.

Key considerations for this location include:

1. Site Details and Accessibility
   - Refer to the draft 30% design drawings for LS-3 Site Layout.
   - LS-3, benefiting from a smaller tributary area, requires less site footprint than LS-1. Site will be smaller than the typical layout provided in EMWD's small lift station design guidelines.
   - Property acquisition of one parcel, approximately 50 feet by 100 feet in size is necessary.
   - A 20-foot wide driveway allows a 14-foot maintenance vehicle to enter and exit the site. One vehicle tracking exhibit is prepared to illustrate the turning movements of an approximately 23-foot-long truck entering and exiting the smaller lift stations, LS-2 through LS-5. See the exhibit in Section 10.2 and Figure 12 for the dimensions of the design vehicle used.
2. Environmental Impact Mitigation
   - LS-3 site is situated away from drainage courses, limiting environmental impacts.
   - The site will be surrounded by a perimeter wall to minimize noise and visual impacts on the surrounding residences.
3. Sewer System Connectivity
   - This site is farther from the main sewer system on Mountain View Place and requires approximately 650 feet of force main to connect to the gravity sewer system.
4. Existing infrastructure Upgrades
   - No utility conflicts are anticipated, but electrical upgrades are necessary to provide electrical service to the site.

10.4 Lift Station 4 Site Selection

LS-4 site includes a smaller lift station equipped with a pre-packaged pumping system. Located on Lucas Drive, just east of the intersection of Mountain View Place and Lucas Drive, LS-4 collects wastewater flows from select lots on Lake Drive, Elsinore Lane, Lucas Drive, and San Jacinto Road. Additionally, it receives additional wastewater flow from LS-5.

Key considerations for this location include:

1. Site Details and Accessibility
   - Refer to the draft 30% design drawings for Lift Station 4 Site Layout.
   - LS-4, benefiting from a smaller tributary area, requires less site footprint than LS-1. Site will be smaller than the typical layout provided in EMWD's small lift station design guidelines.
   - Property acquisition of one parcel, approximately 50 feet by 100 feet in size is necessary.
   - A 20-foot driveway allows a 14-foot maintenance vehicle to enter and exit the site. One vehicle tracking exhibit is prepared to illustrate the turning movements of an approximately 23-foot-long truck entering and exiting the smaller lift stations, LS-2 through LS-5. See the exhibit in Section 10.2 and Figure 12 for the dimensions of the design vehicle used.
2. Environmental Impact Mitigation
   - LS-4 site is situated away from drainage courses, limiting environmental impacts.
   - The site will be surrounded by a perimeter wall to minimize noise and visual impacts on the surrounding residences.

3. Sewer System Connectivity
    - This LS-4 location is near the backbone of the proposed SA4 sewer system along Mountain View Place, ensuring connection to the sewer system.
4. Existing infrastructure Upgrades
    - No utility conflicts are anticipated, but electrical upgrades are necessary to provide electrical service to the site.

10.5 Lift Station 5 Site Selection

LS-5 site is situated on Johnson Lane, just east of the intersection of Mountain View Place and Johnson Lane. LS-5 collects wastewater flows from lots on Johnson Lane, constituting a small tributary area.

Key considerations for this location include:

1. Site Details and Accessibility
    - Refer to the draft 30% design drawings for Lift Station 5 Site Layout.
    - Lift station size than the typical layout provided in EMWD's small lift station design guidelines.
    - Property acquisition of one parcel, approximately 50 feet by 100 feet in size is necessary.
    - A 20-foot driveway allows a 14-foot maintenance vehicle to enter and exit the site.
      One vehicle tracking exhibit is prepared to illustrate the turning movements of an approximately 23-foot-long truck entering and exiting the smaller lift stations, LS-2 through LS-5. See the exhibit in Section 10.2 and Figure 12 for the dimensions of the design vehicle used.
2. Environmental Impact Mitigation
    - LS-5 site is situated away from drainage courses, limiting environmental impacts.
    - The site is configured with a perimeter wall to minimize noise and visual impacts on the surrounding residences.
3. Sewer System Connectivity
    - LS-5's proximity to the backbone of the proposed SA4 sewer system along Mountain View Place ensures connection to the sewer system.
    - Approximately 270 feet of force main will be required to connect to the main sewer system in Mountain View Place.
4. Existing infrastructure Upgrades
    - No utility conflicts are anticipated, but electrical upgrades are necessary to provide electrical service to the site.

11. SEPTIC SYSTEM CONVERSION

11.1 Septic Tank Conversion

Prior to performing septic conversion, the lift stations and gravity collection system will need to be constructed and placed into service. The septic tank conversion process then requires resident coordination and involvement. Community outreach and right-of-entry is essential to initiate the septic tank conversion process. Of the 652 project parcels, 493 right-of-entry have been obtained. This is shown in the GIS portal described in Section 4. These initial right of entry agreements included access for septic system locating work, and most have expired as of December 2024. New right of entry agreement for construction will be required.

Once right-of-entry agreements have been acquired, the construction of sewer laterals and abandonment of septic tanks can begin. The conversion process involves several essential steps to ensure continued service for homeowners while adhering to environmental and safety standards:

1. Locate and expose lateral between the house and septic tank
2. Trench to the property line
3. Install 4-inch Sch 40 PVC sewer lateral
4. Backfill trench and restore basic landscaping, including grass and bushes
5. Pump out all water from the septic tank
6. Fill emptied tank with earth, sand, gravel or concrete
7. Have the county inspect and approve the abandonment

If the septic tank conversion cannot proceed due to the absence of a right-of-entry agreement, the parcel owner could be responsible for the coordination, design, construction, and associated costs of abandoning the septic tank and connecting to the main sewer line stub as determined by the agency of jurisdiction.

11.2 Septic Tank Abandonment

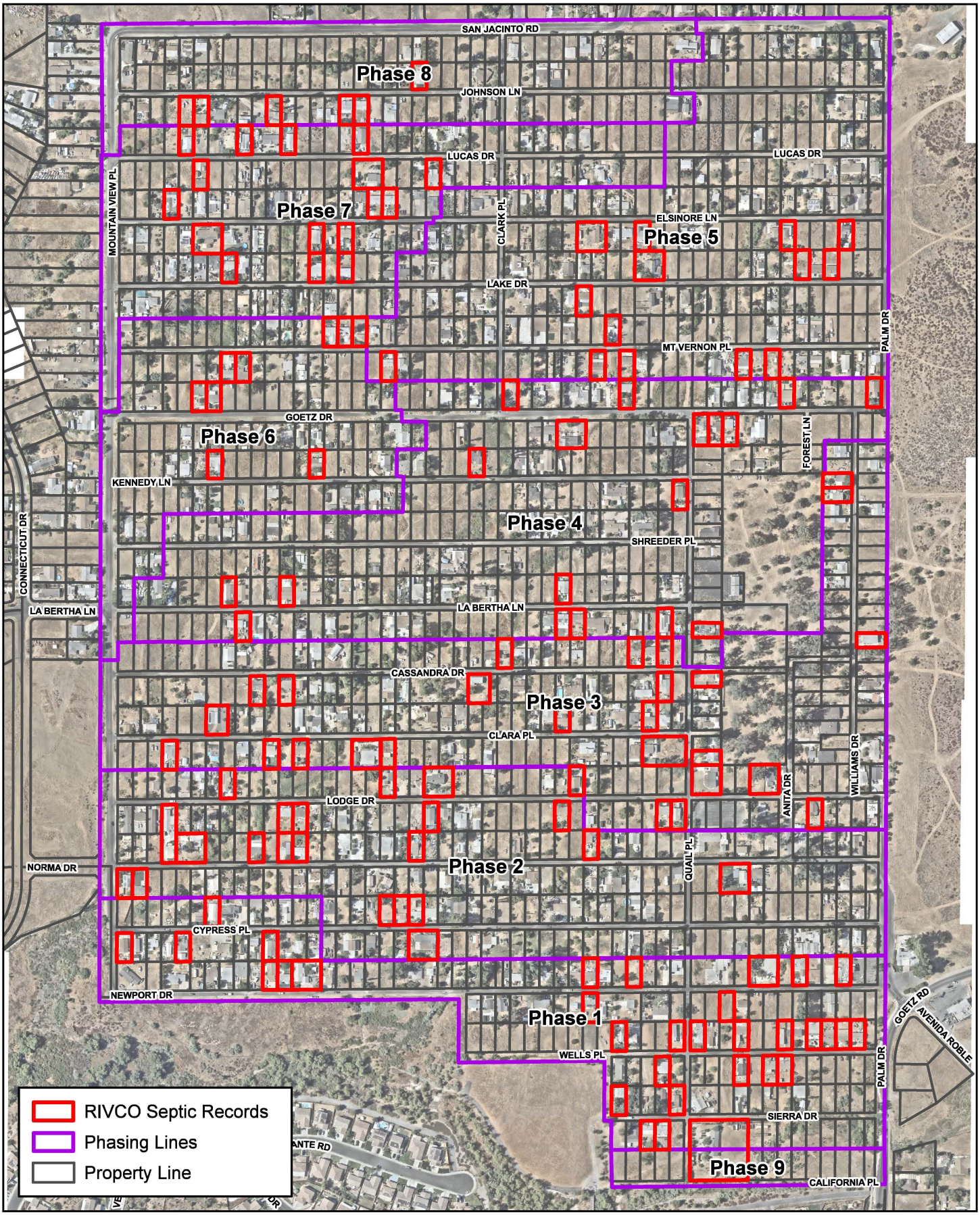
According to the County of Riverside Department of Environmental Health Local Agency Management Plan for Onsite Wastewater Treatment Systems (LAMP) Chapter 8, the following steps are required to abandon an onsite wastewater treatment system:

1. Obtain a permit from the County of Riverside Department of Environmental Health (prior to work)
    - Requires fees to be paid with the application.
        - Initial coordination suggests that the Department of Environmental Health will discuss the final fee for the project with EMWD.
    - Requires a plot plan showing the layout of the system to be destroyed.
        - Due to incomplete records, further actions are necessary for systems without as-built documentation. The County requires the septic systems without as-builts to be evaluated by a certified contractor.
        - Out of the 652 parcels believed to have existing septic systems, record drawings were obtained from the County for only 146 parcels.
        - Copies of the record drawings can be found in Appendix G. In addition, an exhibit illustrating the parcels within SA4 for which county record drawings are available is presented in GIS Exhibit 7, which can also be found in Appendix G.

2. All wastewater in the tank and on the surface that is accessible should be removed by an approved liquid waste hauler. If requested, the County needs documentation from the hauler.
3. Tanks/seepage pits need to either be removed or filled with earth, sand, gravel, or concrete. If the tanks are to be filled, the top must be removed prior to filling unless concrete slurry is piped into the tank. The filled tank must be inspected before being buried. The most common abandonment method includes collapsing the tank or drilling holes in concrete tanks, followed by filling.

The County's preferred method of abandonment is to abandon the septic tanks in place after removing the liquid waste and drilling holes in the tanks. For each leach field, an approved hauler must remove the waste before abandoning the lines in place with no further action. Inspection of the abandoned septic tanks will need to be coordinated directly with the County once permits are approved. Due to the scope of the project, a schedule inspection is preferred.

Exhibit 12 illustrates a typical existing septic system abandonment plan.



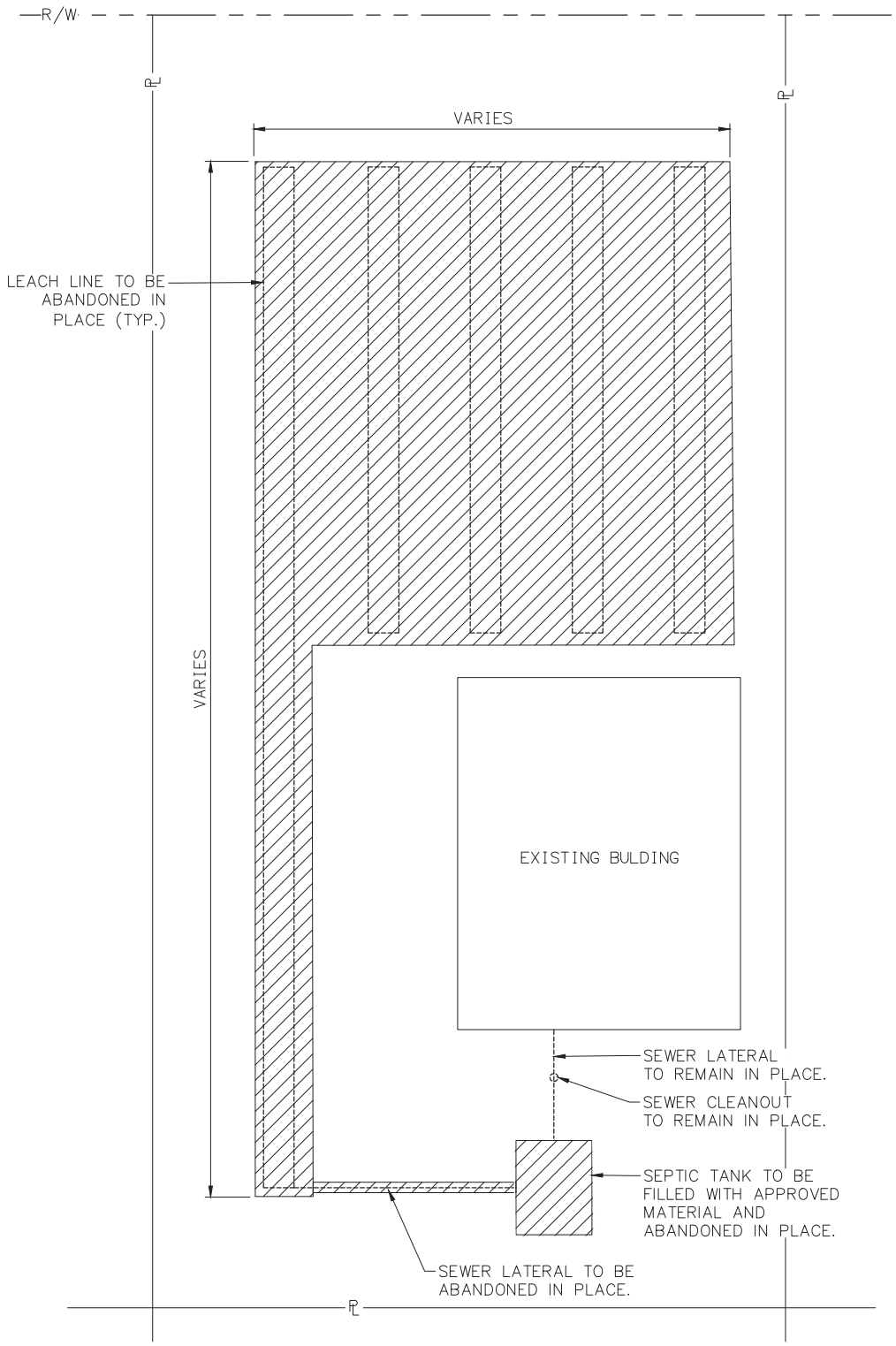
QUAIL VALLEY
SEPTIC TO SEWER CONVERSION

Michael Baker INTERNATIONAL

0 200 400 Feet

Source: ESRI, Michael Baker International

GIS Exhibit 7 - Parcels with County Records Received



NOTES:
1. DIMENSIONS VARY AT EACH SITE
2. ABANDONMENT WILL FOLLOW THE COUNTY OF RIVERSIDE STANDARDS/UPC

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EXHIBIT - 12

QUAIL VALLEY SUBAREA 4

TYPICAL EXISTING SEPTIC SYSTEM ABANDONMENT

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11.3 Service Lateral on Private Property

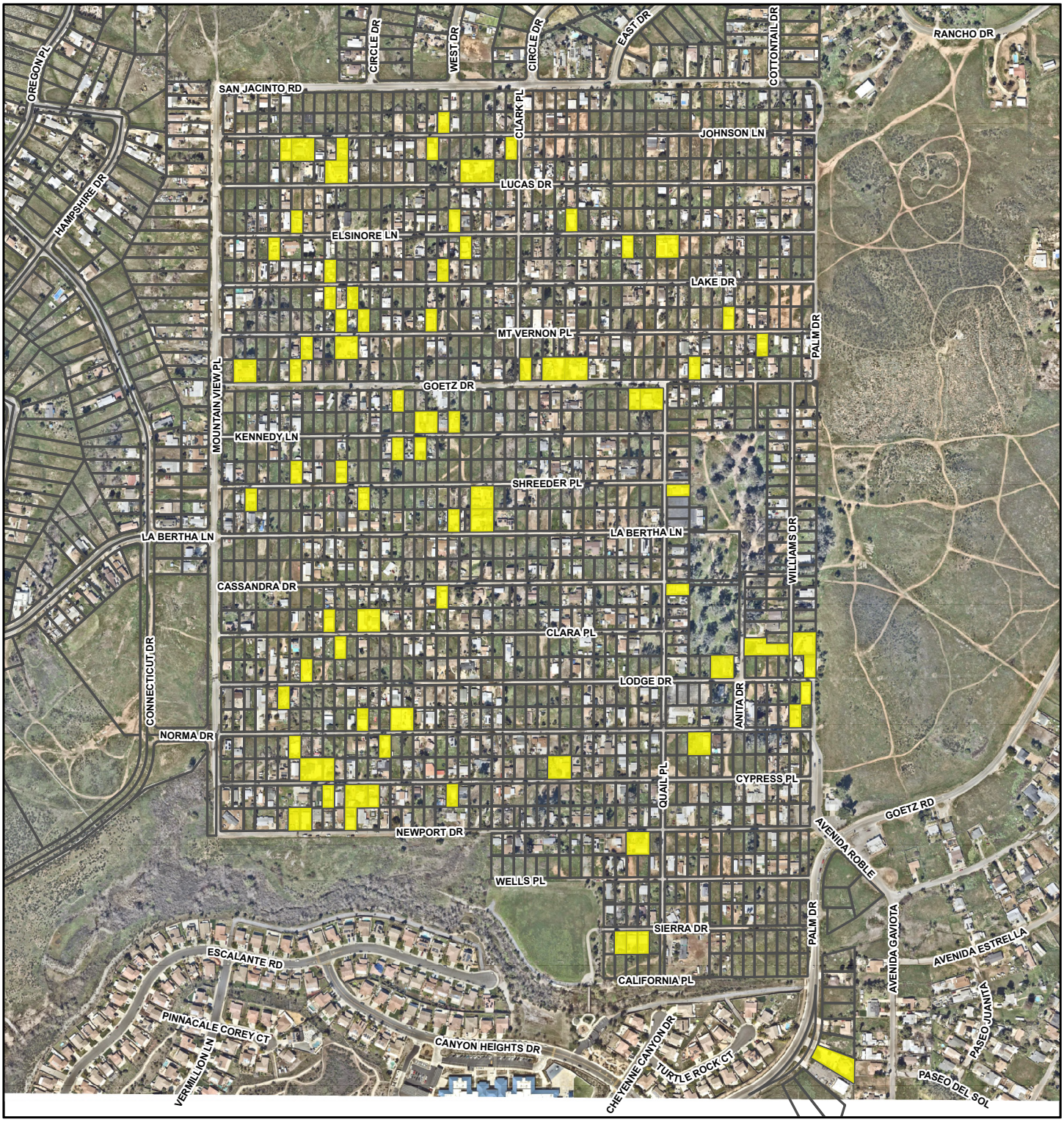
The construction of service laterals on private properties varies depending on the specific parcel. Some properties have minimal site improvements, resulting in no conflicts with existing structures and easy accessibility. These properties facilitate straightforward service lateral construction. However, other properties feature enhancements like patio structures/pavers, retaining walls and mature trees, which pose challenges for service lateral construction. To address this, each parcel is individually assessed using aerial imagery and topography. Preliminary alignment for the new sewer service lateral is carefully chosen to minimize any impact on existing improvements. Nevertheless, potential issues with the service lateral construction can occur, which will be discussed in Section 11.5

11.3.1 Service Exhibits for Individual Parcels

Lot exhibits have been prepared for developed parcels to document the location and elevation of existing septic systems, along with the proposed alignment of the future gravity service laterals. These exhibits, included in Appendix H, incorporate aerial imagery to highlight key structures, hardscape features, and potential obstructions that may impact service lateral construction. Parcels with high-potential constructability challenges, such as hardscape improvements or other obstructions, are also identified. These preliminary service exhibits can be used during community outreach to illustrate the proposed service lateral alignment and required property modifications, aiding property owners in understanding the planned improvements. The final design of the service laterals will be completed during the final design phase and shared with property owners as a comprehensive package.

GIS Exhibit 8 has been prepared to identify parcels within the Quail Valley SA4 project that may require increased construction effort when installing gravity service laterals. This exhibit specifically highlights areas within SA4 where construction and property restoration could be more complex. A list of these parcels with difficult constructability is provided in Appendix J. It is important to note that this analysis is preliminary and subjective, and the list will evolve during the final design phase. Additionally, the analysis is not comprehensive, as only surveyed parcels were evaluated. Preliminary findings indicate that approximately 30% of parcels with existing septic systems are expected to require increased effort during lateral construction. However, the cost estimate in Appendix D assumes that 66% of these parcels will require extensive restoration. This higher percentage is a conservative estimate to account for potential contingencies and unknown variables at this stage of the design process. During preliminary design, the laterals were placed into two categories of difficulty. However, there will be varying degrees of difficulty during construction and the assumption of 66% of parcels requiring extensive restoration is intended to account for this variable degree of difficulty across all installations.

Service exhibits were prepared only for developed parcels with available information on their existing septic systems. For parcels without this information, service exhibits were not prepared. The lack of information on existing septic systems is due to various reasons, such as the lack of right of entry agreements, parcel inaccessibility during survey due to closed gates or dogs, or septic systems that could not be located.



Legend

- Difficult Sewer Lateral Constructability
- Property Line

Michael Baker INTERNATIONAL

0 250 500 Feet

Source: ESRI, Michael Baker International

QUAIL VALLEY
SEPTIC TO SEWER CONVERSION

GIS Exhibit 8 - Parcels with Difficult Sewer Lateral Constructability

11.4 Private Property Restoration

The conversion of septic tank systems to gravity service laterals for each parcel represents a distinct, site-specific project. The complexity arises from the varied placement of septic tanks in relation to homes, lot boundaries, and yard configurations. Existing site improvements add increases construction efforts at some locations. In some instances, minimal modifications will enable straightforward access to the septic tank and facilitate lateral pipe trenching, requiring only minor property restoration. However, more complex cases involving mature trees, landscaping, walls, patio structures, pavers, or stamped concrete may necessitate significant demolition and extensive restoration efforts.

11.5 Potential Issues

Several potential challenges that will increase the difficulty of the septic tank abandonment and service lateral construction are outlined below:

- **Property Additions**: These refer to built improvements that obstruct septic tanks, such as additional rooms or covered patios.
- **Unpermitted Structures**: These structures are likely not authorized by the county or city and may not comply with legal regulations and may encroach on the septic system.
- **Inaccessible Systems**: These septic systems are challenging to access due to their location, such as being under a garage or in a basement.
- **Landscape and Hardscape Improvements**: Examples include patio pavers or elaborate stamped concrete placed on top of septic tanks. Additionally, retaining walls and mature trees create obstacles for lateral installation. If these obstructions cannot be avoided, they will have to be removed and replaced during the construction of the laterals.

Examples of potential challenges are depicted in Figure 13 and Figure 14.



Figure 13: Example of Stamped Concrete built over Septic Tank



Figure 14: Example of Concrete over Septic Tanks and Laterals

12. ADDITIONAL PROPERTY ACQUISITION AND EASEMENT NEEDS

Quail Valley SA4 features multiple high and low points along its streets. To optimize the sewer system and minimize the need for lift stations, gravity lines are strategically routed between parallel streets and across unoccupied parcels. The draft 30% design drawings include 23 connector pipes following this approach.

These connector pipes traverse vacant back-to-back parcels, for which EMWD intends to acquire or obtain sewer easements. Given that there are 23 connector pipes, EMWD will need to acquire or obtain sewer easements for approximately 46 parcels. However, in cases where property acquisition or easements are not feasible, alternative routing scenarios for the connector pipes can be implemented. Refer to Exhibit 13 – Property Acquisition or Easement Needs for an overview of the various routing options under such circumstances. The full-sized exhibit can be found in Appendix A. Appendix C includes a table listing the affected properties and associated property information, such as owner, address, owner contact, etc. The figure and table also serve as a guide for EMWD, as the District conducts an environmental assessment of these properties. In the event that a connector pipe cannot be constructed due to property acquisition difficulties, the design will need to be modified in the detailed design phase to incorporate a lift station or other design adjustment in the area instead.

In addition, EMWD will need to acquire the properties needed for the five lift station sites. The regional lift station, LS-1, has two alternative locations to choose from, and the final selection could depend on which properties EMWD is able to acquire. The site locations for the four smaller lift stations, LS-2, LS-3, LS-4, and LS-5, have also been recommended, but the final locations will ultimately depend on property acquisition and will need to be finalized in the 100% design phase. The APN number for the parcels that need to be acquired for Lift Station 1, as well as the four smaller lift stations, are indicated in Table 12.1.

Table 12.1: Property Acquisition Needs for Lift Station Sites

Lift Station	Property Acquisition Needs	Parcel APN
LS-1 Alternative 1	3 parcels	350262050, 350262049, 350262048
LS-1 Alternative 2	1 parcel	351200006
LS-2	1 parcel	350221002
LS-3	1 parcel	350191039
LS-4	1 parcel	350113001
LS-5	1 parcel	350112005

13. CONSTRUCTION SEQUENCING AND PHASING

13.1 Public Sewer System Construction Phasing

The construction of Quail Valley SA4 sewer system needs to be based on a systematic approach for implementation, ensuring both effectiveness and financial viability. To accomplish this, the project is divided into a series of nine distinct phases, allowing for flexibility for construction timing and funding as needed. These phases also generally align with anticipated grant funding. Phase 1 will require a larger effort and more upfront costs, largely driven by the need to construct LS-1.

The initial focus is to bring the regional lift station (LS-1) online. This critical infrastructure component will not only serve the immediate needs of a set of parcels but also lay the groundwork for subsequent phases. LS-1 acts as the backbone, and is required to convey flows from all phases of SA4 to the existing EMWD gravity system in Goetz Road.

As the project progresses, subsequent phases will address parcels in planned batches. Once LS-1 and the gravity collection system are operational, construction will commence on homes served by this station. Beyond LS-1, additional lift stations will be strategically constructed. Each subsequent station will integrate with the existing infrastructure. It is anticipated that LS-1 will need to be built with expansion in mind, and will grow in capacity as additional phases are constructed, and to accommodate build out conditions for SA4. The lift station evaluation report, located in Appendix M, will provide sizing and phasing recommendations for individual lift stations.

A summary of the phasing plan is found in Table 13.1 and Table 13.2 and illustrated in Exhibit 14 – Phasing Sewer Improvements. A full-sized exhibit can be found in Appendix A. The phases will be adjusted based on schedule, budget, stakeholder inputs.

Table 13.1: Sewer System Phasing Summary

Phase	Street	Limits	Lift Station	Connector Pipes	Additional Notes
1	Cypress	Partial, see exhibit	Regional LS-1, Collection manhole CMH-1	CP-24	Construct regional lift station and associated force main. Construct the gravity sewer lines parallel to force main. Stub out required for Mountain View and CP-24. Connect to sewer main on Goetz Rd.
	Newport	Entirety			
	Wells	Entirety			
	Mountain View	Partial, see exhibit			
	Palm	Partial, see exhibit			
	Sierra	Entirety			
2	Norma	Entirety		CP-11, CP-12, CP-22, CP-23	Stub out required for Mountain View, CP-11 and Quail Place. Connect to Stub out on CP-24 & Mountain View. Flows to LS-1.
	Cypress	Partial, see exhibit			
	Lodge	Partial, see exhibit			
	Mountain View	Partial, see exhibit			
	Quail	Partial, see exhibit			
3	Cassandra	Entirety	Collection manhole CMH-2	CP-10, CP-21, CP-35, CP-36	Stub out required for CP-10 and CP-35.
	Clara	Entirety			
	Lodge	Partial, see exhibit			Connect to Stub out on CP-11. Flows to LS-1
	Mountain View	Partial, see exhibit			Stub out required for Mountain View force main. Connect to Stub out on Mountain View. Flows to LS-1.
	Quail	Partial, see exhibit			Connect to Stub out on Quail.
	Anita	Entirety			
	Williams	Entirety			
4	Goetz	Partial, see exhibit		CP-6, CP-7, CP-8, CP-9, CP-34	Stub out required for CP-6.
	Kennedy	Partial, see exhibit			
	Shreeder	Partial, see exhibit			
		Partial, see exhibit			Connect to Stub out on CP-35 & CP-10. Flows to LS-1.
	Clark	Partial, see exhibit			Stub out required
	Quail	Partial, see exhibit			
	Forest	Entirety			
5	San Jacinto	Partial, see exhibit		CP-1, CP-2, CP-3, CP-4, CP-5	
	Johnson	Partial, see exhibit			
	Lucas	Partial, see exhibit			
	Elsinore	Partial, see exhibit			
	Lake	Partial, see exhibit			
	Mt Vernon	Partial, see exhibit			Connect to Stub out on CP-6. Flows to LS-1.
	Clark				Connect to Stub out
	Mt Vernon	Partial, see exhibit	Lift Station LS-2	CP-33	

Phase	Street	Limits	Lift Station	Connector Pipes	Additional Notes
6	Goetz	Partial, see exhibit			Construct lift station and associated force main. Construct the gravity sewer lines parallel to force main. Stub out required for Mountain View force main.
	Kennedy	Partial, see exhibit			
	Shreeder	Partial, see exhibit			
	La Bertha	Partial, see exhibit			
	Mountain View	Partial, see exhibit			Stub out required for Mountain View force main. Construct the gravity sewer lines parallel to force main. Connect to Stub out force main on CMH-2. Flows to LS-1 & LS-2.
7	Lucas	Partial, see exhibit	Lift Station LS-4, Lift Station LS-3	CP-31, CP-32	Construct lift station and associated force main. Construct the gravity sewer lines parallel to force main. Flows to LS-4.
	Elsinore	Partial, see exhibit			Flows to LS-3 & LS-4.
	Lake	Partial, see exhibit			Construct the gravity sewer lines parallel to force main. Flows to LS-3 & LS-4.
	Mountain View	Partial, see exhibit			Stub out required for Mountain View gravity main. Construct the gravity sewer lines parallel to force main. Connect to Stub out force main.
8	San Jacinto	Partial, see exhibit	Lift Station LS-5	None.	Flows to LS-4.
	Johnson	Partial, see exhibit			Construct the gravity sewer lines parallel to force main. Flows to LS-5.
	Mountain View	Partial, see exhibit			Connect to Stub out gravity main.
9	California	Entirety	Lift Station required		Connect to Manhole on Goetz Rd (not part of this project as sewer construction here will be the responsibility of the developer)

Table 13.2: Sewer System Elements by Phase

Phase	No. of Sewer Connection			Length of sewer (LF)	Length of Force main (LF)	No. of Lift Station
	House Laterals[1]		Vacant laterals[2]			
	Surveyed and Designed	No Survey Data				
Phase 1	59	21	78	6568	3241	1
Phase 2	53	31	122	7504	0	0
Phase 3	64	22	118	8426	0	0
Phase 4	61	22	156	8740	0	0
Phase 5	53	22	149	8631	0	0
Phase 6	27	9	66	3994	994	1
Phase 7	30	23	80	4770	1598	2
Phase 8	17	11	74	4280	283	1
Phase 9	Design on California Place to be the responsibility of the developer					

[1] The house lateral sewer connections represent the service connections for existing developed parcels. The 'surveyed and designed' category includes parcels with existing septic systems that have been surveyed. The 'no survey data' category includes developed parcels that haven't been surveyed but are assumed to have existing septic systems.
[2] The vacant lateral sewer connections represent the service connections for vacant parcels. This count reflects the maximum number of vacant laterals, though a lower number is anticipated. This count shall be confirmed in the final design phase.

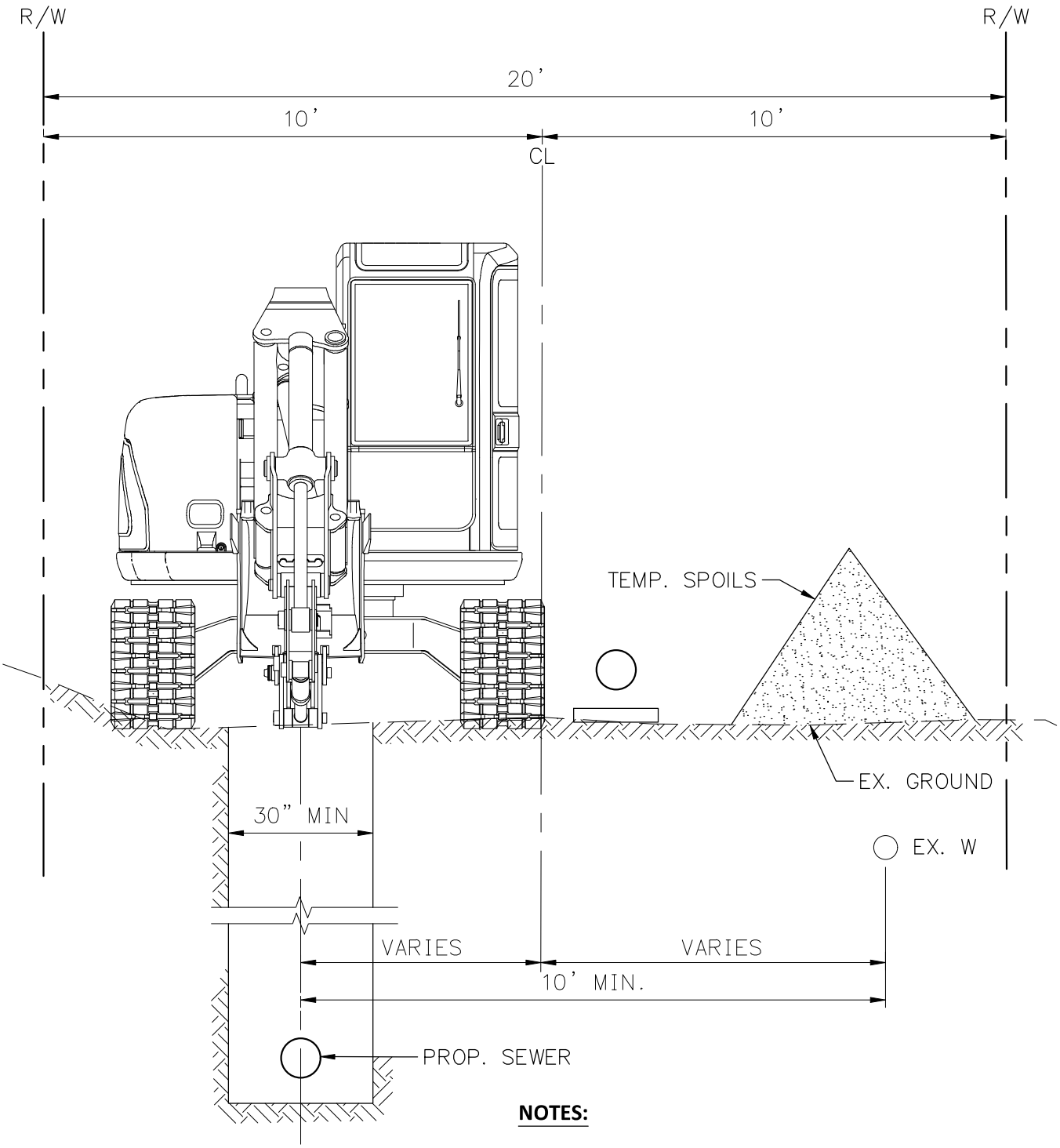
14. CONSTRUCTION ACCESS AND STAGING

14.1 Vehicle and Equipment Access

The narrow streets in SA4 present construction access challenges for vehicles and equipment. Exhibit 15 shows that conventional excavation equipment can fit within the street right-of-way, but maneuvering around existing electrical poles, light poles, and mailboxes will be necessary. If special excavation equipment is required, the contractor must ensure it can also access and operate within these narrow streets. Exhibit 15 also outlines the staging of equipment during sewer pipe installation, indicating that the sewer pipe and excavated material can be temporarily placed next to the equipment. Street closures may be necessary during the installation process.

14.2 Staging and Spoils Area

The street right-of-way can be used for temporary staging and stockpiling during the sewer installation process. When construction is not active, excavation equipment and pipe materials must be moved to designated staging and spoils area, as shown in Exhibit 16. Properties identified for EMWD to acquire for sewer connector pipe construction should also be used for staging and spoils. Spoils may be used to fill and level these properties if needed, provided the fill does not block natural watercourses. Appropriate grading and erosion control plans will be required for these stockpile areas. In areas without a nearby connecting pipeline or EMWD-acquired properties, temporary construction easements must be obtained. These easements can be used for staging, but spoils are not permitted in these areas.



NOTES:

TYPICAL WORKING WIDTH – MAY VARY DEPENDING ON SIZE OF PIPE, DEPTH AND GROUND CONDITIONS.

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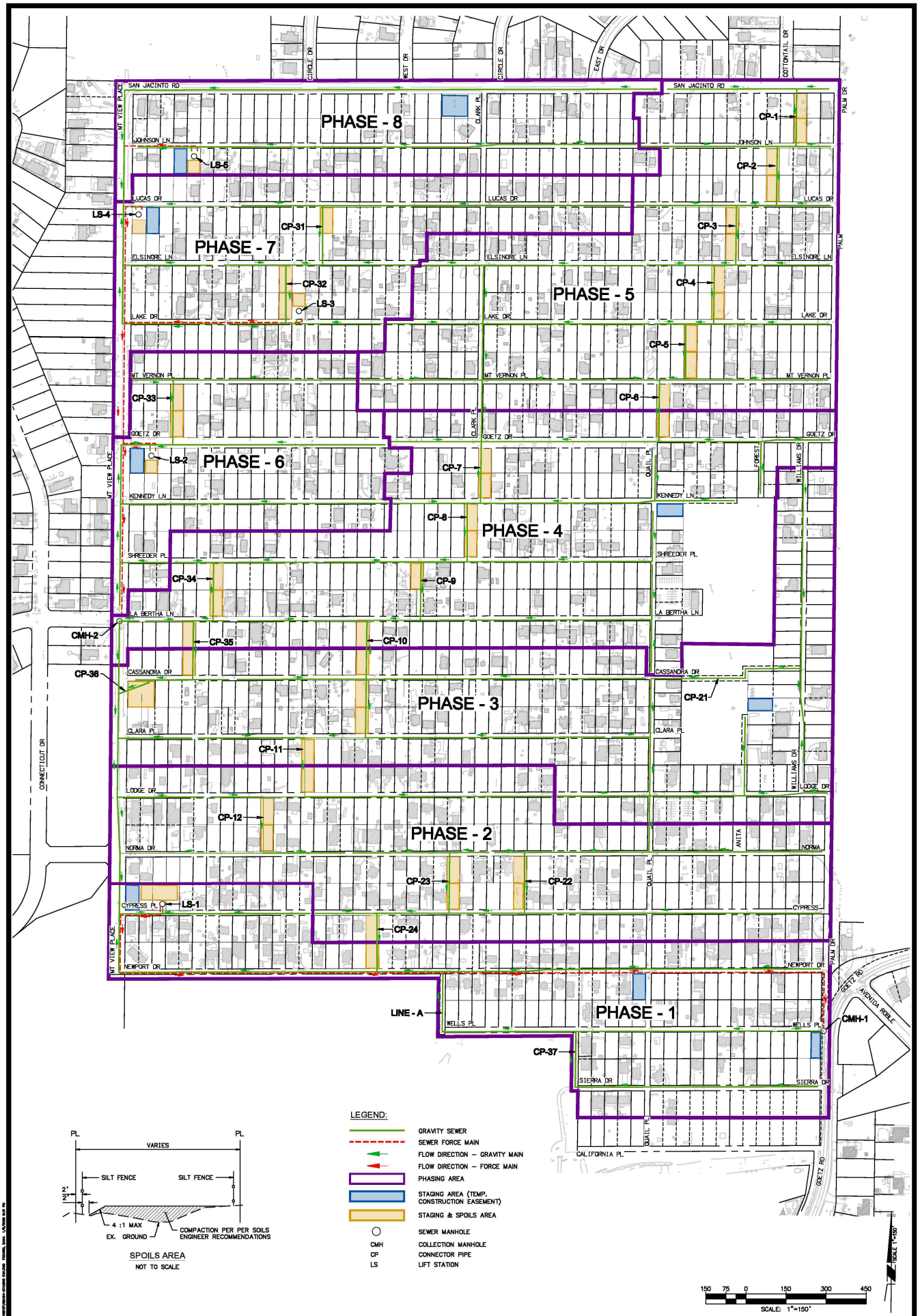
EXHIBIT - 15

QUAIL VALLEY SUBAREA 4

TYPICAL STREET CROSS SECTION DURING SEWER PIPE INSTALLATION ACTIVITY

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\EXHIBITS\196454-X-SECT PIPE CONSTR.DWG 1/6/2025 6:04 PM



SPOILS AREA

NOT TO SCALE

LEGEND:

- GRAVITY SEWER
- SEWER FORCE MAIN
- FLOW DIRECTION – GRAVITY MAIN
- FLOW DIRECTION – FORCE MAIN
- PHASING AREA
- STAGING AREA (TEMP. CONSTRUCTION EASEMENT)
- STAGING & SPOILS AREA
- SEWER MANHOLE
- CMH COLLECTION MANHOLE
- CP CONNECTOR PIPE
- LS LIFT STATION

150 75 0 150 300 450

SCALE: 1"=150'

SCALE 1"=150'

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EXHIBIT - 16

QUAIL VALLEY SUBAREA 4

STAGING AND SPOILS AREAS

15. COST OPINION

An opinion of probable construction cost can be found in Appendix D. This document provides a construction estimate based on the 30% design plans. The estimated construction cost is $99,355,439. This cost was estimated using MII software and the 2023 MII Cost Book Library. This estimate considers contractor markups, direct costs to prime markups, risk and contractor contingencies, and inflation escalation, assuming a midpoint of construction in Fall of 2027. The following items and assumptions have been also included in the direct costs:

1. Mobilization/Demobilization: 8% of the total direct construction cost.
2. Traffic Control: 4% of the total direct construction cost.
3. Third Party Inspection, Testing & Commissioning: 1% of the total direct construction cost.
4. Costs associated with site topographic survey, subsurface utility survey, erosion & sediment control.
5. Additional cost to rent and install trench box due to deep sewer line.
6. Additional cost for rock excavation and hauling as contingency.
7. Additional cost for dewatering of 100 days as contingency.
8. Costs associated with bracing an assumed total of 50 power poles.
9. Additional cost related to power drops at electrical poles.
10. Construction costs of the sewer main, manholes and sewer laterals.
11. Construction costs of the lift stations and associated force mains.
12. Costs for restoring private properties affected by lateral construction.
13. Costs for concrete filling existing septic tanks

The cost opinion in Appendix D is limited to current market construction costs only and does not include soft costs. It specifically excludes the following items:

1. Costs associated with easement and/or land acquisition.
2. Costs for SCE service upgrades required for 3-phase power.
3. Stand-by generators for small lift stations.
4. SCADA system level upgrades/programming to incorporate additional lift stations.
5. Long-term costs associated with the project, such as increased operation and maintenance efforts, and future equipment replacement.
6. Allowance for rock removal that requires specialty removal efforts (e.g., perforation drilling, breaking, etc.)
7. CEQA Mitigation Costs
8. Future cost escalation and inflation adjustment for deferred phasing. Full implementation of SA4 sewer system is anticipated to take up to 20 years from the start of construction. However, this cost opinion only accounts for inflation up to 2027.
9. Engineering and implementation costs associated with engineering design, permitting, construction oversite, administration and project management, legal, and public participation.

15.1 Construction Costs by Phase

The project construction costs are broken down by the phases described in Section 13 and illustrated in Exhibit 14 – Phasing Exhibit. Refer to Table 15.1 for the phased construction costs. Full sized table can be found in Appendix D.

The phased construction costs are retroactively calculated based on the cost opinion presented in the document titled “30% Design Cost Estimate for Sewer Improvements at Quail Valley, California” and

located in Appendix D. The overall project cost is distributed across the phases based on the geographical area weight of each phase. Phase 1 cost is weighted more heavily due to higher contingency associated with the unknown construction conditions in the initial phase of the project. As the project progresses to the later phases, more knowledge about the construction conditions will be gained, justifying a lower contingency. This method allocates the costs proportionally according to how much area or scope each phase covers compared to the total project.

The construction phasing is preliminary and may be adjusted based on grant funding, stakeholder participation, and EMWD CIP implementation. The project phases were initially subdivided into increments of approximately $15 million to align with the anticipated maximum grant amount. This approach aims to fund each phase within the anticipated grant limits.

Table 15.1: Sewer System Construction Costs by Phase - Summary

ITEM No.	DESCRIPTION	PHASE 1 COST	PHASE 2 COST	PHASE 3 COST	PHASE 4 COST	PHASE 5 COST	PHASE 6 COST	PHASE 7 COST	PHASE 8 COST	PROJECT COST
1	Mobilization, Demobilization	$639,203	$663,402	$683,034	$742,390	$730,975	$334,668	$438,310	$333,755	$4,565,737
2	Traffic Control	$403,331	$418,600	$430,988	$468,440	$461,238	$211,173	$276,570	$210,596	$2,880,936
3	Site Clearing & Preparation	$114,925	$120,033	$122,587	$135,356	$132,802	$61,293	$79,171	$61,293	$827,461
4	Site Topo Survey & Subsurface Utility Survey	$37,386	$38,802	$39,950	$43,422	$42,754	$19,575	$25,636	$19,520	$267,045
5	Selective Demo (asphalt pavement demo)	$1,195,465	$1,240,763	$1,277,500	$1,388,452	$1,367,151	$625,942	$819,805	$624,190	$8,539,268
6	Erosion & Sediment Control	$228,099	$238,236	$243,305	$268,649	$263,581	$121,653	$157,135	$121,653	$1,642,310
7	Earthwork, Aggregate Base, Backfill & Cycle Hauling	$1,936,528	$2,009,799	$2,069,324	$2,249,091	$2,214,567	$1,013,882	$1,327,852	$1,011,068	$13,832,112
8	12" Sanitary Sewer Piping (20% of total pipe length)	$1,031,317	$1,031,046	$1,031,046	$0	$0	$0	$0	$0	$3,093,408
9	8" Sanitary Sewer Piping (80% of total pipe length)	$1,122,231	$1,203,580	$1,269,357	$2,488,776	$2,450,384	$1,121,695	$1,469,371	$1,118,741	$12,244,136
10	4' Sanity Sewer Manholes	$758,606	$773,779	$804,123	$864,811	$849,639	$394,475	$515,852	$394,475	$5,355,761
11	Sewer Laterals to Existing Development w/ Basic Restoration	$338,137	$338,137	$351,662	$378,713	$378,713	$175,831	$229,933	$175,831	$2,366,959
12	Sewer Laterals to Existing Development w/ Pavement Replacement	$1,446,802	$1,505,855	$1,535,382	$1,653,488	$1,653,488	$738,164	$1,003,904	$738,164	$10,275,249
13	Sewer Laterals to Vacant Lots	$970,675	$1,010,134	$1,041,700	$1,128,509	$1,112,725	$512,958	$670,792	$505,067	$6,952,560
14	Lift Station 1, Site Improvement	$4,584,524	$0	$0	$0	$0	$0	$0	$0	$4,584,524
15	Lift Station 2-5, Site Improvement	$0	$0	$0	$0	$0	$2,412,907	$4,825,815	$2,412,907	$9,651,629
16	4" Force Main	$254,287	$0	$0	$0	$0	$76,753	$124,764	$23,982	$479,786
17	Brace Power Pole	$70,968	$70,968	$70,968	$81,107	$81,107	$40,553	$50,692	$40,553	$506,917
18	Third Party Inspections, Testing & Commissioning	$100,833	$104,650	$107,746	$117,110	$115,310	$52,793	$69,143	$52,650	$720,235
19	Site Improvement (New Asphalt Pavement)	$1,479,677	$1,535,744	$1,581,214	$1,718,544	$1,692,180	$774,755	$1,014,707	$772,586	$10,569,407
Phase Cost		$16,712,996	$12,303,527	$12,659,886	$13,726,860	$13,546,615	$8,689,072	$13,099,452	$8,617,033	$99,355,440

Note: This cost opinion is limited to our best judgment of anticipated construction expenses and does not constitute a proposal or guarantee. All costs are subject to reflect changes in the cost of labor, contractor's method of determining prices, project revisions, and general market conditions. This cost opinion is limited to construction costs only and excludes items as property acquisitions, engineering, inspections, project administration, electrical service upgrades, CEQA mitigation costs, permitting costs, etc. Please refer to PDR section 14 for items and assumptions included in direct costs and items excluded.

15.2 Property Acquisition Costs

This section addresses property acquisition costs, which were not included in the 30% Design Cost Estimate found in Appendix D. This section discusses the cost related to property procurement including the cost for acquiring a property or easement and the acquisition services.

The Real Property Team at EMWD anticipates a typical property acquisition cost of $45,000 per parcel. This projection is based on the analysis of approximately 30 lots currently listed for sale, with prices ranging from $15,000 to $95,000 per lot. Most lots had listing prices between $30,000 and $40,000. Separately, the estimated acquisition cost for the regional lift station parcel is $300,000, reflecting the larger size and higher value of the parcel specified at the LS-1 Alternative 2 location.

The costs for acquiring an easement have been excluded because most lots are too small for an easement. A 20-foot-wide easement for the sewer pipeline would occupy roughly 25% of the property, likely rendering the lot virtually unusable from the owner's perspective. Because of the small lot size, EMWD will likely need to acquire entire lots where easements are identified.

EMWD will need to acquire or obtain easements for 51 parcels for the construction of connector pipes, 4 parcels for the smaller lift station sites and one to three parcels for the regional lift station site. As a result, approximately 55 parcels, plus one larger parcel for the regional lift station, will need to be acquired for the entire SA4 project. At $45,000 per parcel and $300,000 for the regional lift station parcel, the cost for acquiring these properties will be approximately $2.8 million. Consultant costs for acquisition services are estimated between $500,000 and $1 million, and EMWD labor costs for property acquisition are estimated at approximately 5% of the overall property acquisition cost. This results in total property procurement costs ranging from approximately $3.5 million to $4.0 million, presented in 2024 dollars.

It is ideal to procure all necessary properties at once before Phase 1 sewer construction begins to minimize acquisition costs. Phasing property acquisition in line with the project's phased construction could lead to significant cost increases due to increasing property values as the project is expected to span over 20 years or more. Acquiring all properties in advance allows for a more accurate sewer design, as the exact number of connector pipes and lift stations needed will be known. If properties are acquired in phases, the last few lots may face significantly higher costs, and there is a risk that a seller may refuse to sell. This could necessitate the installation of a lift station and result in last-minute design changes.

15.2.1 Property Acquisition Costs by Phase

If property procurement cannot be completed prior to the start of any construction, this subsection provides a phased breakdown of acquisition costs, organized according to the phases outlined in Section 13 and illustrated in Exhibit 14 – Phasing Exhibit.

Table 15.2 provides a breakdown of the property acquisitions costs by phase and assumes the most conservative value of acquisition service costs based on 2024 property valuations. The total property acquisition costs for all phases are approximately $4 million dollars.

Table 15.2: Property Acquisition Costs by Phase

Item No.	Description	Phase 1 Cost	Phase 2 Cost	Phase 3 Cost	Phase 4 Cost	Phase 5 Cost	Phase 6 Cost	Phase 7 Cost	Phase 8 Cost
1	Acquisition of property and easement	$480,000	$360,000	$540,000	$495,000	$450,000	$135,000	$270,000	$45,000
2	Acquisition Services – Consultant Fees	$100,000	$140,000	$210,000	$200,000	$180,000	$50,000	$100,000	$20,000
3	District Labor Cost for Property Acquisition	$20,000	$28,000	$42,000	$40,000	$36,000	$10,000	$20,000	$4,000
Total Acquisition Cost:		$600,000	$528,000	$792,000	$735,000	$666,000	$195,000	$390,000	$69,000

15.3 Additional Soft Costs

Additional soft costs are added as a percentage of the total construction costs. The percentages listed below represent assumed values for certain soft cost categories. However, they do not encompass all potential soft costs (e.g. electrical infrastructure upgrades, standby generator costs, SCADA costs, etc.) due to insufficient definition of the require elements at this stage:

- Final Design Consultant; Environmental Consultant (EIR/CEQA); EMWD labor for public outreach, grants, and engineering; Legal and Permitting; and SCE Power Agreement: 10% of the construction costs
- Geotechnical, Survey, Environmental, and EMWD direct costs: 20% of the construction costs

The next section provides a cost roll-up of the construction costs and soft costs.

15.4 Project-Level Cost Aggregation

This section provides a project-level cost aggregation, which combines the construction costs, property acquisition costs, and additional soft costs. This cost aggregation is presented in Table 15.3, as 2024 dollars with the construction costs in item 5 accounting for escalation into Fall 2027.

Table 15.3: Project-Level Cost Aggregation

Item No.	Description	Cost
1	Preliminary design for all phases	$2,200,000
2	Property Acquisition	$4,000,000
3	Final Design, EIR, Public Outreach, Grants, Permitting, SCE Power Agreement	$9,900,000
4	Geotechnical, Survey, Environmental and EMWD direct costs	$19,900,000
5	Construction Costs	$99,355,441
	Total Project-Level Cost:	$135,355,441

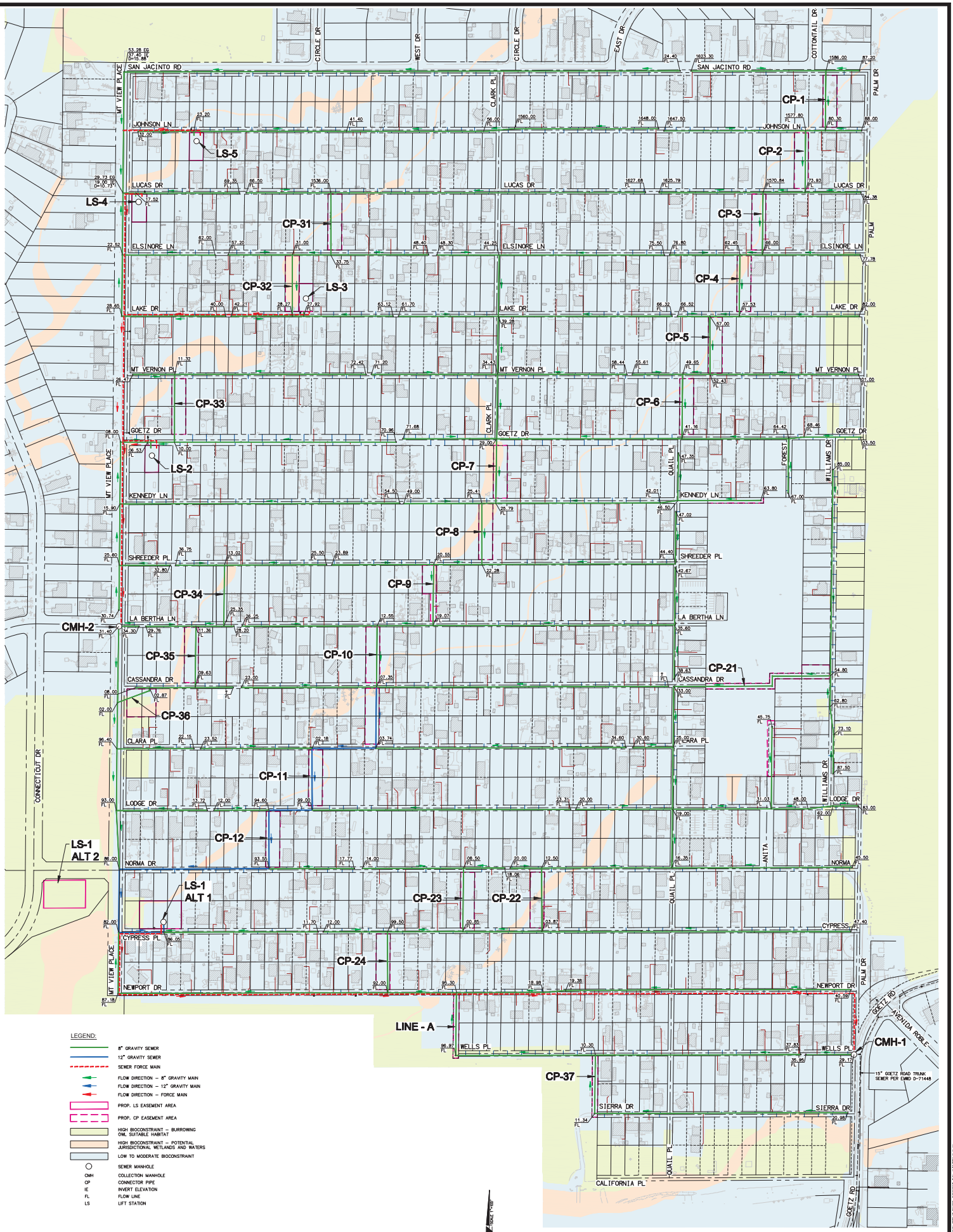
15.5 Connector Pipe vs. Lift Station - Cost Comparison

Because the connector pipes cross back-to-back parcels, two properties will need to be acquired to construct the connector pipes. However, if EMWD cannot acquire both lots, the design must be modified to implement a lift station. If a connector pipe cannot be installed and a lift station is required, the cost will increase by approximately $2.1 million. Table 15.4 provides a breakdown of the costs for incorporating a lift station instead of a connector pipe, including construction, design, and lot acquisition costs. Note that this cost analysis does not account for markups, contingencies, or inflation escalation.

Table 15.4: Increased Costs to Implement Lift Station vs. Connector Pipe

Item No.	Subitem No.	Description	Unit	Unit Cost	Cost
1		Smaller Grinder Station	1	$2,180,000.00	$2,180,000.00
	1a	Lot Acquisition	1	$30,000.00	
	1b	Engineering Design Cost	1	$150,000.00	
	1c	Construction Cost	1	$2,000,000.00	
2		Second Lot Acquisition	1	$(30,000.00)	$(30,000.00)
3		Connector Pipe Construction Cost	1	$(82,500.00)	$(82,500.00)
				Total	$2,067,500.00

APPENDIX A – FULL SIZED EXHIBITS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LUCAS DR
ELSINORE LN
LAKE DR
MT VERNON PL
GOETZ DR
KENNEDY LN
SHREEDER PL
LA BERTHA LN
CASSANDRA DR
CLARA PL
LODGE DR
NORMA DR
CYPRESS PL
NEWPORT DR
WELLS PL
SIERRA DR
CALIFORNIA PL
CIRCLE DR
WEST DR
EAST DR
COTTONTAIL DR
CLARK PL
PALM DR
MT VIEW PLACE
CONNECTICUT DR
QUAIL PL
FOREST
WILLIAMS DR
ANITA
GOETZ RD
AVENIDA ROBLE
CP-1
CP-2
CP-3
CP-4
CP-5
CP-6
CP-7
CP-8
CP-9
CP-10
CP-11
CP-12
CP-21
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CP-24
CP-31
CP-32
CP-33
CP-34
CP-35
CP-36
CP-37
LS-1 ALT 1
LS-1 ALT 2
LS-2
LS-3
LS-4
LS-5
CMH-1
CMH-2
LINE - A
15" GOETZ ROAD TRUNK SEWER PER EMWD D-71448
LEGEND:
8" GRAVITY SEWER
12" GRAVITY SEWER
SEWER FORCE MAIN
FLOW DIRECTION – 8" GRAVITY MAIN
FLOW DIRECTION – 12" GRAVITY MAIN
FLOW DIRECTION – FORCE MAIN
PROP. LS EASEMENT AREA
PROP. CP EASEMENT AREA
HIGH BIOCONSTRAINT – BURROWING OWL SUITABLE HABITAT
HIGH BIOCONSTRAINT – POTENTIAL JURISDICTIONAL WETLANDS AND WATERS
LOW TO MODERATE BIOCONSTRAINT
SEWER MANHOLE
CMH COLLECTION MANHOLE
CP CONNECTOR PIPE
IE INVERT ELEVATION
FL FLOW LINE
LS LIFT STATION
SCALE: 1"=100'
100 50 0 100 200 300
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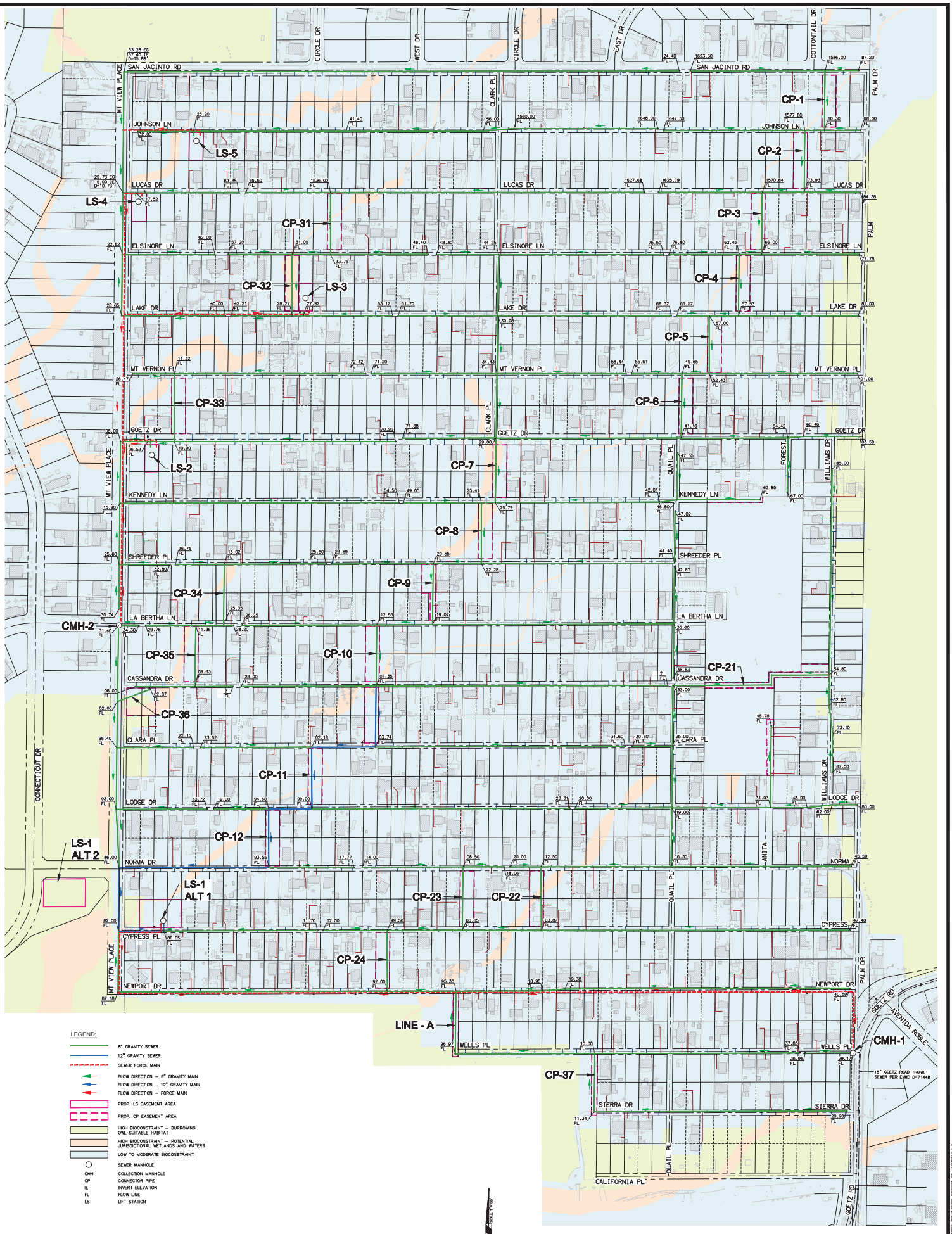
MBAKERINTL.COM
EXHIBIT 1
QUAIL VALLEY SUBAREA 4
PROPOSED SEWER IMPROVEMENTS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JOHNSON LN
LUCAS DR
ELSINORE LN
LAKE DR
MT VERNON PL
GOETZ DR
KENNEDY LN
SHREEDER PL
LA BERTHA LN
CASSANDRA DR
CLARA PL
LODGE DR
NORMA DR
CYPRESS PL
NEWPORT DR
WELLS PL
SIERRA DR
CALIFORNIA PL
CIRCLE DR
WEST DR
EAST DR
COTTONTAIL DR
CLARK PL
PALM DR
MT VIEW PLACE
CONNECTICUT DR
QUAIL PL
FOREST
WILLIAMS DR
ANITA
GOETZ RD
AVENIDA ROBLE
CP-1
CP-2
CP-3
CP-4
CP-5
CP-6
CP-7
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CP-37
LS-1 ALT 1
LS-1 ALT 2
LS-2
LS-3
LS-4
LS-5
CMH-1
CMH-2
LINE - A
15" GOETZ ROAD TRUNK SEWER PER EMWD D-71448
LEGEND:
8" GRAVITY SEWER
12" GRAVITY SEWER
SEWER FORCE MAIN
FLOW DIRECTION – 8" GRAVITY MAIN
FLOW DIRECTION – 12" GRAVITY MAIN
FLOW DIRECTION – FORCE MAIN
PROP. LS EASEMENT AREA
PROP. CP EASEMENT AREA
HIGH BIOCONSTRAINT – BURROWING OWL SUITABLE HABITAT
HIGH BIOCONSTRAINT – POTENTIAL JURISDICTIONAL WETLANDS AND WATERS
LOW TO MODERATE BIOCONSTRAINT
SEWER MANHOLE
CMH COLLECTION MANHOLE
CP CONNECTOR PIPE
IE INVERT ELEVATION
FL FLOW LINE
LS LIFT STATION
SCALE: 1"=100'
100 50 0 100 200 300
EXHIBIT 1
QUAIL VALLEY SUBAREA 4
PROPOSED SEWER IMPROVEMENTS
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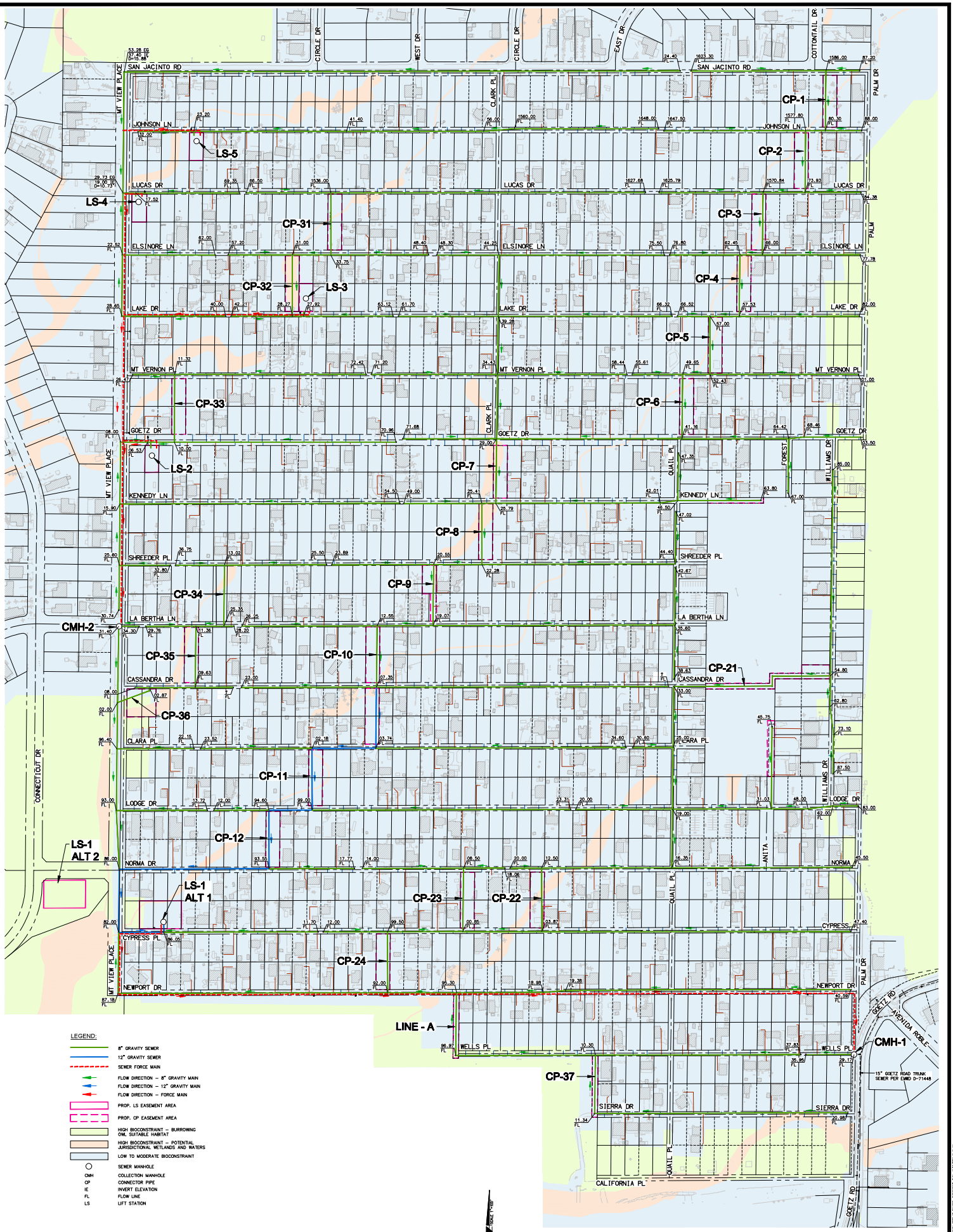

LEGEND:

- 8" GRAVITY SEWER
- 12" GRAVITY SEWER
- SEWER FORCE MAIN
- FLOW DIRECTION – 8" GRAVITY MAIN
- FLOW DIRECTION – 12" GRAVITY MAIN
- FLOW DIRECTION – FORCE MAIN
- PROP. LS EASEMENT AREA
- PROP. CP EASEMENT AREA
- HIGH BIOCONSTRAINT – BURROWING OWL SUITABLE HABITAT
- HIGH BIOCONSTRAINT – POTENTIAL JURISDICTIONAL WETLANDS AND WATERS
- LOW TO MODERATE BIOCONSTRAINT
- SEWER MANHOLE
- CMH COLLECTION MANHOLE
- CP CONNECTOR PIPE
- IE INVERT ELEVATION
- FL FLOW LINE
- LS LIFT STATION

SCALE: 1"=100'

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EXHIBIT 1

QUAIL VALLEY SUBAREA 4

PROPOSED SEWER IMPROVEMENTS

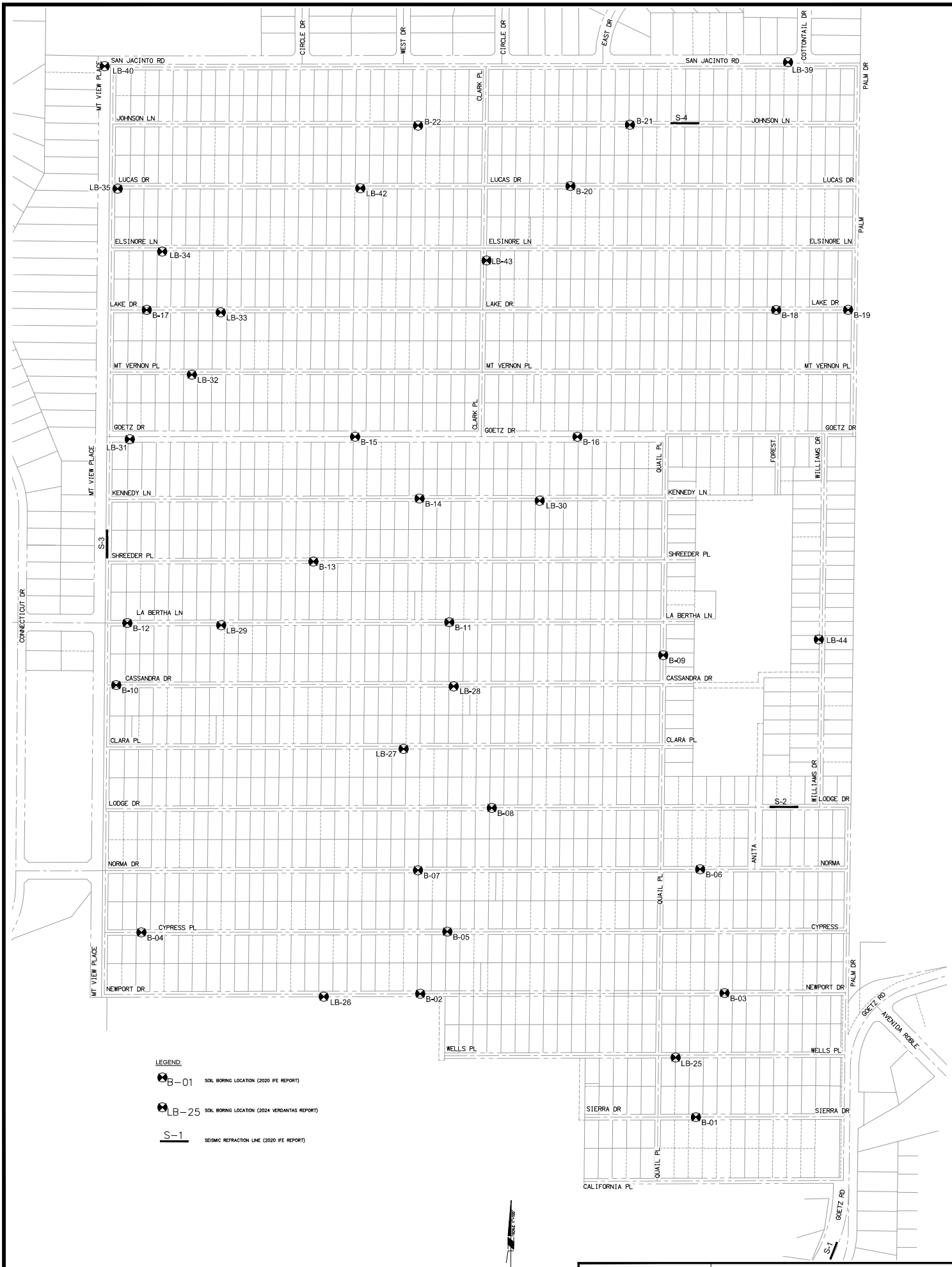

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EXHIBIT - 2

QUAIL VALLEY SUBAREA 4

2024 GEOTECHNICAL EXPLORATION

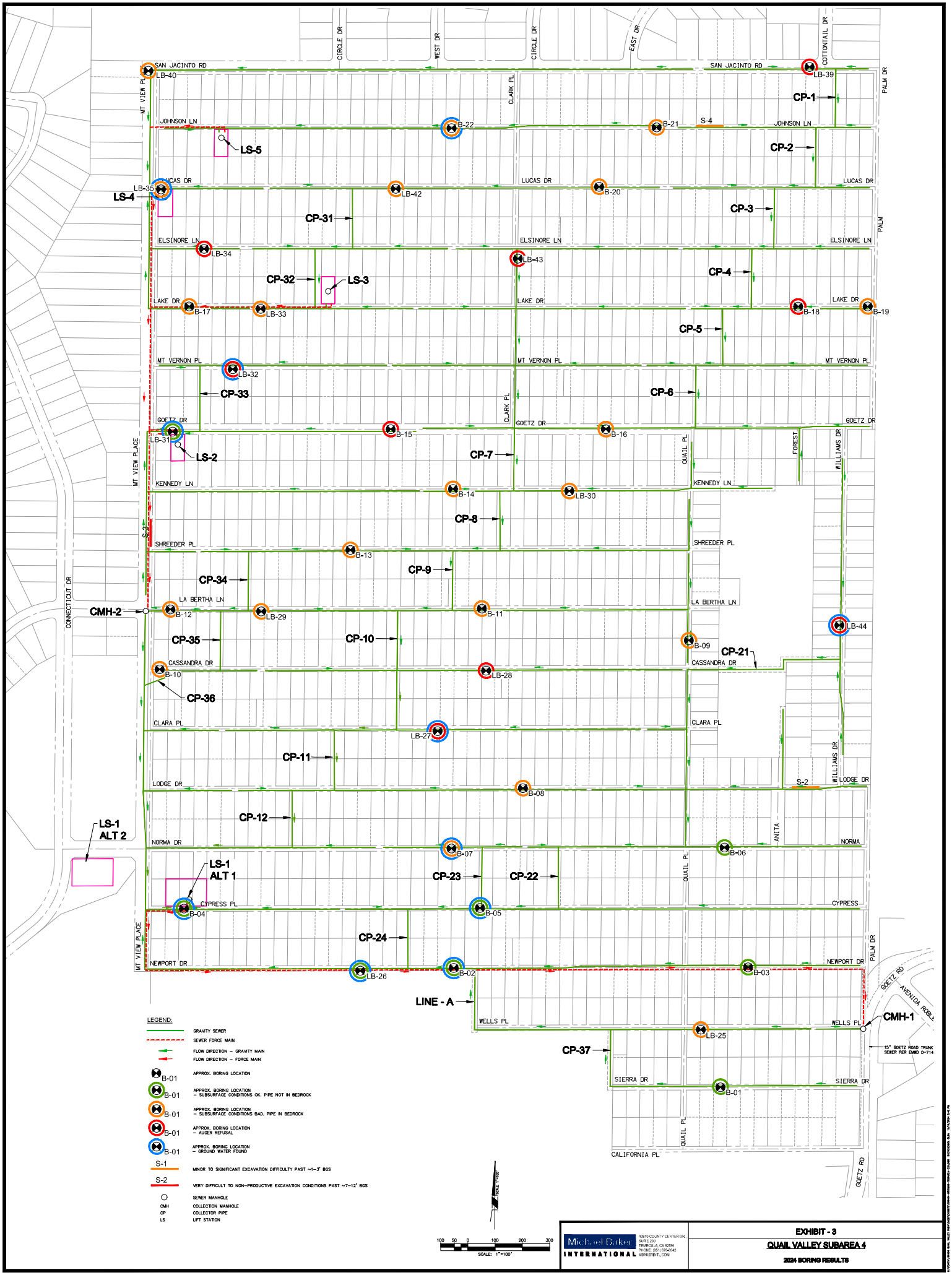
SAN JACINTO RD
LB-40
LB-39
CIRCLE DR
WEST DR
CIRCLE DR
EAST DR
COTTONTAIL DR
PALM DR
MT VIEW PL
CLARK PL
CP-1
JOHNSON LN
B-22
B-21
S-4
LS-5
CP-2
LUCAS DR
LB-35
LB-42
B-20
LS-4
CP-31
CP-3
ELSINORE LN
LB-34
LB-43
CP-32
LS-3
CP-4
LAKE DR
B-17
LB-33
B-18
B-19
CP-5
MT VERNON PL
LB-32
CP-33
CP-6
GOETZ DR
B-15
B-16
LB-31
LS-2
CP-7
QUAIL PL
FOREST
WILLIAMS DR
MT VIEW PLACE
KENNEDY LN
B-14
LB-30
CP-8
S-3
SHREEDER PL
B-13
CP-9
CP-34
LA BERTHA LN
CONNECTICUT DR
CMH-2
B-12
LB-29
B-11
LB-44
CP-35
CP-10
B-09
CP-21
CASSANDRA DR
B-10
LB-28
CP-36
CLARA PL
LB-27
CP-11
LODGE DR
B-08
S-2
LS-1
ALT 2
CP-12
ANITA
NORMA DR
B-07
B-06
LS-1
ALT 1
CP-23
CP-22
CYPRESS PL
B-04
B-05
CP-24
NEWPORT DR
LB-26
B-02
B-03
GOETZ RD
AVENIDA ROBLE
CMH-1
LINE - A
WELLS PL
LB-25
15" GOETZ ROAD TRUNK SEWER PER EMID D-714
CP-37
SIERRA DR
B-01
CALIFORNIA PL
LEGEND:
GRAVITY SEWER
SEWER FORCE MAIN
FLOW DIRECTION – GRAVITY MAIN
FLOW DIRECTION – FORCE MAIN
APPROX. BORING LOCATION
APPROX. BORING LOCATION – SUBSURFACE CONDITIONS OK. PIPE NOT IN BEDROCK
APPROX. BORING LOCATION – SUBSURFACE CONDITIONS BAD. PIPE IN BEDROCK
APPROX. BORING LOCATION – AUGER REFUSAL
APPROX. BORING LOCATION – GROUND WATER FOUND
MINOR TO SIGNIFICANT EXCAVATION DIFFICULTY PAST ~1–3' BGS
VERY DIFFICULT TO NON-PRODUCTIVE EXCAVATION CONDITIONS PAST ~7–12' BGS
SEWER MANHOLE
COLLECTION MANHOLE
COLLECTOR PIPE
LIFT STATION
SCALE: 1"=100'
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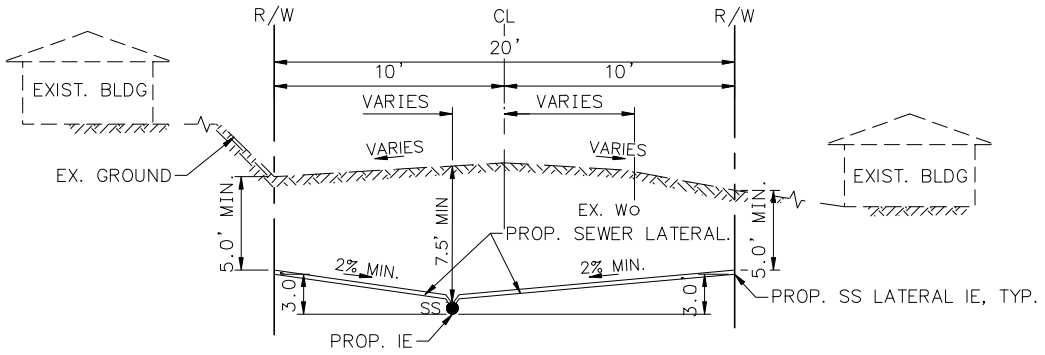
EXHIBIT - 3
QUAIL VALLEY SUBAREA 4
2024 BORING RESULTS

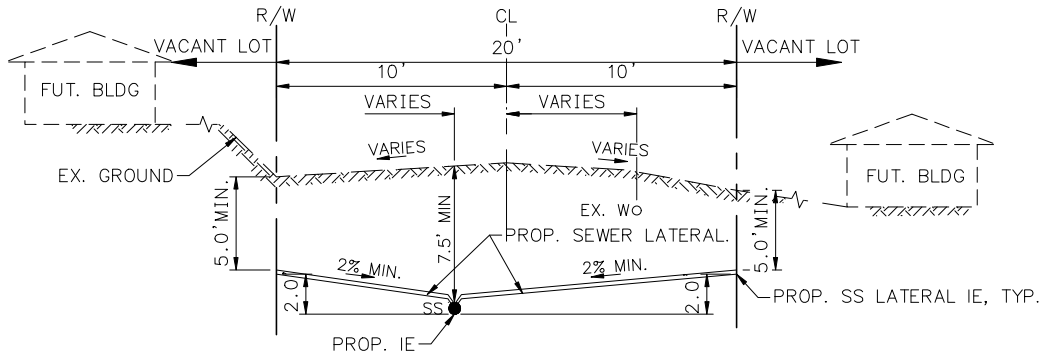


EXISTING HOUSE

PROP. SEWER LATERAL - TYPICAL SECTION

MODIFIED PER STD. NO. SB-177

N.T.S



VACANT LOT

PROP. SEWER LATERAL - TYPICAL SECTION

MODIFIED PER STD. NO. SB-177

N.T.S

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EXHIBIT - 4

QUAIL VALLEY SUBAREA 4

DESIGN METHODOLOGY TYPICAL SECTIONS

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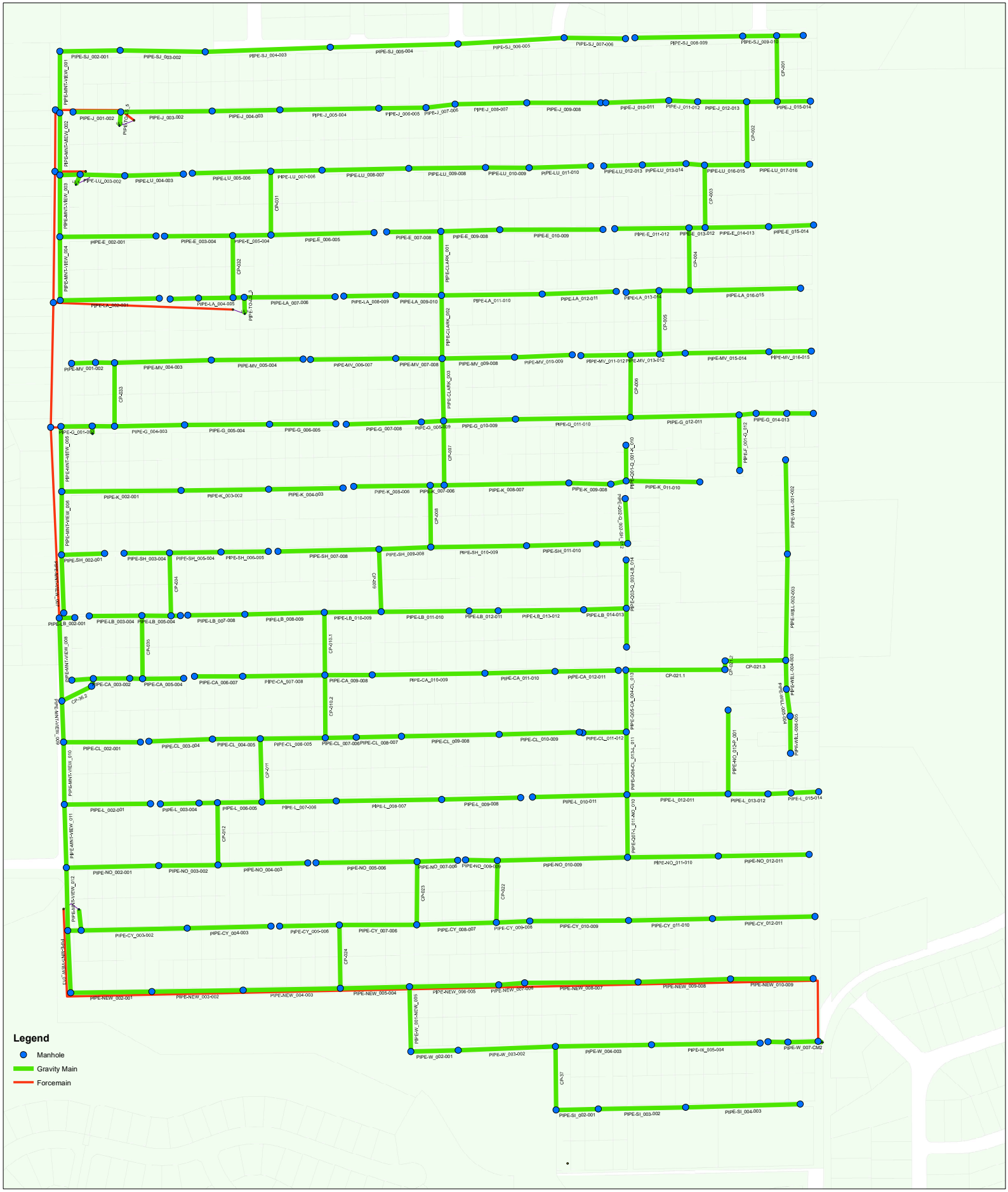

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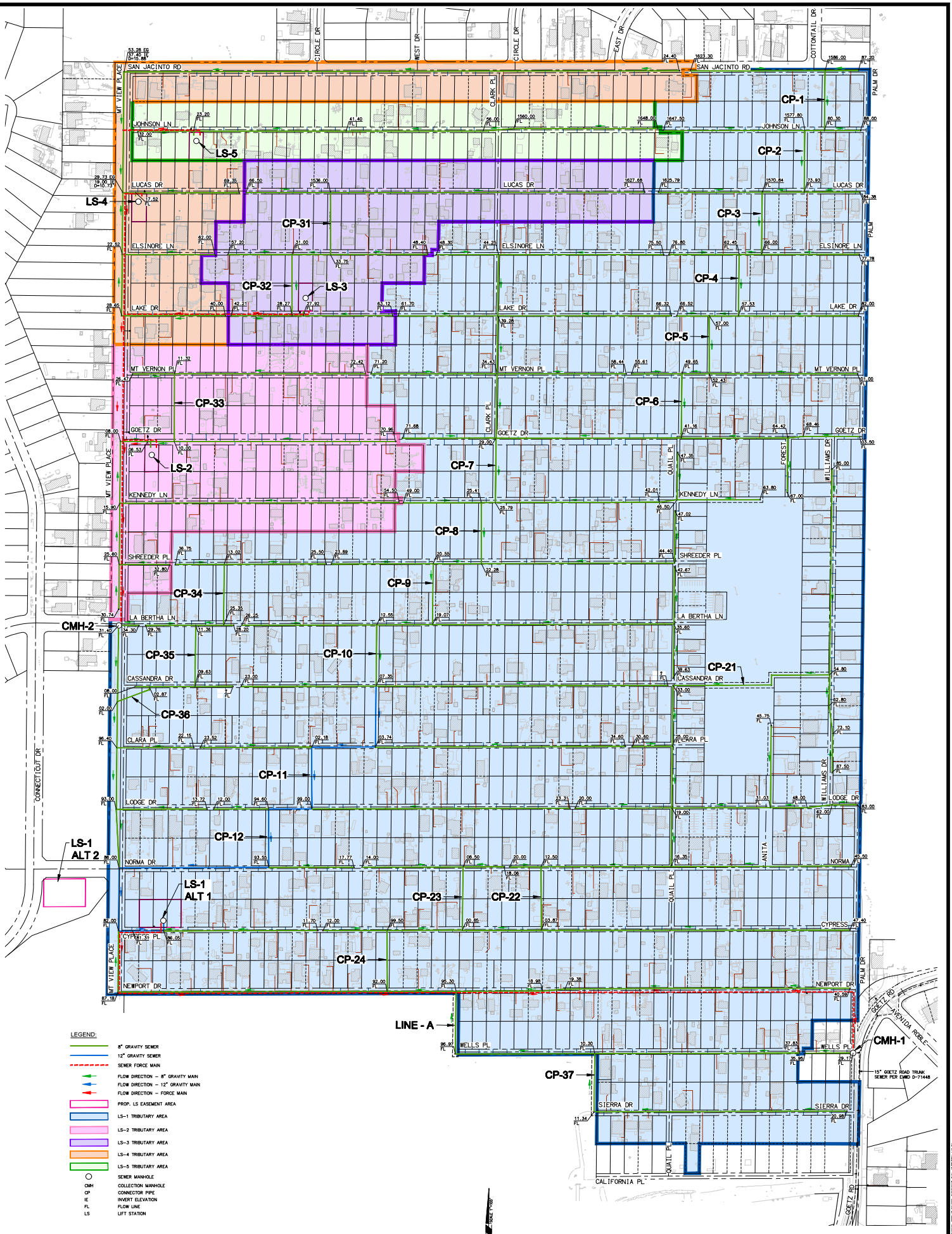
Exhibit 5

INFOSEWER MODEL LAYOUT

N

0 250 500 1,000 Feet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JOHNSON LN
LUCAS DR
ELSINORE LN
LAKE DR
MT VERNON PL
GOETZ DR
KENNEDY LN
SHREEDER PL
LA BERTHA LN
CASSANDRA DR
CLARA PL
LODGE DR
NORMA DR
CYPRESS
NEWPORT DR
WELLS PL
SIERRA DR
CALIFORNIA PL
MT VIEW PLACE
CLARK PL
QUAIL PL
FOREST
WILLIAMS DR
ANITA
PALM DR
CIRCLE DR
WEST DR
EAST DR
COTTONTAIL DR
CONNECTICUT DR
GOETZ RD
AVENIDA ROBLE
CP-1
CP-2
CP-3
CP-4
CP-5
CP-6
CP-7
CP-8
CP-9
CP-10
CP-11
CP-12
CP-21
CP-22
CP-23
CP-24
CP-31
CP-32
CP-33
CP-34
CP-35
CP-36
CP-37
LS-1 ALT 1
LS-1 ALT 2
LS-2
LS-3
LS-4
LS-5
CMH-1
CMH-2
LINE - A
15" GOETZ ROAD TRUNK SEWER PER EMWD D-71448
LEGEND:
8" GRAVITY SEWER
12" GRAVITY SEWER
SEWER FORCE MAIN
FLOW DIRECTION – 8" GRAVITY MAIN
FLOW DIRECTION – 12" GRAVITY MAIN
FLOW DIRECTION – FORCE MAIN
PROP. LS EASEMENT AREA
LS-1 TRIBUTARY AREA
LS-2 TRIBUTARY AREA
LS-3 TRIBUTARY AREA
LS-4 TRIBUTARY AREA
LS-5 TRIBUTARY AREA
SEWER MANHOLE
CMH COLLECTION MANHOLE
CP CONNECTOR PIPE
IE INVERT ELEVATION
FL FLOW LINE
LS LIFT STATION
SCALE: 1"=100'
Michael Baker INTERNATIONAL
EXHIBIT - 6
QUAIL VALLEY SUBAREA 4
LIFT STATION - TRIBUTARY AREA

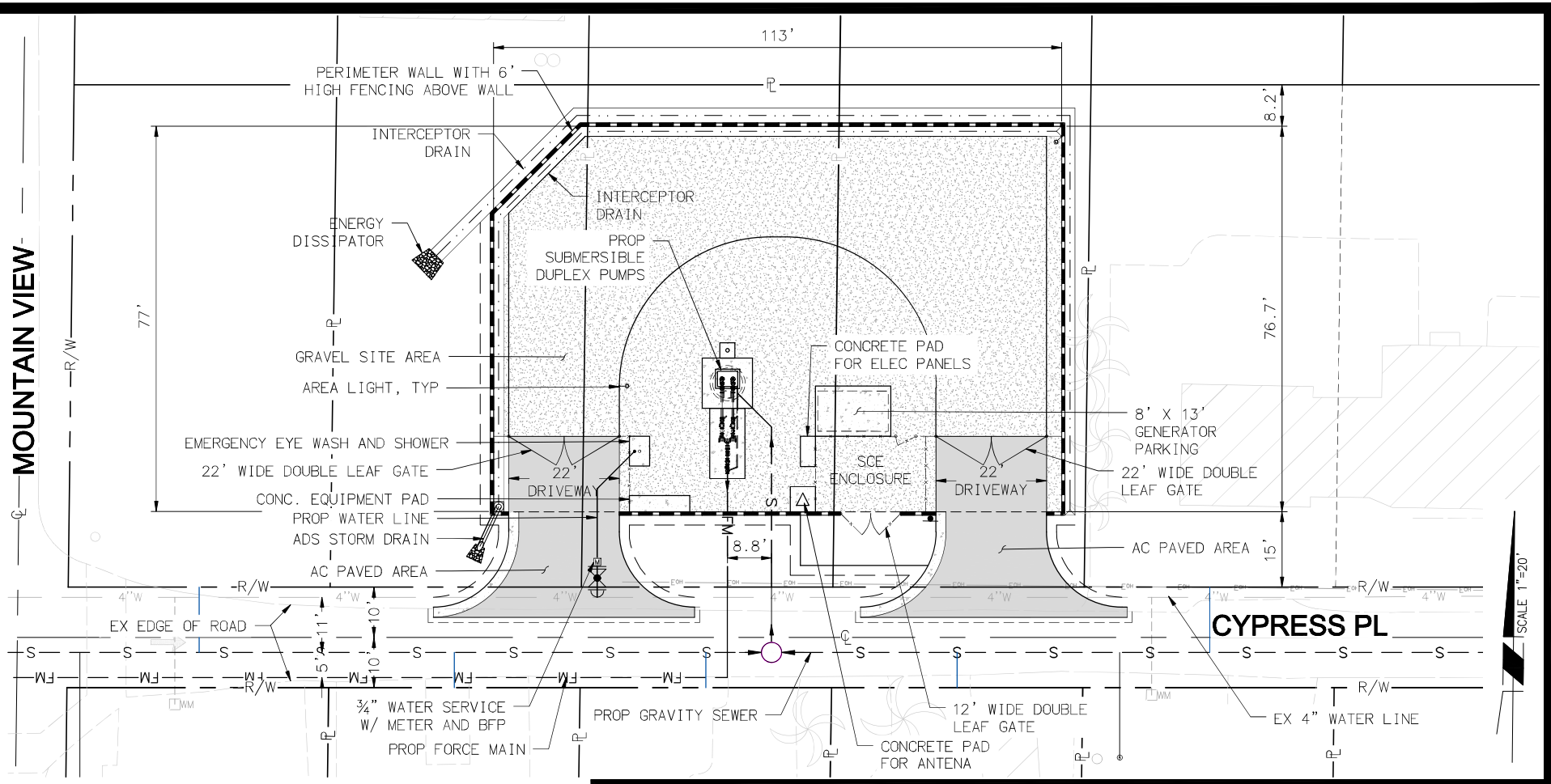

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EXHIBIT - 7

QUAIL VALLEY SUB. 4
LS-1 ALTERNATIVE 1
SITE PLAN

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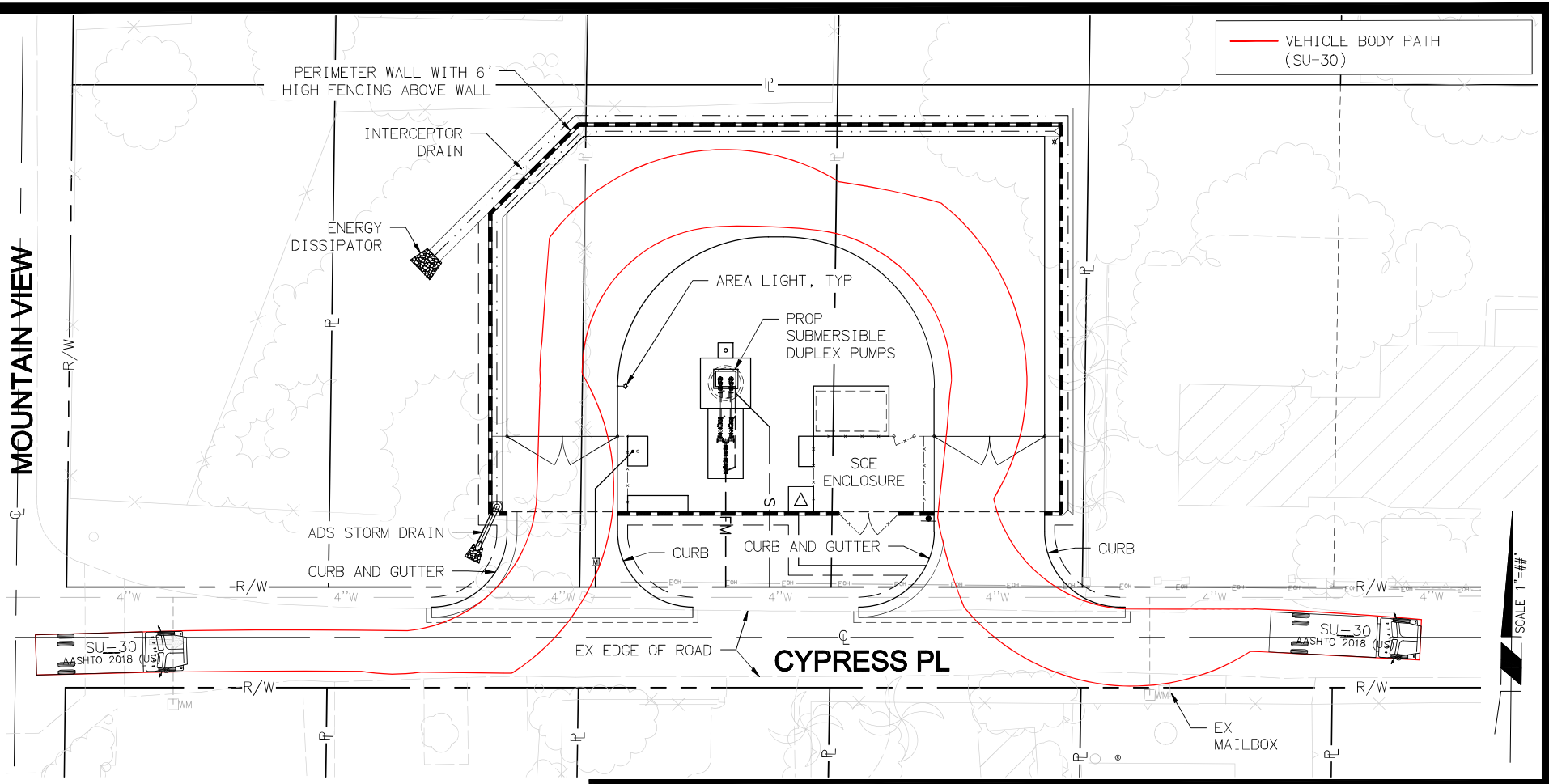

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EXHIBIT - 8

QUAIL VALLEY SUB. 4
LS-1 ALTERNATIVE 1
VEHICLE TRACKING

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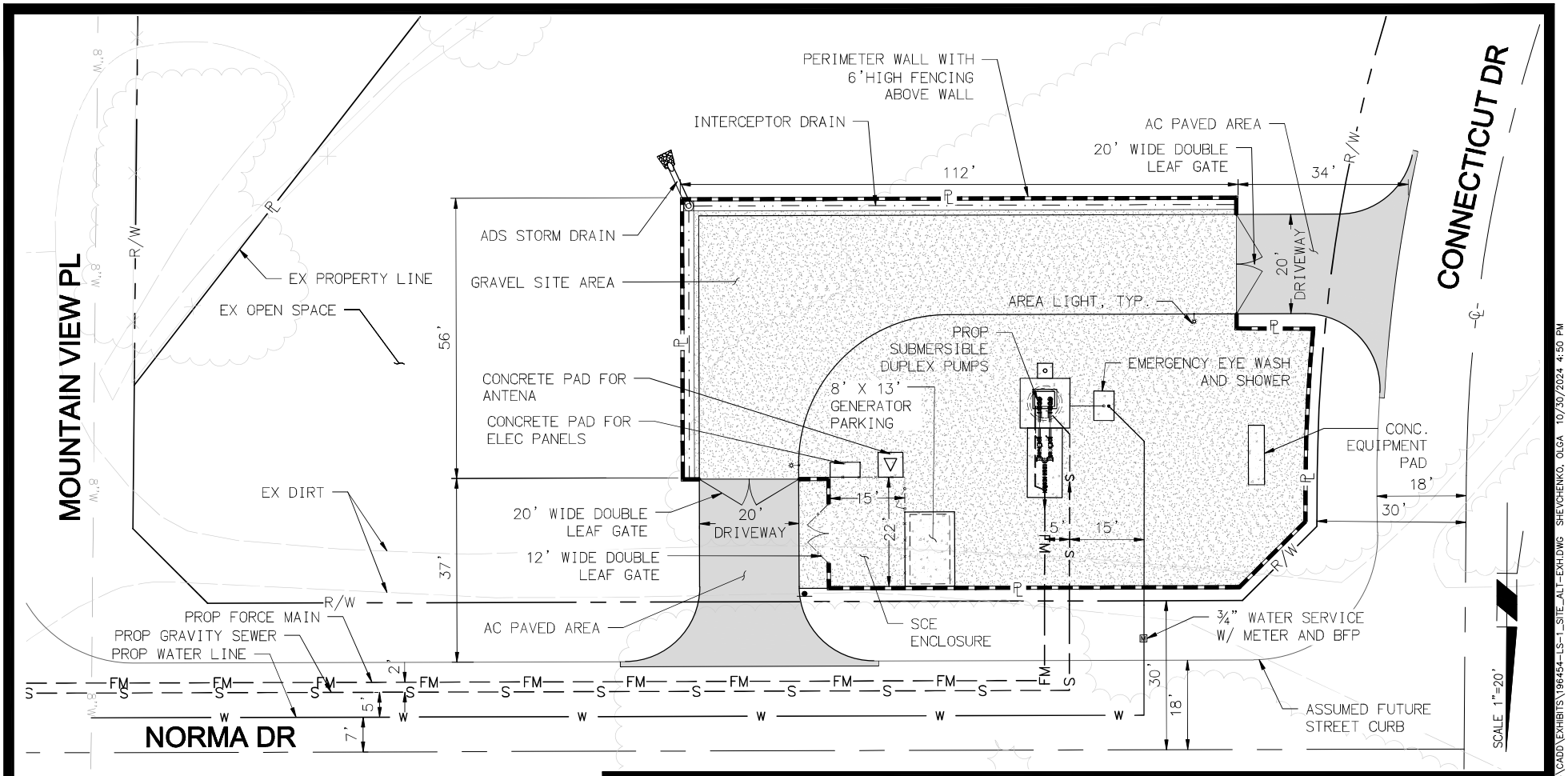

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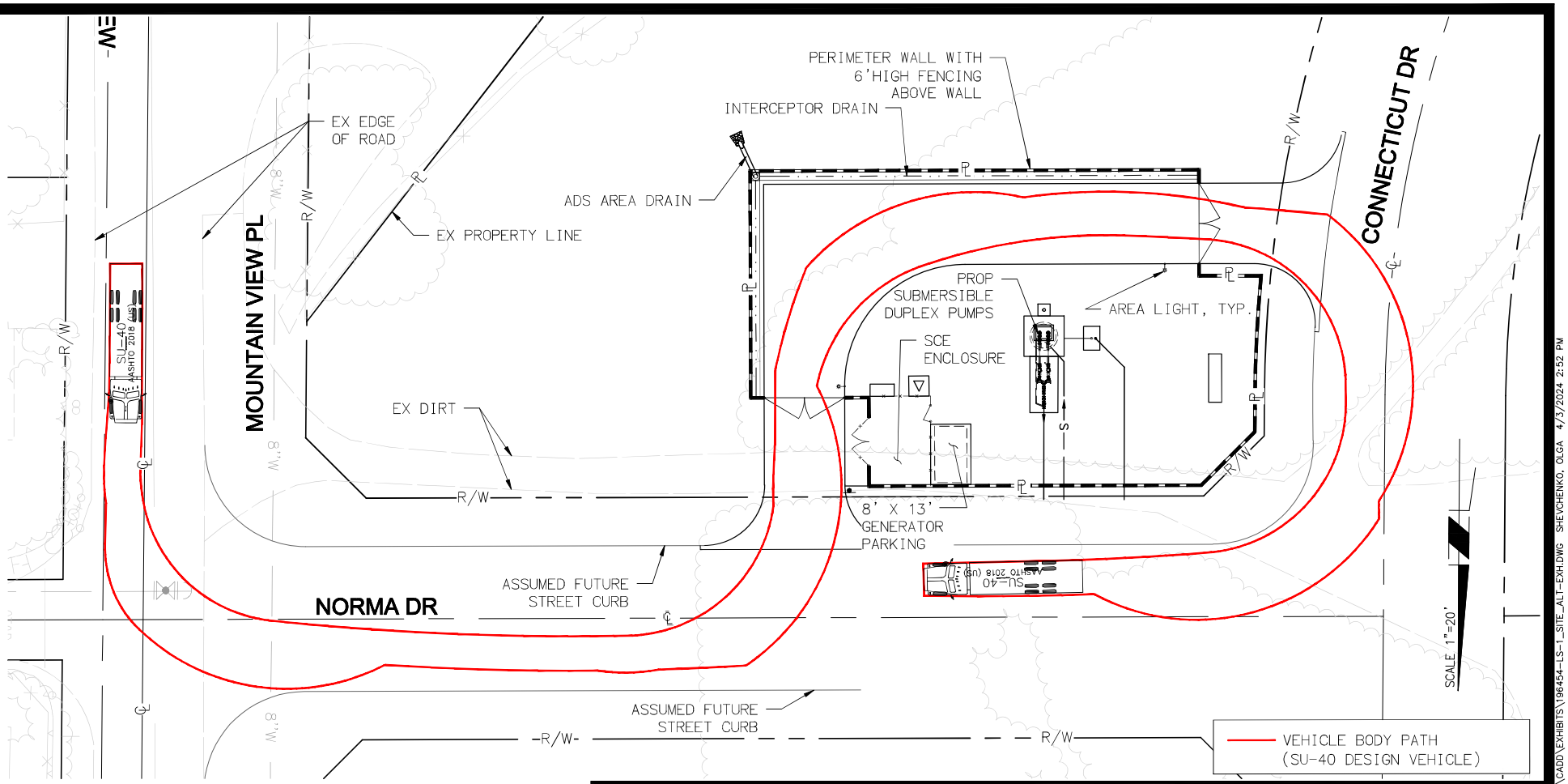
EXHIBIT - 9

QUAIL VALLEY SUB. 4
LS-1 ALTERNATIVE 2
SITE PLAN

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\EXHIBITS\196454-LS-1_SITE_ALT-EXH.DWG SHEVCHENKO, OLGA 10/30/2024 4:50 PM



25 12.5 0 25 50 75

SCALE: 1"=25'

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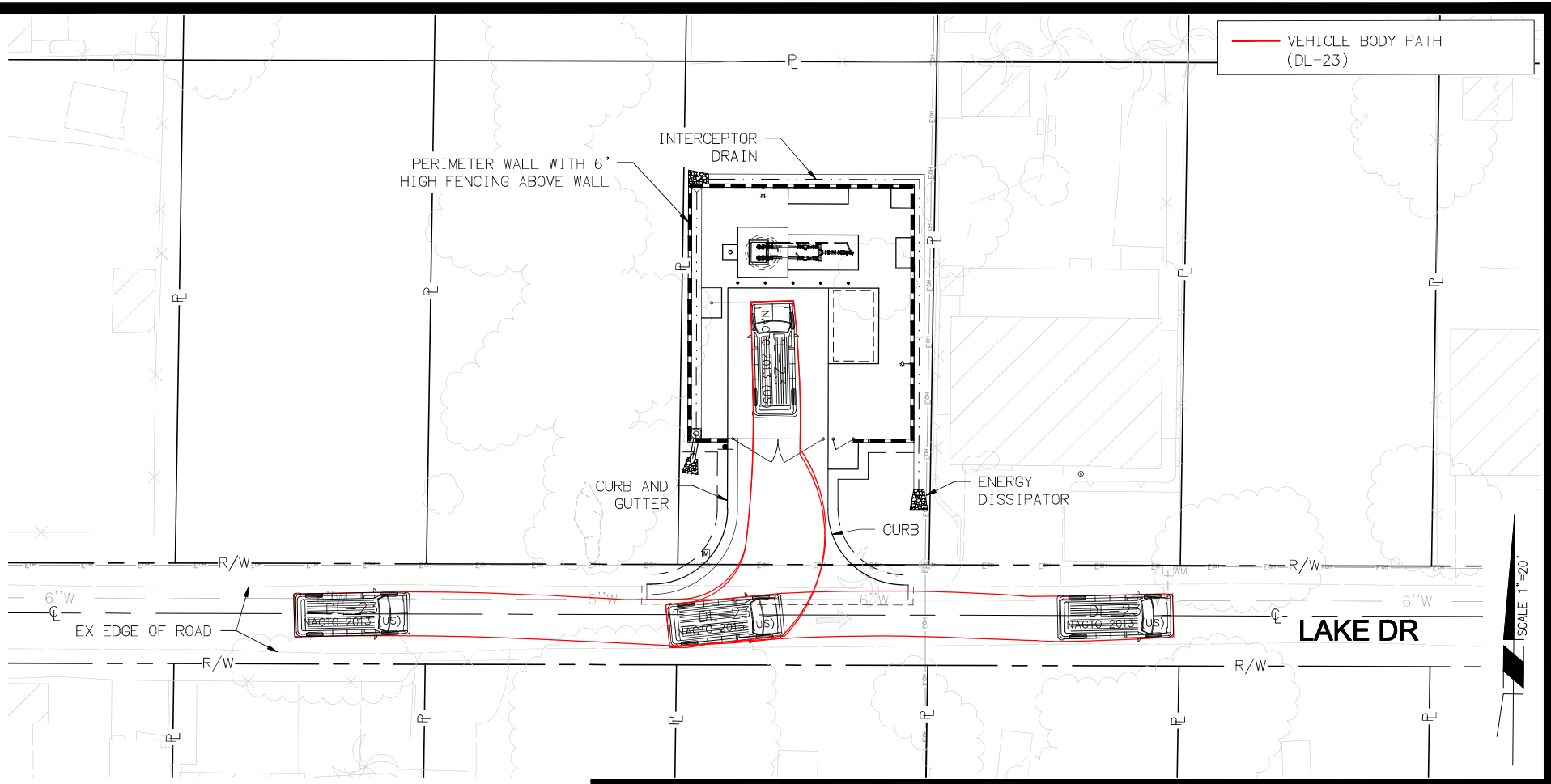
EXHIBIT - 10

QUAIL VALLEY SUB. 4
LS-1 ALTERNATIVE 2
VEHICLE TRACKING

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\EXHIBITS\196454-LS-1_SITE_ALT-EXH.DWG SHEVCHENKO, OLGA 4/3/2024 2:52 PM



20 10 0 20 40 60

SCALE: 1"=20'

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EXHIBIT - 11

QUAIL VALLEY SUB. 4
LIFT STATION 2 - 5
TYPICAL VEHICLE TRACKING

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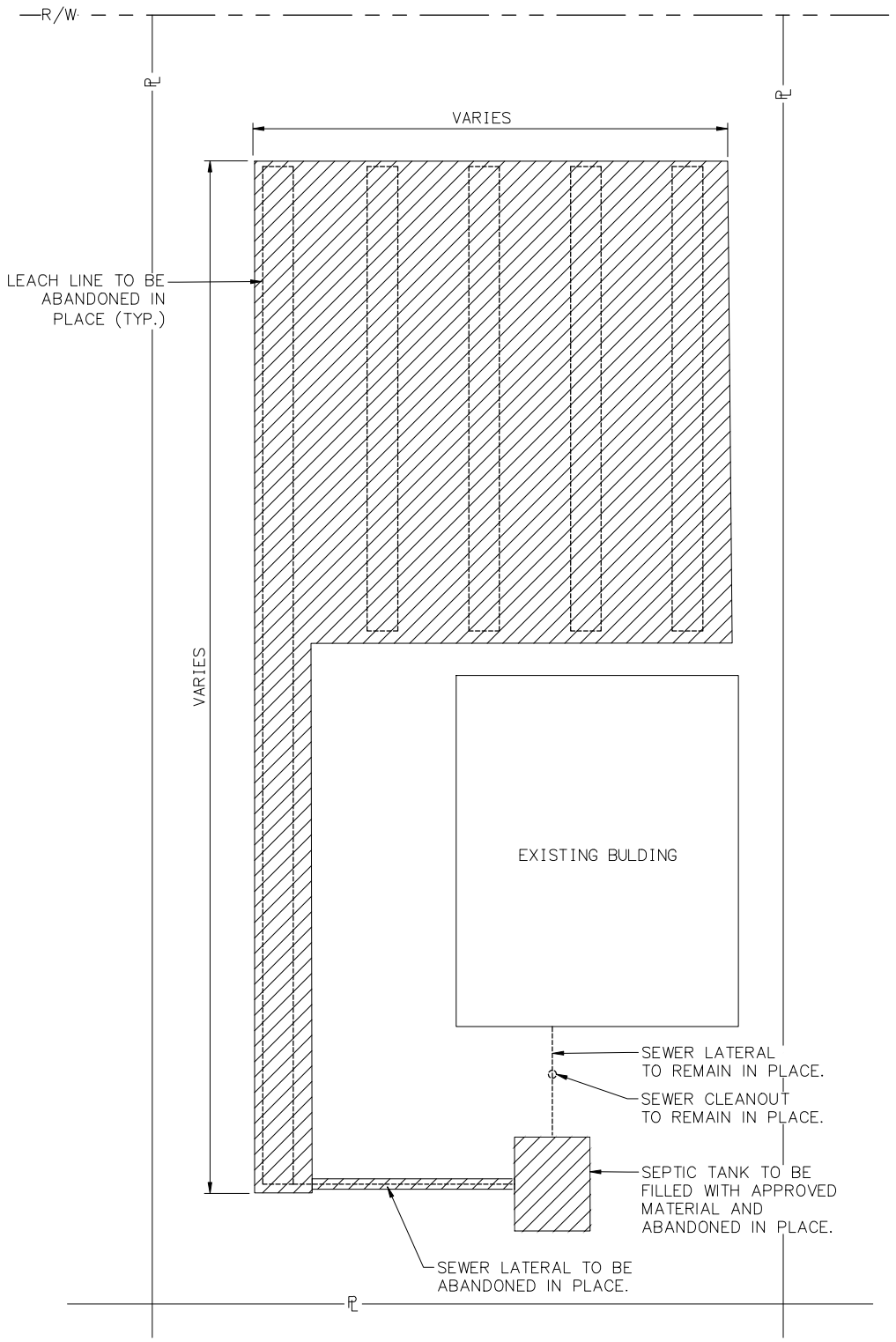

NOTES:
1. DIMENSIONS VARY AT EACH SITE
2. ABANDONMENT WILL FOLLOW THE COUNTY OF RIVERSIDE STANDARDS/UPC

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EXHIBIT - 12

QUAIL VALLEY SUBAREA 4

TYPICAL EXISTING SEPTIC SYSTEM ABANDONMENT

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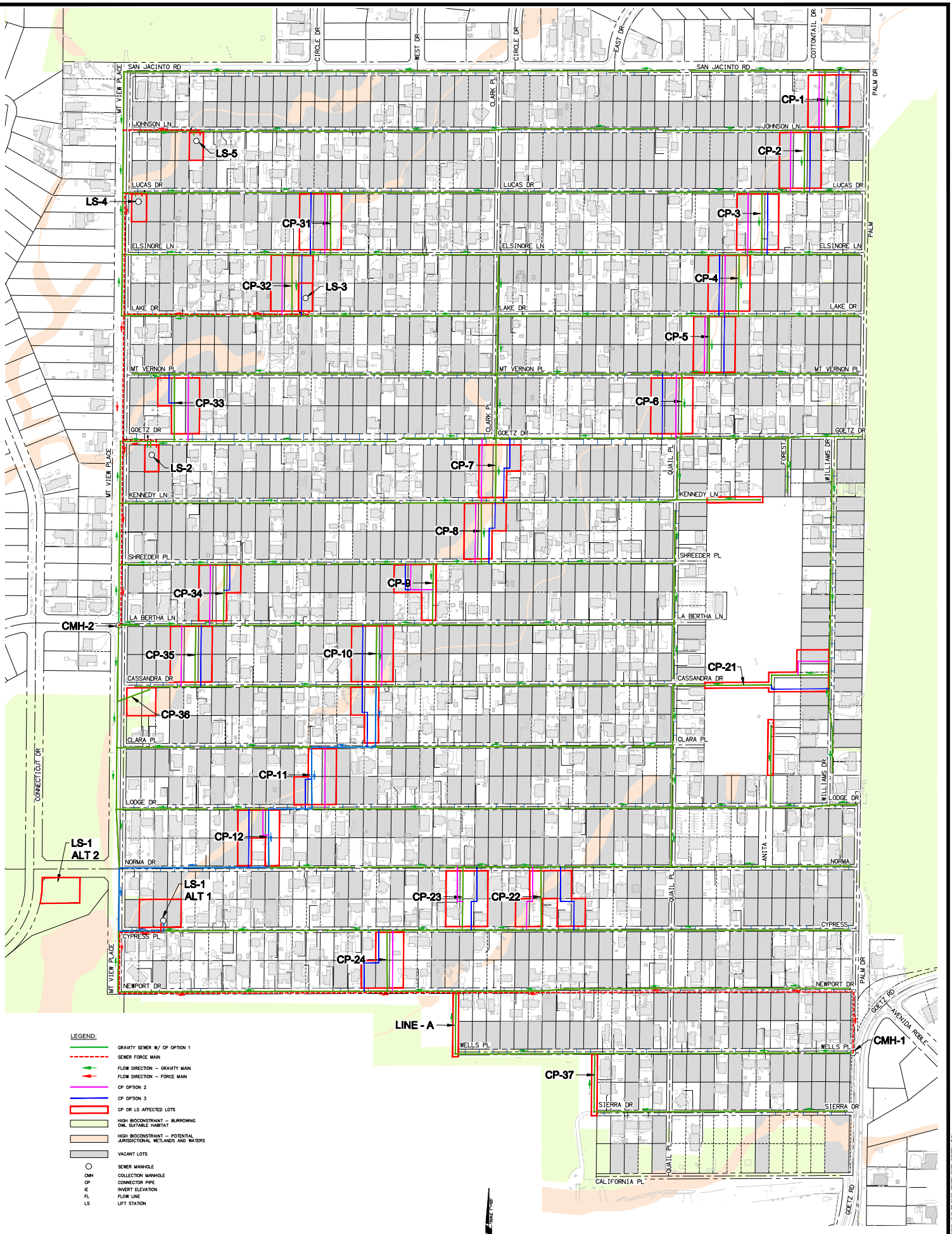
SAN JACINTO RD
JOHNSON LN
LUCAS DR
ELSINORE LN
LAKE DR
MT VERNON PL
GOETZ DR
KENNEDY LN
SHREEDER PL
LA BERTHA LN
CASSANDRA DR
CLARA PL
LODGE DR
NORMA DR
CYPRESS PL
NEWPORT DR
WELLS PL
SIERRA DR
CALIFORNIA PL
MT VIEW PLACE
CLARK PL
QUAIL PL
FOREST
WILLIAMS DR
ANITA
PALM DR
CIRCLE DR
WEST DR
EAST DR
COTTONTAIL DR
CONNECTICUT DR
GOETZ RD
AVENIDA ROBLE
CP-1
CP-2
CP-3
CP-4
CP-5
CP-6
CP-7
CP-8
CP-9
CP-10
CP-11
CP-12
CP-21
CP-22
CP-23
CP-24
CP-31
CP-32
CP-33
CP-34
CP-35
CP-36
CP-37
LS-1 ALT 1
LS-1 ALT 2
LS-2
LS-3
LS-4
LS-5
CMH-1
CMH-2
LINE - A
LEGEND:
GRAVITY SEWER W/ CP OPTION 1
SEWER FORCE MAIN
FLOW DIRECTION – GRAVITY MAIN
FLOW DIRECTION – FORCE MAIN
CP OPTION 2
CP OPTION 3
CP OR LS AFFECTED LOTS
HIGH BIOCONSTRAINT – BURROWING OWL SUITABLE HABITAT
HIGH BIOCONSTRAINT – POTENTIAL JURISDICTIONAL WETLANDS AND WATERS
VACANT LOTS
SEWER MANHOLE
CMH COLLECTION MANHOLE
CP CONNECTOR PIPE
IE INVERT ELEVATION
FL FLOW LINE
LS LIFT STATION
SCALE: 1"=100'
100 50 0 100 200 300
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EXHIBIT - 13
QUAIL VALLEY SUBAREA 4
PROPERTY ACQUISITION OR EASEMENT NEEDS - OPTIONS

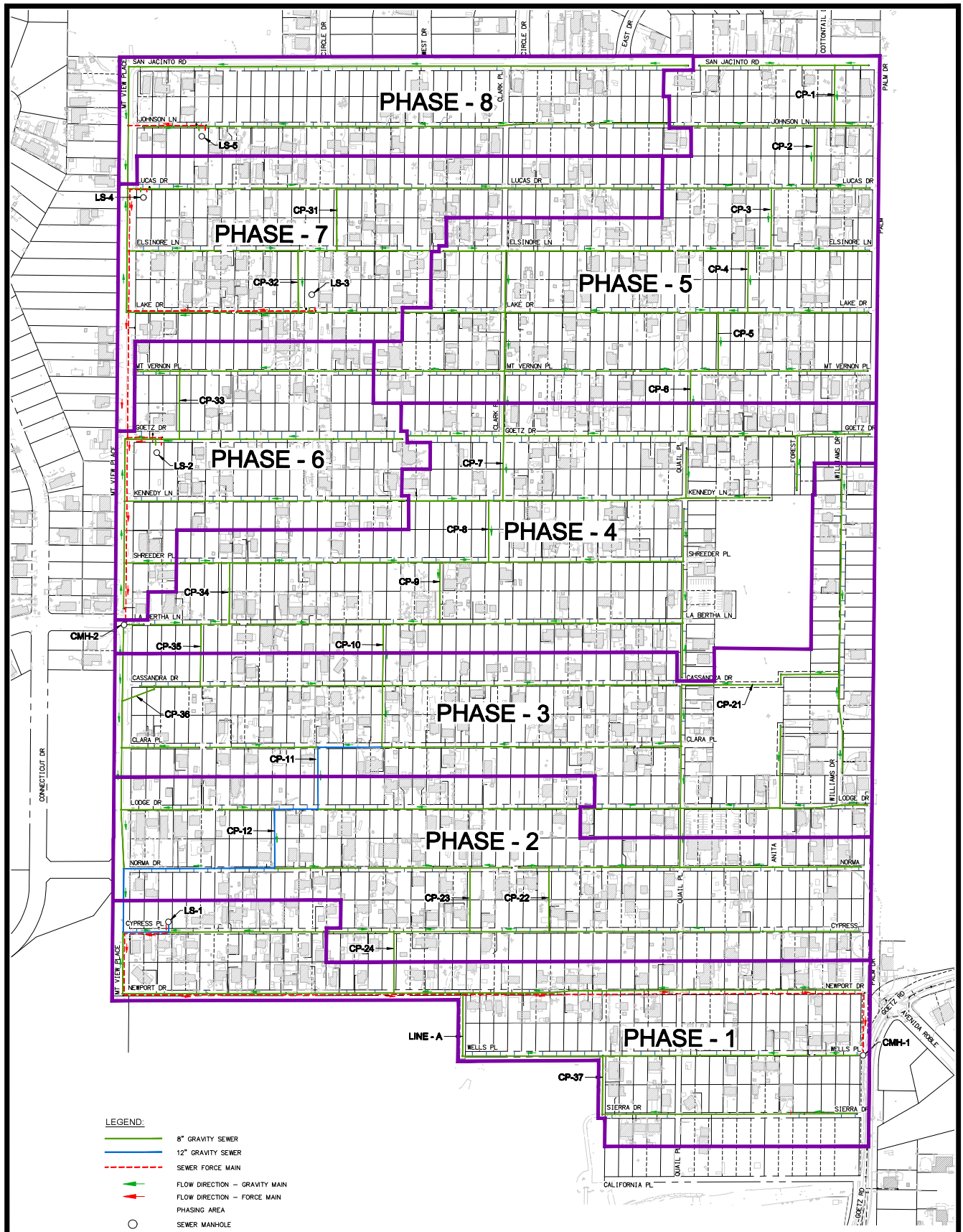

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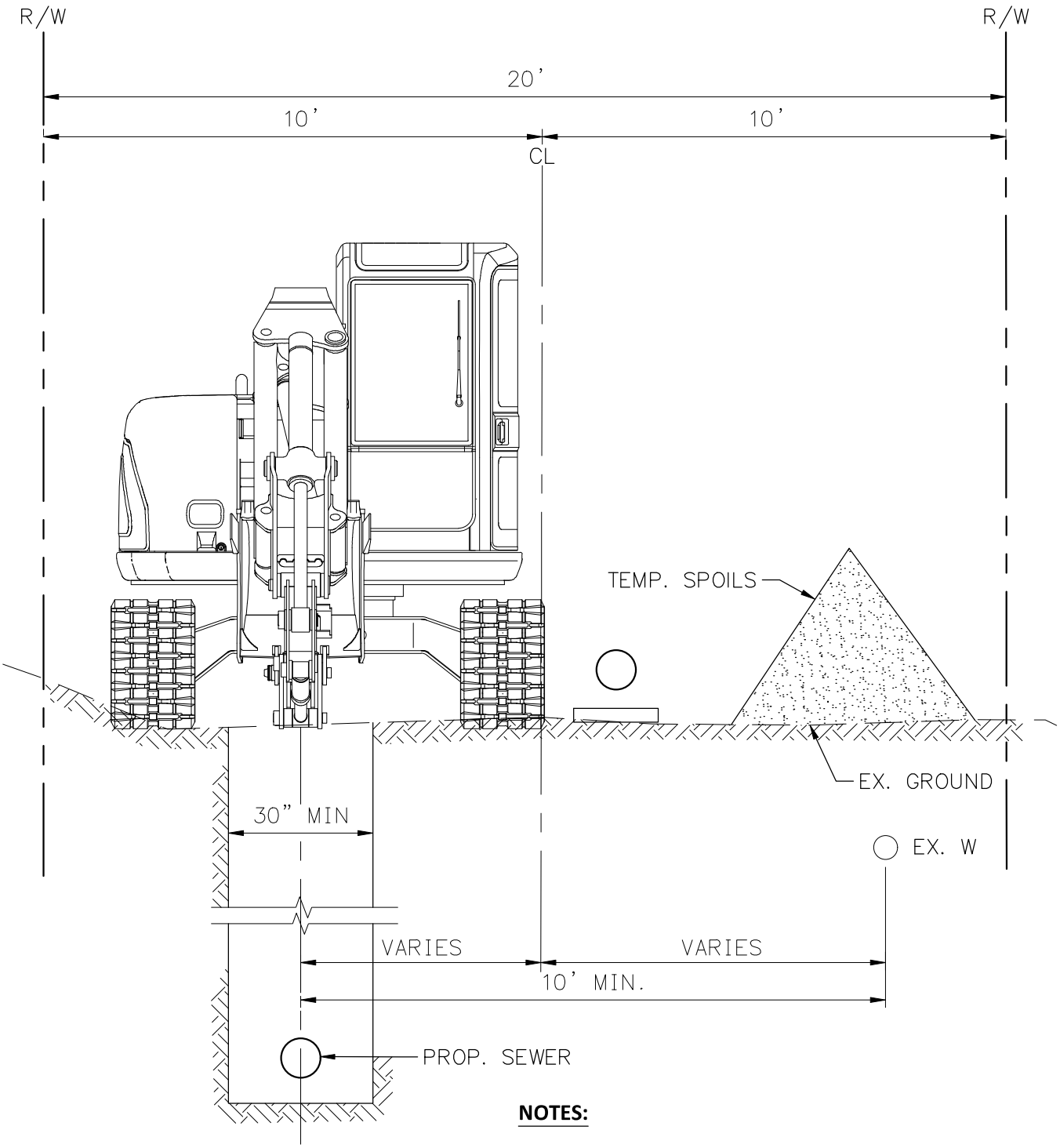
EXHIBIT - 14

QUAIL VALLEY SUBAREA 4

PHASING SEWER IMPROVEMENTS



NOTES:

TYPICAL WORKING WIDTH – MAY VARY DEPENDING ON SIZE OF PIPE, DEPTH AND GROUND CONDITIONS.

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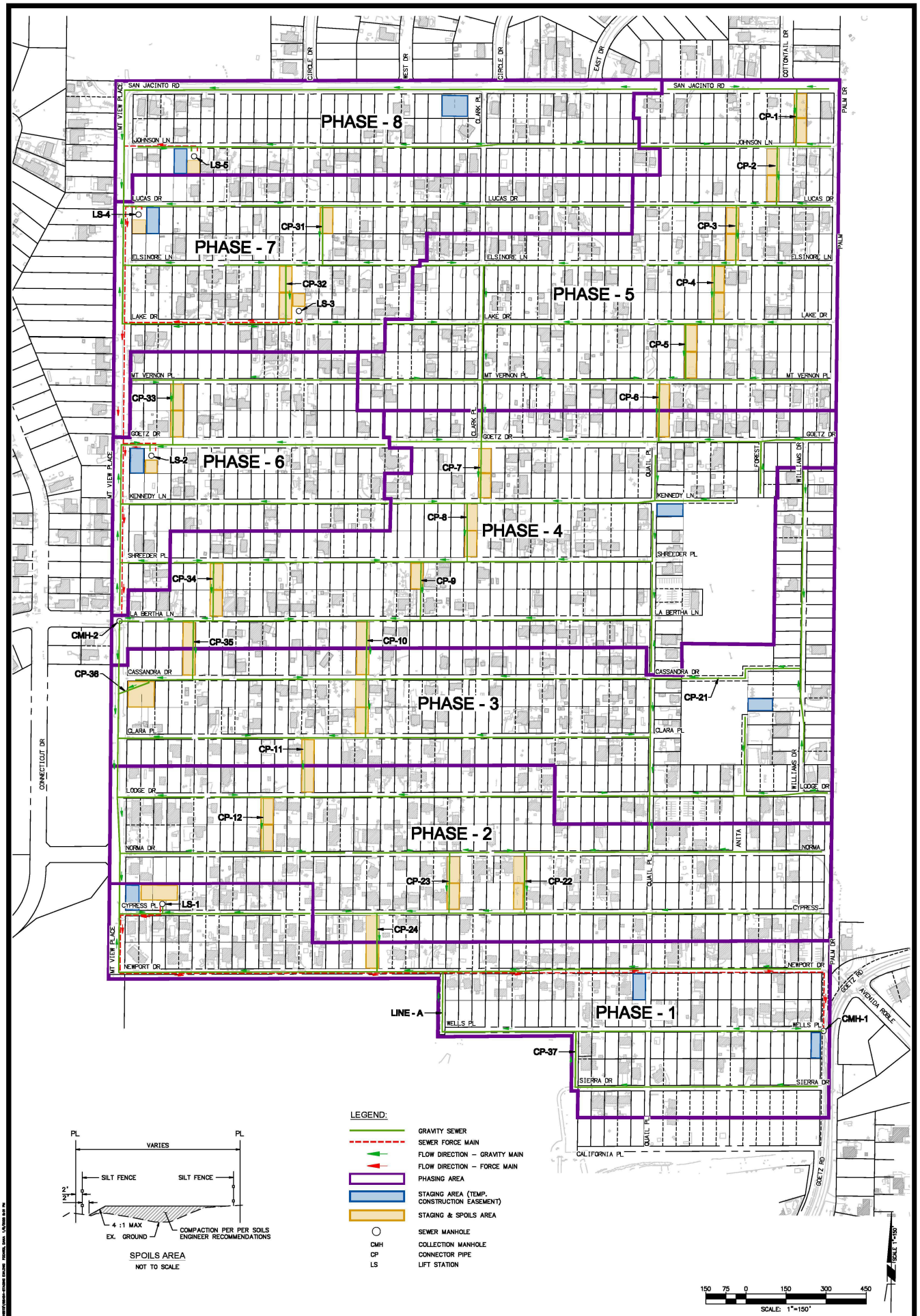
EXHIBIT - 15

QUAIL VALLEY SUBAREA 4

TYPICAL STREET CROSS SECTION DURING SEWER PIPE INSTALLATION ACTIVITY

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\EXHIBITS\196454-X-SECT PIPE CONSTR.DWG 1/6/2025 6:04 PM



PL VARIES PL
SILT FENCE SILT FENCE
2'
4 :1 MAX
EX. GROUND
COMPACTION PER PER SOILS ENGINEER RECOMMENDATIONS

SPOILS AREA
NOT TO SCALE

LEGEND:

- GRAVITY SEWER
- SEWER FORCE MAIN
- FLOW DIRECTION – GRAVITY MAIN
- FLOW DIRECTION – FORCE MAIN
- PHASING AREA
- STAGING AREA (TEMP. CONSTRUCTION EASEMENT)
- STAGING & SPOILS AREA
- SEWER MANHOLE
- CMH COLLECTION MANHOLE
- CP CONNECTOR PIPE
- LS LIFT STATION

150 75 0 150 300 450
SCALE: 1"=150'

SCALE 1"=150'

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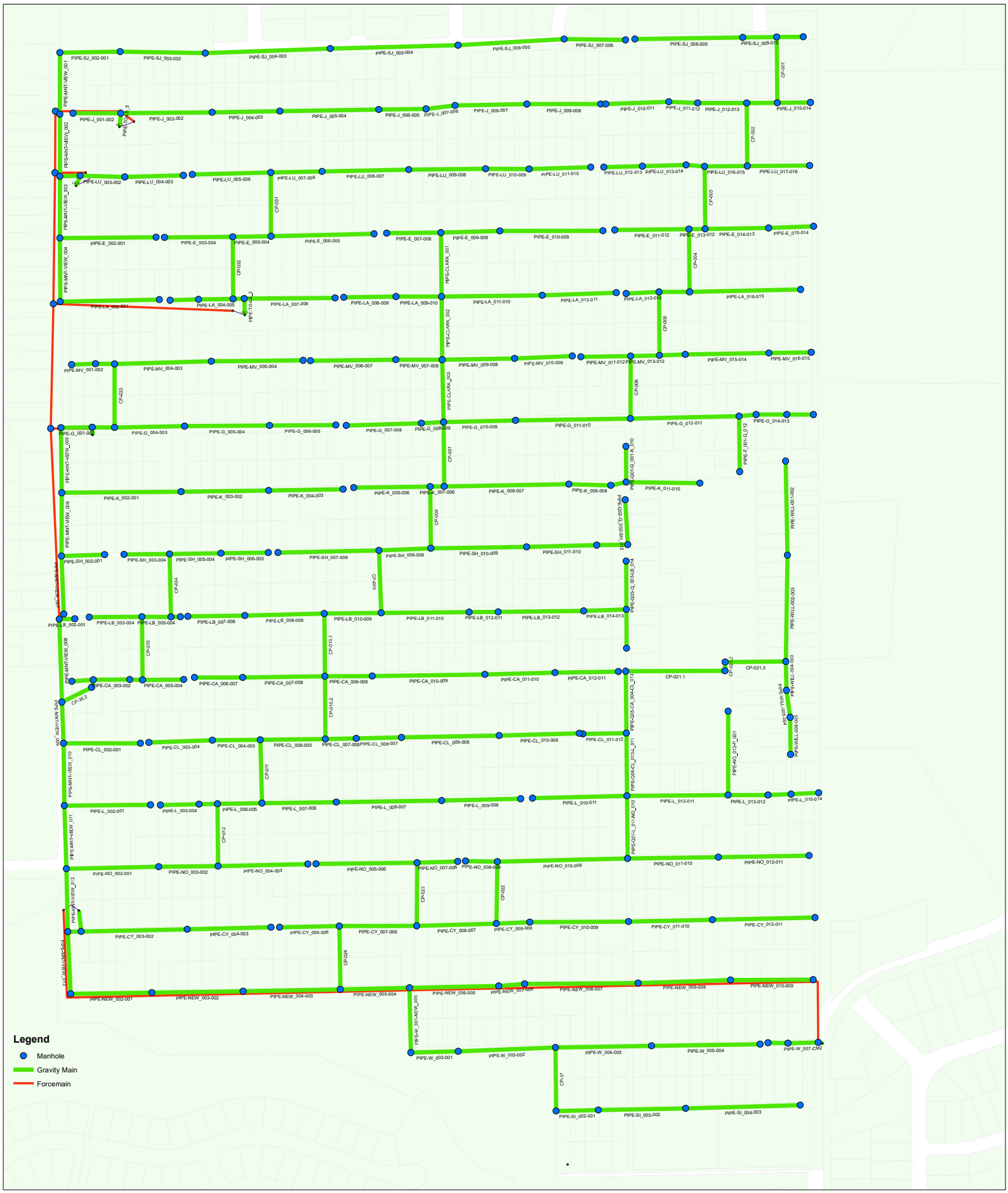
EXHIBIT - 16

QUAIL VALLEY SUBAREA 4

STAGING AND SPOILS AREAS

APPENDIX B – HYDRAULIC MODEL RESULTS



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INTERNATIONAL

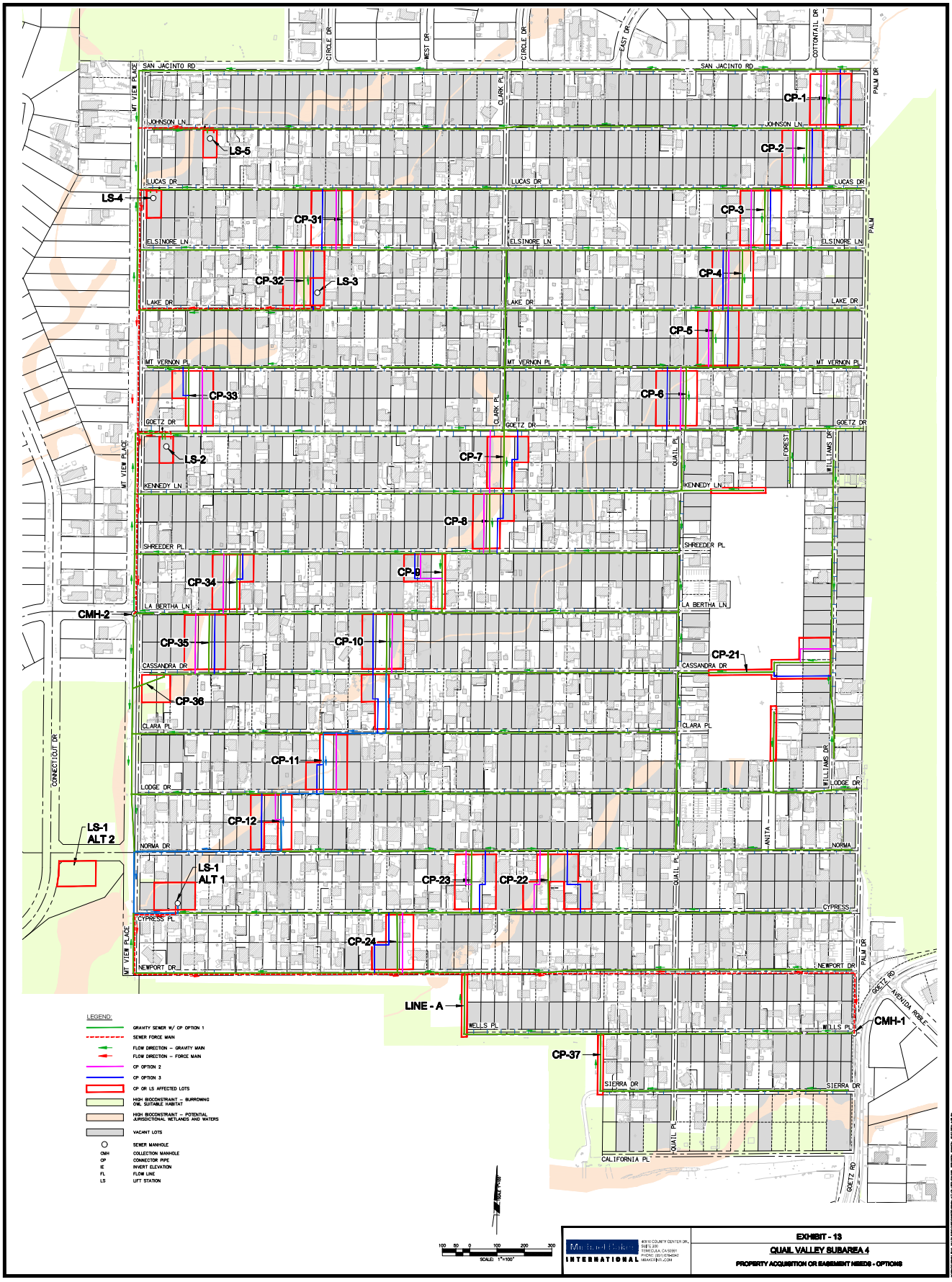
N

0 250 500 1,000
Feet

INFOSEWER MODEL LAYOUT

Exhibit C

APPENDIX C – PROPERTY ACQUISITION AND EASEMENT NEEDS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CIRCLE DR
WEST DR
EAST DR
COTTONTAIL DR
PALM DR
MT VIEW PLACE
CLARK PL
JOHNSON LN
LUCAS DR
ELSINORE LN
LAKE DR
MT VERNON PL
GOETZ DR
QUAIL PL
FOREST
WILLIAMS DR
KENNEDY LN
SHREEDER PL
LA BERTHA LN
CASSANDRA DR
CLARA PL
LODGE DR
ANITA
NORMA
CYPRESS
NEWPORT DR
WELLS PL
SIERRA DR
CALIFORNIA PL
AVENIDA ROBLE
CONNECTICUT DR
CP-1
CP-2
CP-3
CP-4
CP-5
CP-6
CP-7
CP-8
CP-9
CP-10
CP-11
CP-12
CP-21
CP-22
CP-23
CP-24
CP-31
CP-32
CP-33
CP-34
CP-35
CP-36
CP-37
LS-1 ALT 1
LS-1 ALT 2
LS-2
LS-3
LS-4
LS-5
CMH-1
CMH-2
LINE - A
LEGEND:
GRAVITY SEWER W/ CP OPTION 1
SEWER FORCE MAIN
FLOW DIRECTION – GRAVITY MAIN
FLOW DIRECTION – FORCE MAIN
CP OPTION 2
CP OPTION 3
CP OR LS AFFECTED LOTS
HIGH BIOCONSTRAINT – BURROWING OWL SUITABLE HABITAT
HIGH BIOCONSTRAINT – POTENTIAL JURISDICTIONAL WETLANDS AND WATERS
VACANT LOTS
SEWER MANHOLE
COLLECTION MANHOLE
CONNECTOR PIPE
INVERT ELEVATION
FLOW LINE
LIFT STATION
NORTH
100 50 0 100 200 300
SCALE: 1"=100'
INTERNATIONAL
EXHIBIT - 13
QUAIL VALLEY SUBAREA 4
PROPERTY ACQUISITION OR EASEMENT NEEDS - OPTIONS

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QUAIL VALLEY SEWER CAPACITY SPREADSHEET (EXISTING CONDITIONS)

Preliminary (30%) SUBMITTAL

ID	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (ft)	Slope	Diameter (in)	Pipe Material	Manning's N Value	Contributing EDU	Average Daily Flow Per DU (GPD)	Peaking Factor	Peak Flow (GPD)	Total Peak Flow (gpd)	Full Capacity (gpd)	d/D (%)	Velocity (ft/s)
CP-001	SJ-010	J-014	1,588.10	1,582.00	215.51	2.83%	8	VCP	0.015	0	0	2.87	0	3,035	1,141,786	0.04	1.09
CP-002	J-013	LU-016	1,580.00	1,576.00	221.03	1.81%	8	VCP	0.015	0	0	2.87	0	4,249	912,973	0.05	1.03
CP-003	LU-015	E-013	1,572.00	1,567.80	223.07	1.88%	8	VCP	0.015	1	211	2.87	607	9,712	931,231	0.07	1.34
CP-004	E-012	LA-015	1,563.24	1,559.50	220.30	1.70%	8	VCP	0.015	0	0	2.87	0	15,782	884,264	0.09	1.50
CP-005	LA-014	MV-013	1,557.00	1,551.50	208.31	2.64%	8	VCP	0.015	0	0	2.87	0	18,210	1,102,757	0.09	1.83
CP-006	MV-012	G-011	1,550.82	1,547.00	230.55	1.66%	8	VCP	0.015	0	0	2.87	0	23,673	873,580	0.11	1.68
CP-007	G-009	K-007	1,532.00	1,527.80	231.05	1.82%	8	VCP	0.015	0	0	2.87	0	62,521	915,009	0.18	2.32
CP-008	K-006	SH-009	1,526.60	1,524.00	218.88	1.19%	8	VCP	0.015	0	0	2.87	0	69,198	739,669	0.21	2.06
CP-009	SH-008	LB-010	1,521.80	1,520.20	218.87	0.73%	8	VCP	0.015	1	211	2.87	607	77,696	580,257	0.25	1.79
CP-010.1	LB-009	CA-008	1,514.50	1,509.00	219.87	2.50%	8	VCP	0.015	0	0	2.87	0	94,692	1,073,376	0.20	2.93
CP-010.2	CA-008	CL-006	1,509.00	1,507.91	218.87	0.50%	12	VCP	0.015	0	0	2.87	0	110,473	1,412,070	0.19	1.66
CP-011	CL-005	L-006	1,502.00	1,499.00	220.83	1.36%	12	VCP	0.015	0	0	2.87	0	124,434	2,332,210	0.16	2.44
CP-012	L-005	NO-003	1,496.00	1,494.95	210.00	0.50%	12	VCP	0.015	0	0	2.87	0	135,360	1,414,885	0.21	1.76
CP-021.1	CP21.2	Q-005	1,542.51	1,534.50	352.88	2.27%	8	VCP	0.015	0	0	2.87	0	6,070	1,022,484	0.06	1.24
CP-021.2	CP21.3	CP21.2	1,549.68	1,542.51	35.99	19.92%	8	VCP	0.015	0	0	2.87	0	6,070	3,029,160	0.03	2.64
CP-021.3	WILL-003	CP21.3	1,555.30	1,549.68	208.00	2.70%	8	VCP	0.015	0	0	2.87	0	6,070	1,115,553	0.05	1.32
CP-022	NO-009	CY-008	1,514.00	1,505.00	226.99	3.96%	8	VCP	0.015	0	0	2.87	0	30,957	1,351,361	0.10	2.47
CP-023	NO-006	CY-007	1,508.50	1,502.50	226.98	2.64%	8	VCP	0.015	0	0	2.87	0	5,463	1,103,406	0.05	1.27
CP-024	CY-006	NEW-004	1,500.00	1,492.50	218.84	3.43%	8	VCP	0.015	0	0	2.87	0	50,988	1,256,380	0.14	2.73
CP-031	LU-006	E-005	1,537.00	1,535.89	222.07	0.50%	8	VCP	0.015	0	0	2.87	0	10,319	479,811	0.10	0.86
CP-032	E-004	LA-005	1,532.00	1,528.22	220.08	1.72%	8	VCP	0.015	0	0	2.87	0	20,638	889,425	0.11	1.63
CP-033	MV-003	G-003	1,514.48	1,513.00	242.62	0.61%	8	VCP	0.015	0	0	2.87	0	6,070	530,055	0.08	0.79
CP-034	SH-004	LB-005	1,514.00	1,512.90	218.82	0.50%	8	VCP	0.015	0	0	2.87	0	3,642	481,179	0.06	0.63
CP-035	LB-004	CA-004	1,512.00	1,510.90	219.84	0.50%	8	VCP	0.015	0	0	2.87	0	4,856	480,061	0.07	0.69
CP-36.1	CA-002	CP36.2	1,504.60	1,504.54	11.00	0.55%	8	VCP	0.015	0	0	2.87	0	6,070	501,225	0.08	0.76
CP-36.2	CP36.2	MNT-VIEW-002	1,504.54	1,503.93	122.16	0.50%	8	VCP	0.015	0	0	2.87	0	6,070	479,572	0.08	0.73
CP-37	SI-001	W-003	1,511.00	1,509.95	209.39	0.50%	8	VCP	0.015	0	0	2.87	0	7,284	480,585	0.09	0.78
PIPE-CA_001-002	CA-001	CA-002	1,508.50	1,504.60	50.00	7.80%	8	VCP	0.015	0	0	2.87	0	-	1,895,400	0.00	0.00
PIPE-CA_003-002	CA-003	CA-002	1,505.15	1,504.60	110.00	0.50%	8	VCP	0.015	0	0	2.87	0	6,070	479,887	0.08	0.73
PIPE-CA_004-003	CA-004	CA-003	1,510.90	1,505.15	53.92	10.66%	8	VCP	0.015	0	0	2.87	0	6,070	2,216,218	0.04	2.13
PIPE-CA_005-004	CA-005	CA-004	1,527.30	1,510.90	136.08	12.05%	8	VCP	0.015	2	423	2.87	1214	1,214	2,356,017	0.02	1.36
PIPE-CA_006-007	CA-006	CA-007	1,524.80	1,511.80	200.00	6.50%	8	VCP	0.015	3	634	2.87	1821	1,821	1,730,256	0.02	1.24
PIPE-CA_007-008	CA-007	CA-008	1,511.80	1,509.00	283.76	0.99%	8	VCP	0.015	5	1057	2.87	3035	4,856	674,151	0.06	0.87
PIPE-CA_009-008	CA-009	CA-008	1,523.00	1,509.00	176.24	7.94%	8	VCP	0.015	3	634	2.87	1821	10,926	1,912,782	0.05	2.30
PIPE-CA_010-009	CA-010	CA-009	1,525.30	1,523.00	370.00	0.62%	8	VCP	0.015	7	1480	2.87	4249	9,105	535,077	0.09	0.89
PIPE-CA_011-010	CA-011	CA-010	1,528.70	1,525.30	275.00	1.24%	8	VCP	0.015	3	634	2.87	1821	4,856	754,617	0.06	0.94
PIPE-CA_012-011	CA-012	CA-011	1,539.00	1,528.70	225.00	4.58%	8	VCP	0.015	5	1057	3.87	3035	3,035	1,452,048	0.03	1.28
PIPE-CL_002-001	CL-002	CL-001	1,523.90	1,496.40	275.09	10.00%	8	VCP	0.015	4	846	4.87	2428	2,428	2,145,767	0.03	1.57
PIPE-CL_003-004	CL-003	CL-004	1,525.40	1,509.90	224.00	6.92%	8	VCP	0.015	4	846	2.87	2428	2,428	1,785,235	0.03	1.38
PIPE-CL_004-005	CL-004	CL-005	1,509.90	1,502.00	175.00	4.51%	8	VCP	0.015	3	634	2.87	1821	4,249	1,441,943	0.04	1.41
PIPE-CL_006-005	CL-006	CL-005	1,507.91	1,502.00	228.28	2.59%	12	VCP	0.015	3	634	2.87	1821	120,185	3,219,556	0.13	3.03
PIPE-CL_007-006	CL-007	CL-006	1,516.41	1,507.91	96.72	8.79%	8	VCP	0.015	2	423	2.87	1214	7,891	2,011,893	0.05	2.15
PIPE-CL_008-007	CL-008	CL-007	1,517.56	1,516.41	230.00	0.50%	8	VCP	0.015	4	846	2.87	2428	6,677	479,887	0.08	0.75
PIPE-CL_009-008	CL-009	CL-008	1,525.35	1,517.56	270.00	2.89%	8	VCP	0.015	1	211	2.87	607	4,249	1,152,764	0.04	1.21
PIPE-CL_010-009	CL-010	CL-009	1,534.00	1,525.35	300.00	2.88%	8	VCP	0.015	6	1269	2.87	3642	3,642	1,152,394	0.04	1.15
PIPE-CL_011-012	CL-011	CL-012	1,530.80	1,525.50	144.11	3.68%	8	VCP	0.015	3	634	2.87	1821	1,821	1,301,501	0.03	1.02
PIPE-CLARK_001	E-008	LA-010	1,547.00	1,539.34	219.09	3.50%	8	VCP	0.015	0	0	2.87	0	7,891	1,268,986	0.06	1.56
PIPE-CLARK_002	LA-010	MV-008	1,539.34	1,536.35	208.51	1.43%	8	VCP	0.015	1	211	2.87	607	15,175	812,692	0.09	1.40
PIPE-CLARK_003	MV-008	G-009	1,536.35	1,532.00	230.51	1.89%	8	VCP	0.015	0	0	2.87	0	23,066	932,295	0.11	1.74
PIPE-CY_002-001	CY-001	CY-002	1,482.91	1,481.53	162.05	0.85%	12	VCP	0.015	3	634	2.87	1821	324,743	1,846,508	0.28	2.74
PIPE-CY_003-002	CY-003	CY-002	1,499.40	1,481.53	270.00	6.62%	8	VCP	0.015	6	1269	2.87	3642	8,498	1,745,959	0.05	2.00
PIPE-CY_004-003	CY-004	CY-003	1,511.70	1,499.40	281.95	4.36%	8	VCP	0.015	8	1692	2.87	4856	4,856	1,417,490	0.04	1.46
PIPE-CY_005-006	CY-005	CY-006	1,512.00	1,500.00	230.00	5.22%	8	VCP	0.015	4	846	2.87	2428	2,428	1,550,173	0.03	1.25
PIPE-CY_007-006	CY-007	CY-006	1,502.50	1,500.00	270.03	0.93%	8	VCP	0.015	4	846	2.87	2428	48,560	653,007	0.18	1.70
PIPE-CY_008-007	CY-008	CY-007	1,505.00	1,502.50	283.13	0.88%	8	VCP	0.015	2	423	2.87	1214	40,669	637,721	0.17	1.58
PIPE-CY_009-008	CY-009	CY-008	1,523.30	1,505.00	356.58	5.13%	8	VCP	0.015	5	1057	2.87	3035	8,498	1,537,449	0.05	1.83
PIPE-CY_010-009	CY-010	CY-009	1,527.00	1,523.30	104.49	3.54%	8	VCP	0.015	1	211	2.87	607	5,463	1,277,077	0.05	1.40
PIPE-CY_011-010	CY-011	CY-010	1,544.00	1,527.00	300.82	5.65%	8	VCP	0.015	3	634	2.87	1821	4,856	1,613,336	0.04	1.59
PIPE-CY_012-011	CY-012	CY-011	1,548.65	1,544.00	344.55	1.35%	8	VCP	0.015	5	1057	2.87	3035	3,035	788,413	0.05	0.84
PIPE-E_002-001	E-002	E-001	1,562.54	1,522.52	332.08	12.05%	8	VCP	0.015	4	846	2.87	2428	2,428	2,355,976	0.02	1.68
PIPE-E_003-004	E-003	E-004	1,557.20	1,532.00	230.08	10.95%	8	VCP	0.015	5	1057	2.87	3035	3,035	2,246,024	0.03	1.74
PIPE-E_005-004	E-005	E-004	1,535.89	1,532.00	137.52	2.83%	8	VCP	0.015	2	423	2.87	1214	17,603	1,141,420	0.09	1.85
PIPE-E_006-005	E-006	E-005	1,549.50	1,535.89	349.90	3.89%	8	VCP	0.015	10	2115	2.87	6070	6,070	1,338,476	0.05	1.50
PIPE-E_007-008	E-007	E-008	1,549.80	1,547.00	223.12	1.25%	8	VCP	0.015	4	846	2.87	2428	2,428	760,262	0.04	0.76
PIPE-E_009-008	E-009	E-008	1,553.00	1,547.00	201.88	2.97%	8	VCP	0.015	3	634	2.87	1821	5,463	1,169,991	0.05	1.32
PIPE-E_010-009	E-010	E-009	1,575.20	1,553.00	390.00	5.69%	8	VCP	0.015	6	1269	2.87	3642	3,642	1,619,190	0.04	1.46
PIPE-E_011-012	E-011	E-012	1,576.65	1,563.24	251.76	5.33%	8	VCP	0.015	3	634	2.87	1821	1,821	1,566,299	0.03	1.16
PIPE-E_013-012	E-013	E-012	1,567.80	1,563.24	79.95	5.70%	8	VCP	0.015	2	423	2.87	1214	13,961	1,620,790	0.07	2.20
PIPE-E_014-013	E-014	E-013	1,570.08	1,567.80	198.29	1.15%	8	VCP	0.015	3	634	2.87	1821	3,035	727,731	0.05	0.79

PIPE-E_015-014	E-015	E-014	1,578.34	1,570.08	151.52	5.45%	8	VCP	0.015	2	423	2.87	1214	1,214	1,584,560	0.02	1.03
PIPE-F_001-G_012	F-001	G-012	1,567.44	1,565.50	193.97	1.00%	8	VCP	0.015	0	0	2.87	0	-	678,715	0.00	0.00
PIPE-G_001-002	G-001	G-002	1,508.50	1,507.96	108.08	0.50%	8	VCP	0.015	1	211	2.87	607	8,498	479,709	0.09	0.81
PIPE-G_003-002	G-003	G-002	1,513.00	1,507.96	84.91	5.94%	8	VCP	0.015	0	0	2.87	0	12,747	1,653,444	0.06	2.17
PIPE-G_004-003	G-004	G-003	1,526.25	1,513.00	239.09	5.54%	8	VCP	0.015	4	846	2.87	2428	6,677	1,597,647	0.05	1.74
PIPE-G_005-004	G-005	G-004	1,534.00	1,526.25	310.00	2.50%	8	VCP	0.015	4	846	2.87	2428	4,249	1,073,059	0.05	1.15
PIPE-G_006-005	G-006	G-005	1,573.20	1,534.00	245.00	16.00%	8	VCP	0.015	3	634	2.87	1821	1,821	2,714,648	0.02	1.69
PIPE-G_007-008	G-007	G-008	1,574.00	1,534.00	240.00	16.67%	8	VCP	0.015	3	634	2.87	1821	1,821	2,770,626	0.02	1.72
PIPE-G_008-009	G-008	G-009	1,534.00	1,532.00	95.94	2.08%	8	VCP	0.015	0	0	2.87	0	1,821	979,871	0.03	0.84
PIPE-G_010-009	G-010	G-009	1,541.50	1,532.00	254.06	3.74%	8	VCP	0.015	5	1057	2.87	3035	37,634	1,312,343	0.12	2.57
PIPE-G_011-010	G-011	G-010	1,547.00	1,541.50	419.81	1.31%	8	VCP	0.015	5	1057	2.87	3035	34,599	776,799	0.14	1.73
PIPE-G_012-011	G-012	G-011	1,565.50	1,547.00	382.67	4.83%	8	VCP	0.015	11	2326	2.87	6677	7,891	1,492,201	0.05	1.75
PIPE-G_013-012	G-013	G-012	1,570.00	1,565.50	55.00	8.18%	8	VCP	0.015	1	211	2.87	607	1,214	1,941,237	0.02	1.19
PIPE-G_014-013	G-014	G-013	1,582.00	1,570.00	112.52	10.66%	8	VCP	0.015	0	0	2.87	0	607	2,216,304	0.01	1.05
PIPE-G_015-014	G-015	G-014	1,604.00	1,582.00	90.00	24.44%	8	VCP	0.015	1	211	2.87	607	607	3,355,395	0.01	1.40
PIPE-J_001-002	J-001	J-002	1,532.00	1,523.20	200.00	4.40%	8	VCP	0.015	3	634	2.87	1821	1,821	1,423,574	0.03	1.08
PIPE-J_003-002	J-003	J-002	1,541.32	1,523.20	230.00	7.88%	8	VCP	0.015	3	634	2.87	1821	9,712	1,904,885	0.05	2.21
PIPE-J_004-003	J-004	J-003	1,542.90	1,541.32	317.00	0.50%	8	VCP	0.015	2	423	2.87	1214	7,891	479,129	0.09	0.79
PIPE-J_005-004	J-005	J-004	1,544.50	1,542.90	320.00	0.50%	8	VCP	0.015	6	1269	2.87	3642	6,677	479,887	0.08	0.75
PIPE-J_006-005	J-006	J-005	1,557.00	1,544.50	163.00	7.67%	8	VCP	0.015	0	0	2.87	0	3,035	1,879,381	0.03	1.53
PIPE-J_007-006	J-007	J-006	1,560.26	1,557.00	160.00	2.04%	8	VCP	0.015	2	423	2.87	1214	3,035	968,729	0.04	0.97
PIPE-J_008-007	J-008	J-007	1,568.00	1,560.26	210.00	3.69%	8	VCP	0.015	2	423	2.87	1214	1,821	1,302,910	0.03	1.02
PIPE-J_009-008	J-009	J-008	1,648.00	1,568.00	265.00	30.19%	8	VCP	0.015	1	211	2.87	607	607	3,728,856	0.01	1.51
PIPE-J_010-011	J-010	J-011	1,649.00	1,610.00	185.00	21.08%	8	VCP	0.015	0	0	2.87	0	-	3,116,019	0.00	0.00
PIPE-J_011-012	J-011	J-012	1,610.00	1,587.00	140.00	16.43%	8	VCP	0.015	0	0	2.87	0	-	2,750,765	0.00	0.00
PIPE-J_012-013	J-012	J-013	1,587.00	1,580.00	183.00	3.83%	8	VCP	0.015	0	0	2.87	0	-	1,327,324	0.00	0.00
PIPE-J_014-013	J-014	J-013	1,582.00	1,580.00	69.89	2.86%	8	VCP	0.015	1	211	2.87	607	4,249	1,148,051	0.04	1.21
PIPE-J_015-014	J-015	J-014	1,589.00	1,582.00	129.81	5.39%	8	VCP	0.015	1	211	2.87	607	607	1,575,972	0.02	0.83
PIPE-K_002-001	K-002	K-001	1,520.00	1,515.90	422.09	0.97%	8	VCP	0.015	5	1057	2.87	3035	6,070	668,872	0.07	0.92
PIPE-K_003-002	K-003	K-002	1,527.00	1,520.00	300.00	2.33%	8	VCP	0.015	2	423	2.87	1214	3,035	1,036,673	0.04	1.01
PIPE-K_004-003	K-004	K-003	1,555.00	1,527.00	280.00	10.00%	8	VCP	0.015	3	634	2.87	1821	1,821	2,146,118	0.02	1.44
PIPE-K_005-006	K-005	K-006	1,555.00	1,526.60	279.90	10.15%	8	VCP	0.015	2	423	2.87	1214	1,214	2,161,779	0.02	1.28
PIPE-K_007-006	K-007	K-006	1,527.80	1,526.60	50.12	2.39%	8	VCP	0.015	0	0	2.87	0	67,984	1,050,119	0.17	2.62
PIPE-K_008-007	K-008	K-007	1,535.10	1,527.80	459.98	1.59%	8	VCP	0.015	6	1269	2.87	3642	5,463	854,960	0.06	1.06
PIPE-K_009-008	K-009	K-008	1,543.64	1,535.10	129.63	6.59%	8	VCP	0.015	0	0	2.87	0	1,821	1,741,926	0.02	1.24
PIPE-K_010-009	K-010	K-009	1,547.70	1,543.64	63.12	6.43%	8	VCP	0.015	1	211	2.87	607	1,821	1,721,207	0.02	1.23
PIPE-K_011-010	K-011	K-010	1,564.70	1,547.70	297.25	5.72%	8	VCP	0.015	2	423	2.87	1214	1,214	1,622,995	0.02	1.05
PIPE-L_002-001	L-002	L-001	1,513.72	1,493.00	324.70	6.38%	8	VCP	0.015	9	1903	2.87	5463	5,463	1,714,381	0.04	1.72
PIPE-L_003-004	L-003	L-004	1,512.00	1,498.70	114.40	11.63%	8	VCP	0.015	2	423	2.87	1214	1,214	2,314,016	0.02	1.34
PIPE-L_004-005	L-004	L-005	1,498.70	1,496.00	82.67	3.27%	8	VCP	0.015	0	0	2.87	0	1,214	1,226,483	0.02	0.86
PIPE-L_006-005	L-006	L-005	1,499.00	1,496.00	155.00	1.94%	12	VCP	0.015	2	423	2.87	1214	134,146	2,783,755	0.15	2.83
PIPE-L_007-006	L-007	L-006	1,511.00	1,499.00	264.42	4.54%	8	VCP	0.015	3	634	2.87	1821	8,498	1,445,763	0.05	1.75
PIPE-L_008-007	L-008	L-007	1,513.50	1,511.00	357.91	0.70%	8	VCP	0.015	8	1692	2.87	4856	6,677	567,201	0.08	0.85
PIPE-L_009-008	L-009	L-008	1,524.30	1,513.50	303.00	3.56%	8	VCP	0.015	3	634	2.87	1821	1,821	1,281,280	0.03	1.01
PIPE-L_010-011	L-010	L-011	1,521.00	1,518.50	345.70	0.72%	8	VCP	0.015	3	634	2.87	1821	1,821	577,130	0.04	0.58
PIPE-L_012-011	L-012	L-011	1,531.05	1,518.50	354.34	3.54%	8	VCP	0.015	3	634	2.87	1821	7,284	1,277,219	0.05	1.53
PIPE-L_013-012	L-013	L-012	1,546.50	1,531.05	131.96	11.71%	8	VCP	0.015	3	634	2.87	1821	3,642	2,322,184	0.03	1.88
PIPE-L_014-013	L-014	L-013	1,562.00	1,546.50	89.24	17.37%	8	VCP	0.015	0	0	2.87	0	1,821	2,828,392	0.02	1.74
PIPE-L_015-014	L-015	L-014	1,582.50	1,562.00	89.30	22.96%	8	VCP	0.015	3	634	2.87	1821	1,821	3,251,658	0.02	1.92
PIPE-LA_002-001	LA-002	LA-001	1,542.00	1,528.65	372.08	3.59%	8	VCP	0.015	5	1057	2.87	3035	3,035	1,285,512	0.04	1.18
PIPE-LA_003-004	LA-003	LA-004	1,542.21	1,529.30	100.00	12.91%	8	VCP	0.015	3	634	2.87	1821	1,821	2,438,466	0.02	1.57
PIPE-LA_004-005	LA-004	LA-005	1,529.30	1,528.22	119.68	0.90%	8	VCP	0.015	3	634	2.87	1821	3,642	644,696	0.05	0.77
PIPE-LA_005-006	LA-005	LA-006	1,528.22	1,528.02	40.32	0.50%	8	VCP	0.015	0	0	2.87	0	24,280	477,978	0.15	1.11
PIPE-LA_007-006	LA-007	LA-006	1,563.22	1,528.02	320.00	11.00%	8	VCP	0.015	4	846	2.87	2428	2,428	2,250,868	0.02	1.62
PIPE-LA_008-009	LA-008	LA-009	1,562.72	1,540.20	185.00	12.17%	8	VCP	0.015	2	423	2.87	1214	1,214	2,367,838	0.02	1.36
PIPE-LA_009-010	LA-009	LA-010	1,540.20	1,539.34	172.36	0.50%	8	VCP	0.015	1	211	2.87	607	1,821	479,385	0.04	0.51
PIPE-LA_011-010	LA-011	LA-010	1,549.50	1,539.34	362.64	2.80%	8	VCP	0.015	6	1269	2.87	3642	4,856	1,135,959	0.05	1.25
PIPE-LA_012-011	LA-012	LA-011	1,567.00	1,549.50	260.00	6.73%	8	VCP	0.015	2	423	2.87	1214	1,214	1,760,702	0.02	1.11
PIPE-LA_013-014	LA-013	LA-014	1,567.92	1,557.00	116.06	9.41%	8	VCP	0.015	1	211	2.87	607	607	2,081,726	0.01	1.01
PIPE-LA_015-014	LA-015	LA-014	1,559.50	1,557.00	105.04	2.38%	8	VCP	0.015	0	0	2.87	0	17,603	1,046,999	0.09	1.74
PIPE-LA_016-015	LA-016	LA-015	1,583.00	1,559.50	429.90	5.47%	8	VCP	0.015	3	634	2.87	1821	1,821	1,586,733	0.03	1.17
PIPE-LB_002-001	LB-002	CM2	1,534.30	1,531.40	72.01	4.03%	8	VCP	0.015	1	211	2.87	607	607	1,361,934	0.02	0.75
PIPE-LB_003-004	LB-003	LB-004	1,533.00	1,512.00	179.45	11.70%	8	VCP	0.015	1	211	2.87	607	607	2,321,622	0.01	1.08
PIPE-LB_005-004	LB-005	LB-004	1,512.90	1,512.00	73.25	1.23%	8	VCP	0.015	0	0	2.87	0	4,249	752,265	0.05	0.90
PIPE-LB_006-005	LB-006	LB-005	1,529.00	1,512.90	62.30	25.84%	8	VCP	0.015	1	211	2.87	607	607	3,450,027	0.01	1.43
PIPE-LB_007-008	LB-007	LB-008	1,526.25	1,519.80	210.00	3.07%	8	VCP	0.015	5	1057	2.87	3035	3,035	1,189,389	0.04	1.12
PIPE-LB_008-009	LB-008	LB-009	1,519.80	1,514.50	274.24	1.93%	8	VCP	0.015	5	1057	2.87	3035	6,070	943,466	0.06	1.17
PIPE-LB_010-009	LB-010	LB-009	1,520.20	1,514.50	199.89	2.85%	8	VCP	0.015	3	634	2.87	1821	88,622	1,146,029	0.19	3.01
PIPE-LB_011-010	LB-011	LB-010	1,524.50	1,520.20	325.87	1.32%	8	VCP	0.015	1	211	2.87	607	9,105	779,589	0.08	1.16
PIPE-LB_012-011	LB-012	LB-011	1,532.00	1,524.50	70.00	10.71%	8	VCP	0.015	1	211	2.87	607	8,498	2,221,443	0.04	2.36
PIPE-LB_013-012	LB-013	LB-012	1,534.00	1,532.00	320.00	0.63%	8	VCP	0.015	6	1269	2.87	3642	7,891	536,529	0.08	0.86
PIPE-LB_014-013	LB-014	LB-013	1,536.00	1,534.00	149.89	1.33%	8	VCP	0.015	3	634	2.87	1821	4,249	783,939	0.05	0.93
PIPE-LU_002-001	LU-001	LU-002	1,519.00	1,518.77	46.08	0.50%	8	VCP	0.015	0	0	2.87	0	11,533	479,470	0.11	0.89
PIPE-LU_003-002	LU-003	LU-002	1,539.00	1,518.77	179.00	11.30%	8	VCP	0.015	0	0	2.87	0	1,821	2,281,524	0.02	1.50
PIPE-LU_004-003	LU-004	LU-003	1,570.00	1,539.00	192.00	16.15%	8	VCP	0.015	3	634	2.87	1821	1,821	2,726,992	0.02	1.70
PIPE-LU_005-006	LU-005	LU-006	1,569.00	1,537.00	303.00	10.56%	8	VCP	0.015	4	846	2.87	2428	2,428	2,205,501	0.03	1.60

PIPE-LU_007-006	LU-007	LU-006	1,537.88	1,537.00	177.00	0.50%	8	VCP	0.015	2	423	2.87	1214	7,891	478,529	0.09	0.79
PIPE-LU_008-007	LU-008	LU-007	1,550.00	1,537.88	300.00	4.04%	8	VCP	0.015	4	846	2.87	2428	6,677	1,364,094	0.05	1.56
PIPE-LU_009-008	LU-009	LU-008	1,562.36	1,550.00	270.00	4.58%	8	VCP	0.015	3	634	2.87	1821	4,249	1,452,048	0.04	1.42
PIPE-LU_010-009	LU-010	LU-009	1,583.20	1,562.36	180.00	11.58%	8	VCP	0.015	4	846	2.87	2428	2,428	2,309,225	0.02	1.65
PIPE-LU_011-010	LU-011	LU-010	1,627.68	1,583.20	200.00	22.24%	8	VCP	0.015	0	0	2.87	0	-	3,200,523	0.00	0.00
PIPE-LU_012-013	LU-012	LU-013	1,625.80	1,597.40	130.00	21.85%	8	VCP	0.015	2	423	2.87	1214	1,214	3,172,058	0.02	1.67
PIPE-LU_013-014	LU-013	LU-014	1,597.40	1,579.00	160.00	11.50%	8	VCP	0.015	1	211	2.87	607	1,821	2,301,455	0.02	1.51
PIPE-LU_014-015	LU-014	LU-015	1,579.00	1,572.00	82.39	8.50%	8	VCP	0.015	1	211	2.87	607	2,428	1,978,178	0.03	1.48
PIPE-LU_016-015	LU-016	LU-015	1,576.00	1,572.00	149.98	2.67%	8	VCP	0.015	0	0	2.87	0	6,677	1,108,324	0.06	1.35
PIPE-LU_017-016	LU-017	LU-016	1,584.38	1,576.00	199.63	4.20%	8	VCP	0.015	4	846	2.87	2428	2,428	1,390,473	0.03	1.16
PIPE-MNT-VIEW_001	SJ-001	MNT-VIEW-001	1,537.40	1,531.00	209.30	3.06%	8	VCP	0.015	0	0	2.87	0	6,070	1,186,749	0.05	1.38
PIPE-MNT-VIEW_002	MNT-VIEW-001	LU-001	1,531.00	1,519.00	224.55	5.34%	8	VCP	0.015	0	0	2.87	0	6,070	1,568,873	0.05	1.67
PIPE-MNT-VIEW_003	E-001	LU-001	1,522.52	1,519.00	222.09	1.58%	8	VCP	0.015	0	0	2.87	0	5,463	854,398	0.06	1.06
PIPE-MNT-VIEW_004	LA-001	E-001	1,528.65	1,522.52	219.09	2.80%	8	VCP	0.015	0	0	2.87	0	3,035	1,135,200	0.04	1.08
PIPE-MNT-VIEW_005	K-001	G-001	1,515.90	1,508.50	221.52	3.34%	8	VCP	0.015	0	0	2.87	0	7,891	1,240,403	0.06	1.54
PIPE-MNT-VIEW_006	SH-001	K-001	1,525.60	1,515.90	219.89	4.41%	8	VCP	0.015	1	211	2.87	607	1,821	1,425,400	0.03	1.08
PIPE-MNT-VIEW_007	LB-001	SH-001	1,530.74	1,525.60	159.62	3.22%	8	VCP	0.015	0	0	2.87	0	-	1,217,844	0.00	0.00
PIPE-MNT-VIEW_008	CM2	MNT-VIEW-002	1,531.40	1,503.95	272.79	10.06%	8	VCP	0.015	0	0	2.87	0	73,447	2,152,834	0.13	4.44
PIPE-MNT-VIEW_009	MNT-VIEW-002	CL-001	1,503.95	1,496.40	165.88	4.55%	8	VCP	0.015	0	0	2.87	0	79,517	1,447,872	0.16	3.44
PIPE-MNT-VIEW_010	CL-001	L-001	1,496.40	1,493.00	220.82	1.54%	8	VCP	0.015	0	0	2.87	0	81,945	842,120	0.21	2.37
PIPE-MNT-VIEW_011	L-001	NO-001	1,493.00	1,486.00	209.68	3.34%	8	VCP	0.015	0	0	2.87	0	87,408	1,240,007	0.18	3.17
PIPE-MNT-VIEW_012	NO-001	CY-001	1,486.00	1,482.91	226.83	1.36%	12	VCP	0.015	0	0	2.87	0	231,873	2,335,421	0.21	2.94
PIPE-MNT-VIEW_013	NEW-001	CY-001	1,487.18	1,482.91	218.81	1.95%	8	VCP	0.015	0	0	2.87	0	91,050	948,056	0.21	2.66
PIPE-MV_001-002	MV-001	MV-002	1,526.47	1,514.85	75.00	15.49%	8	VCP	0.015	1	211	2.87	607	607	2,671,321	0.01	1.20
PIPE-MV_002-003	MV-002	MV-003	1,514.85	1,514.48	75.06	0.49%	8	VCP	0.015	0	0	2.87	0	607	476,486	0.03	0.36
PIPE-MV_004-003	MV-004	MV-003	1,525.55	1,514.48	329.94	3.36%	8	VCP	0.015	3	634	2.87	1821	5,463	1,243,111	0.05	1.38
PIPE-MV_005-004	MV-005	MV-004	1,574.00	1,525.55	355.00	13.65%	8	VCP	0.015	6	1269	2.87	3642	3,642	2,507,185	0.03	1.98
PIPE-MV_006-007	MV-006	MV-007	1,571.20	1,537.13	295.00	11.55%	8	VCP	0.015	5	1057	2.87	3035	3,035	2,306,368	0.03	1.77
PIPE-MV_007-008	MV-007	MV-008	1,537.13	1,536.35	156.74	0.50%	8	VCP	0.015	1	211	2.87	607	3,642	478,752	0.06	0.63
PIPE-MV_009-008	MV-009	MV-008	1,542.78	1,536.35	253.26	2.54%	8	VCP	0.015	3	634	2.87	1821	4,249	1,081,374	0.05	1.16
PIPE-MV_010-009	MV-010	MV-009	1,558.44	1,542.78	210.00	7.46%	8	VCP	0.015	4	846	2.87	2428	2,428	1,853,275	0.03	1.42
PIPE-MV_011-012	MV-011	MV-012	1,558.80	1,550.82	180.64	4.42%	8	VCP	0.015	0	0	2.87	0	-	1,426,422	0.00	0.00
PIPE-MV_013-012	MV-013	MV-012	1,551.50	1,550.82	97.57	0.70%	8	VCP	0.015	1	211	2.87	607	23,673	566,565	0.14	1.24
PIPE-MV_014-013	MV-014	MV-013	1,555.80	1,551.50	91.79	4.68%	8	VCP	0.015	1	211	2.87	607	4,856	1,468,893	0.04	1.49
PIPE-MV_015-014	MV-015	MV-014	1,572.00	1,555.80	290.00	5.59%	8	VCP	0.015	6	1269	2.87	3642	4,249	1,604,029	0.04	1.52
PIPE-MV_016-015	MV-016	MV-015	1,604.00	1,572.00	150.35	21.28%	8	VCP	0.015	1	211	2.87	607	607	3,130,955	0.01	1.33
PIPE-NEW_002-001	NEW-002	NEW-001	1,488.84	1,487.18	302.04	0.55%	8	VCP	0.015	2	423	2.87	1214	91,050	503,124	0.29	1.69
PIPE-NEW_003-002	NEW-003	NEW-002	1,490.38	1,488.84	280.00	0.55%	8	VCP	0.015	4	846	2.87	2428	89,836	503,309	0.29	1.69
PIPE-NEW_004-003	NEW-004	NEW-003	1,492.50	1,490.38	384.55	0.55%	8	VCP	0.015	4	846	2.87	2428	87,408	503,901	0.28	1.67
PIPE-NEW_005-004	NEW-005	NEW-004	1,495.60	1,492.50	246.85	1.26%	8	VCP	0.015	1	211	2.87	607	33,992	760,533	0.14	1.70
PIPE-NEW_006-005	NEW-006	NEW-005	1,513.40	1,495.60	158.60	11.22%	8	VCP	0.015	5	1057	2.87	3035	16,389	2,273,589	0.06	2.93
PIPE-NEW_007-006	NEW-007	NEW-006	1,520.40	1,513.40	232.23	3.01%	8	VCP	0.015	6	1269	2.87	3642	13,354	1,178,266	0.07	1.74
PIPE-NEW_008-007	NEW-008	NEW-007	1,526.30	1,520.40	267.77	2.20%	8	VCP	0.015	6	1269	2.87	3642	9,712	1,007,392	0.07	1.42
PIPE-NEW_009-008	NEW-009	NEW-008	1,536.95	1,526.30	260.00	4.10%	8	VCP	0.015	2	423	2.87	1214	6,070	1,373,541	0.05	1.52
PIPE-NEW_010-009	NEW-010	NEW-009	1,541.40	1,536.95	494.80	0.90%	8	VCP	0.015	8	1692	2.87	4856	4,856	643,604	0.06	0.84
PIPE-NO_002-001	NO-002	NO-001	1,490.00	1,486.00	321.97	1.24%	12	VCP	0.015	5	1057	2.87	3035	144,465	2,230,275	0.17	2.47
PIPE-NO_003-002	NO-003	NO-002	1,494.95	1,490.00	215.31	2.30%	12	VCP	0.015	4	846	2.87	2428	141,430	3,033,938	0.15	3.05
PIPE-NO_004-003	NO-004	NO-003	1,517.77	1,494.95	304.69	7.49%	8	VCP	0.015	6	1269	2.87	3642	3,642	1,857,301	0.03	1.61
PIPE-NO_005-006	NO-005	NO-006	1,514.00	1,508.50	362.45	1.52%	8	VCP	0.015	7	1480	2.87	4249	4,249	836,009	0.05	0.97
PIPE-NO_007-006	NO-007	NO-006	1,520.00	1,508.50	147.55	7.79%	8	VCP	0.015	2	423	2.87	1214	1,214	1,894,667	0.02	1.17
PIPE-NO_008-009	NO-008	NO-009	1,520.00	1,514.00	112.50	5.33%	8	VCP	0.015	2	423	2.87	1214	1,214	1,567,303	0.02	1.02
PIPE-NO_010-009	NO-010	NO-009	1,517.00	1,514.00	465.97	0.64%	8	VCP	0.015	7	1480	2.87	4249	29,743	544,547	0.16	1.29
PIPE-NO_011-010	NO-011	NO-010	1,528.50	1,517.00	326.53	3.52%	8	VCP	0.015	4	846	2.87	2428	5,463	1,273,623	0.05	1.40
PIPE-NO_012-011	NO-012	NO-011	1,545.50	1,528.50	319.45	5.32%	8	VCP	0.015	5	1057	2.87	3035	3,035	1,565,585	0.03	1.35
PIPE-NO_012-P_001	P-001	L-012	1,545.75	1,531.05	293.91	5.00%	8	VCP	0.015	3	634	2.87	1821	1,821	1,517,767	0.03	1.13
PIPE-Q01-Q_001-K_010	Q-001	K-010	1,548.72	1,547.70	169.94	0.60%	8	VCP	0.015	0	0	2.87	0	-	525,782	0.00	0.00
PIPE-Q02-Q_002-SH_012	Q-002	SH-012	1,548.55	1,545.00	187.10	1.90%	8	VCP	0.015	2	423	2.87	1214	1,214	934,826	0.03	0.71
PIPE-Q03-Q_003-LB_014	Q-003	LB-014	1,542.67	1,536.00	205.82	3.24%	8	VCP	0.015	2	423	2.87	1214	1,214	1,221,723	0.02	0.86
PIPE-Q04-Q_004-LB_014	Q-004	LB-014	1,538.63	1,536.00	193.99	1.36%	8	VCP	0.015	2	423	2.87	1214	1,214	790,209	0.03	0.64
PIPE-Q05-CA_004-CL_013	Q-005	CL-012	1,534.50	1,525.50	218.91	4.11%	8	VCP	0.015	3	634	2.87	1821	7,891	1,376,075	0.05	1.65
PIPE-Q06-CL_013-L_011	CL-012	L-011	1,525.50	1,518.50	220.91	3.17%	8	VCP	0.015	2	423	2.87	1214	10,926	1,208,078	0.07	1.67
PIPE-Q07-L_011-NO_010	L-011	NO-010	1,518.50	1,517.00	210.06	0.71%	8	VCP	0.015	0	0	2.87	0	20,031	573,492	0.13	1.19
PIPE-SH_002-001	SH-002	SH-001	1,532.80	1,525.60	182.10	3.95%	8	VCP	0.015	2	423	2.87	1214	1,214	1,349,475	0.02	0.92
PIPE-SH_003-004	SH-003	SH-004	1,537.30	1,514.00	145.00	16.07%	8	VCP	0.015	0	0	2.87	0	-	2,720,493	0.00	0.00
PIPE-SH_005-004	SH-005	SH-004	1,515.80	1,514.00	205.00	0.88%	8	VCP	0.015	3	634	2.87	1821	3,642	635,935	0.05	0.76
PIPE-SH_006-005	SH-006	SH-005	1,527.40	1,515.80	190.00	6.11%	8	VCP	0.015	3	634	2.87	1821	1,821	1,676,895	0.02	1.21
PIPE-SH_007-008	SH-007	SH-008	1,526.00	1,521.80	364.55	1.15%	8	VCP	0.015	2	423	2.87	1214	1,214	728,450	0.03	0.60
PIPE-SH_009-008	SH-009	SH-008	1,524.00	1,521.80	172.76	1.27%	8	VCP	0.015	1	211	2.87	607	75,875	765,849	0.21	2.16
PIPE-SH_010-009	SH-010	SH-009	1,529.72	1,524.00	347.69	1.65%	8	VCP	0.015	5	1057	2.87	3035	6,070	870,473	0.06	1.11
PIPE-SH_011-010	SH-011	SH-010	1,535.70	1,529.72	235.00	2.54%	8	VCP	0.015	3	634	2.87	1821	3,035	1,082,606	0.04	1.05
PIPE-SH_012-011	SH-012	SH-011	1,545.50	1,535.70	110.26	8.89%	8	VCP	0.015	0	0	2.87	0	1,214	2,023,288	0.02	1.22
PIPE-SI_002-001	SI-002	SI-001	1,514.91	1,511.00	259.95	1.50%	8	VCP	0.015	7	1480	2.87	4249	7,284	832,333	0.07	1.14
PIPE-SI_003-002	SI-003	SI-002	1,517.21	1,514.91	460.00	0.50%	8	VCP	0.015	5	1057	2.87	3035	3,035	479,887	0.06	0.59
PIPE-SI_004-003	SI-004	SI-003	1,522.00	1,517.21	186.95	2.56%	8	VCP	0.015	0	0	2.87	0	-	1,086,322	0.00	0.00
PIPE-SJ_002-001	SJ-002	SJ-001	1,538.91	1,537.40	252.05	0.60%	8	VCP	0.015	3	634	2.87	1821	6,070	525,289	0.08	0.78
PIPE-SJ_003-002	SJ-003	SJ-002	1,548.37	1,538.91	274.70	3.44%	8	VCP	0.015	2	423	2.87	1214	4,249	1,259,418	0.04	1.29

Quail Valley SA4
Hydraulic Model Results - Gravity Mains
Existing Conditions
10/16/2024

PIPE-SJ_004-003	SJ-004	SJ-003	1,550.50	1,548.37	425.30	0.50%	8	VCP	0.015	0	0	2.87	0	3,035	480,281	0.06	0.59
PIPE-SJ_005-004	SJ-005	SJ-004	1,553.72	1,550.50	460.00	0.70%	8	VCP	0.015	2	423	2.87	1214	3,035	567,809	0.05	0.67
PIPE-SJ_006-005	SJ-006	SJ-005	1,582.20	1,553.72	380.00	7.49%	8	VCP	0.015	3	634	2.87	1821	1,821	1,857,940	0.02	1.30
PIPE-SJ_007-006	SJ-007	SJ-006	1,625.32	1,582.20	200.00	21.56%	8	VCP	0.015	0	0	2.87	0	-	3,151,215	0.00	0.00
PIPE-SJ_008-009	SJ-008	SJ-009	1,623.00	1,590.10	350.00	9.40%	8	VCP	0.015	3	634	2.87	1821	1,821	2,080,739	0.02	1.41
PIPE-SJ_009-010	SJ-009	SJ-010	1,590.10	1,588.10	133.52	1.50%	8	VCP	0.015	1	211	2.87	607	2,428	830,607	0.04	0.81
PIPE-SJ_011-010	SJ-011	SJ-010	1,589.29	1,588.10	119.65	0.99%	8	VCP	0.015	1	211	2.87	607	607	676,816	0.02	0.46
PIPE-W_001-NEW_005	W-001	NEW-005	1,497.70	1,495.60	224.58	0.94%	8	VCP	0.015	0	0	2.87	0	16,996	656,263	0.11	1.25
PIPE-W_002-001	W-002	W-001	1,502.00	1,497.70	155.92	2.76%	8	VCP	0.015	0	0	2.87	0	16,996	1,127,034	0.09	1.82
PIPE-W_003-002	W-003	W-002	1,509.95	1,502.00	344.34	2.31%	8	VCP	0.015	0	0	2.87	0	16,996	1,031,201	0.09	1.71
PIPE-W_004-003	W-004	W-003	1,532.00	1,509.95	345.66	6.38%	8	VCP	0.015	8	1692	2.87	4856	9,712	1,714,089	0.05	2.05
PIPE-W_005-004	W-005	W-004	1,538.00	1,532.00	390.00	1.54%	8	VCP	0.015	8	1692	2.87	4856	4,856	841,777	0.05	1.01
PIPE-W_006-007	W-006	W-007	1,537.00	1,531.52	75.00	7.31%	8	VCP	0.015	1	211	2.87	607	607	1,834,481	0.01	0.92
PIPE-W_007-CM2	W-007	CM1	1,531.52	1,530.30	97.42	1.25%	8	VCP	0.015	1	211	2.87	607	1,214	759,468	0.03	0.62
PIPE-WILL-001-002	WILL-001	WILL-002	1,585.00	1,566.20	288.00	6.53%	8	VCP	0.015	6	1269	2.87	3642	3,642	1,733,949	0.03	1.53
PIPE-WILL-002-003	WILL-002	WILL-003	1,566.20	1,555.30	450.19	2.42%	8	VCP	0.015	2	423	2.87	1214	4,856	1,056,012	0.05	1.19
PIPE-WILL-004-003	WILL-004	WILL-003	1,564.80	1,555.30	110.02	8.63%	8	VCP	0.015	0	0	2.87	0	1,214	1,994,250	0.02	1.21
PIPE-WILL-005-004	WILL-005	WILL-004	1,574.27	1,564.80	100.02	9.47%	8	VCP	0.015	1	211	2.87	607	1,214	2,088,263	0.02	1.25
PIPE-WILL-006-005	WILL-006	WILL-005	1,587.50	1,574.27	139.77	9.47%	8	VCP	0.015	1	211	2.87	607	607	2,087,981	0.01	1.01

Michael Baker International

QUAIL VALLEY SEWER CAPACITY SPREADSHEET (BUILDOUT CONDITIONS)

Preliminary (30%) SUBMITTAL

ID	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (ft)	Slope	Diameter (in)	Pipe Material	Manning's N Value	Contributing EDU	Average Daily Flow Per DU (GPD)	Peaking Factor	Peak Flow (GPD)	Total Peak Flow (gpd)	Full Capacity (gpd)	d/D (%)	Velocity (ft/s)
CP-001	SJ-010	J-014	1,588.10	1,582.00	215.51	2.83%	8	VCP	0.015	0	0	2.87	0	4,249	1,141,786	0.04	1.20
CP-002	J-013	LU-016	1,580.00	1,576.00	221.03	1.81%	8	VCP	0.015	0	0	2.87	0	19,424	912,973	0.10	1.63
CP-003	LU-015	E-013	1,572.00	1,567.80	223.07	1.88%	8	VCP	0.015	1	211	2.87	607	33,992	931,231	0.13	1.96
CP-004	E-012	LA-015	1,563.24	1,559.50	220.30	1.70%	8	VCP	0.015	0	0	2.87	0	47,346	884,264	0.16	2.08
CP-005	LA-014	MV-013	1,557.00	1,551.50	208.31	2.64%	8	VCP	0.015	0	0	2.87	0	62,521	1,102,757	0.16	2.64
CP-006	MV-012	G-011	1,550.82	1,547.00	230.55	1.66%	8	VCP	0.015	0	0	2.87	0	78,910	873,580	0.20	2.40
CP-007	G-009	K-007	1,532.00	1,527.80	231.05	1.82%	8	VCP	0.015	0	0	2.87	0	169,352	915,009	0.29	3.10
CP-008	K-006	SH-009	1,526.60	1,524.00	218.88	1.19%	8	VCP	0.015	0	0	2.87	0	192,418	739,669	0.35	2.76
CP-009	SH-008	LB-010	1,521.80	1,520.20	218.87	0.73%	8	VCP	0.015	1	211	2.87	607	221,554	580,257	0.43	2.40
CP-010.1	LB-009	CA-008	1,514.50	1,509.00	219.87	2.50%	8	VCP	0.015	0	0	2.87	0	256,153	1,073,376	0.33	3.90
CP-010.2	CA-008	CL-006	1,509.00	1,507.91	218.87	0.50%	12	VCP	0.015	0	0	2.87	0	284,682	1,412,070	0.30	2.18
CP-011	CL-005	L-006	1,502.00	1,499.00	220.83	1.36%	12	VCP	0.015	0	0	2.87	0	315,031	2,332,210	0.25	3.21
CP-012	L-005	NO-003	1,496.00	1,494.95	210.00	0.50%	12	VCP	0.015	0	0	2.87	0	342,953	1,414,885	0.34	2.30
CP-021.1	CP21.2	Q-005	1,542.51	1,534.50	352.88	2.27%	8	VCP	0.015	0	0	2.87	0	22,459	1,022,484	0.10	1.85
CP-021.2	CP21.3	CP21.2	1,549.68	1,542.51	35.99	19.92%	8	VCP	0.015	0	0	2.87	0	22,459	3,029,160	0.06	3.94
CP-021.3	WILL-003	CP21.3	1,555.30	1,549.68	208.00	2.70%	8	VCP	0.015	0	0	2.87	0	22,459	1,115,553	0.10	1.96
CP-022	NO-009	CY-008	1,514.00	1,505.00	226.99	3.96%	8	VCP	0.015	0	0	2.87	0	72,233	1,351,361	0.16	3.18
CP-023	NO-006	CY-007	1,508.50	1,502.50	226.98	2.64%	8	VCP	0.015	0	0	2.87	0	9,105	1,103,406	0.06	1.48
CP-024	CY-006	NEW-004	1,500.00	1,492.50	218.84	3.43%	8	VCP	0.015	0	0	2.87	0	117,757	1,256,380	0.21	3.49
CP-031	LU-006	E-005	1,537.00	1,535.89	222.07	0.50%	8	VCP	0.015	0	0	2.87	0	30,350	479,811	0.17	1.19
CP-032	E-004	LA-005	1,532.00	1,528.22	220.08	1.72%	8	VCP	0.015	0	0	2.87	0	44,918	889,425	0.15	2.06
CP-033	MV-003	G-003	1,514.48	1,513.00	242.62	0.61%	8	VCP	0.015	0	0	2.87	0	17,603	530,055	0.12	1.08
CP-034	SH-004	LB-005	1,514.00	1,512.90	218.82	0.50%	8	VCP	0.015	0	0	2.87	0	12,140	481,179	0.11	0.91
CP-035	LB-004	CA-004	1,512.00	1,510.90	219.84	0.50%	8	VCP	0.015	0	0	2.87	0	18,210	480,061	0.13	1.02
CP-36.1	CA-002	CP36.2	1,504.60	1,504.54	11.00	0.55%	8	VCP	0.015	0	0	2.87	0	24,887	501,225	0.15	1.16
CP-36.2	CP36.2	MNT-VIEW-002	1,504.54	1,503.93	122.16	0.50%	8	VCP	0.015	0	0	2.87	0	24,887	479,572	0.15	1.12
CP-37	SI-001	W-003	1,511.00	1,509.95	209.39	0.50%	8	VCP	0.015	0	0	2.87	0	17,603	480,585	0.13	1.01
PIPE-CA_001-002	CA-001	CA-002	1,508.50	1,504.60	50.00	7.80%	8	VCP	0.015	1	211	2.87	607	607	1,895,400	0.01	0.94
PIPE-CA_003-002	CA-003	CA-002	1,505.15	1,504.60	110.00	0.50%	8	VCP	0.015	5	1057	2.87	3035	24,280	479,887	0.15	1.11
PIPE-CA_004-003	CA-004	CA-003	1,510.90	1,505.15	53.92	10.66%	8	VCP	0.015	0	0	2.87	0	21,852	2,216,218	0.07	3.14
PIPE-CA_005-004	CA-005	CA-004	1,527.30	1,510.90	136.08	12.05%	8	VCP	0.015	6	1269	2.87	3642	3,642	2,356,017	0.03	1.90
PIPE-CA_006-007	CA-006	CA-007	1,524.80	1,511.80	200.00	6.50%	8	VCP	0.015	7	1480	2.87	4249	4,249	1,730,256	0.04	1.61
PIPE-CA_007-008	CA-007	CA-008	1,511.80	1,509.00	283.76	0.99%	8	VCP	0.015	7	1480	2.87	4249	8,498	674,151	0.08	1.03
PIPE-CA_009-008	CA-009	CA-008	1,523.00	1,509.00	176.24	7.94%	8	VCP	0.015	5	1057	2.87	3035	20,031	1,912,782	0.07	2.76
PIPE-CA_010-009	CA-010	CA-009	1,525.30	1,523.00	370.00	0.62%	8	VCP	0.015	13	2749	2.87	7891	16,996	535,077	0.12	1.08
PIPE-CA_011-010	CA-011	CA-010	1,528.70	1,525.30	275.00	1.24%	8	VCP	0.015	8	1692	2.87	4856	10,319	754,617	0.08	1.18
PIPE-CA_012-011	CA-012	CA-011	1,539.00	1,528.70	225.00	4.58%	8	VCP	0.015	9	1903	2.87	5463	5,463	1,452,048	0.04	1.53
PIPE-CL_002-001	CL-002	CL-001	1,523.90	1,496.40	275.09	10.00%	8	VCP	0.015	8	1692	3.87	4856	5,463	2,145,767	0.04	2.01
PIPE-CL_003-004	CL-003	CL-004	1,525.40	1,509.90	224.00	6.92%	8	VCP	0.015	9	1903	4.87	5463	5,463	1,785,235	0.04	1.77
PIPE-CL_004-005	CL-004	CL-005	1,509.90	1,502.00	175.00	4.51%	8	VCP	0.015	6	1269	2.87	3642	9,105	1,441,943	0.06	1.78
PIPE-CL_006-005	CL-006	CL-005	1,507.91	1,502.00	228.28	2.59%	12	VCP	0.015	5	1057	2.87	3035	305,926	3,219,556	0.21	4.00
PIPE-CL_007-006	CL-007	CL-006	1,516.41	1,507.91	96.72	8.79%	8	VCP	0.015	10	2115	2.87	6070	18,210	2,011,893	0.07	2.78
PIPE-CL_008-007	CL-008	CL-007	1,517.56	1,516.41	230.00	0.50%	8	VCP	0.015	10	2115	2.87	6070	15,782	479,887	0.12	0.98
PIPE-CL_009-008	CL-009	CL-008	1,525.35	1,517.56	270.00	2.89%	8	VCP	0.015	10	2115	2.87	6070	12,140	1,152,764	0.07	1.67
PIPE-CL_010-009	CL-010	CL-009	1,534.00	1,525.35	300.00	2.88%	8	VCP	0.015	4	846	2.87	2428	6,070	1,152,394	0.05	1.35
PIPE-CL_011-012	CL-011	CL-012	1,530.80	1,525.50	144.11	3.68%	8	VCP	0.015	2	423	2.87	1214	2,428	1,301,501	0.03	1.11
PIPE-CLARK_001	E-008	LA-010	1,547.00	1,539.34	219.09	3.50%	8	VCP	0.015	0	0	2.87	0	15,782	1,268,986	0.08	1.93
PIPE-CLARK_002	LA-010	MV-008	1,539.34	1,536.35	208.51	1.43%	8	VCP	0.015	1	211	2.87	607	34,599	812,692	0.14	1.79
PIPE-CLARK_003	MV-008	G-009	1,536.35	1,532.00	230.51	1.89%	8	VCP	0.015	0	0	2.87	0	55,237	932,295	0.17	2.26
PIPE-CY_002-001	CY-001	CY-002	1,482.91	1,481.53	162.05	0.85%	12	VCP	0.015	1	211	2.87	607	799,415	1,846,508	0.46	3.51
PIPE-CY_003-002	CY-003	CY-002	1,499.40	1,481.53	270.00	6.62%	8	VCP	0.015	11	2326	2.87	6677	9,105	1,745,959	0.05	2.04
PIPE-CY_004-003	CY-004	CY-003	1,511.70	1,499.40	281.95	4.36%	8	VCP	0.015	10	2115	2.87	6070	5,463	1,417,490	0.05	1.51
PIPE-CY_005-006	CY-005	CY-006	1,512.00	1,500.00	230.00	5.22%	8	VCP	0.015	7	1480	2.87	4249	3,035	1,550,173	0.03	1.34
PIPE-CY_007-006	CY-007	CY-006	1,502.50	1,500.00	270.03	0.93%	8	VCP	0.015	7	1480	2.87	4249	114,722	653,007	0.28	2.18
PIPE-CY_008-007	CY-008	CY-007	1,505.00	1,502.50	283.13	0.88%	8	VCP	0.015	9	1903	2.87	5463	101,368	637,721	0.27	2.07
PIPE-CY_009-008	CY-009	CY-008	1,523.30	1,505.00	356.58	5.13%	8	VCP	0.015	12	2538	2.87	7284	23,673	1,537,449	0.09	2.49
PIPE-CY_010-009	CY-010	CY-009	1,527.00	1,523.30	104.49	3.54%	8	VCP	0.015	3	634	2.87	1821	16,389	1,277,077	0.08	1.96
PIPE-CY_011-010	CY-011	CY-010	1,544.00	1,527.00	300.82	5.65%	8	VCP	0.015	10	2115	2.87	6070	14,568	1,613,336	0.07	2.23
PIPE-CY_012-011	CY-012	CY-011	1,548.65	1,544.00	344.55	1.35%	8	VCP	0.015	13	2749	2.87	7891	7,891	788,413	0.07	1.12
PIPE-E_002-001	E-002	E-001	1,562.54	1,522.52	332.08	12.05%	8	VCP	0.015	10	2115	2.87	6070	6,070	2,355,976	0.04	2.22
PIPE-E_003-004	E-003	E-004	1,557.20	1,532.00	230.08	10.95%	8	VCP	0.015	7	1480	2.87	4249	4,249	2,246,024	0.03	1.92
PIPE-E_005-004	E-005	E-004	1,535.89	1,532.00	137.52	2.83%	8	VCP	0.015	4	846	2.87	2428	40,669	1,141,420	0.13	2.38
PIPE-E_006-005	E-006	E-005	1,549.50	1,535.89	349.90	3.89%	8	VCP	0.015	13	2749	2.87	7891	7,891	1,338,476	0.06	1.62
PIPE-E_007-008	E-007	E-008	1,549.80	1,547.00	223.12	1.25%	8	VCP	0.015	7	1480	2.87	4249	4,249	760,262	0.05	0.91
PIPE-E_009-008	E-009	E-008	1,553.00	1,547.00	201.88	2.97%	8	VCP	0.015	7	1480	2.87	4249	11,533	1,169,991	0.07	1.66
PIPE-E_010-009	E-010	E-009	1,575.20	1,553.00	390.00	5.69%	8	VCP	0.015	13	2749	2.87	7891	7,284	1,619,190	0.05	1.81
PIPE-E_011-012	E-011	E-012	1,576.65	1,563.24	251.76	5.33%	8	VCP	0.015	10	2115	2.87	6070	5,463	1,566,299	0.04	1.62
PIPE-E_013-012	E-013	E-012	1,567.80	1,563.24	79.95	5.70%	8	VCP	0.015	2	423	2.87	1214	41,883	1,620,790	0.11	3.07
PIPE-E_014-013	E-014	E-013	1,570.08	1,567.80	198.29	1.15%	8	VCP	0.015	6	1269	2.87	3642	6,677	727,731	0.07	1.01

PIPE-E_015-014	E-015	E-014	1,578.34	1,570.08	151.52	5.45%	8	VCP	0.015	5	1057	2.87	3035	3,035	1,584,560	0.03	1.36
PIPE-F_001-G_012	F-001	G-012	1,567.44	1,565.50	193.97	1.00%	8	VCP	0.015	5	1057	2.87	3035	2,428	678,715	0.04	0.71
PIPE-G_001-002	G-001	G-002	1,508.50	1,507.96	108.08	0.50%	8	VCP	0.015	3	634	2.87	1821	25,494	479,709	0.16	1.13
PIPE-G_003-002	G-003	G-002	1,513.00	1,507.96	84.91	5.94%	8	VCP	0.015	1	211	2.87	607	35,206	1,653,444	0.10	2.96
PIPE-G_004-003	G-004	G-003	1,526.25	1,513.00	239.09	5.54%	8	VCP	0.015	8	1692	2.87	4856	16,996	1,597,647	0.07	2.32
PIPE-G_005-004	G-005	G-004	1,534.00	1,526.25	310.00	2.50%	8	VCP	0.015	10	2115	2.87	6070	12,140	1,073,059	0.07	1.59
PIPE-G_006-005	G-006	G-005	1,573.20	1,534.00	245.00	16.00%	8	VCP	0.015	10	2115	2.87	6070	6,070	2,714,648	0.03	2.45
PIPE-G_007-008	G-007	G-008	1,574.00	1,534.00	240.00	16.67%	8	VCP	0.015	9	1903	2.87	5463	5,463	2,770,626	0.03	2.40
PIPE-G_008-009	G-008	G-009	1,534.00	1,532.00	95.94	2.08%	8	VCP	0.015	3	634	2.87	1821	7,284	979,871	0.06	1.27
PIPE-G_010-009	G-010	G-009	1,541.50	1,532.00	254.06	3.74%	8	VCP	0.015	7	1480	2.87	4249	106,831	1,312,343	0.19	3.50
PIPE-G_011-010	G-011	G-010	1,547.00	1,541.50	419.81	1.31%	8	VCP	0.015	13	2749	2.87	7891	102,582	776,799	0.25	2.39
PIPE-G_012-011	G-012	G-011	1,565.50	1,547.00	382.67	4.83%	8	VCP	0.015	14	2961	2.87	8498	15,782	1,492,201	0.07	2.16
PIPE-G_013-012	G-013	G-012	1,570.00	1,565.50	55.00	8.18%	8	VCP	0.015	3	634	2.87	1821	5,463	1,941,237	0.04	1.88
PIPE-G_014-013	G-014	G-013	1,582.00	1,570.00	112.52	10.66%	8	VCP	0.015	3	634	2.87	1821	4,249	2,216,304	0.03	1.91
PIPE-G_015-014	G-015	G-014	1,604.00	1,582.00	90.00	24.44%	8	VCP	0.015	4	846	2.87	2428	2,428	3,355,395	0.02	2.14
PIPE-J_001-002	J-001	J-002	1,532.00	1,523.20	200.00	4.40%	8	VCP	0.015	7	1480	2.87	4249	4,856	1,423,574	0.04	1.46
PIPE-J_003-002	J-003	J-002	1,541.32	1,523.20	230.00	7.88%	8	VCP	0.015	9	1903	2.87	5463	35,813	1,904,885	0.10	3.28
PIPE-J_004-003	J-004	J-003	1,542.90	1,541.32	317.00	0.50%	8	VCP	0.015	12	2538	2.87	7284	30,957	479,129	0.17	1.19
PIPE-J_005-004	J-005	J-004	1,544.50	1,542.90	320.00	0.50%	8	VCP	0.015	13	2749	2.87	7891	24,887	479,887	0.15	1.12
PIPE-J_006-005	J-006	J-005	1,557.00	1,544.50	163.00	7.67%	8	VCP	0.015	6	1269	2.87	3642	16,996	1,879,381	0.07	2.59
PIPE-J_007-006	J-007	J-006	1,560.26	1,557.00	160.00	2.04%	8	VCP	0.015	3	634	2.87	1821	14,568	968,729	0.09	1.56
PIPE-J_008-007	J-008	J-007	1,568.00	1,560.26	210.00	3.69%	8	VCP	0.015	9	1903	2.87	5463	12,140	1,302,910	0.07	1.81
PIPE-J_009-008	J-009	J-008	1,648.00	1,568.00	265.00	30.19%	8	VCP	0.015	11	2326	2.87	6677	6,677	3,728,856	0.03	3.14
PIPE-J_010-011	J-010	J-011	1,649.00	1,610.00	185.00	21.08%	8	VCP	0.015	6	1269	2.87	3642	3,642	3,116,019	0.03	2.30
PIPE-J_011-012	J-011	J-012	1,610.00	1,587.00	140.00	16.43%	8	VCP	0.015	6	1269	2.87	3642	7,284	2,750,765	0.04	2.61
PIPE-J_012-013	J-012	J-013	1,587.00	1,580.00	183.00	3.83%	8	VCP	0.015	7	1480	2.87	4249	11,533	1,327,324	0.07	1.81
PIPE-J_014-013	J-014	J-013	1,582.00	1,580.00	69.89	2.86%	8	VCP	0.015	3	634	2.87	1821	7,891	1,148,051	0.06	1.46
PIPE-J_015-014	J-015	J-014	1,589.00	1,582.00	129.81	5.39%	8	VCP	0.015	4	846	2.87	2428	2,428	1,575,972	0.03	1.27
PIPE-K_002-001	K-002	K-001	1,520.00	1,515.90	422.09	0.97%	8	VCP	0.015	16	3384	2.87	9712	20,638	668,872	0.12	1.34
PIPE-K_003-002	K-003	K-002	1,527.00	1,520.00	300.00	2.33%	8	VCP	0.015	12	2538	2.87	7284	10,926	1,036,673	0.07	1.50
PIPE-K_004-003	K-004	K-003	1,555.00	1,527.00	280.00	10.00%	8	VCP	0.015	6	1269	2.87	3642	3,642	2,146,118	0.03	1.78
PIPE-K_005-006	K-005	K-006	1,555.00	1,526.60	279.90	10.15%	8	VCP	0.015	11	2326	2.87	6677	6,677	2,161,779	0.04	2.15
PIPE-K_007-006	K-007	K-006	1,527.80	1,526.60	50.12	2.39%	8	VCP	0.015	1	211	2.87	607	185,741	1,050,119	0.28	3.51
PIPE-K_008-007	K-008	K-007	1,535.10	1,527.80	459.98	1.59%	8	VCP	0.015	16	3384	2.87	9712	15,782	854,960	0.09	1.46
PIPE-K_009-008	K-009	K-008	1,543.64	1,535.10	129.63	6.59%	8	VCP	0.015	4	846	2.87	2428	6,070	1,741,926	0.04	1.80
PIPE-K_010-009	K-010	K-009	1,547.70	1,543.64	63.12	6.43%	8	VCP	0.015	0	0	2.87	0	3,642	1,721,207	0.03	1.53
PIPE-K_011-010	K-011	K-010	1,564.70	1,547.70	297.25	5.72%	8	VCP	0.015	2	423	2.87	1214	1,214	1,622,995	0.02	1.05
PIPE-L_002-001	L-002	L-001	1,513.72	1,493.00	324.70	6.38%	8	VCP	0.015	9	1903	2.87	5463	6,070	1,714,381	0.04	1.78
PIPE-L_003-004	L-003	L-004	1,512.00	1,498.70	114.40	11.63%	8	VCP	0.015	6	1269	2.87	3642	3,035	2,314,016	0.03	1.77
PIPE-L_004-005	L-004	L-005	1,498.70	1,496.00	82.67	3.27%	8	VCP	0.015	2	423	2.87	1214	4,856	1,226,483	0.05	1.32
PIPE-L_006-005	L-006	L-005	1,499.00	1,496.00	155.00	1.94%	12	VCP	0.015	5	1057	2.87	3035	338,097	2,783,755	0.24	3.71
PIPE-L_007-006	L-007	L-006	1,511.00	1,499.00	264.42	4.54%	8	VCP	0.015	9	1903	2.87	5463	20,031	1,445,763	0.08	2.27
PIPE-L_008-007	L-008	L-007	1,513.50	1,511.00	357.91	0.70%	8	VCP	0.015	14	2961	2.87	8498	14,568	567,201	0.11	1.07
PIPE-L_009-008	L-009	L-008	1,524.30	1,513.50	303.00	3.56%	8	VCP	0.015	11	2326	2.87	6677	6,677	1,281,280	0.05	1.50
PIPE-L_010-011	L-010	L-011	1,521.00	1,518.50	345.70	0.72%	8	VCP	0.015	13	2749	2.87	7891	7,891	577,130	0.08	0.90
PIPE-L_012-011	L-012	L-011	1,531.05	1,518.50	354.34	3.54%	8	VCP	0.015	6	1269	2.87	3642	11,533	1,277,219	0.07	1.76
PIPE-L_013-012	L-013	L-012	1,546.50	1,531.05	131.96	11.71%	8	VCP	0.015	4	846	2.87	2428	6,070	2,322,184	0.04	2.20
PIPE-L_014-013	L-014	L-013	1,562.00	1,546.50	89.24	17.37%	8	VCP	0.015	2	423	2.87	1214	3,642	2,828,392	0.03	2.15
PIPE-L_015-014	L-015	L-014	1,582.50	1,562.00	89.30	22.96%	8	VCP	0.015	4	846	2.87	2428	2,428	3,251,658	0.02	2.10
PIPE-LA_002-001	LA-002	LA-001	1,542.00	1,528.65	372.08	3.59%	8	VCP	0.015	13	2749	2.87	7891	7,284	1,285,512	0.05	1.54
PIPE-LA_003-004	LA-003	LA-004	1,542.21	1,529.30	100.00	12.91%	8	VCP	0.015	4	846	2.87	2428	2,428	2,438,466	0.02	1.72
PIPE-LA_004-005	LA-004	LA-005	1,529.30	1,528.22	119.68	0.90%	8	VCP	0.015	5	1057	2.87	3035	5,463	644,696	0.07	0.87
PIPE-LA_005-006	LA-005	LA-006	1,528.22	1,528.02	40.32	0.50%	8	VCP	0.015	0	0	2.87	0	50,381	477,978	0.22	1.38
PIPE-LA_007-006	LA-007	LA-006	1,563.22	1,528.02	320.00	11.00%	8	VCP	0.015	11	2326	2.87	6677	6,070	2,250,868	0.04	2.15
PIPE-LA_008-009	LA-008	LA-009	1,562.72	1,540.20	185.00	12.17%	8	VCP	0.015	6	1269	2.87	3642	4,249	2,367,838	0.03	2.00
PIPE-LA_009-010	LA-009	LA-010	1,540.20	1,539.34	172.36	0.50%	8	VCP	0.015	4	846	2.87	2428	6,677	479,385	0.08	0.75
PIPE-LA_011-010	LA-011	LA-010	1,549.50	1,539.34	362.64	2.80%	8	VCP	0.015	11	2326	2.87	6677	11,533	1,135,959	0.07	1.62
PIPE-LA_012-011	LA-012	LA-011	1,567.00	1,549.50	260.00	6.73%	8	VCP	0.015	9	1903	2.87	5463	5,463	1,760,702	0.04	1.75
PIPE-LA_013-014	LA-013	LA-014	1,567.92	1,557.00	116.06	9.41%	8	VCP	0.015	5	1057	2.87	3035	3,035	2,081,726	0.03	1.65
PIPE-LA_015-014	LA-015	LA-014	1,559.50	1,557.00	105.04	2.38%	8	VCP	0.015	3	634	2.87	1821	59,486	1,046,999	0.16	2.51
PIPE-LA_016-015	LA-016	LA-015	1,583.00	1,559.50	429.90	5.47%	8	VCP	0.015	7	1480	2.87	4249	10,319	1,586,733	0.06	1.98
PIPE-LB_002-001	LB-002	CM2	1,534.30	1,531.40	72.01	4.03%	8	VCP	0.015	2	423	2.87	1214	1,214	1,361,934	0.02	0.93
PIPE-LB_003-004	LB-003	LB-004	1,533.00	1,512.00	179.45	11.70%	8	VCP	0.015	6	1269	2.87	3642	3,642	2,321,622	0.03	1.88
PIPE-LB_005-004	LB-005	LB-004	1,512.90	1,512.00	73.25	1.23%	8	VCP	0.015	2	423	2.87	1214	14,568	752,265	0.10	1.31
PIPE-LB_006-005	LB-006	LB-005	1,529.00	1,512.90	62.30	25.84%	8	VCP	0.015	2	423	2.87	1214	1,214	3,450,027	0.01	1.77
PIPE-LB_007-008	LB-007	LB-008	1,526.25	1,519.80	210.00	3.07%	8	VCP	0.015	7	1480	2.87	4249	4,249	1,189,389	0.04	1.24
PIPE-LB_008-009	LB-008	LB-009	1,519.80	1,514.50	274.24	1.93%	8	VCP	0.015	9	1903	2.87	5463	10,319	943,466	0.07	1.38
PIPE-LB_010-009	LB-010	LB-009	1,520.20	1,514.50	199.89	2.85%	8	VCP	0.015	6	1269	2.87	3642	245,834	1,146,029	0.31	4.05
PIPE-LB_011-010	LB-011	LB-010	1,524.50	1,520.20	325.87	1.32%	8	VCP	0.015	9	1903	2.87	5463	20,638	779,589	0.11	1.49
PIPE-LB_012-011	LB-012	LB-011	1,532.00	1,524.50	70.00	10.71%	8	VCP	0.015	4	846	2.87	2428	15,175	2,221,443	0.06	2.82
PIPE-LB_013-012	LB-013	LB-012	1,534.00	1,532.00	320.00	0.63%	8	VCP	0.015	9	1903	2.87	5463	12,747	536,529	0.11	0.99
PIPE-LB_014-013	LB-014	LB-013	1,536.00	1,534.00	149.89	1.33%	8	VCP	0.015	6	1269	2.87	3642	7,284	783,939	0.07	1.09
PIPE-LU_002-001	LU-001	LU-002	1,519.00	1,518.77	46.08	0.50%	8	VCP	0.015	0	0	2.87	0	34,599	479,470	0.18	1.23
PIPE-LU_003-002	LU-003	LU-002	1,539.00	1,518.77	179.00	11.30%	8	VCP	0.015	7	1480	2.87	4249	8,498	2,281,524	0.04	2.40
PIPE-LU_004-003	LU-004	LU-003	1,570.00	1,539.00	192.00	16.15%	8	VCP	0.015	7	1480	2.87	4249	4,249	2,726,992	0.03	2.20
PIPE-LU_005-006	LU-005	LU-006	1,569.00	1,537.00	303.00	10.56%	8	VCP	0.015	11	2326	2.87	6677	6,677	2,205,501	0.04	2.18

PIPE-LU_007-006	LU-007	LU-006	1,537.88	1,537.00	177.00	0.50%	8	VCP	0.015	6	1269	2.87	3642	23,673	478,529	0.15	1.10
PIPE-LU_008-007	LU-008	LU-007	1,550.00	1,537.88	300.00	4.04%	8	VCP	0.015	10	2115	2.87	6070	20,031	1,364,094	0.08	2.18
PIPE-LU_009-008	LU-009	LU-008	1,562.36	1,550.00	270.00	4.58%	8	VCP	0.015	10	2115	2.87	6070	13,961	1,452,048	0.07	2.04
PIPE-LU_010-009	LU-010	LU-009	1,583.20	1,562.36	180.00	11.58%	8	VCP	0.015	5	1057	2.87	3035	7,891	2,309,225	0.04	2.37
PIPE-LU_011-010	LU-011	LU-010	1,627.68	1,583.20	200.00	22.24%	8	VCP	0.015	8	1692	2.87	4856	4,856	3,200,523	0.03	2.56
PIPE-LU_012-013	LU-012	LU-013	1,625.80	1,597.40	130.00	21.85%	8	VCP	0.015	6	1269	2.87	3642	3,642	3,172,058	0.03	2.33
PIPE-LU_013-014	LU-013	LU-014	1,597.40	1,579.00	160.00	11.50%	8	VCP	0.015	5	1057	2.87	3035	6,677	2,301,455	0.04	2.25
PIPE-LU_014-015	LU-014	LU-015	1,579.00	1,572.00	82.39	8.50%	8	VCP	0.015	3	634	2.87	1821	8,498	1,978,178	0.05	2.18
PIPE-LU_016-015	LU-016	LU-015	1,576.00	1,572.00	149.98	2.67%	8	VCP	0.015	2	423	2.87	1214	24,887	1,108,324	0.10	2.01
PIPE-LU_017-016	LU-017	LU-016	1,584.38	1,576.00	199.63	4.20%	8	VCP	0.015	7	1480	2.87	4249	4,249	1,390,473	0.04	1.38
PIPE-MNT-VIEW_001	SJ-001	MNT-VIEW-001	1,537.40	1,531.00	209.30	3.06%	8	VCP	0.015	0	0	2.87	0	21,245	1,186,749	0.09	2.01
PIPE-MNT-VIEW_002	MNT-VIEW-001	LU-001	1,531.00	1,519.00	224.55	5.34%	8	VCP	0.015	0	0	2.87	0	21,245	1,568,873	0.08	2.45
PIPE-MNT-VIEW_003	E-001	LU-001	1,522.52	1,519.00	222.09	1.58%	8	VCP	0.015	0	0	2.87	0	13,354	854,398	0.09	1.39
PIPE-MNT-VIEW_004	LA-001	E-001	1,528.65	1,522.52	219.09	2.80%	8	VCP	0.015	0	0	2.87	0	7,284	1,135,200	0.06	1.41
PIPE-MNT-VIEW_005	K-001	G-001	1,515.90	1,508.50	221.52	3.34%	8	VCP	0.015	0	0	2.87	0	23,673	1,240,403	0.10	2.15
PIPE-MNT-VIEW_006	SH-001	K-001	1,525.60	1,515.90	219.89	4.41%	8	VCP	0.015	0	0	2.87	0	3,035	1,425,400	0.03	1.27
PIPE-MNT-VIEW_007	LB-001	SH-001	1,530.74	1,525.60	159.62	3.22%	8	VCP	0.015	0	0	2.87	0	-	1,217,844	0.00	0.00
PIPE-MNT-VIEW_008	CM2	MNT-VIEW-002	1,531.40	1,503.95	272.79	10.06%	8	VCP	0.015	0	0	2.87	0	202,130	2,152,834	0.21	5.99
PIPE-MNT-VIEW_009	MNT-VIEW-002	CL-001	1,503.95	1,496.40	165.88	4.55%	8	VCP	0.015	0	0	2.87	0	227,017	1,447,872	0.27	4.67
PIPE-MNT-VIEW_010	CL-001	L-001	1,496.40	1,493.00	220.82	1.54%	8	VCP	0.015	0	0	2.87	0	232,480	842,120	0.36	3.19
PIPE-MNT-VIEW_011	L-001	NO-001	1,493.00	1,486.00	209.68	3.34%	8	VCP	0.015	0	0	2.87	0	238,550	1,240,007	0.30	4.24
PIPE-MNT-VIEW_012	NO-001	CY-001	1,486.00	1,482.91	226.83	1.36%	12	VCP	0.015	0	0	2.87	0	599,713	2,335,421	0.35	3.85
PIPE-MNT-VIEW_013	NEW-001	CY-001	1,487.18	1,482.91	218.81	1.95%	8	VCP	0.015	0	0	2.87	0	197,274	948,056	0.31	3.32
PIPE-MV_001-002	MV-001	MV-002	1,526.47	1,514.85	75.00	15.49%	8	VCP	0.015	4	846	2.87	2428	2,428	2,671,321	0.02	1.83
PIPE-MV_002-003	MV-002	MV-003	1,514.85	1,514.48	75.06	0.49%	8	VCP	0.015	2	423	2.87	1214	3,642	476,486	0.06	0.62
PIPE-MV_004-003	MV-004	MV-003	1,525.55	1,514.48	329.94	3.36%	8	VCP	0.015	12	2538	2.87	7284	13,961	1,243,111	0.07	1.83
PIPE-MV_005-004	MV-005	MV-004	1,574.00	1,525.55	355.00	13.65%	8	VCP	0.015	11	2326	2.87	6677	6,677	2,507,185	0.04	2.38
PIPE-MV_006-007	MV-006	MV-007	1,571.20	1,537.13	295.00	11.55%	8	VCP	0.015	10	2115	2.87	6070	7,284	2,306,368	0.04	2.31
PIPE-MV_007-008	MV-007	MV-008	1,537.13	1,536.35	156.74	0.50%	8	VCP	0.015	6	1269	2.87	3642	10,926	478,752	0.10	0.87
PIPE-MV_009-008	MV-009	MV-008	1,542.78	1,536.35	253.26	2.54%	8	VCP	0.015	6	1269	2.87	3642	9,712	1,081,374	0.07	1.49
PIPE-MV_010-009	MV-010	MV-009	1,558.44	1,542.78	210.00	7.46%	8	VCP	0.015	8	1692	2.87	4856	5,463	1,853,275	0.04	1.82
PIPE-MV_011-012	MV-011	MV-012	1,558.80	1,550.82	180.64	4.42%	8	VCP	0.015	8	1692	2.87	4856	4,249	1,426,422	0.04	1.40
PIPE-MV_013-012	MV-013	MV-012	1,551.50	1,550.82	97.57	0.70%	8	VCP	0.015	3	634	2.87	1821	74,661	566,565	0.25	1.74
PIPE-MV_014-013	MV-014	MV-013	1,555.80	1,551.50	91.79	4.68%	8	VCP	0.015	2	423	2.87	1214	10,319	1,468,893	0.06	1.88
PIPE-MV_015-014	MV-015	MV-014	1,572.00	1,555.80	290.00	5.59%	8	VCP	0.015	12	2538	2.87	7284	9,105	1,604,029	0.05	1.92
PIPE-MV_016-015	MV-016	MV-015	1,604.00	1,572.00	150.35	21.28%	8	VCP	0.015	4	846	2.87	2428	2,428	3,130,955	0.02	2.04
PIPE-NEW_002-001	NEW-002	NEW-001	1,488.84	1,487.18	302.04	0.55%	8	VCP	0.015	4	846	2.87	2428	197,274	503,124	0.43	2.09
PIPE-NEW_003-002	NEW-003	NEW-002	1,490.38	1,488.84	280.00	0.55%	8	VCP	0.015	6	1269	2.87	3642	194,846	503,309	0.43	2.09
PIPE-NEW_004-003	NEW-004	NEW-003	1,492.50	1,490.38	384.55	0.55%	8	VCP	0.015	7	1480	2.87	4249	191,811	503,901	0.43	2.08
PIPE-NEW_005-004	NEW-005	NEW-004	1,495.60	1,492.50	246.85	1.26%	8	VCP	0.015	3	634	2.87	1821	70,412	760,533	0.21	2.11
PIPE-NEW_006-005	NEW-006	NEW-005	1,513.40	1,495.60	158.60	11.22%	8	VCP	0.015	10	2115	2.87	6070	27,315	2,273,589	0.08	3.42
PIPE-NEW_007-006	NEW-007	NEW-006	1,520.40	1,513.40	232.23	3.01%	8	VCP	0.015	3	634	2.87	1821	24,280	1,178,266	0.10	2.09
PIPE-NEW_008-007	NEW-008	NEW-007	1,526.30	1,520.40	267.77	2.20%	8	VCP	0.015	8	1692	2.87	4856	19,424	1,007,392	0.10	1.75
PIPE-NEW_009-008	NEW-009	NEW-008	1,536.95	1,526.30	260.00	4.10%	8	VCP	0.015	6	1269	2.87	3642	14,568	1,373,541	0.07	1.99
PIPE-NEW_010-009	NEW-010	NEW-009	1,541.40	1,536.95	494.80	0.90%	8	VCP	0.015	19	4018	2.87	11533	10,926	643,604	0.09	1.08
PIPE-NO_002-001	NO-002	NO-001	1,490.00	1,486.00	321.97	1.24%	12	VCP	0.015	10	2115	2.87	6070	361,163	2,230,275	0.27	3.23
PIPE-NO_003-002	NO-003	NO-002	1,494.95	1,490.00	215.31	2.30%	12	VCP	0.015	8	1692	2.87	4856	355,093	3,033,938	0.23	4.00
PIPE-NO_004-003	NO-004	NO-003	1,517.77	1,494.95	304.69	7.49%	8	VCP	0.015	12	2538	2.87	7284	7,284	1,857,301	0.05	1.99
PIPE-NO_005-006	NO-005	NO-006	1,514.00	1,508.50	362.45	1.52%	8	VCP	0.015	12	2538	2.87	7284	6,677	836,009	0.06	1.11
PIPE-NO_007-006	NO-007	NO-006	1,520.00	1,508.50	147.55	7.79%	8	VCP	0.015	4	846	2.87	2428	2,428	1,894,667	0.03	1.44
PIPE-NO_008-009	NO-008	NO-009	1,520.00	1,514.00	112.50	5.33%	8	VCP	0.015	4	846	2.87	2428	2,428	1,567,303	0.03	1.26
PIPE-NO_010-009	NO-010	NO-009	1,517.00	1,514.00	465.97	0.64%	8	VCP	0.015	17	3595	2.87	10319	69,805	544,547	0.24	1.66
PIPE-NO_011-010	NO-011	NO-010	1,528.50	1,517.00	326.53	3.52%	8	VCP	0.015	8	1692	2.87	4856	12,140	1,273,623	0.07	1.79
PIPE-NO_012-011	NO-012	NO-011	1,545.50	1,528.50	319.45	5.32%	8	VCP	0.015	13	2749	2.87	7891	7,284	1,565,585	0.05	1.77
PIPE-NO_012-P_001	P-001	L-012	1,545.75	1,531.05	293.91	5.00%	8	VCP	0.015	0	0	2.87	0	1,821	1,517,767	0.03	1.13
PIPE-Q01-Q_001-K_010	Q-001	K-010	1,548.72	1,547.70	169.94	0.60%	8	VCP	0.015	2	423	2.87	1214	1,214	525,782	0.04	0.48
PIPE-Q02-Q_002-SH_012	Q-002	SH-012	1,548.55	1,545.00	187.10	1.90%	8	VCP	0.015	4	846	2.87	2428	2,428	934,826	0.04	0.88
PIPE-Q03-Q_003-LB_014	Q-003	LB-014	1,542.67	1,536.00	205.82	3.24%	8	VCP	0.015	2	423	2.87	1214	1,214	1,221,723	0.02	0.86
PIPE-Q04-Q_004-LB_014	Q-004	LB-014	1,538.63	1,536.00	193.99	1.36%	8	VCP	0.015	4	846	2.87	2428	2,428	790,209	0.04	0.79
PIPE-Q05-CA_004-CL_013	Q-005	CL-012	1,534.50	1,525.50	218.91	4.11%	8	VCP	0.015	4	846	2.87	2428	24,887	1,376,075	0.09	2.34
PIPE-Q06-CL_013-L_011	CL-012	L-011	1,525.50	1,518.50	220.91	3.17%	8	VCP	0.015	2	423	2.87	1214	28,529	1,208,078	0.11	2.23
PIPE-Q07-L_011-NO_010	L-011	NO-010	1,518.50	1,517.00	210.06	0.71%	8	VCP	0.015	0	0	2.87	0	47,953	573,492	0.20	1.54
PIPE-SH_002-001	SH-002	SH-001	1,532.80	1,525.60	182.10	3.95%	8	VCP	0.015	5	1057	2.87	3035	2,428	1,349,475	0.03	1.14
PIPE-SH_003-004	SH-003	SH-004	1,537.30	1,514.00	145.00	16.07%	8	VCP	0.015	6	1269	2.87	3642	3,642	2,720,493	0.03	2.10
PIPE-SH_005-004	SH-005	SH-004	1,515.80	1,514.00	205.00	0.88%	8	VCP	0.015	6	1269	2.87	3642	8,498	635,935	0.08	0.99
PIPE-SH_006-005	SH-006	SH-005	1,527.40	1,515.80	190.00	6.11%	8	VCP	0.015	7	1480	2.87	4249	4,249	1,676,895	0.04	1.57
PIPE-SH_007-008	SH-007	SH-008	1,526.00	1,521.80	364.55	1.15%	8	VCP	0.015	14	2961	2.87	8498	9,105	728,450	0.08	1.11
PIPE-SH_009-008	SH-009	SH-008	1,524.00	1,521.80	172.76	1.27%	8	VCP	0.015	5	1057	2.87	3035	211,842	765,849	0.36	2.90
PIPE-SH_010-009	SH-010	SH-009	1,529.72	1,524.00	347.69	1.65%	8	VCP	0.015	11	2326	2.87	6677	16,389	870,473	0.10	1.50
PIPE-SH_011-010	SH-011	SH-010	1,535.70	1,529.72	235.00	2.54%	8	VCP	0.015	8	1692	2.87	4856	9,712	1,082,606	0.07	1.49
PIPE-SH_012-011	SH-012	SH-011	1,545.50	1,535.70	110.26	8.89%	8	VCP	0.015	4	846	2.87	2428	4,856	2,023,288	0.04	1.86
PIPE-SI_002-001	SI-002	SI-001	1,514.91	1,511.00	259.95	1.50%	8	VCP	0.015	10	2115	2.87	6070	17,603	832,333	0.10	1.49
PIPE-SI_003-002	SI-003	SI-002	1,517.21	1,514.91	460.00	0.50%	8	VCP	0.015	9	1903	2.87	5463	11,533	479,887	0.11	0.89
PIPE-SI_004-003	SI-004	SI-003	1,522.00	1,517.21	186.95	2.56%	8	VCP	0.015	6	1269	2.87	3642	4,856	1,086,322	0.05	1.21
PIPE-SJ_002-001	SJ-002	SJ-001	1,538.91	1,537.40	252.05	0.60%	8	VCP	0.015	3	634	2.87	1821	21,245	525,289	0.14	1.14
PIPE-SJ_003-002	SJ-003	SJ-002	1,548.37	1,538.91	274.70	3.44%	8	VCP	0.015	6	1269	2.87	3642	19,424	1,259,418	0.09	2.04

Quail Valley SA4
Hydraulic Model Results - Gravity Mains
Buildout Conditions
10/16/2024

PIPE-SJ_004-003	SJ-004	SJ-003	1,550.50	1,548.37	425.30	0.50%	8	VCP	0.015	8	1692	2.87	4856	15,782	480,281	0.12	0.98
PIPE-SJ_005-004	SJ-005	SJ-004	1,553.72	1,550.50	460.00	0.70%	8	VCP	0.015	8	1692	2.87	4856	10,926	567,809	0.10	0.99
PIPE-SJ_006-005	SJ-006	SJ-005	1,582.20	1,553.72	380.00	7.49%	8	VCP	0.015	8	1692	2.87	4856	6,070	1,857,940	0.04	1.88
PIPE-SJ_007-006	SJ-007	SJ-006	1,625.32	1,582.20	200.00	21.56%	8	VCP	0.015	3	634	2.87	1821	1,214	3,151,215	0.02	1.66
PIPE-SJ_008-009	SJ-008	SJ-009	1,623.00	1,590.10	350.00	9.40%	8	VCP	0.015	3	634	2.87	1821	2,428	2,080,739	0.03	1.54
PIPE-SJ_009-010	SJ-009	SJ-010	1,590.10	1,588.10	133.52	1.50%	8	VCP	0.015	1	211	2.87	607	3,035	830,607	0.04	0.87
PIPE-SJ_011-010	SJ-011	SJ-010	1,589.29	1,588.10	119.65	0.99%	8	VCP	0.015	2	423	2.87	1214	1,214	676,816	0.03	0.57
PIPE-W_001-NEW_005	W-001	NEW-005	1,497.70	1,495.60	224.58	0.94%	8	VCP	0.015	0	0	2.87	0	41,276	656,263	0.17	1.62
PIPE-W_002-001	W-002	W-001	1,502.00	1,497.70	155.92	2.76%	8	VCP	0.015	0	0	2.87	0	41,276	1,127,034	0.13	2.37
PIPE-W_003-002	W-003	W-002	1,509.95	1,502.00	344.34	2.31%	8	VCP	0.015	3	634	2.87	1821	39,455	1,031,201	0.13	2.20
PIPE-W_004-003	W-004	W-003	1,532.00	1,509.95	345.66	6.38%	8	VCP	0.015	7	1480	2.87	4249	17,603	1,714,089	0.07	2.46
PIPE-W_005-004	W-005	W-004	1,538.00	1,532.00	390.00	1.54%	8	VCP	0.015	13	2749	2.87	7891	9,712	841,777	0.08	1.25
PIPE-W_006-007	W-006	W-007	1,537.00	1,531.52	75.00	7.31%	8	VCP	0.015	16	3384	2.87	9712	1,821	1,834,481	0.02	1.29
PIPE-W_007-CM2	W-007	CM1	1,531.52	1,530.30	97.42	1.25%	8	VCP	0.015	3	634	2.87	1821	4,249	759,468	0.05	0.91
PIPE-WILL-001-002	WILL-001	WILL-002	1,585.00	1,566.20	288.00	6.53%	8	VCP	0.015	11	2326	2.87	6677	6,677	1,733,949	0.05	1.85
PIPE-WILL-002-003	WILL-002	WILL-003	1,566.20	1,555.30	450.19	2.42%	8	VCP	0.015	17	3595	2.87	10319	16,996	1,056,012	0.09	1.74
PIPE-WILL-004-003	WILL-004	WILL-003	1,564.80	1,555.30	110.02	8.63%	8	VCP	0.015	3	634	2.87	1821	5,463	1,994,250	0.04	1.91
PIPE-WILL-005-004	WILL-005	WILL-004	1,574.27	1,564.80	100.02	9.47%	8	VCP	0.015	2	423	2.87	1214	3,642	2,088,263	0.03	1.75
PIPE-WILL-006-005	WILL-006	WILL-005	1,587.50	1,574.27	139.77	9.47%	8	VCP	0.015	3	634	2.87	1821	1,821	2,087,981	0.02	1.41

LIST OF PROPERTIES WITH POTENTIAL ACQUISITION OR EASEMENT NEEDS DUE TO CONNECTOR PIPES OR LIFT STATION

Pipe ID	Option#	Lot-APN	Status	Parcel Type	Status	Situs Address	Primary Owner	All Owner List	Mailing Address	Translator Required	Parcel Developed	Account Number (Water)	Account Status	Customer Name	Service Address	Email Address	Phone Type	Phone Number
CP-1	Option 1	350101024	Undeveloped	Not Included	Not Included		JOHN WILLIAMS	JOHN WILLIAMS; DEANNA ROBYN ZINGG; MICHAEL ZINGG	22300 LOCH LOMAND DR CANYON LAKE CA 92587				Vacant					
CP-1	Option 1	350101029	Undeveloped	Not Included	Not Included		JOHN WILLIAMS	JOHN WILLIAMS; DEANNA ROBYN ZINGG; MICHAEL ZINGG	22300 LOCH LOMAND DR CANYON LAKE CA 92587				Vacant					
CP-1	Option 2	350101055	Developed	ROE Received	Not Started	23963 SAN JACINTO RD, CANYON LAKE, CA 92587	CRAIG J. MUNSELL	CRAIG J. MUNSELL; ESTEUTA B. MUNSELL	8160 TIMOR ST LONG BEACH CA 90808	No	Yes	500034551	Active	JOSIE S GOMEZ	23963 SAN JACINTO RD CANYON LAKE CA 92587	JOSIEDELEON1@VERIZON.NET	CELL	9515507354
CP-1	Option 2	350101030	Undeveloped	Not Included	Not Included		JOHN WILLIAMS	JOHN WILLIAMS; MICHAEL ZINGG; DEANNA ROBYN ZINGG	22300 LOCH LOMAND DR CANYON LAKE CA 92587				Vacant					
CP-1	Option 3	350101025	Undeveloped	Not Included	Not Included		ARMANDO RAMIREZ	ARMANDO RAMIREZ; JUANA RAMIREZ	P O BOX 3605 QUAIL VALLEY CA 92587				Vacant					
CP-1	Option 3	350101028	Undeveloped	Not Included	Not Included		JOHN WILLIAMS	JOHN WILLIAMS; MICHAEL ZINGG; DEANNA ROBYN ZINGG	22300 LOCH LOMAND DR CANYON LAKE CA 92587				Vacant					
CP-2	Option 1	350102022	Undeveloped	Not Included	Not Included		ALAN SCHWARTZ	ALAN SCHWARTZ; CYNTHIA B. SCHWARTZ	504 S BROOKHURST ST ANAHEIM CA 92804				Vacant					
CP-2	Option 1	350102031	Undeveloped	Not Included	Not Included		CAOYU YANG	CAOYU YANG	423 W 8TH ST APT 504 LOS ANGELES CA 90014				Vacant					
CP-2	Option 2	350102021	Undeveloped	Not Included	Not Included		MARIAH MCCARTY	MARIAH MCCARTY	25060 HANCOCK AVE # 103-104 MURRIETA CA 92562				Vacant					
CP-2	Option 2	350102032	Undeveloped	Not Included	Not Included		LUZ N. RODRIGUEZ	LUZ N. RODRIGUEZ	13082 SAYRE ST SYLMAR CA 91342				Vacant					
CP-2	Option 3	350102053	Developed	ROE Received	Not Started	23991 JOHNSON LN, CANYON LAKE, CA 92587	VINCENTE LEON MONDRAGON	VINCENTE LEON MONDRAGON	23991 JOHNSON LN SUN CITY CA 92587		Yes	500125681	Active	VICENTE LEON	23991 JOHNSON LN CANYON LAKE CA 92587		CELL	7607121963
CP-2	Option 3	350102030	Undeveloped	Not Included	Not Included		JESUS AVILA	JESUS AVILA; PATRICIA AVILA	553 S MAGNOLIA AVE # 301 EL CAJON CA 92020				Vacant					
CP-3	Option 1	350103017	Undeveloped	Not Included	Not Included		AEK GLOBAL INV	AEK GLOBAL INV	4609 HURFORD TER ENCINO CA 91436				Vacant					
CP-3	Option 1	350103031	Undeveloped	ROE Received	Not Started	23926 ELSINORE LN, CANYON LAKE, CA 92587	ALONI FAMILY 2017 TRUST DATED 12/19/17	ALONI FAMILY 2017 TRUST DATED 12/19/17; CATHERINE MAE ALONI; NIR ALONI	12652 CARMEL COUNTRY RD # 99 SAN DIEGO CA 92130		No		Vacant		23926 ELSINORE LN CANYON LAKE CA 92587			
CP-3	Option 2	350103016	Undeveloped	Not Included	Not Included		EVELYN LORAINE LUPIAN PADILLA	EVELYN LORAINE LUPIAN PADILLA	130 IBIZA LN HEMET CA 92545				Vacant					
CP-3	Option 2	350103032	Developed	ROE Received	Not Started	23927 ELSINORE LN, CANYON LAKE, CA 92587	JUAN CARLOS ANGULO	JUAN CARLOS ANGULO; LILI ANA MEJIA	23927 ELSINORE LN CANYON LAKE CA 92587	Yes	Yes	500209007	Active	LILI MEJIA	23927 ELSINORE LN CANYON LAKE CA 92587	JUANANGULO524@GMAIL.COM	CELL	9516236606
CP-3	Option 3	350103060	Developed	ROE Received	Not Started	23959 LUCAS DR, CANYON LAKE, CA 92587	ERNESTO SANTILLAN	ERNESTO SANTILLAN	23959 LUCAS DR SUN CITY CA 92587	Yes	Yes	500029239	Active	ERNESTO SANTILLAN	23959 LUCAS DR CANYON LAKE CA 92587		CELL	9514907495
CP-3	Option 3	350103030	Developed	ROE Received	Not Started	23930 ELSINORE LN, CANYON LAKE, CA 92587	ALONI FAMILY 2017 TRUST DATED 12/19/17	ALONI FAMILY 2017 TRUST DATED 12/19/17; CATHERINE MAE ALONI; NIR ALONI	12652 CARMEL COUNTRY RD # 99 SAN DIEGO CA 92130		Yes	500106222	Active	ANGEL OCHOA	23930 ELSINORE LN CANYON LAKE CA 92587	AOCHOA9@YAHOO.COM	CELL	9514288632
CP-4	Option 1	350201057	Developed	ROE Received	Not Started	23935 ELSINORE LN, CANYON LAKE, CA 92587	SYLVIA VILLEDA	SHAWN DAVID MIZE. DEANNA MARIE MIZE	23935 ELSINORE LN SUN CITY CA 92587		Yes	500580267	Active	SYLVIA VILLEDA	23935 ELSINORE LN CANYON LAKE CA 92587	sylviavilleda1@outlook.com	CELL	9519077130
CP-4	Option 1	350201035	Undeveloped	No Mailbox	Not Started	23972 LAKE DR, CANYON LAKE, CA 92587	PABLO MONTALVO	PABLO MONTALVO; MIRIAM MONTALVO	1860 MURRIETA RD PERRIS CA 92571				Vacant		23972 LAKE DR CANYON LAKE CA 92587			
CP-4	Option 2	350201017	Undeveloped	Not Included	Not Included	23911 ELSINORE LN, CANYON LAKE, CA 92587	MYRIAM E. PEREZ	MYRIAM E. PEREZ	1562 CANTANIA DR PERRIS CA 92571				Vacant		23911 ELSINORE LN CANYON LAKE CA 92587			
CP-4	Option 2	350201036	Undeveloped	Not Included	Not Included		ASHKIA INC	ASHKIA INC	15021 VENTURA BLVD SHERMAN OAKS CA 91403				Vacant					
CP-4	Option 3	350201016	Undeveloped	Not Included	Not Included		JOSE ANTONIO COMPARAN	JOSE ANTONIO COMPARAN	31624 SADDLE RIDGE DR LAKE ELSINORE CA 92532				Vacant					
CP-4	Option 3	350201037	Undeveloped	Not Included	Not Included		SUN POK KIM	SUN POK KIM	1856 MENTONE BLVD NO A MENTONE CA 92359				Vacant					
CP-5	Option 1	350202016	Undeveloped	Not Included	Not Included		KIM NGUYEN	KIM NGUYEN	13505 ZINNIA HILLS PL # 13 SAN DIEGO CA 92130				Vacant					
CP-5	Option 1	350202037	Undeveloped	Not Included	Not Included		MARIO SEGURA	MARIO SEGURA	23889 MOUNT VERNON PL MENIFEE CA 92587				Vacant					
CP-5	Option 2	350202015	Undeveloped	Not Included	Not Included		JOSE A. COMPARAN	JOSE A. COMPARAN	31624 SADDLE RIDGE DR LAKE ELSINORE CA 92532				Vacant					
CP-5	Option 2	350202038	Undeveloped	ROE Return To Sender	Not Started		NICOLO GOBBI	NICOLO GOBBI	1732 N HARVARD BLVD UNIT 208 LOS ANGELES CA 90027	No			Vacant					
CP-5	Option 3	350202017	Undeveloped	Not Included	Not Included		MA FELIXITAS S SANTOYO	MA FELIXITAS S SANTOYO	8700 HAMPSHIRE DR QUAIL VALLEY CA 92587				Vacant					
CP-5	Option 3	350202036	Undeveloped	Not Included	Not Included		DEMO FAMILY TRUST DTD 10/15/2020	DEMO FAMILY TRUST DTD 10/15/2020; BETTY DEMO; STEVEN D. DEMO	3503 AMES ST SAN DIEGO CA 92111				Vacant					
CP-6	Option 1	350203014	Undeveloped	Not Included	Not Included		JARON OTTONIEL PEREZ PEREZ	JARON OTTONIEL PEREZ PEREZ; ALICIA PAOLA SANCHEZ FLORES	22115 OSPREY CT WILDOMAR CA 92595				Vacant					
CP-6	Option 1	350203039	Undeveloped	Not Included	Not Included		JORDI JOSUE ECHEVERRIA	JORDI JOSUE ECHEVERRIA; JOHNNY ECHEVERRIA	1096 PINTO CT SAN MARCOS CA 92069				Vacant					
CP-6	Option 2	350203013	Undeveloped	Not Included	Not Included		MICHAEL JASON TINIO	MICHAEL JASON TINIO	325 W BERRY AVE ANAHEIM CA 92805				Vacant					
CP-6	Option 2	350203040	Undeveloped	Not Included	Not Included		JORDI JOSUE ECHEVERRIA	JORDI JOSUE ECHEVERRIA; JOHNNY ECHEVERRIA	1096 PINTO CT SAN MARCOS CA 92069				Vacant					
CP-6	Option 3	350203012	Undeveloped	Not Included	Not Included		LOAN K. DO	LOAN K. DO	1064 VILLAGE CT OCEANSIDE CA 92057				Vacant					
CP-6	Option 3	350203041	Undeveloped	Not Included	Not Included		LOAN K. DO	LOAN K. DO	1064 VILLAGE CT OCEANSIDE CA 92057				Vacant					
CP-7	Option 1	350211001	Undeveloped	Not Included	Not Included		SALVADOR CAZARES	SALVADOR CAZARES; PILAR CAZARES	24362 E VIEW RD LAGUNA HILLS CA 92653				Vacant					
CP-7	Option 1	350211026	Undeveloped	Not Included	Not Included		ESTEBAN ORTIZ	ESTEBAN ORTIZ; ALBERTA ARANGO ORTIZ	182 HANALEI DR VISTA CA 92083				Vacant					
CP-7	Option 2	350221026	Undeveloped	Not Included	Not Included		NYIT YEW WONG	NYIT YEW WONG; AH LEK KEE	768 LEYLAND DR DIAMOND BAR CA 91765				Vacant					
CP-7	Option 2	350221027	Undeveloped	Not Included	Not Included		WILLIE RODRIGUEZ	WILLIE RODRIGUEZ	151 E 234TH ST CARSON CA 90745				Vacant					
CP-7	Option 3	350211002	Undeveloped	Not Included	Not Included		SALVADOR CAZARES	SALVADOR CAZARES; PILAR CAZARES	24362 E VIEW RD LAGUNA HILLS CA 92653				Vacant					
CP-7	Option 3	350211001	Undeveloped	Not Included	Not Included		SALVADOR CAZARES	SALVADOR CAZARES; PILAR CAZARES	24362 E VIEW RD LAGUNA HILLS CA 92653				Vacant					
CP-7	Option 3	350211026	Undeveloped	Not Included	Not Included		ESTEBAN ORTIZ	ESTEBAN ORTIZ; ALBERTA ARANGO ORTIZ	182 HANALEI DR VISTA CA 92083				Vacant					
CP-8	Option 1	350222026	Undeveloped	Not Included	Not Included		AGUSTIN MAURICIO LOPEZ LOPEZ	AGUSTIN MAURICIO LOPEZ LOPEZ	25840 TRADEWINDS DR ROMOLAND CA 92585				Vacant					
CP-8	Option 1	350222027	Undeveloped	ROE Received	Not Started		JOHNNY BARAJAS	JOHNNY BARAJAS	23736 SHREEDER PL MENIFEE CA 92587				Vacant					
CP-8	Option 2	350222025	Undeveloped	Not Included	Not Included		MICHAEL TATER	MICHAEL TATER	16130 TWINNELE CIR HUNTINGTON BEACH CA 92649				Vacant					
CP-8	Option 2	350222028	Undeveloped	Not Included	Not Included		BURLEY RAY JOHNSON	BURLEY RAY JOHNSON; DOROTHY ELIZABETH JOHNSON	1732 W DESERT SPRING WAY QUEEN CREEK AZ 85142				Vacant					
CP-8	Option 3	350212001	Undeveloped	Not Included	Not Included		FRANCISCO MARTINEZ	FRANCISCO MARTINEZ	1859 BROKSTONE RD PERRIS CA 92571				Vacant					
CP-8	Option 3	350222026	Undeveloped	Not Included	Not Included		AGUSTIN MAURICIO LOPEZ LOPEZ	AGUSTIN MAURICIO LOPEZ LOPEZ	25840 TRADEWINDS DR ROMOLAND CA 92585				Vacant					
CP-8	Option 3	350222027	Undeveloped	ROE Received	Not Started		JOHNNY BARAJAS	JOHNNY BARAJAS	23736 SHREEDER PL MENIFEE CA 92587				Vacant					
CP-9	Option 1	350223022	Undeveloped	Not Included	Not Included		5316 MAYWOOD	5316 MAYWOOD	9838 PARAMOUNT BLVD DOWNEY CA 90240				Vacant					
CP-9	Option 1	350223056	Developed	ROE Received	Not Started	23690 LA BERTHA LN, CANYON LAKE, CA 92587	EVANGELINA VAZQUEZ	EVANGELINA VAZQUEZ	304 MONUMENT PKY PERRIS CA 92570		Yes	500023440	Active	PAULINA JAVIER	23690 LA BERTHA LN CANYON LAKE CA 92587	ANA.T.JAVIER21@GMAIL.COM	HOME	9512461796
CP-9	Option 2	350223021	Developed	ROE Received	Not Included		FLORELINDA DOMINGUEZ	FLORELINDA DOMINGUEZ	P O BOX 3388 CANYON LAKE CA 92587				Vacant					
CP-9	Option 2	350223022	Undeveloped	Not Included	Not Included		5316 MAYWOOD	5316 MAYWOOD	9838 PARAMOUNT BLVD DOWNEY CA 90240				Vacant					
CP-9	Option 2	350223056	Developed	ROE Received	Not Started	23690 LA BERTHA LN, CANYON LAKE, CA 92587	EVANGELINA VAZQUEZ	EVANGELINA VAZQUEZ	304 MONUMENT PKY PERRIS CA 92570		Yes	500023440	Active	PAULINA JAVIER	23690 LA BERTHA LN CANYON LAKE CA 92587	ANA.T.JAVIER21@GMAIL.COM	HOME	9512461796
CP-9	Option 3	350223020	Undeveloped	Not Included	Not Included		JESUS AYARD	JESUS AYARD	PO BOX 3388 MENIFEE CA 92587				Vacant					
CP-9	Option 3	350223021	Developed	ROE Received	Not Included		FLORELINDA DOMINGUEZ	FLORELINDA DOMINGUEZ	P O BOX 3388 CANYON LAKE CA 92587				Vacant					
CP-9	Option 3	350223022	Undeveloped	Not Included	Not Included		5316 MAYWOOD	5316 MAYWOOD	9838 PARAMOUNT BLVD DOWNEY CA 90240				Vacant					
CP-9	Option 3	350223056	Developed	ROE Received	Not Started	23690 LA BERTHA LN, CANYON LAKE, CA 92587	EVANGELINA VAZQUEZ	EVANGELINA VAZQUEZ	304 MONUMENT PKY PERRIS CA 92570		Yes	500023440	Active	PAULINA JAVIER	23690 LA BERTHA LN CANYON LAKE CA 92587	ANA.T.JAVIER21@GMAIL.COM	HOME	9512461796
CP-10	Option 1	350231018	Undeveloped	Not Included	Not Included		ROCIO GARCIA	ROCIO GARCIA	3712 DINEHOE COVE AUSTIN TX 78725				Vacant					
CP-10	Option 1	350231035	Undeveloped	Not Included	Not Included		SUN QUANG DINH	SUN QUANG DINH	38961 CHERRY POINT LN MURRIETA CA 92563				Vacant					
CP-10	Option 1	350232017	Undeveloped	Not Included	Not Included		FERNANDO RUELAS	FERNANDO RUELAS	4976 ROSE AVE RIVERSIDE CA 92505				Vacant					
CP-10	Option 1	350232034	Undeveloped	Not Included	Not Included		MELISSA I. ORNELAS	MELISSA I. ORNELAS	6576 PINECONE LN SAN DIEGO CA 91932				Vacant					
CP-10	Option 2	350231019	Undeveloped	Rikland	Not Started		CELIA PEREZ	CELIA PEREZ; FRANCISCO MENDEZ	23664 LA BERTHA LN MENIFEE CA 92587				Vacant					
CP-10	Option 2	350231034	Undeveloped	Not Included	Not Included		CHAIRMAINE NI TAR LWIN	CHAIRMAINE NI TAR LWIN	5122 SKANNER ST IRVINE CA 92604				Vacant					
CP-10	Option 2	350232017	Undeveloped	Not Included	Not Included		FERNANDO RUELAS	FERNANDO RUELAS	4976 ROSE AVE RIVERSIDE CA 92505				Vacant					
CP-10	Option 2	350232034	Undeveloped	Not Included	Not Included		MELISSA I. ORNELAS	MELISSA I. ORNELAS	6576 PINECONE LN SAN DIEGO CA 91932				Vacant					
CP-10	Option 3	350231017	Undeveloped	Not Included	Not Included		CA BEST HOMES INC	CA BEST HOMES INC	6903 RITA AVE NO 212 HUNTINGTON PARK CA 90255				Vacant					
CP-10	Option 3	350231036	Undeveloped	Not Included	Not Included		ROBERT DAVIS	ROBERT DAVIS; IRMA DAVIS	5317 E FLORENCE AVE NO 10 BELL CA 90201				Vacant					
CP-10	Option 3	350232016	Undeveloped	Not Included	Not Included		EFRAIN NAVARRETE	EFRAIN NAVARRETE	3443 VANCOUVER AVE SAN DIEGO CA 92104				Vacant					
CP-10	Option 3	350232034	Undeveloped	Not Included	Not Included		MELISSA I. ORNELAS	MELISSA I. ORNELAS	6576 PINECONE LN SAN DIEGO CA 91932				Vacant					
CP-10	Option 3	350232017	Undeveloped	Not Included	Not Included		FERNANDO RUELAS	FERNANDO RUELAS	4976 ROSE AVE RIVERSIDE CA 92505				Vacant					
CP-11	Option 1	350233014	Undeveloped	Not Included	Not Included		JIHAN M. AWAD	JIHAN M. AWAD	11431 STUDEBAKER RD NORWALK CA 90650				Vacant					
CP-11	Option 1	350233038	Undeveloped	Not Included	Not Included		MYLINH PHAN	MYLINH PHAN	18868 MOUNT MORGAN CIR FOUNTAIN VALLEY CA 92708				Vacant					
CP-11	Option 2	350233015	Undeveloped	Not Included	Not Included		GUADALUPE YASMIN NERI	GUADALUPE YASMIN NERI	15161 VIA MONTANA DESERT HOT SPRINGS CA 92240				Vacant					
CP-11	Option 2	350233037	Undeveloped	Not Included	Not Included		JAMES A. LATHROP	JAMES A. LATHROP	4165 3/4 VERDUGO RD LOS ANGELES CA 90065				Vacant					
CP-11	Option 3	350233014	Undeveloped	Not Included	Not Included		JIHAN M. AWAD	JIHAN M. AWAD	11431 STUDEBAKER RD NORWALK CA 90650				Vacant					
CP-11	Option 3	350233039	Undeveloped	Not Included	Not Included		CESAR A. ZUNIGA	CESAR A. ZUNIGA	28131 PALOMAR CT LAGUNA NIGUEL CA 92677				Vacant					
CP-11	Option 3	350233038	Undeveloped	Not Included	Not Included		MYLINH PHAN	MYLINH PHAN	18868 MOUNT MORGAN CIR FOUNTAIN VALLEY CA 92708				Vacant					
CP-11	Option 4	350233014	Undeveloped	Not Included	Not Included		JIHAN M. AWAD	JIHAN M. AWAD	11431 STUDEBAKER RD NORWALK CA 90650				Vacant					
CP-11	Option 4	350233039	Undeveloped	Not Included	Not Included		CESAR A. ZUNIGA	CESAR A. ZUNIGA	28131 PALOMAR CT LAGUNA NIGUEL CA 92677				Vacant					
CP-11	Option 4	350233013	Developed	Pending	Not Started		DANIEL REYES	DANIEL REYES	23591 CLARA PL MENIFEE CA 92587			500040193	Active	DANIEL REYES		SHELBYABRAM21@GMAIL.COM	CELL	9517468512
CP-12	Option 1	350261011	Undeveloped	Not Included	Not Included		ANTONIO TORRES HERMOSILLO	ANTONIO TORRES HERMOSILLO	2237 CONRAD AVE POMONA CA 91768				Vacant					
CP-12	Option 1	350261042	Undeveloped	Not Included	Not Included		JOEL SAMAYOA	JOEL SAMAYOA	1909 S OLIVE ST SANTA ANA CA 92707				Vacant					
CP-12	Option 2	350261010	Undeveloped	Not Included	Not Included		HOWARD WALLACE	HOWARD WALLACE	41763 IVY ST MURRIETA CA 92562				Vacant					
CP-12	Option 2	350261011	Undeveloped	Not Included	Not Included		ANTONIO TORRES HERMOSILLO	ANTONIO TORRES HERMOSILLO	2237 CONRAD AVE POMONA CA 91768				Vacant					
CP-12	Option 2	350261042	Undeveloped	Not Included	Not Included		JOEL SAMAYOA	JOEL SAMAYOA	1909 S OLIVE ST SANTA ANA CA 92707				Vacant					
CP-12	Option 3	350261009	Undeveloped	Not Included	Not Included		HOWARD ALAN WALLACE	HOWARD ALAN WALLACE	41763 IVY ST MURRIETA CA 92562				Vacant					
CP-12	Option 3	350261044	Undeveloped	Not Included	Not Included		THOMAS IAN MERVINE	THOMAS IAN MERVINE; JEANA MARIE MERVINE	9 BEL FLORA CT ALISO VIEJO CA 92656				Vacant					
CP-21	Option 1	350244028	Undeveloped	Not Included	Not Included	28645 WILLIAMS DR, CANYON LAKE, CA 92587	MARICELA GONZALEZ	MARICELA GONZALEZ	50 BRIARWOOD IRVINE CA 92604				Vacant		28645 WILLIAMS DR CANYON LAKE CA 92587			
CP-21	Option 1	350244052	Undeveloped	Not Included	Not Included		CAROLINA GONZALEZ	CAROLINA GONZALEZ	50 BRIARWOOD IRVINE CA 98604				Vacant					
CP-21	Option 2	350244029	Undeveloped	Not Included	Not Included	28635 WILLIAMS DR, NUEVO, CA 92567	MARIELENA AYALA	MARIELENA AYALA; ENTRUST GROUP INC	555 12TH ST STE 900 OAKLAND CA 94607				Vacant		28635 WILLIAMS DR NUEVO CA 92567			
CP-21	Option 2	350244052	Undeveloped	Not Included	Not Included		CAROLINA GONZALEZ	CAROLINA GONZALEZ	50 BRIARWOOD IRVINE CA 98604				Vacant					
CP-21	Option 3	350244047	Undeveloped	Not Included	Not Included	28655 WILLIAMS DR, CANYON LAKE, CA 92587	RODRIGO PERALTA	RODRIGO PERALTA; EVELYN PERALTA	1736 E 4TH ST APT 11 LONG BEACH CA 90802				Vacant		28655 WILLIAMS DR CANYON LAKE CA 92587			
CP-21	Option 3	350244052	Undeveloped	Not Included	Not Included		CAROLINA GONZALEZ	CAROLINA GONZALEZ	50 BRIARWOOD IRVINE CA 98604				Vacant					
CP-22	Option 1	350252004	Undeveloped	ROE Received	Not Started		SANTOS MARTINEZ	SANTOS MARTINEZ	23769 NORMA DR MENIFEE CA 92587		No		Vacant					
CP-22	Option 1	350252028	Developed	ROE Received	Not Started	23780 CYPRESS PL, CANYON LAKE, CA 92587	PEDRO ARMIENTA	PEDRO ARMIENTA; ROSALVA ARMIENTA	23780 CYPRESS PL QUAIL VALLEY CA 92587			500103354	Active	PEDRO ARMIENTA	23780 CYPRESS PL CANYON LAKE CA 92587	ROSALVAARMIENTA@GMAIL.COM	BUS	7607235140
CP-22	Option 2	350252004	Undeveloped	ROE Received	Not Started		SANTOS MARTINEZ	SANTOS MARTINEZ	23769 NORMA DR MENIFEE CA 92587		No		Vacant					
CP-22	Option 2	350252028	Developed	ROE Received	Not Started	23780 CYPRESS PL, CANYON LAKE, CA 92587	PEDRO ARMIENTA	PEDRO ARMIENTA; ROSALVA ARMIENTA	23780 CYPRESS PL QUAIL VALLEY CA 92587			500103354	Active	PEDRO ARMIENTA	23780 CYPRESS PL CANYON LAKE CA 92587	ROSALVAARMIENTA@GMAIL.COM	BUS	7607235140
CP-22	Option 2	350252024	Undeveloped	Not Included	Not Included		JOSE ANTONIO BATISTA	JOSE ANTONIO BATISTA	24968 ROSEBRUGH LN HEMET CA 92544				Vacant					
CP-22	Option 3	350252027	Developed	ROE Received	Not Started	23799 NORMA DR, CANYON LAKE, CA 92587	ANTONIO MONTES BERUMEN	ANTONIO MONTES BERUMEN	23799 NORMA DR SUN CITY CA 92587		Yes	500072178	Active	ANTONIO MONTES BERUMEN	23799 NORMA DR CANYON LAKE CA 92587	KARINA.MINNELLA@GMAIL.COM	CELL	9517222231
CP-22	Option 3	350252021	Developed	ROE Received	Not Started	23790 CYPRESS PL, CANYON LAKE, CA 92587	DEAN A. MACK	DEAN A. MACK; RANDA F. MACK	23763 VIA SEQUOIA MURRIETA CA 92562	No		500098160	Active	ALEXIS CHIP	23790 CYPRESS PL CANYON LAKE CA 92587	ALEXISCHIP@GMAIL.COM	CELL	9517229146
CP-23	Option 1	350262025	Undeveloped	Not Included	Not Included		PEDRO ARREOLA	PEDRO ARREOLA	23740 CYPRESS PL QUAIL VALLEY CA 92587				Vacant					
CP-23	Option 1	350262028	Undeveloped	Not Included	Not Included		PEDRO ARREOLA GARCIA	PEDRO ARREOLA GARCIA	23740 CYPRESS PL QUAIL VALLEY CA 92587				Vacant					
CP-23	Option 2	350262054	Developed	Pending	Not Started	23731 NORMA DR, CANYON LAKE, CA 92587	GERD GLOCKZIN	GERD GLOCKZIN; LOURDES URIBE DEGLOCKZIN	23731 NORMA DR SUN CITY CA 92587			500015730	Active	SERGIO VIDES	23731 NORMA DR CANYON LAKE CA 92587	VIDES_SERGIO@YAHOO.COM	CELL	9517460926
CP-23	Option 2	350262029	Developed	ROE Received	Not Started	23740 CYPRESS PL, CANYON LAKE, CA 92587	HEDILBERTO ARREOLA	HEDILBERTO ARREOLA; REBECA ARREOLA	23740 CYPRESS PL MENIFEE CA 92587	Yes	Yes	500059335	Active	PEDRO ARRIOLA	23740 CYPRESS PL CANYON LAKE CA 92587		CELL	9512306682

CP-23	Option 2	350262028	Undeveloped	Not Included			PEDRO ARREOLA GARCIA	PEDRO ARREOLA GARCIA	23740 CYPRESS PL QUAIL VALLEY CA 92587			Vacant							
CP-23	Option 3	350252031	Developed	ROE Received	Not Started	23757 NORMA DR, CANYON LAKE, CA 92587	DENISE REYES	DENISE REYES	29277 COPPER RIDGE RD QUAIL VALLEY CA 92587		Yes	500030480	Active	ESPERANZA REYES	23757 NORMA DR CANYON LAKE CA 92587	ramirezclaudia776@gmail.com	HOME	9513495866	
CP-23	Option 3	350262027	Developed	ROE Received	Not Started	23748 CYPRESS ST, CANYON LAKE, CA 92587	STEVEN GONZALES	STEVEN GONZALES; SHIRLEY GONZALES	113 LINDEN RD WATSONVILLE CA 95076		No	500100761	Active	MARIA MEDINA	23748 CYPRESS ST CANYON LAKE CA 92587	MARIAMEDINA219@GMAIL.COM	HOME	9517469217	
CP-23	Option 3	350262028	Undeveloped	Not Included	Not Included		PEDRO ARREOLA GARCIA	PEDRO ARREOLA GARCIA	23740 CYPRESS PL QUAIL VALLEY CA 92587			Vacant							
CP-24	Option 1	350263018	Undeveloped	Not Included	Not Included		JAMES LYNN OLSEN	JAMES LYNN OLSEN; SANDRA OLSEN	7641 E CORTO RD ANAHEIM CA 92808			Vacant							
CP-24	Option 1	350263033	Undeveloped	Not Included	Not Included	23686 NEWPORT RD, CANYON LAKE, CA 92587	GARY D. POTTER	GARY D. POTTER; RAY GANDY	17232 MARINA VIEW PL HUNTINGTON BEACH CA 92649			Vacant			23686 NEWPORT RD CANYON LAKE CA 92587				
CP-24	Option 2	350263059	Developed	ROE Received	Not Started	23705 CYPRESS PL, CANYON LAKE, CA 92587	MIGUEL LOPEZ	MIGUEL LOPEZ	23705 CYPRESS PL SUN CITY CA 92587			500091517	Active	MIGUEL LOPEZ	23705 CYPRESS PL CANYON LAKE CA 92587		HOME	9512444280	
CP-24	Option 2	350263051	Developed	ROE Received	Not Started	23700 NEWPORT DR, CANYON LAKE, CA 92587	MARTIN TORRES AYALA ADAN	MARTIN TORRES AYALA ADAN; MARIA ISABEL TINAJERO	23700 NEWPORT DR CANYON LAKE CA 92587			500096625	Active	ADAN MARTIN TORRES	23700 NEWPORT DR CANYON LAKE CA 92587	ADAN.T@ATT.NET	CELL	7148372097	
CP-24	Option 3	350263018	Undeveloped	Not Included	Not Included		JAMES LYNN OLSEN	JAMES LYNN OLSEN; SANDRA OLSEN	7641 E CORTO RD ANAHEIM CA 92808			Vacant							
CP-24	Option 3	350263033	Undeveloped	Not Included	Not Included	23686 NEWPORT RD, CANYON LAKE, CA 92587	GARY D. POTTER	GARY D. POTTER; RAY GANDY	17232 MARINA VIEW PL HUNTINGTON BEACH CA 92649			Vacant			23686 NEWPORT RD CANYON LAKE CA 92587				
CP-24	Option 3	350263034	Undeveloped	Not Included	Not Included	23676 NEWPORT DR, CANYON LAKE, CA 92587	FLORES BROTHERS INV	FLORES BROTHERS INV; SELLEM INV INC; MIDCOAST INV	115 CAYUGA SALINAS CA 93901			Vacant			23676 NEWPORT DR CANYON LAKE CA 92587				
CP-31	Option 1	350113015	Undeveloped	Not Included	Not Included		CARL PUI LAM CHOI	CARL PUI LAM CHOI; CHUN YIP LAU	PO BOX 1112 BEAVERTON OR 97075			Vacant							
CP-31	Option 1	350113037	Undeveloped	Not Included	Not Included		GUILLERMINA DELACRUZ	GUILLERMINA DELACRUZ	23652 ELSINORE LN CANYON LAKE CA 92587			Vacant							
CP-31	Option 2	350113014	Undeveloped	Not Included	Not Included		MARIAH MCCARTY	MARIAH MCCARTY	25060 HANCOCK AVE # 103-104 MURRIETA CA 92562			Vacant							
CP-31	Option 2	350113038	Undeveloped	Not Included	Not Included		GABRIEL A. CASTRUITA	GABRIEL A. CASTRUITA	308 HUFF ST VISTA CA 92083			Vacant							
CP-31	Option 3	350113013	Undeveloped	Not Included	Not Included		DINH NHIEM DO	DINH NHIEM DO; MRISHA CHENG DO	1565 W PERSIMMON ST RIALTO CA 92377			Vacant							
CP-31	Option 3	350113055	Developed	ROE Received	Not Started	23620 ELSINORE LN, CANYON LAKE, CA 92587	DANIEL MARTINEZ-SARABIA	DANIEL MARTINEZ-SARABIA	23620 ELSINORE LN CANYON LAKE CA 92587		Yes	500030683	Active	DANIEL MARTINEZ-SARABIA	23620 ELSINORE LN CANYON LAKE CA 92587	DANIEL.MARTINEZSARABIA@GMAIL.COM	CELL	7607072577	
CP-32	Option 1	350191011	Undeveloped	Not Included	Not Included		JAMES L. OLSEN	JAMES L. OLSEN; SANDRA OLSEN	7641 E CORTO RD ANAHEIM CA 92808			Vacant							
CP-32	Option 1	350191040	Undeveloped	Not Included	Not Included		OLSEN TRUST DATED 02/27/18	OLSEN TRUST DATED 02/27/18; SANDRA OLSEN	7641 E CORTO RD ANAHEIM CA 92808			Vacant							
CP-32	Option 2	350191010	Undeveloped	Not Included	Not Included		SHAMROCK PROPERTY SERVICES LLC	SHAMROCK PROPERTY SERVICES LLC	26741 PORTOLA PKY # 1E123 FOOTHILL RANCH CA 92610			Vacant							
CP-32	Option 2	350191041	Undeveloped	Not Included	Not Included		PEDRO ALVARES GUTIERREZ	PEDRO ALVARES GUTIERREZ	913 S GRAND AVE NO 113 SAN JACINTO CA 92582			Vacant							
CP-32	Option 3	350191012	Undeveloped	Pending	Not Started		CESAR ALCANTAR	CESAR ALCANTAR; SYLVIA ALCANTAR	27878 GREENWALD AVE PERRIS CA 92570		No	Vacant							
CP-32	Option 3	350191039	Undeveloped	Not Included	Not Included		PORTER FAMILY TRUST DTD 8/18/93	PORTER FAMILY TRUST DTD 8/18/93; DAVID W. PORTER; CHRISTOPHER J. PORTER	417 N CORDOVA ST BURBANK CA 91505			Vacant							
CP-33	Option 1	350193004	Undeveloped	Not Included	Not Included		IRMA L. JIMENEZ	IRMA L. JIMENEZ; FIDEL A. JIMENEZ	28861 AVENIDA GAVIOTA MENIFEE CA 92587			Vacant							
CP-33	Option 1	350193049	Undeveloped	Not Included	Not Included		MARIA A. CAMBEROS	MARIA A. CAMBEROS	27911 TROCADERO MISSION VIEJO CA 92692			Vacant							
CP-33	Option 2	350193005	Undeveloped	Not Included	Not Included		IRMA L. JIMENEZ	IRMA L. JIMENEZ; FIDEL A. JIMENEZ	28861 AVENIDA GAVIOTA MENIFEE CA 92587			Vacant							
CP-33	Option 2	350193048	Undeveloped	Not Included	Not Included		AXEL GONZALEZ	AXEL GONZALEZ; JANTZEN GONZALEZ GUZMAN	5604 GOZUM DR BAKERSFIELD CA 93313			Vacant							
CP-33	Option 3	350193003	Undeveloped	Not Included	Not Included		TUYEN T. LE	TUYEN T. LE	11633 COMPASS POINT DR N UNT 5 SAN DIEGO CA 92126			Vacant							
CP-33	Option 3	350193004	Undeveloped	Not Included	Not Included		IRMA L. JIMENEZ	IRMA L. JIMENEZ; FIDEL A. JIMENEZ	28861 AVENIDA GAVIOTA MENIFEE CA 92587			Vacant							
CP-33	Option 3	350193049	Undeveloped	Not Included	Not Included		MARIA A. CAMBEROS	MARIA A. CAMBEROS	27911 TROCADERO MISSION VIEJO CA 92692			Vacant							
CP-34	Option 1	350223007	Undeveloped	Not Included	Not Included		JULIO E. MIRAMONTES	JULIO E. MIRAMONTES	7659 TAMARIND AVE # 2 FONTANA CA 92336			Vacant							
CP-34	Option 1	350223046	Undeveloped	Not Included	Not Included		ELLEN B. MICHEL	ELLEN B. MICHEL	9963 SW 222ND TER MIAMI FL 33190			Vacant							
CP-34	Option 2	350223006	Undeveloped	Not Included	Not Included		FRANCES ETHLYN JONES	FRANCES ETHLYN JONES	22427 NEEDLES ST CHATSWORTH CA 91311			Vacant							
CP-34	Option 2	350223047	Undeveloped	Not Included	Not Included		ATHANASIOS SHINAS	ATHANASIOS SHINAS; DONNA SHINAS	2628 AMHERST ST LA VERNE CA 91750			Vacant							
CP-34	Option 3	350223008	Undeveloped	Not Included	Not Included		CARLOS A. CAMPOS	CARLOS A. CAMPOS	22926 PAHUTE DR MORENO VALLEY CA 92553			Vacant							
CP-34	Option 3	350223007	Undeveloped	Not Included	Not Included		JULIO E. MIRAMONTES	JULIO E. MIRAMONTES	7659 TAMARIND AVE # 2 FONTANA CA 92336			Vacant							
CP-34	Option 3	350223046	Undeveloped	Not Included	Not Included		ELLEN B. MICHEL	ELLEN B. MICHEL	9963 SW 222ND TER MIAMI FL 33190			Vacant							
CP-35	Option 1	350231035	Undeveloped	Not Included	Not Included		JOHNNY T. VU	JOHNNY T. VU; LYON Q. DOAN	15410 SWALLOW LN WESTMINSTER CA 92683			Vacant							
CP-35	Option 1	350231046	Undeveloped	Not Included	Not Included		A M P ACQUISITIONS	A M P ACQUISITIONS	30300 COBURN CIR MENIFEE CA 92584			Vacant							
CP-35	Option 2	350231004	Undeveloped	Not Included	Not Included		CASTLE BRIDGE SERVICES	CASTLE BRIDGE SERVICES	PO BOX 17071 LA JOLLA CA 92039			Vacant							
CP-35	Option 2	350231047	Undeveloped	Not Included	Not Included		LOUAY IBRAHIM	LOUAY IBRAHIM; BAASSAM IBRAHIM; TAREK IBRAHIM	1501 SEVENTH ST STE A RIVERSIDE CA 92507			Vacant							
CP-35	Option 3	350231006	Undeveloped	Not Included	Not Included		STACY SORENSEN	STACY SORENSEN	2306 VIA ZAFIRO SAN CLEMENTE CA 92673			Vacant							
CP-35	Option 3	350231045	Undeveloped	Not Included	Not Included		ROLANDO J. GARCIA	ROLANDO J. GARCIA; SANDRA UGALDE	13902 WARHOL CT MORENO VALLEY CA 92555			Vacant							
CP-36	Option 1	350232001	Undeveloped	Not Included	Not Included		CHRISTINE EID HADDAD	CHRISTINE EID HADDAD	5757 OWENSMOUTH UNIT S WOODLAND HILLS CA 91367			Vacant							
CP-36	Option 1	350232002	Undeveloped	Not Included	Not Included		PEDRO SANDOVAL VALENCIA	PEDRO SANDOVAL VALENCIA	26824 EVERGREEN AVE MURRIETA CA 92563			Vacant							
CP-37	Option 1	351200003	Undeveloped	N/A	N/A														
Line-A	Option 1	351200003	Undeveloped	N/A															
LS-1	Option 1	350262050	Undeveloped	Not Included	Not Included		ARMANDO ROBERTO QUINTANA	ARMANDO ROBERTO QUINTANA	958 HOME AVE SAN BERNARDINO CA 92413			Vacant							
LS-1	Option 1	350262049	Undeveloped	Not Included	Not Included		ALICE CHONG	ALICE CHONG	27428 MOUNTAIN MEADOW RD ESCONDIDO CA 92026			Vacant							
LS-1	Option 1	350262048	Undeveloped	Not Included	Not Included		ALICE CHONG	ALICE CHONG	27428 MOUNTAIN MEADOW RD ESCONDIDO CA 92026			Vacant							
LS-1	Option 2	351200006	Undeveloped	N/A	N/A							Vacant							
LS-2	Option 1	350221002	Undeveloped	Not Included	Not Included		MARIANNE LANDIS	MARIANNE LANDIS; MAURICE MILES	38490 MAGDELENA ST MURRIETA CA 92563			Vacant							
LS-3	Option 1	350191039	Undeveloped	Not Included	Not Included		PORTER FAMILY TRUST DTD 8/18/93	PORTER FAMILY TRUST DTD 8/18/93; DAVID W. PORTER; CHRISTOPHER J. PORTER	417 N CORDOVA ST BURBANK CA 91505			Vacant							
LS-4	Option 1	350113001	Undeveloped	Not Included	Not Included		ALBERTO FLORIAN ALFARO	ALBERTO FLORIAN ALFARO	25120 ANTELOPE RD MENIFEE CA 92585			Vacant							
LS-5	Option 1	350112005	Undeveloped	Pending	Not Started	23543 JOHNSON LN, CANYON LAKE, CA 92587	DAVID J. HAMERNIK	DAVID J. HAMERNIK	23557 JOHNSON LN QUAIL VALLEY CA 92587			Vacant			23543 JOHNSON LN CANYON LAKE CA 92587				

APPENDIX D – OPINION OF PROBABLE CONSTRUCTION COST

Eastern Municipal Water District

Quail Valley Subarea 4 Septic to Sewer Conversion - Phase Breakdwon

Engineer's Opinion of Probable Construction Costs

Michael Baker INTERNATIONAL

December 2024

ITEM No.	DESCRIPTION	PHASE 1 COST	PHASE 2 COST	PHASE 3 COST	PHASE 4 COST	PHASE 5 COST	PHASE 6 COST	PHASE 7 COST	PHASE 8 COST	PROJECT COST
1	Mobilization, Demobilization	$639,203	$663,402	$683,034	$742,390	$730,975	$334,668	$438,310	$333,755	$4,565,737
2	Traffic Control	$403,331	$418,600	$430,988	$468,440	$461,238	$211,173	$276,570	$210,596	$2,880,936
3	Site Clearing & Preparation	$114,925	$120,033	$122,587	$135,356	$132,802	$61,293	$79,171	$61,293	$827,461
4	Site Topo Survey & Subsurface Utility Survey	$37,386	$38,802	$39,950	$43,422	$42,754	$19,575	$25,636	$19,520	$267,045
5	Selective Demo (asphalt pavement demo)	$1,195,465	$1,240,763	$1,277,500	$1,388,452	$1,367,151	$625,942	$819,805	$624,190	$8,539,268
6	Erosion & Sediment Control	$228,099	$238,236	$243,305	$268,649	$263,581	$121,653	$157,135	$121,653	$1,642,310
7	Earthwork, Aggregate Base, Backfill & Cycle Hauling	$1,936,528	$2,009,799	$2,069,324	$2,249,091	$2,214,567	$1,013,882	$1,327,852	$1,011,068	$13,832,112
8	12" Sanitary Sewer Piping (20% of total pipe length)	$1,031,317	$1,031,046	$1,031,046	$0	$0	$0	$0	$0	$3,093,408
9	8" Sanitary Sewer Piping (80% of total pipe length)	$1,122,231	$1,203,580	$1,269,357	$2,488,776	$2,450,384	$1,121,695	$1,469,371	$1,118,741	$12,244,136
10	4' Sanity Sewer Manholes	$758,606	$773,779	$804,123	$864,811	$849,639	$394,475	$515,852	$394,475	$5,355,761
11	Sewer Laterals to Existing Development w/ Basic Restoration	$338,137	$338,137	$351,662	$378,713	$378,713	$175,831	$229,933	$175,831	$2,366,959
12	Sewer Laterals to Existing Development w/ Pavement Replacement	$1,446,802	$1,505,855	$1,535,382	$1,653,488	$1,653,488	$738,164	$1,003,904	$738,164	$10,275,249
13	Sewer Laterals to Vacant Lots	$970,675	$1,010,134	$1,041,700	$1,128,509	$1,112,725	$512,958	$670,792	$505,067	$6,952,560
14	Lift Station 1, Site Improvement	$4,584,524	$0	$0	$0	$0	$0	$0	$0	$4,584,524
15	Lift Station 2-5, Site Improvement	$0	$0	$0	$0	$0	$2,412,907	$4,825,815	$2,412,907	$9,651,629
16	4" Force Main	$254,287	$0	$0	$0	$0	$76,753	$124,764	$23,982	$479,786
17	Brace Power Pole	$70,968	$70,968	$70,968	$81,107	$81,107	$40,553	$50,692	$40,553	$506,917
18	Third Party Inspections, Testing & Commissioning	$100,833	$104,650	$107,746	$117,110	$115,310	$52,793	$69,143	$52,650	$720,235
19	Site Improvement (New Asphalt Pavement)	$1,479,677	$1,535,744	$1,581,214	$1,718,544	$1,692,180	$774,755	$1,014,707	$772,586	$10,569,407
Phase Cost		$16,712,996	$12,303,527	$12,659,886	$13,726,860	$13,546,615	$8,689,072	$13,099,452	$8,617,033	$99,355,440

This cost opinion is limited to our best judgment of anticipated construction expenses and does not constitute a proposal or guarantee. All costs are subject to reflect changes in the cost of labor, contractor's method of determining prices, project revisions, and general market conditions. This cost opinion is limited to construction costs only and excludes items as property acquisitions, engineering, inspections, project administration, electrical service upgrades, CEQA mitigation costs, permitting costs, etc. Please refer to PDR section 14 for items and assumptions included in direct costs and items exclused.

30% Submittal
Cost Estimate

Sewer Improvement at Quail Valley, Sub Area 4

Prepared for:

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

Contact:
Miles W. Costanza, PE
951-506-2086
miles.costanza@mbakerintl.com

Michael Baker International

April 5, 2024

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Michael Baker
INTERNATIONAL

Section 1
Basis of Estimate

The basis for this Opinion of Probable Construction Cost was established using the following assumptions to provide an estimate for the Sewer Improvements at Quail Valley, Sub Area 4 Project.

The Estimates are based on the best available information regarding the anticipated scope of the project. Quantities have been determined using 30% Design Development Plans prepared by Michael Baker International dated March 2024. Changes in the cost elements may occur because of further design and engineering processes.

The pricing used reflects the probable construction costs for the scheduled time period of the project. This estimate assumes a competitive bid situation and is an opinion of probable costs based on fair market value and is not a prediction of the anticipated low bid. This estimate assumes no control over the cost of labor and materials, the General Contractor's, or any subcontractor's method of determining price, or competitive bidding and market conditions.

Estimate was prepared utilizing MII software and the 2023 MII Cost Book library. Labor rates were updated based on Davis Bacon, Riverside County (October 2023). Equipment library is MII Region 7 2022 library.

Estimated Construction Cost: **$99,355,439.**

To best forecast construction conditions, the estimate contains the following assumptions that are included in the direct costs:

- Mobilization/Demobilization: 8% of the total direct construction cost
- Traffic Control: 4% of the total direct construction cost to account cost for alternative routes and placement of trench plates.
- Third Party Inspection, Testing & Commissioning: 1% of the total direct construction cost.
- Costs related to Site Topographic Survey, Subsurface Utility Survey, Erosion & Sediment Control have been included in this estimate.
- Assumed average width of roadway is about 20' wide and entire roadway pavement to be replaced with new asphalt pavement.
- Additional cost to rent and install trench box is included in this estimate due to high depth (assumed average depth of about 13.5') of sewer main line.

- Assumed 10% of total length of 57,007x10% = 5,701’ to have rock with 2' deep, 4' wide and about 1,689 cubic yards. Additional cost for rock excavation and hauling has been included in this estimate as contingency.
- Additional cost for dewatering of 100 days has been included in this estimate as contingency.
- Assumed 20% of total sewer main line (57,000x20% = 11,401 lf) is 12” diameter and remaining 80% of total sewer main line (57,007x80% = 45,606 lf) is 8” diameter sewer pipe. All sewer main line is assumed to be PVC, SDR 26 pipe.
- Assumed a total 1,404 sewer laterals which includes total 175 sewer laterals connecting to existing development requiring basic restoration; total 348 sewer laterals connecting to existing development requires extra effort (i.e., sawcut & pavement replacement, tree replacement, stamped concrete replacement etc.) and remaining 881 laterals connecting to vacant lots. All laterals are assumed to be PVC, Schedule 40 pipe. For sewer laterals requiring extra effort, assumed 12’x20’ driveway, 10’x10’ stamped concrete, and 1 tree to be replaced at each of 348 locations.
- Lift Station #1 in Quail Valley assumed to have larger footprint as well as larger capacity and likely to include chemical conditioning facilities. The small lift stations are assumed to be about 30 to 40 GPM, and Lift Station#1 is assumed to be about 600 GPM. Based on recent bid amount of small size lift station, the cost is about $2 million and the cost for lift station#1 is assumed to be about 90% higher in terms of cost at about $3.8 million. Additional cost for 4” diameter force main line and cost due to escalation to construction mid-point have been included to lift station costs as well.
- Assumed total 50 Power Poles to be braced and costs associated with bracing power poles have been included in this estimate.
- Additional cost related to power drops at electrical poles have been included in this estimate.
- **EXCLUSIONS** – Cost related to removal of contaminated soil or water, design fee, and real estate property acquisition, overtime premium, shift work premium have been excluded from this estimate.
- Productivity factor of 90% is applied to account for inefficiencies associated with working in difficult conditions.
- All work will be performed by general contractor. It is assumed that no subcontractors will be utilized on this project.

- The estimate is based on a Design-Bid-Build project execution methodology within a competitive bid procurement process open to all qualified contractors, with at least four contractors responding. No allowance is included for a "single source" or "change order" negotiated procurement.
- Escalation to mid-point of construction and cost book escalation are calculated utilizing the NAVFAC 2023 Q3 BCI Market Escalation Calculator published in December 2023. Predicted start of construction April 2025, duration 5 years.

- Prime Contractor Markups include the following:
    - Job Office Overhead: 5%
    - Home Office Overhead: 3%
    - General Requirements: 4%
    - Profit: 10%
    - Bond and Insurance: 2%

- Direct Costs to Prime include the following markups:
    - Sales tax: 8.75%
    - Location factor, applied to material only: 11%
    - Design Contingency: 15%

- Owner's markups include the following:
    - Risk Contingency: 5%
    - Contractor Contingency: 5%
    - Material Cost Book Escalation (from Cost Book date of 01/01/2023 to Estimate date of 4/5/2024): 4.71%
    - Labor Cost Book Escalation (from 10/01/2023 to date of Estimate 04/05/2024): 2.44%
    - Equipment Cost Book Escalation (from 01/01/2022 to date of Estimate 04/05/2024): 17.04%
    - Escalation to Midpoint of Construction (from estimate date of 4/5/2024 to mid-point of construction date of 9/30/2027): 19.50%

Included below are the cost estimate summary and detail reports.

This opinion of probable cost of construction is made based on the experience, qualifications, and best judgment of the cost estimator. There can be no guarantee that proposals, bid or actual construction costs will not vary from this or subsequent estimates. This estimate was prepared in accordance with generally accepted cost estimating practices and industry standards.

Michael Baker
INTERNATIONAL

Section 2
Summary Report

Sewer Improvements, Quail Valley, CA - 30% Design Cost Estimate

Estimated by	Michael Baker International
Designed by	Michael Baker International
Prepared by	Mohammad Kamruzzaman - Michael Baker International
Preparation Date	4/5/2024
Effective Date of Pricing	4/5/2024
Estimated Construction Time	1,825 Days

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Description	Quantity	UOM	ManHours	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Project Cost Summary Report			**204,362.74**	**58,140,851**	**15,231,782**	**77,193,333**	**99,355,439**
			204,362.74	*58,140,851.19*		*77,193,333.25*	*99,355,439.01*
Sewer Improvements, Quail Valley, CA	**1.00**	**JOB**	**204,362.74**	**58,140,851**	**15,231,782**	**77,193,333**	**99,355,439**
			0.00	*0.00*		*3,820,700.00*	*4,565,736.50*
Mobilization, Demobilization (assumed 8% of total direct cost)	**1.00**	**JOB**	**0.00**	**0**	**0**	**3,820,700**	**4,565,737**
			0.00	*1,910,350.00*		*2,410,824.87*	*2,880,935.72*
Traffic Control (assumed 4% of total direct cost)	**1.00**	**JOB**	**0.00**	**1,910,350**	**500,475**	**2,410,825**	**2,880,936**
			16.60	*15,360.42*		*19,384.56*	*25,538.91*
Site Clearing & Preparation	**32.40**	**ACR**	**537.71**	**497,678**	**130,382**	**628,060**	**827,461**
			14,717.60	*160,614.71*		*202,692.66*	*267,045.05*
Site Topo Survey & Subsurface Utility Survey	**1.00**	**JOB**	**14,717.60**	**160,615**	**42,078**	**202,693**	**267,045**
			0.19	*40.54*		*51.16*	*67.41*
Selective Demo	**126,682.00**	**SY**	**23,755.37**	**5,135,958**	**1,345,522**	**6,481,480**	**8,539,268**
			0.19	*40.54*		*51.16*	*67.41*
Asphalt Pavement Demo	**126,682.00**	**SY**	**23,755.37**	**5,135,958**	**1,345,522**	**6,481,480**	**8,539,268**
			242.17	*30,486.74*		*38,473.68*	*50,688.59*
Erosion & Sediment Control	**32.40**	**ACR**	**7,846.30**	**987,770**	**258,777**	**1,246,547**	**1,642,310**
			0.34	*65.09*		*82.15*	*108.23*
Earthwork, Aggregate Base, Backfill & Cycle Hauling	**127,805.00**	**CY**	**44,086.51**	**8,319,347**	**2,179,509**	**10,498,856**	**13,832,112**
			0.00	*18.78*		*23.70*	*31.23*
Excavation Support for Deep Excavation	**57,007.00**	**LF**	**0.00**	**1,070,675**	**280,496**	**1,351,171**	**1,780,151**
			0.30	*154.44*		*194.90*	*256.78*
Rock Excavation Allowance	**1,689.00**	**BCY**	**509.38**	**260,854**	**68,339**	**329,193**	**433,707**
			13.33	*1,448.97*		*1,828.57*	*2,409.11*
Dewatering	**100.00**	**DAY**	**1,333.33**	**144,897**	**37,960**	**182,857**	**240,911**
			0.33	*53.54*		*67.57*	*89.02*
Earthwork, Aggregate Base, Backfill & Cycle Hauling for Sewer Piping, Forcemain & Manholes	**127,805.00**	**BCY**	**42,243.80**	**6,842,922**	**1,792,714**	**8,635,636**	**11,377,342**
			99,797.27	*24,261,102.99*		*30,617,044.21*	*40,288,073.96*
Site Utilities	**1.00**	**JOB**	**99,797.27**	**24,261,103**	**6,355,941**	**30,617,044**	**40,288,074**

Description	Quantity	UOM	ManHours	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			0.58	*163.19*		*205.94*	*271.33*
12" Sanitary Sewer Piping (20% of Ttotal Pipe Length)	**11,401.00**	**LF**	**6,617.01**	**1,860,536**	**487,425**	**2,347,960**	**3,093,408**
			0.58	*161.48*		*203.78*	*268.48*
8" Sanitary Sewer Piping (80% of Ttotal Pipe Length)	**45,606.00**	**LF**	**26,469.14**	**7,364,257**	**1,929,293**	**9,293,550**	**12,244,136**
			38.12	*9,125.30*		*11,515.96*	*15,172.13*
Sanitary Sewer Manholes	**353.00**	**EA**	**13,457.86**	**3,221,232**	**843,901**	**4,065,132**	**5,355,761**
			37.93	*8,415.30*		*10,619.94*	*13,956.39*
Sewer Laterals	**1,404.00**	**EA**	**53,253.26**	**11,815,079**	**3,095,323**	**14,910,402**	**19,594,769**
			32.58	*8,184.18*		*10,328.28*	*13,525.48*
Sewer Laterals to Existing Development w/ Basic Restoration	**175.00**	**EA**	**5,701.82**	**1,432,232**	**375,217**	**1,807,449**	**2,366,959**
			1.28	*258.77*		*326.56*	*430.24*
Basic Restoration	**175.00**	**EA**	**224.70**	**45,285**	**11,864**	**57,148**	**75,292**
			73.19	*17,819.59*		*22,487.98*	*29,526.58*
Sewer Laterals to Existing Development w/ Pavement Replacement	**348.00**	**EA**	**25,469.97**	**6,201,218**	**1,624,600**	**7,825,817**	**10,275,249**
			41.89	*9,895.69*		*12,488.17*	*16,453.01*
Pavement, Stamped Concrete & Tree Replacement	**348.00**	**EA**	**14,578.40**	**3,443,701**	**902,183**	**4,345,884**	**5,725,648**
			25.06	*4,746.46*		*5,989.94*	*7,891.67*
Sewer Laterals to Vacant Lots	**881.00**	**EA**	**22,081.47**	**4,181,629**	**1,095,506**	**5,277,135**	**6,952,560**
			325.36	*1,945,713.59*		*2,455,453.03*	*2,943,187.56*
Lift Stations	**5.00**	**EA**	**1,626.78**	**9,728,568**	**2,548,697**	**12,277,265**	**14,715,938**
			0.00	*3,040,000.00*		*3,836,421.39*	*4,584,523.56*
Lift Station#1	**1.00**	**EA**	**0.00**	**3,040,000**	**796,421**	**3,836,421**	**4,584,524**
			0.00	*1,600,000.00*		*2,019,169.15*	*2,412,907.14*
Lift Stations#2-5	**4.00**	**EA**	**0.00**	**6,400,000**	**1,676,677**	**8,076,677**	**9,651,629**
			0.16	*28.34*		*35.76*	*47.12*
Force main	**10,183.00**	**LF**	**1,626.78**	**288,568**	**75,599**	**364,167**	**479,786**
			1,633.48	*304,886.12*		*384,760.40*	*506,917.02*
Site Electrical & Communications	**1.00**	**JOB**	**1,633.48**	**304,886**	**79,874**	**384,760**	**506,917**
			20.61	*2,136.81*		*2,696.61*	*3,552.75*
Brace Power Poles	**50.00**	**EA**	**1,030.31**	**106,841**	**27,990**	**134,831**	**177,638**

Description	Quantity	UOM	ManHours	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			0.21	*69.49*		*87.69*	*115.54*
Power Drops at Electrical Pole	**2,850.00**	**LF**	**603.17**	**198,046**	**51,884**	**249,930**	**329,279**
			0.00	*477,588.00*		*602,706.85*	*720,234.68*
Third Party Inspections, Testing & Commissioning (assumed 1% of total direct cost)	**1.00**	**JOB**	**0.00**	**477,588**	**125,119**	**602,707**	**720,235**
			0.08	*50.18*		*63.33*	*83.43*
Site Improvements	**126,682.00**	**SY**	**10,361.72**	**6,356,988**	**1,665,408**	**8,022,397**	**10,569,407**
			0.08	*50.18*		*63.33*	*83.43*
New Asphalt Pavement	**126,682.00**	**SY**	**10,361.72**	**6,356,988**	**1,665,408**	**8,022,397**	**10,569,407**

Michael Baker
INTERNATIONAL

Section 3
Detailed Report

Sewer Improvements, Quail Valley, CA - 30% Design Cost Estimate

Estimated by	Michael Baker International
Designed by	Michael Baker International
Prepared by	Mohammad Kamruzzaman - Michael Baker International
Preparation Date	4/5/2024
Effective Date of Pricing	4/5/2024
Estimated Construction Time	1,825 Days

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Designed by
Michael Baker International
Estimated by
Michael Baker International
Prepared by
Mohammad Kamruzzaman - Michael Baker International

Design Document	30% Design
Document Date	4/5/2024
District	Eastern Municipal Water District
Contact	mohammad.kamruzzaman@mbakerintl.com
Budget Year	2025
UOM System	English

Direct Costs
LaborCost
EQCost
MatlCost
SubBidCost
Contingency
SIOH

Timeline/Currency

Preparation Date	4/5/2024
Escalation Date	4/5/2024
Eff. Pricing Date	4/5/2024
Estimated Duration	1825 Day(s)
Currency	US dollars
Exchange Rate	1.000000

Costbook CB23EN: 2023 MII English Cost Book

Labor : Riverside County (Desert Hot Spring) CA - October 2023

Labor Rates
LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment EP22R07: MII Equipment 2022 Region 07

Region 07 - WEST, (2022)

Sales Tax	8.75
Working Hours per Year	1,560
Labor Adjustment Factor	1.14
Cost of Money	1.63
Cost of Money Discount	25.00
Tire Recap Cost Factor	1.50
Tire Recap Wear Factor	1.80
Tire Repair Factor	0.15
Equipment Cost Factor	1.00
Standby Depreciation Factor	0.50

Fuel

Electricity	0.151
Gas	4.970
Diesel Off-Road	4.840
Diesel On-Road	5.790

Shipping Rates

Over 0 CWT	54.63
Over 240 CWT	39.74
Over 300 CWT	32.87
Over 400 CWT	28.59
Over 500 CWT	29.33
Over 700 CWT	25.14
Over 800 CWT	8.62

Direct Cost Markups	**Category**	**Method**
Productivity	Productivity	Productivity
Sales Tax	TaxAdj	Running % on Selected Costs
MatlCost		
Material Cost Book Escalation	MiscDirect	Running % on Selected Costs
MatlCost		
Labor Costbook Escalation	MiscDirect	Running % on Selected Costs
LaborCost		
Equipment Cost Book Escalation	MiscDirect	Running % on Selected Costs
EQCost		
Market Escalation	Productivity	Running % on Selected Costs
Location Factor	MiscDirect	Running % on Selected Costs
MatlCost		
Design Contingency	MiscDirect	Running % on Selected Costs
LaborCost		
EQCost		
MatlCost		
SubBidCost		

Contractor Markups	**Category**	**Method**	
Profit Running	Profit	Running %	
Profit (Calculated)	Profit	Profit Weighted Guidelines	
Guideline	*Value*	*Weight*	*Percentage*
Risk	*0.090*	*20*	*1.80*
Difficulty	*0.100*	*15*	*1.50*
Size	*0.030*	*15*	*0.45*
Period	*0.101*	*15*	*1.52*
Invest (Contractor's)	*0.070*	*5*	*0.35*
Assist (Assistance by)	*0.075*	*5*	*0.38*
SubContracting	*0.092*	*25*	*2.30*
Total		*100*	*8.65*
JOOH (Calculated) (Small Tools)	JOOH	% of Labor	
JOOH (Calculated)	JOOH	JOOH (Calculated)	
JOOH Running	JOOH	Running %	
Sub-JOOH	JOOH	Running %	
HOOH	HOOH	Running %	
Gen Req	MiscContract	Running %	
Bond and Insurance	Bond	Running %	
Excise Tax	Excise	Running %	
Competition Premium	Allowance	Running %	

Owner Markups	Category	Method
Risk Contingency	Contingency	Running %
Contractor Contingency	Escalation	Running %
Escalation to Midpoint	Escalation	Escalation

StartDate	*StartIndex*	*EndDate*	*EndIndex*	*Escalation*
4/5/2024	*8,045.00*	*9/30/2027*	*9,614.00*	*19.50*

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
DETAILED ESTIMATE			**204,363**	**13,265,590**	**15,248,558**	**3,222,881**	**58,140,851**	**15,231,782**	**77,193,333**	**99,355,439**
			204,362.74	*13,265,590.19*	*15,248,557.69*	*3,222,880.75*	*58,140,851.19*		*77,193,333.25*	*99,355,439.01*
Sewer Improvements, Quail Valley, CA	**1**	**JOB**	**204,363**	**13,265,590**	**15,248,558**	**3,222,881**	**58,140,851**	**15,231,782**	**77,193,333**	**99,355,439**
			0.00	*0.00*	*0.00*	*0.00*	*0.00*		*3,820,700.00*	*4,565,736.50*
Mobilization, Demobilization (assumed 8% of total direct cost)	**1**	**JOB**	**0**	**0**	**0**	**0**	**0**	**0**	**3,820,700**	**4,565,737**
			0.00	*0.00*	*0.00*	*0.00*	*0.00*		*3,820,700.00*	*4,565,736.50*
Mobilization or demobilization, crane, large lattice boom, requiring assembly	1	EA	0	0	0	0	0	0	3,820,700	4,565,737
(Note: Assumed 8% of total construction direct cost of $47,758,751)										
			0.00	*0.00*	*0.00*	*0.00*	*1,910,350.00*		*2,410,824.87*	*2,880,935.72*
Traffic Control (assumed 4% of total direct cost)	**1**	**JOB**	**0**	**0**	**0**	**0**	**1,910,350**	**500,475**	**2,410,825**	**2,880,936**
			0.00	*0.00*	*0.00*	*0.00*	*1,910,350.00*		*2,410,824.87*	*2,880,935.72*
Traffic Controls	1	EA	0	0	0	0	1,910,350	500,475	2,410,825	2,880,936
(Note: Traffic Control cost is assumed 4% of total direct cost of $47,758,751)										
			16.60	*0.00*	*10,562.64*	*1,079.82*	*15,360.42*		*19,384.56*	*25,538.91*
Site Clearing & Preparation	**32**	**ACR**	**538**	**0**	**342,229**	**34,986**	**497,678**	**130,382**	**628,060**	**827,461**
			5.93	*0.00*	*457.07*	*129.56*	*879.10*		*1,109.41*	*1,461.63*
Selective tree and shrub removal, selective clearing brush mowing, medium density, tractor with rotary mower, excludes removal offsite	32	ACR	192	0	14,809	4,198	28,483	7,462	35,945	47,357
			0.00	*0.00*	*50.00*	*0.00*	*63.89*		*80.63*	*106.22*
Dump charges	6,098	TON	0	0	304,900	0	389,594	102,066	491,661	647,757
(Note: https://rcwaste.org/landfill-fees)										
			0.08	*0.00*	*5.17*	*7.07*	*18.27*		*23.06*	*30.38*
Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 10 min wait/load/unload, 8 C.Y. truck, cycle 6 miles, 15 MPH, excludes loading equipment	4,356	LCY	346	0	22,521	30,789	79,600	20,854	100,454	132,347
			14,717.60	*2,138.40*	*94,464.73*	*13,378.30*	*160,614.71*		*202,692.66*	*267,045.05*
Site Topo Survey & Subsurface Utility Survey	**1**	**JOB**	**14,718**	**2,138**	**94,465**	**13,378**	**160,615**	**42,078**	**202,693**	**267,045**
			21.33	*66.00*	*1,341.50*	*19.39*	*2,143.81*		*2,705.44*	*3,564.39*
Boundary & survey markers, lot location and lines, for average quantities	32	ACR	691	2,138	43,465	628	69,459	18,197	87,656	115,486

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			550.06	*0.00*	*2,000.00*	*500.00*	*3,574.72*		*4,511.23*	*5,943.49*
Subsurface Utility Survey	26	MI	14,026	0	51,000	12,750	91,155	23,881	115,036	151,559
(Note: assumed 1 person, 5 days survey per mile; 1x5x8x$50/hr = $2,000 / mile & equipment rental - $100/day)										
			0.19	*0.00*	*23.39*	*5.38*	*40.54*		*51.16*	*67.41*
Selective Demo	**126,682**	**SY**	**23,755**	**0**	**2,962,757**	**681,890**	**5,135,958**	**1,345,522**	**6,481,480**	**8,539,268**
			0.19	*0.00*	*23.39*	*5.38*	*40.54*		*51.16*	*67.41*
Asphalt Pavement Demo	**126,682**	**SY**	**23,755**	**0**	**2,962,757**	**681,890**	**5,135,958**	**1,345,522**	**6,481,480**	**8,539,268**
			0.17	*0.00*	*10.86*	*4.20*	*22.59*		*28.51*	*37.56*
Demolish, remove pavement & curb, remove concrete, mesh reinforced, to 6" thick, hydraulic hammer, excludes hauling and disposal fees	126,682	SY	22,080	0	1,375,598	532,654	2,861,570	749,676	3,611,246	4,757,772
			0.00	*0.00*	*50.00*	*0.00*	*63.89*		*80.63*	*106.22*
Dump charges	29,560	TON	0	0	1,478,000	0	1,888,556	494,765	2,383,321	3,139,995
(Note: https://rcwaste.org/landfill-fees)										
			0.08	*0.00*	*5.17*	*7.07*	*18.27*		*23.06*	*30.38*
Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 10 min wait/load/unload, 8 C.Y. truck, cycle 6 miles, 15 MPH, excludes loading equipment	21,114	LCY	1,676	0	109,159	149,236	385,832	101,081	486,912	641,501
			242.17	*5,008.92*	*14,309.23*	*1,171.81*	*30,486.74*		*38,473.68*	*50,688.59*
Erosion & Sediment Control	**32**	**ACR**	**7,846**	**162,289**	**463,619**	**37,967**	**987,770**	**258,777**	**1,246,547**	**1,642,310**
			0.04	*0.64*	*2.50*	*0.25*	*5.04*		*6.36*	*8.38*
Synthetic erosion control, silt fence, install and maintain, remove, 3' high	154,840	LF	6,352	99,098	386,404	37,967	780,193	204,395	984,588	1,297,183
			0.56	*23.50*	*28.72*	*0.00*	*77.20*		*97.42*	*128.35*
Synthetic erosion control, underdrain fabric, 18" x 100' roll	2,689	RLL	1,494	63,192	77,215	0	207,578	54,381	261,959	345,127
			0.34	*6.18*	*29.37*	*8.87*	*65.09*		*82.15*	*108.23*
Earthwork, Aggregate Base, Backfill & Cycle Hauling	**127,805**	**CY**	**44,087**	**790,258**	**3,753,673**	**1,133,643**	**8,319,347**	**2,179,509**	**10,498,856**	**13,832,112**
			0.00	*8.28*	*3.20*	*1.00*	*18.78*		*23.70*	*31.23*
Excavation Support for Deep Excavation	**57,007**	**LF**	**0**	**472,018**	**182,400**	**57,000**	**1,070,675**	**280,496**	**1,351,171**	**1,780,151**
			0.00	*2.07*	*0.00*	*0.00*	*3.01*		*3.80*	*5.00*

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Excavating, trench, shoring, SF, 4' width, loose material SF protected wall, excludes installation & dewatering, rent per week after first day	228,028	SF	0	472,018	0	0	686,115	179,749	865,864	1,140,764
			0.00	*0.00*	*640.00*	*200.00*	*1,349.33*		*1,702.83*	*2,243.46*
Trench Box Installation	285	DAY	0	0	182,400	57,000	384,560	100,747	485,307	639,386
(Note: assumed 2 personnel (including one operator) can install about 200 lf of trench box per day; 57007/200 = 285 days; 2x8x$40 = $640/day; excavator rental per day - $200)										
			0.30	*0.00*	*92.53*	*20.90*	*154.44*		*194.90*	*256.78*
Rock Excavation Allowance	**1,689**	**BCY**	**509**	**0**	**156,290**	**35,299**	**260,854**	**68,339**	**329,193**	**433,707**
			0.22	*0.00*	*17.35*	*13.83*	*46.71*		*58.95*	*77.66*
Hydraulic rock breaking and loading, solid rock mass excavation, 270 H.P. excavator w/8,000 ft-lb breaker, mobilization 40 ton & 30 ton, 30,000 PSI rock	1,689	BCY	375	0	29,308	23,361	78,892	20,668	99,561	131,170
			0.00	*0.00*	*50.00*	*0.00*	*63.89*		*80.63*	*106.22*
Dump charges	2,365	TON	0	0	118,250	0	151,097	39,585	190,682	251,221
(Note: https://rcwaste.org/landfill-fees)										
			0.08	*0.00*	*5.17*	*7.07*	*18.27*		*23.06*	*30.38*
Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 10 min wait/load/unload, 8 C.Y. truck, cycle 6 miles, 15 MPH, excludes loading equipment	1,689	LCY	134	0	8,732	11,938	30,864	8,086	38,950	51,316
			13.33	*0.00*	*925.92*	*40.41*	*1,448.97*		*1,828.57*	*2,409.11*
Dewatering	**100**	**DAY**	**1,333**	**0**	**92,592**	**4,041**	**144,897**	**37,960**	**182,857**	**240,911**
			13.33	*0.00*	*925.92*	*40.41*	*1,448.97*		*1,828.57*	*2,409.11*
Dewatering, pumping 8 hours, attended 2 hrs per day, 4" diaphragm pump, includes 20 LF of suction hose and 100 LF of discharge hose	100	DAY	1,333	0	92,592	4,041	144,897	37,960	182,857	240,911
			0.33	*2.49*	*26.00*	*8.12*	*53.54*		*67.57*	*89.02*
Earthwork, Aggregate Base, Backfill & Cycle Hauling for Sewer Piping, Forcemain & Manholes	**127,805**	**BCY**	**42,244**	**318,240**	**3,322,392**	**1,037,304**	**6,842,922**	**1,792,714**	**8,635,636**	**11,377,342**
			0.20	*0.00*	*13.05*	*5.60*	*27.95*		*35.28*	*46.47*

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Structural excavation for minor structures, bank measure, for spread and mat footings, elevator pits, and small building foundations, common earth, 3/4 C.Y. bucket, machine excavation, hydraulic backhoe										
			0.00	*0.00*	*50.00*	*0.00*	*63.89*		*80.63*	*106.22*
Dump charges	11,977	TON	0	0	598,850	0	765,197	200,467	965,664	1,272,250
(Note: https://rcwaste.org/landfill-fees)										
			0.08	*0.00*	*5.17*	*7.07*	*18.27*		*23.06*	*30.38*
Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 10 min wait/load/unload, 8 C.Y. truck, cycle 6 miles, 15 MPH, excludes loading equipment	8,555	LCY	679	0	44,229	60,468	156,332	40,956	197,288	259,924
			0.09	*0.00*	*5.83*	*1.71*	*11.30*		*14.26*	*18.78*
Backfill, structural, common earth, 55 H.P. wheeled loader, 50' haul, excludes compaction	119,250	LCY	10,600	0	695,371	203,486	1,347,187	352,937	1,700,124	2,239,892
			0.00	*0.00*	*0.31*	*0.55*	*1.28*		*1.61*	*2.12*
Compaction, subgrade, non cohesive soils, 95% proctor, 24" depth	30,843	SY	137	0	9,519	16,811	39,417	10,327	49,744	65,537
			0.05	*60.00*	*3.71*	*4.09*	*94.97*		*119.86*	*157.91*
Base course drainage layers, aggregate base course for roadways and large paved areas, gravel bank run, compacted, 6" deep	5,304	ECY	282	318,240	19,673	21,710	503,741	131,970	635,711	837,541
(Note: https://massmulch.com/crushed-stone-gravel/)										
			0.04	*0.00*	*2.40*	*0.16*	*3.85*		*4.85*	*6.39*
Compaction, structural, common fill, 8" lifts, vibratory plate	119,250	ECY	5,300	0	286,582	19,198	458,627	120,151	578,779	762,533
			99,797.27	*8,723,742.59*	*6,807,257.83*	*928,630.13*	*24,261,102.99*		*30,617,044.21*	*40,288,073.96*
Site Utilities	**1**	**JOB**	**99,797**	**8,723,743**	**6,807,258**	**928,630**	**24,261,103**	**6,355,941**	**30,617,044**	**40,288,074**
			0.58	*79.11*	*32.26*	*0.00*	*163.19*		*205.94*	*271.33*
12" Sanitary Sewer Piping (20% of Ttotal Pipe Length)	**11,401**	**LF**	**6,617**	**901,988**	**367,800**	**0**	**1,860,536**	**487,425**	**2,347,960**	**3,093,408**
(Note: assumed 20% of total length is 12" dia. sewer main line)										
			0.56	*77.00*	*30.91*	*0.00*	*158.22*		*199.67*	*263.06*

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Pipe, plastic, PVC, pressure, 160 PSI, 12" diameter, SDR 26, includes couplings 10' OC, and hangers 3 per 10'	11,401	LF	6,334	877,877	352,361	0	1,803,837	472,571	2,276,408	2,999,139
			0.06	*2.00*	*3.06*	*0.00*	*7.50*		*9.46*	*12.47*
Utility line signs, markers, and flags, underground tape, detectable, reinforced, aluminum foil core, 2", excludes excavation and backfill	114	CLF	7	228	349	0	855	224	1,079	1,421
			2.42	*209.50*	*132.37*	*0.00*	*489.86*		*618.19*	*814.46*
Public sanitary utility sewerage piping, elbows HDPE Corrugated Type S with watertight gaskets, 12" diameter, excludes excavation or backfill	114	EA	276	23,883	15,090	0	55,844	14,630	70,474	92,848
(Note: https://drainageproducts.us/12-pvc-sdr35-gasket-joint-cap-g/)										
			0.58	*77.88*	*32.26*	*0.00*	*161.48*		*203.78*	*268.48*
8" Sanitary Sewer Piping (80% of Ttotal Pipe Length)	**45,606**	**LF**	**26,469**	**3,551,772**	**1,471,264**	**0**	**7,364,257**	**1,929,293**	**9,293,550**	**12,244,136**
(Note: assumed 80% of total length is 8" dia. sewer main line)										
			0.56	*77.00*	*30.91*	*0.00*	*158.22*		*199.67*	*263.06*
Pipe, plastic, PVC, pressure, 160 PSI, 8" diameter, SDR 26,	45,606	LF	25,337	3,511,662	1,409,506	0	7,215,666	1,890,365	9,106,032	11,997,083
			0.06	*2.00*	*3.06*	*0.00*	*7.50*		*9.46*	*12.47*
Utility line signs, markers, and flags, underground tape, detectable, reinforced, aluminum foil core, 2", excludes excavation and backfill	456	CLF	27	912	1,397	0	3,419	896	4,315	5,684
			2.42	*85.96*	*132.37*	*0.00*	*318.36*		*401.76*	*529.32*
Public sanitary utility sewerage piping, elbows HDPE Corrugated Type S with watertight gaskets, 12" diameter, excludes excavation or backfill	456	EA	1,105	39,198	60,361	0	145,172	38,032	183,204	241,369
(Note: https://drainageproducts.us/8-pvc-sdr26-gasket-joint-cap-g/)										
			38.12	*3,661.89*	*2,344.99*	*189.39*	*9,125.30*		*11,515.96*	*15,172.13*
Sanitary Sewer Manholes	**353**	**EA**	**13,458**	**1,292,646**	**827,781**	**66,854**	**3,221,232**	**843,901**	**4,065,132**	**5,355,761**
			16.67	*1,875.00*	*988.32*	*80.88*	*4,331.46*		*5,466.22*	*7,201.67*
Storm drainage manholes, frames and covers, concrete, precast, 4' ID, 8' deep, excludes footing, excavation, backfill, frame and cover	353	EA	5,883	661,875	348,877	28,551	1,529,004	400,570	1,929,574	2,542,190

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			2.08	*119.00*	*123.54*	*10.11*	*373.73*		*471.63*	*621.37*
Storm drainage manholes, frames and covers, concrete, precast, 4' I.D., excludes footing, excavation, backfill, frame and cover, add for depths over 8'	1,942	VLF	4,045	231,039	239,853	19,629	725,588	190,090	915,679	1,206,395
(Note: 353x(13.5-8) = 1941.5 vlf)										
			3.33	*285.00*	*202.76*	*42.66*	*782.08*		*986.97*	*1,300.32*
Storm drainage manholes, frames and covers, precast concrete, 4' diameter manhole, 8" thick top	353	EA	1,177	100,605	71,574	15,059	276,075	72,326	348,401	459,014
			2.21	*271.00*	*133.73*	*0.71*	*596.03*		*752.18*	*990.99*
Structural concrete for Manhole base, in place, slab (3000 psi), over 20 C.Y., includes forms(4 uses), Grade 60 rebar, concrete (Portland cement Type I), placing and finishing	163	CY	360	44,173	21,798	116	97,153	25,452	122,605	161,531
			0.42	*53.50*	*30.57*	*0.73*	*124.52*		*157.14*	*207.04*
Ladder, shop fabricated, aluminum, 20" W, bolted to concrete, excl cage	4,766	VLF	1,993	254,954	145,679	3,499	593,411	155,462	748,873	986,631
(Note: 353x13.5' = 4765.5 lf)										
			37.93	*2,120.61*	*2,949.01*	*613.80*	*8,415.30*		*10,619.94*	*13,956.39*
Sewer Laterals	**1,404**	**EA**	**53,253**	**2,977,337**	**4,140,413**	**861,776**	**11,815,079**	**3,095,323**	**14,910,402**	**19,594,769**
			32.58	*2,305.01*	*2,702.53*	*425.78*	*8,184.18*		*10,328.28*	*13,525.48*
Sewer Laterals to Existing Development w/ Basic Restoration	**175**	**EA**	**5,702**	**403,377**	**472,943**	**74,511**	**1,432,232**	**375,217**	**1,807,449**	**2,366,959**
			0.20	*0.00*	*13.05*	*5.60*	*27.95*		*35.28*	*46.47*
Structural excavation for minor structures, bank measure, for spread and mat footings, elevator pits, and small building foundations, common earth, 3/4 C.Y. bucket, machine excavation, hydraulic backhoe	8,102	BCY	1,600	0	105,751	45,366	226,468	59,330	285,798	376,536
			0.00	*0.00*	*0.31*	*0.55*	*1.28*		*1.61*	*2.12*
Compaction, subgrade, non cohesive soils, 95% proctor, 24" depth	3,889	SY	17	0	1,200	2,120	4,970	1,302	6,272	8,264
			0.05	*60.00*	*3.71*	*4.09*	*94.97*		*119.86*	*157.91*
Base course drainage layers, aggregate base course for roadways and large paved areas, gravel bank run, compacted, 6" deep	648	ECY	34	38,880	2,404	2,652	61,543	16,123	77,666	102,324

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
(Note: https://massmulch.com/crushed-stone-gravel/)										
			0.09	*0.00*	*5.83*	*1.71*	*11.30*		*14.26*	*18.78*
Backfill, structural, common earth, 55 H.P. wheeled loader, 50' haul, excludes compaction	7,420	LCY	660	0	43,268	12,661	83,825	21,961	105,786	139,371
			0.04	*0.00*	*2.40*	*0.16*	*3.85*		*4.85*	*6.39*
Compaction, structural, common fill, 8" lifts, vibratory plate	7,420	ECY	330	0	17,832	1,195	28,537	7,476	36,013	47,447
			0.08	*0.00*	*5.17*	*7.07*	*18.27*		*23.06*	*30.38*
Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 10 min wait/load/unload, 8 C.Y. truck, cycle 6 miles, 15 MPH, excludes loading equipment	682	LCY	54	0	3,526	4,820	12,463	3,265	15,728	20,721
			0.00	*0.00*	*50.00*	*0.00*	*63.89*		*80.63*	*106.22*
Dump charges	955	TON	0	0	47,750	0	61,014	15,984	76,998	101,444
(Note: https://rcwaste.org/landfill-fees)										
			0.07	*14.70*	*3.88*	*0.00*	*27.21*		*34.33*	*45.23*
Public sanitary utility sewerage piping, piping DWV PVC, schedule 40, 10' length, 4" diameter, excludes excavation or backfill	10,500	LF	747	154,350	40,770	0	285,661	74,838	360,499	474,952
			1.47	*51.00*	*77.93*	*0.00*	*190.73*		*240.70*	*317.12*
Tee, plastic, PVC, white, socket joint, 4", schedule 40	175	EA	257	8,925	13,637	0	33,378	8,744	42,122	55,495
			0.98	*17.75*	*51.81*	*0.00*	*103.32*		*130.39*	*171.78*
Coupling, plastic, PVC, white, socket joint, 4", schedule 40	525	EA	513	9,319	27,200	0	54,242	14,210	68,453	90,186
			0.06	*2.00*	*3.06*	*0.00*	*7.50*		*9.46*	*12.47*
Utility line signs, markers, and flags, underground tape, detectable, reinforced, aluminum foil core, 2", excludes excavation and backfill	105	CLF	6	210	322	0	787	206	993	1,309
			1.56	*0.00*	*100.00*	*20.00*	*171.81*		*216.82*	*285.66*
Water utility distribution valve, detector check valves, reducing, galvanized, with rubber gaskets, 8" diameter, excludes excavation and backfill	175	EA	273	0	17,500	3,500	30,067	7,877	37,943	49,990
(Note: assume 1 person, 2 hours ea)										

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			0.00	*0.00*	*447.00*	*0.00*	*653.75*		*825.02*	*985.90*
Water utility distribution valve, detector check valves, reducing, galvanized, with rubber gaskets, 8" diameter, excludes excavation and backfill	175	EA	0	0	78,225	0	114,407	29,972	144,379	172,533
			0.00	*0.00*	*0.00*	*0.00*	*481.20*		*607.27*	*838.17*
Sludge Dewatering, rotary vacuum drum filter, equipment operator costs, based on 8 hr/day	88	DAY	0	0	0	0	42,346	11,094	53,440	73,759
			0.89	*188.00*	*55.77*	*0.99*	*358.68*		*452.64*	*596.35*
Structural concrete, in place, lightweight ready mix with sand aggregate (2000 psi), 1:3:2 mix, includes concrete (Portland cement Type I), placing and screed finish only, excludes forms and reinforcing	875	CY	778	164,500	48,799	870	313,842	82,221	396,063	521,807
(Note: assumed septic tank size is about 1,000 gallon ea or volume about 5 cy; assumed cellular concrete or lightweight concrete to be used to fill septic tank)										
			1.19	*60.50*	*68.55*	*0.00*	*190.85*		*240.85*	*317.31*
Public sanitary utility sewage piping, backwater sewer line valve, PVC swing check, 3" size	175	EA	207	10,588	11,997	0	33,398	8,750	42,148	55,530
			1.28	*94.89*	*72.93*	*7.58*	*258.77*		*326.56*	*430.24*
Basic Restoration	**175**	**EA**	**225**	**16,606**	**12,763**	**1,327**	**45,285**	**11,864**	**57,148**	**75,292**
			0.05	*0.56*	*3.04*	*0.34*	*5.90*		*7.44*	*9.80*
Topsoil placement and grading, loam or topsoil, fine grading, with equipment	3,889	SY	207	2,178	11,841	1,327	22,926	6,006	28,932	38,118
(Note: assume 1/3 of total 523 or 175 ea, the surface to have basic landscaping (like grass and bushes) and remaining 2/3 of total 523 or 348 ea the surface to have extra effort to sawcut & replace pavement)										
			0.00	*3.71*	*0.24*	*0.00*	*5.75*		*7.26*	*9.56*
Synthetic grass surfacing, acrylic emulsion color coat, green	3,889	SY	17	14,428	922	0	22,359	5,858	28,216	37,174
			73.19	*4,669.79*	*6,093.71*	*1,229.43*	*17,819.59*		*22,487.98*	*29,526.58*
Sewer Laterals to Existing Development w/ Pavement Replacement	**348**	**EA**	**25,470**	**1,625,088**	**2,120,613**	**427,843**	**6,201,218**	**1,624,600**	**7,825,817**	**10,275,249**
			0.20	*0.00*	*13.05*	*5.60*	*27.95*		*35.28*	*46.47*

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Structural excavation for minor structures, bank measure, for spread and mat footings, elevator pits, and small building foundations, common earth, 3/4 C.Y. bucket, machine excavation, hydraulic backhoe	16,111	BCY	3,182	0	210,288	90,212	450,337	117,980	568,316	748,749
			0.00	*0.00*	*0.31*	*0.55*	*1.28*		*1.61*	*2.12*
Compaction, subgrade, non cohesive soils, 95% proctor, 24" depth	7,733	SY	34	0	2,387	4,215	9,883	2,589	12,472	16,431
			0.05	*60.00*	*3.71*	*4.09*	*94.97*		*119.86*	*157.91*
Base course drainage layers, aggregate base course for roadways and large paved areas, gravel bank run, compacted, 6" deep	1,289	ECY	69	77,340	4,781	5,276	122,421	32,072	154,493	203,543
(Note: https://massmulch.com/crushed-stone-gravel/)										
			0.09	*0.00*	*5.83*	*1.71*	*11.30*		*14.26*	*18.78*
Backfill, structural, common earth, 55 H.P. wheeled loader, 50' haul, excludes compaction	14,755	LCY	1,312	0	86,039	25,178	166,690	43,669	210,359	277,146
			0.04	*0.00*	*2.40*	*0.16*	*3.85*		*4.85*	*6.39*
Compaction, structural, common fill, 8" lifts, vibratory plate	14,755	ECY	656	0	35,459	2,375	56,747	14,867	71,613	94,350
			0.08	*0.00*	*5.17*	*7.07*	*18.27*		*23.06*	*30.38*
Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 10 min wait/load/unload, 8 C.Y. truck, cycle 6 miles, 15 MPH, excludes loading equipment	1,356	LCY	108	0	7,011	9,584	24,779	6,492	31,271	41,199
			0.00	*0.00*	*50.00*	*0.00*	*63.89*		*80.63*	*106.22*
Dump charges (excavated soil)	1,898	TON	0	0	94,900	0	121,261	31,768	153,029	201,614
(Note: https://rcwaste.org/landfill-fees)										
			0.07	*14.70*	*3.88*	*0.00*	*27.21*		*34.33*	*45.23*
Public sanitary utility sewerage piping, piping DWV PVC, schedule 40, 10' length, 4" diameter, excludes excavation or backfill	20,880	LF	1,485	306,936	81,075	0	568,057	148,820	716,877	944,477
			1.47	*51.00*	*77.93*	*0.00*	*190.73*		*240.70*	*317.12*
Tee, plastic, PVC, white, socket joint, 4", schedule 40	348	EA	511	17,748	27,119	0	66,374	17,389	83,763	110,356

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			0.98	*17.75*	*51.81*	*0.00*	*103.32*		*130.39*	*171.78*
Coupling, plastic, PVC, white, socket joint, 4", schedule 40	1,044	EA	1,020	18,531	54,089	0	107,865	28,259	136,123	179,341
			0.06	*2.00*	*3.06*	*0.00*	*7.50*		*9.46*	*12.47*
Utility line signs, markers, and flags, underground tape, detectable, reinforced, aluminum foil core, 2", excludes excavation and backfill	209	CLF	12	418	640	0	1,567	411	1,978	2,605
			1.56	*0.00*	*100.00*	*20.00*	*171.81*		*216.82*	*285.66*
Water utility distribution valve, detector check valves, reducing, galvanized, with rubber gaskets, 8" diameter, excludes excavation and backfill	348	EA	544	0	34,800	6,960	59,789	15,664	75,453	99,409
(Note: assume 1 person, 2 hours ea)										
			0.00	*0.00*	*0.00*	*0.00*	*481.20*		*607.27*	*800.07*
Sludge Dewatering, rotary vacuum drum filter, equipment operator costs, based on 8 hr/day	174	DAY	0	0	0	0	83,729	21,935	105,665	139,212
			0.89	*188.00*	*55.77*	*0.99*	*358.68*		*452.64*	*596.35*
Structural concrete, in place, lightweight ready mix with sand aggregate (2000 psi), 1:3:2 mix, includes concrete (Portland cement Type I), placing and screed finish only, excludes forms and reinforcing	1,740	CY	1,547	327,120	97,041	1,729	624,097	163,501	787,599	1,037,651
(Note: assumed septic tank size is about 1,000 gallon ea or volume about 5 cy; assumed cellular concrete or lightweight concrete to be used to fill septic tank)										
			1.19	*60.50*	*68.55*	*0.00*	*190.85*		*240.85*	*317.31*
Public sanitary utility sewage piping, backwater sewer line valve, PVC swing check, 3" size	348	EA	412	21,054	23,857	0	66,415	17,400	83,815	110,425
			0.00	*0.00*	*447.00*	*0.00*	*653.75*		*825.02*	*985.90*
Water utility distribution valve, detector check valves, reducing, galvanized, with rubber gaskets, 8" diameter, excludes excavation and backfill	348	EA	0	0	155,556	0	227,506	59,602	287,108	343,094
			41.89	*2,459.60*	*3,464.28*	*811.25*	*9,895.69*		*12,488.17*	*16,453.01*
Pavement, Stamped Concrete & Tree Replacement	**348**	**EA**	**14,578**	**855,941**	**1,205,571**	**282,314**	**3,443,701**	**902,183**	**4,345,884**	**5,725,648**
			8.89	*535.00*	*550.28*	*283.23*	*2,024.95*		*2,555.45*	*3,366.78*

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Deciduous trees, elm, Camperdown, balled & burlapped (B&B), 12' - 15', 3" caliper, in prepared beds	348	EA	3,093	186,180	191,497	98,563	704,684	184,614	889,297	1,171,638
			7.41	*0.00*	*451.09*	*154.03*	*906.01*		*1,143.36*	*1,506.37*
Clearing & grubbing, tree removal congested area, 12" diameter, aerial lift truck	348	EA	2,578	0	156,980	53,604	315,291	82,600	397,891	524,216
(Note: assume 1 tree to be removed per site)										
			0.01	*3.57*	*0.36*	*0.09*	*5.88*		*7.42*	*9.77*
Asphaltic concrete paving for driveway, parking lots & driveways, 6" stone base, 3" binder course, 3" topping, no asphalt hauling included	83,520	SF	495	298,166	30,386	7,907	490,850	128,593	619,444	816,109
(Note: assumed 12'x20' driveway ea)										
			0.01	*0.03*	*0.69*	*0.25*	*1.44*		*1.81*	*2.39*
Selective demolition, saw cutting driveway, each additional inch of depth over 3"	66,816	LF	660	2,004	45,874	16,376	95,953	25,138	121,091	159,536
			0.08	*0.00*	*5.17*	*7.07*	*18.27*		*23.06*	*30.38*
Cycle hauling new driveway pavement (wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 10 min wait/load/unload, 8 C.Y. truck, cycle 6 miles, 15 MPH, excludes loading equipment	1,547	LCY	123	0	7,998	10,934	28,269	7,406	35,676	47,002
(Note: 12x20x0.5' thick driveway each)										
			0.08	*0.00*	*5.17*	*7.07*	*18.27*		*23.06*	*30.38*
Cycle hauling existing driveway pavement (wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 10 min wait/load/unload, 8 C.Y. truck, cycle 6 miles, 15 MPH, excludes loading equipment	1,547	LCY	123	0	7,998	10,934	28,269	7,406	35,676	47,002
(Note: 12x20x0.5' thick driveway each)										
			0.08	*0.00*	*5.17*	*7.07*	*18.27*		*23.06*	*30.38*

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Cycle hauling existing stamped concrete (wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 10 min wait/load/unload, 8 C.Y. truck, cycle 6 miles, 15 MPH, excludes loading equipment	644	LCY	51	0	3,329	4,552	11,768	3,083	14,851	19,566
(Note: assumed existing stamped concrete to be demoed 10x10x0.5' thick)										
			0.02	*0.11*	*1.18*	*0.42*	*2.55*		*3.21*	*4.23*
Selective demolition, saw cutting driveway, asphalt, up to 3" deep	22,272	LF	377	2,450	26,214	9,357	56,726	14,861	71,588	94,316
(Note: assumed typical driveway size 12' x 20' or 240 SF)										
			0.07	*0.00*	*4.33*	*1.68*	*9.00*		*11.36*	*14.96*
Demolish driveway, remove pavement & curb, remove bituminous driveways, excludes hauling and disposal fees	9,280	SY	644	0	40,150	15,547	83,521	21,881	105,402	138,866
(Note: assumed typical driveway size 12' x 20' or 240 SF)										
			0.00	*0.00*	*50.00*	*0.00*	*65.45*		*82.59*	*108.82*
Dump charges (driveway pavement)	2,165	TON	0	0	108,250	0	141,694	37,121	178,816	235,587
(Note: https://rcwaste.org/landfill-fees)										
			0.00	*0.00*	*50.00*	*0.00*	*65.45*		*82.59*	*108.82*
Dump charges (stamped concrete)	902	TON	0	0	45,100	0	59,034	15,466	74,500	98,152
(Note: https://rcwaste.org/landfill-fees)										
			0.07	*10.55*	*3.59*	*0.00*	*20.72*		*26.15*	*34.46*
Stamped Concrete, Precast concrete unit paving slabs, patio block, colors, 8" x 16", 2-3/8" thick	34,800	SF	2,335	367,140	124,891	0	721,166	188,932	910,097	1,199,042
(Note: assume 10'x10' stamped concrete surface to be replaced w/ new)										
			0.07	*0.00*	*3.98*	*0.57*	*6.82*		*8.61*	*11.34*
Demolish Stamped Concrete, remove pavement & curb, sidewalk, concrete, rod reinforced, 6" thick, with hand held air equipment, excludes hauling	34,800	SF	2,426	0	138,501	19,740	237,442	62,205	299,648	394,782
			4.81	*0.00*	*800.00*	*100.00*	*1,347.79*		*1,700.89*	*2,240.90*
Sep□c tanks in areas difficult to access like under a shed or at the edge of the house	348	EA	1,674	0	278,400	34,800	469,032	122,877	591,909	779,833
(Note: assumed 1 day additional work by 2 personnel; 1x2x8x$50 = $800/site & $100 for equipment rental)										

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			25.06	*1,077.04*	*1,755.80*	*407.97*	*4,746.46*		*5,989.94*	*7,891.67*
Sewer Laterals to Vacant Lots	**881**	**EA**	**22,081**	**948,872**	**1,546,857**	**359,421**	**4,181,629**	**1,095,506**	**5,277,135**	**6,952,560**
			0.20	*0.00*	*13.05*	*5.60*	*27.95*		*35.28*	*46.47*
Structural excavation for minor structures, bank measure, for spread and mat footings, elevator pits, and small building foundations, common earth, 3/4 C.Y. bucket, machine excavation, hydraulic backhoe	43,506	BCY	8,594	0	567,860	243,607	1,216,085	318,591	1,534,676	2,021,916
			0.00	*0.00*	*0.31*	*0.55*	*1.28*		*1.61*	*2.12*
Compaction, subgrade, non cohesive soils, 95% proctor, 24" depth	16,315	SY	73	0	5,035	8,893	20,850	5,462	26,313	34,667
			0.05	*60.00*	*3.71*	*4.09*	*94.97*		*119.86*	*157.91*
Base course drainage layers, aggregate base course for roadways and large paved areas, gravel bank run, compacted, 6" deep	2,719	ECY	145	163,140	10,085	11,129	258,234	67,652	325,886	429,351
(Note: https://massmulch.com/crushed-stone-gravel/)										
			0.09	*0.00*	*5.83*	*1.71*	*11.30*		*14.26*	*18.78*
Backfill, structural, common earth, 55 H.P. wheeled loader, 50' haul, excludes compaction	40,465	LCY	3,597	0	235,960	69,049	457,140	119,762	576,902	760,061
			0.04	*0.00*	*2.40*	*0.16*	*3.85*		*4.85*	*6.39*
Compaction, structural, common fill, 8" lifts, vibratory plate	40,465	ECY	1,798	0	97,245	6,515	155,626	40,771	196,396	258,750
			0.08	*0.00*	*5.17*	*7.07*	*18.27*		*23.06*	*30.38*
Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 10 min wait/load/unload, 8 C.Y. truck, cycle 6 miles, 15 MPH, excludes loading equipment	2,862	LCY	227	0	14,797	20,229	52,299	13,701	66,001	86,955
			0.00	*0.00*	*50.00*	*0.00*	*63.89*		*80.63*	*106.22*
Dump charges	4,007	TON	0	0	200,350	0	256,003	67,068	323,071	425,641
(Note: https://rcwaste.org/landfill-fees)										
			1.47	*51.00*	*77.93*	*0.00*	*190.73*		*240.70*	*317.12*
Tee, plastic, PVC, white, socket joint, 4", schedule 40	881	EA	1,294	44,931	68,655	0	168,033	44,021	212,054	279,379
			0.07	*14.70*	*3.88*	*0.00*	*27.21*		*34.33*	*45.23*

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Public sanitary utility sewerage piping, piping DWV PVC, schedule 40, 10' length, 4" diameter, excludes excavation or backfill	44,050	LF	3,132	647,535	171,041	0	1,198,415	313,962	1,512,377	1,992,538
			0.98	*17.75*	*51.81*	*0.00*	*103.32*		*130.39*	*171.78*
Coupling, plastic, PVC, white, socket joint, 4", schedule 40	2,202	EA	2,151	39,086	114,085	0	227,508	59,603	287,111	378,265
			0.06	*2.00*	*3.06*	*0.00*	*7.50*		*9.46*	*12.47*
Utility line signs, markers, and flags, underground tape, detectable, reinforced, aluminum foil core, 2", excludes excavation and backfill	440	CLF	26	880	1,348	0	3,299	864	4,163	5,485
			1.19	*60.50*	*68.55*	*0.00*	*190.85*		*240.85*	*317.31*
Public sanitary utility sewage piping, backwater sewer line valve, PVC swing check, 3" size	881	EA	1,044	53,301	60,397	0	168,137	44,049	212,186	279,553
			325.36	*21,773.00*	*17,405.06*	*0.00*	*1,945,713.59*		*2,455,453.03*	*2,943,187.56*
Lift Stations	**5**	**EA**	**1,627**	**108,865**	**87,025**	**0**	**9,728,568**	**2,548,697**	**12,277,265**	**14,715,938**
			0.00	*0.00*	*0.00*	*0.00*	*3,040,000.00*		*3,836,421.39*	*4,584,523.56*
Lift Station#1	**1**	**EA**	**0**	**0**	**0**	**0**	**3,040,000**	**796,421**	**3,836,421**	**4,584,524**
			0.00	*0.00*	*0.00*	*0.00*	*3,040,000.00*		*3,836,421.39*	*4,584,523.56*
Lift Station#1 - Lift Station, Site Improvement	1	EA	0	0	0	0	3,040,000	796,421	3,836,421	4,584,524
(Note: Lift Sta□on #1 in Quail Valley, it will be larger. The small li□ sta□ons will be about 30 to 40 gpm, and Lift Sta□on #1 will be about 600 gpm. It will have a larger footprint, and will likely include chemical condi□oning facili□es. Based on recent bid amount of small size lift station is about $2M and for cost for lift station#1 is assumed to be about 80% higher in terms of cost of about $3.6M)										
			0.00	*0.00*	*0.00*	*0.00*	*1,600,000.00*		*2,019,169.15*	*2,412,907.14*
Lift Stations#2-5	**4**	**EA**	**0**	**0**	**0**	**0**	**6,400,000**	**1,676,677**	**8,076,677**	**9,651,629**
			0.00	*0.00*	*0.00*	*0.00*	*1,600,000.00*		*2,019,169.15*	*2,412,907.14*
Lift Station#2,3,4,5 - Lift Station, Site Improvement	4	EA	0	0	0	0	6,400,000	1,676,677	8,076,677	9,651,629
(Note: Lift Sta□ons#2,3,4 and 5 each in Quail Valley are assumed to be small lift sta□ons with capacity about 30 to 40 gpm each. Based on recent bid for similar size lift station, the cost is expected about $2M with markup and assumed $1.33M as direct cost without markup.)										
			0.16	*10.69*	*8.55*	*0.00*	*28.34*		*35.76*	*47.12*
Force main	**10,183**	**LF**	**1,627**	**108,865**	**87,025**	**0**	**288,568**	**75,599**	**364,167**	**479,786**
			0.08	*6.00*	*4.16*	*0.00*	*14.95*		*18.87*	*24.86*
Polyvinyl chloride, pipe, 4", schedule 80 pipe	10,183	LF	787	61,098	42,327	0	152,231	39,882	192,113	253,107

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			1.10	*32.00*	*59.02*	*0.00*	*134.94*		*170.30*	*224.36*
Polyvinyl chloride, 4", schedule 80 pipe, fittings	204	EA	224	6,528	12,040	0	27,529	7,212	34,741	45,770
(Note: Material Cost last updated 1 Jan 2010.)										
			1.08	*72.50*	*57.15*	*0.00*	*190.89*		*240.90*	*317.38*
Coupling, plastic, PVC, socket joint, 4", schedule 80	566	EA	610	41,035	32,346	0	108,043	28,305	136,348	179,637
			0.06	*2.00*	*3.06*	*0.00*	*7.50*		*9.46*	*12.47*
Utility line signs, markers, and flags, underground tape, detectable, reinforced, aluminum foil core, 2", excludes excavation and backfill	102	CLF	6	204	312	0	765	200	965	1,272
			1,633.48	*115,500.00*	*88,911.43*	*5,000.00*	*304,886.12*		*384,760.40*	*506,917.02*
Site Electrical & Communications	**1**	**JOB**	**1,633**	**115,500**	**88,911**	**5,000**	**304,886**	**79,874**	**384,760**	**506,917**
			20.61	*600.00*	*800.00*	*100.00*	*2,136.81*		*2,696.61*	*3,552.75*
Brace Power Poles	**50**	**EA**	**1,030**	**30,000**	**40,000**	**5,000**	**106,841**	**27,990**	**134,831**	**177,638**
			20.61	*600.00*	*800.00*	*100.00*	*2,136.81*		*2,696.61*	*3,552.75*
Bracing to Power Poles	50	EA	1,030	30,000	40,000	5,000	106,841	27,990	134,831	177,638
(Note: assumed 2 personnel, 1 day work to complete bracing for each power pole; 2x1x8x$50/hr = $800; assumed material cost about $500 for steel anchor, steel plate/steel beam; and equipment cost $100/day)										
			0.21	*30.00*	*17.16*	*0.00*	*69.49*		*87.69*	*115.54*
Power Drops at Electrical Pole	**2,850**	**LF**	**603**	**85,500**	**48,911**	**0**	**198,046**	**51,884**	**249,930**	**329,279**
			0.21	*30.00*	*17.16*	*0.00*	*69.49*		*87.69*	*115.54*
Electrical power equipment (pro-rated per job), feeder, PVC conduit and aluminum wire, 400 amp, in trench	2,850	LF	603	85,500	48,911	0	198,046	51,884	249,930	329,279
			0.00	*0.00*	*0.00*	*0.00*	*477,588.00*		*602,706.85*	*720,234.68*
Third Party Inspections, Testing & Commissioning (assumed 1% of total direct cost)	**1**	**JOB**	**0**	**0**	**0**	**0**	**477,588**	**125,119**	**602,707**	**720,235**
			0.00	*0.00*	*0.00*	*0.00*	*477,588.00*		*602,706.85*	*720,234.68*
Third Party Inspections, Testing & Commissioning	1	JOB	0	0	0	0	477,588	125,119	602,707	720,235
(Note: Third Party Inspections, Testing & Commissioning is assumed 1% of total direct cost of $47,758,751)										
			0.08	*26.55*	*5.12*	*3.06*	*50.18*		*63.33*	*83.43*
Site Improvements	**126,682**	**SY**	**10,362**	**3,362,797**	**648,619**	**387,387**	**6,356,988**	**1,665,408**	**8,022,397**	**10,569,407**
			0.08	*26.55*	*5.12*	*3.06*	*50.18*		*63.33*	*83.43*
New Asphalt Pavement	**126,682**	**SY**	**10,362**	**3,362,797**	**648,619**	**387,387**	**6,356,988**	**1,665,408**	**8,022,397**	**10,569,407**

Description	Quantity	UOM	ManHours	MatlCost	LaborCost	EQCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			0.00	*0.00*	*0.31*	*0.55*	*1.28*		*1.61*	*2.12*
Compaction, subgrade, non cohesive soils, 95% proctor, 24" depth	126,682	SY	563	0	39,099	69,050	161,899	42,414	204,313	269,180
			0.05	*60.00*	*3.71*	*4.09*	*94.97*		*119.86*	*157.91*
Base course drainage layers, aggregate base course for roadways and large paved areas, gravel bank run, 6" deep	21,114	ECY	1,124	1,266,840	78,314	86,421	2,005,276	525,344	2,530,619	3,334,059
(Note: https://massmulch.com/crushed-stone-gravel/)										
			0.04	*0.00*	*2.23*	*0.15*	*3.56*		*4.49*	*5.92*
Compaction, structural, select fill, 8" lifts, vibratory plate	21,114	ECY	869	0	46,983	3,147	75,188	19,698	94,886	125,011
			0.00	*1.70*	*0.30*	*0.08*	*3.04*		*3.84*	*5.06*
Asphaltic concrete paving, parking lots & driveways, binder course, 4" thick, no asphalt hauling included	1,140,140	SF	5,630	1,938,238	345,674	89,952	3,470,839	909,293	4,380,132	5,770,769
			0.08	*0.00*	*5.17*	*7.07*	*18.27*		*23.06*	*30.38*
Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 10 min wait/load/unload, 8 C.Y. truck, cycle 6 miles, 15 MPH, excludes loading equipment	14,076	LCY	1,117	0	72,773	99,491	257,221	67,387	324,608	427,667
			0.00	*1.02*	*0.25*	*0.22*	*2.20*		*2.77*	*3.65*
Fog seal, seal coating, coal tar pitch emulsion, 2 coat, over 10,000 S.Y.	126,682	SY	450	129,216	32,041	28,349	278,127	72,864	350,991	462,426
			0.01	*0.25*	*0.30*	*0.10*	*0.95*		*1.20*	*1.58*
Painted pavement markings, acrylic waterborne, white or yellow, 8" wide, over 16000 LF	114,014	LF	608	28,504	33,735	10,977	108,439	28,409	136,848	180,295
(Note: 57007x2 = 114,014 lf)										

APPENDIX E – BIOLOGICAL CONSTRAINTS REPORT

Biological Constraints Report for the Quail Valley Subarea 4 Project Murrieta, California

Prepared for
Eastern Municipal Water District
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Perris, CA 92572-8300
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RECON Number 9295-4
August 20, 2020



Brian Parker, Project Biologist

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Acronyms and Abbreviations

amsl	above mean sea level
CDFW	California Department of Fish and Wildlife
CFGC	California Fish and Game Code
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
District	Eastern Municipal Water District
MBTA	Migratory Bird Treaty Act
MSHCP	Multiple Species Habitat Conservation Program
OHWM	ordinary high water mark
project	Quail Valley Subarea 4 Project
RWQCB	Regional Water Quality Control Board
USACE	United States Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WRCRCA	Western Riverside County Regional Conservation Authority

Executive Summary

The Eastern Municipal Water District Quail Valley Subarea 4 Project (project) is located in the community of Quail Valley in the city of Murrieta, California. The project would include construction of new sewer pipelines to service the community. The project site is not located inside or immediately adjacent to any Criteria Area, Criteria Cell, or Conservation Area identified for conservation potential by the Western Riverside Multiple Species Habitat Conservation Plan, but is located within the western burrowing owl (*Athene cunicularia hypugaea*) survey area identified in the Western Riverside Multiple Species Habitat Conservation Plan (Western Riverside County Regional Conservation Authority 2003).

RECON Environmental, Inc. conducted a literature review, a general biological survey, a burrowing owl habitat assessment, and an assessment of potential jurisdictional wetlands and waters for the 229.46-acre project site plus all land within 500 feet, for a total survey area of 492.95 acres.

Potential biological constraints for the project include sensitive vegetation communities, plant and wildlife species, and jurisdictional wetlands and waters. For planning purposes, biological constraints are broken into three constraint levels: low, moderate, and high.

Four wetland vegetation communities and occur in the survey area: southern riparian scrub, southern riparian woodland, disturbed wetland, and non-native riparian. Impacts to wetland vegetation communities would require mitigation. In addition, as these areas would likely also be wetlands under the jurisdiction of the United States Army Corps of Engineers, Regional Water Quality Control Board, and California Department of Fish and Wildlife and may require permits from those resource agencies. Therefore, the constraint level from wetland vegetation communities would be considered high.

Two sensitive upland vegetation communities occur in the survey area: native grassland and Riversidean sage scrub (including disturbed). These communities would be considered moderate constraints because impacted areas would need to be revegetated and it may be necessary to have a biological monitor present during construction.

No sensitive or narrow endemic plant species were observed within the survey area; however, one sensitive plant species has moderate potential to occur in the survey area: smooth tarplant (*Centromadia pungens laevis*). Constraints from this species would be considered low because impacts would be considered less than significant, though topsoil salvage may be recommended to reduce potential impacts.

No sensitive wildlife species were observed, but 10 sensitive wildlife species have moderate potential to occur on the project site or in the surrounding survey buffer: orange-throated whiptail (*Aspidoscelis hyperythra*), San Diegan tiger whiptail (*Aspidoscelis tigris stejnegeri*), red diamond rattlesnake (*Crotalus ruber*), western burrowing owl (*Athene cunicularia hypugaea*), least Bell's vireo (*Vireo bellii pusillus*), coastal California gnatcatcher (*Polioptila californica californica*), California horned lark (*Eremophila alpestris actia*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), Cooper's hawk (*Accipiter cooperii*), and San Diego black-tailed jackrabbit (*Lepus californica bennettii*).

San Diego black-tailed jackrabbit has moderate potential to occur. Any impacts to this species would be considered less than significant, so it is not expected to present a constraint on project implementation.

Cooper's hawk and other raptors have potential to nest within the survey area. No direct impacts are anticipated, but construction noise and activities have potential to cause indirect impacts. Avoidance measures and biological monitoring may be required. As a result, Cooper's hawk and other nesting raptors would be considered a moderate constraint.

Orange throated-whiptail, San Diegan tiger whiptail, and red-diamond rattlesnake have potential occur in habitat surrounding the project site. They are not expected to be a constraint to the project as impacts would be less than significant.

Western burrowing owl has potential to occur in Riversidean sage scrub and disturbed habitat in limited portions of the project site, and the surrounding survey buffer. Prior to any work in suitable habitat, focused surveys and pre-construction take avoidance surveys may be required and mitigation measures, including biological monitoring may be required. Therefore, constraints from western burrowing owl would be considered high.

Least Bell's vireo does not have potential to occur on the project site, but does have potential to occur in riparian habitats in the survey buffer. No direct impacts are anticipated, but if construction occurs during the breeding season (February 1 to August 31), construction noise has potential to cause indirect impacts. Protocol surveys, noise attenuation barriers, and construction monitoring may be required. Therefore, constraints from least Bell's vireo would be considered moderate.

Coastal California gnatcatcher has no potential to occur on the project site but has moderate potential to occur in the surrounding Riversidean sage scrub. No direct impacts to coastal California gnatcatcher are expected; however, if construction occurs during the breeding season (February 1 to August 31), construction noise has potential to cause indirect impacts. Protocol surveys, noise attenuation barriers, and construction monitoring may be required. Therefore, constraints from coastal California gnatcatcher would be considered moderate.

California horned lark and southern California rufous-crowned sparrow are not expected to occur on the project site but have potential to occur in the surrounding habitat. No direct impacts to these species are anticipated. While indirect noise impacts may occur, these impacts would not be significant. Therefore, these species would not present a constraint on the project.

In addition to sensitive species, general migratory birds protected by California Fish and Game Code Section 3503 have potential to nest throughout the survey area. Direct impacts could occur if vegetation removal occurs during the general bird breeding season (February 1 to August 31). Direct impacts would be considered significant and require pre-construction surveys, avoidance measures, and biological monitoring. Therefore, migratory birds would be considered a moderate constraint on the project.

Potential jurisdictional wetlands and waters are present within the project site. Impacts to these resources would require resource agency permitting, mitigation, and biological monitoring. Therefore, constraints from jurisdictional wetlands and waters would be considered high.

1.0 Introduction

This report describes potential biological constraints for the Eastern Municipal Water District (District) Quail Valley Subarea 4 Project (project). RECON conducted a general biological survey, jurisdictional assessment, and western burrowing owl habitat assessment of the 492.95-acre survey area, made up of a 229.46-acre project site plus a 500-foot off-site survey buffer comprising 263.49 acres.

The project site is located in the community of Quail Valley in the city of Menifee, California. It is approximately 1.5 miles north of Newport Road and 2.8 miles west of Interstate 215 in southwestern Riverside County, California (Figure 1). The survey area is located within the Sections 25 and 36, in Township 05S, Range 04W of the U.S. Geological Survey (USGS) 7.5-minute topographic map, Romoland quadrangle (Figure 2; USGS 2003). The survey area consists of a mix of sparsely developed and undeveloped land with single-family residences found on a grid of small neighborhood roads (Figure 3).

The project site is not located inside or immediately adjacent to any Criteria Area, Criteria Cell, or Conservation Area identified for conservation potential by the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP), but is located within the required survey area for western burrowing owl (*Athene cunicularia hypugaea*) identified in the Western Riverside MSHCP (Western Riverside County Regional Conservation Authority [WRCRCA] 2003).

This report identifies biological constraints to assist the District in designing sewer infrastructure within the project site. Biological resources will be described and allocated into three increasing levels of constraint: low, moderate, and high.

2.0 Survey Methodology

RECON biologists Brian Parker and Andrew Smisek conducted a review of existing literature and databases, a general biological survey, a burrowing owl habitat assessment, and an assessment of jurisdictional wetlands and waters for the proposed project. All biological surveys were performed on July 22, 2020, and are detailed below.

2.1 Literature Review

RECON conducted a search of existing biological data for the project site, including a review of biological databases for sensitive plant and animal species reported within two miles of the project site, and a review of the site's physical characteristics (e.g., location, elevation, soils/substrate, topography). Supplemental data sources included the California Natural Diversity Database (CNDDB; California Department of Fish and Wildlife [CDFW] 2020a), the All Species Occurrences Database (U.S. Fish and Wildlife Service [USFWS] 2020a), the California Native Plant Society (CNPS) Online database (CNPS 2020), and the U.S. Department of Agriculture (USDA) Soil Conservation Service maps and descriptions (USDA 1971 and 2020).

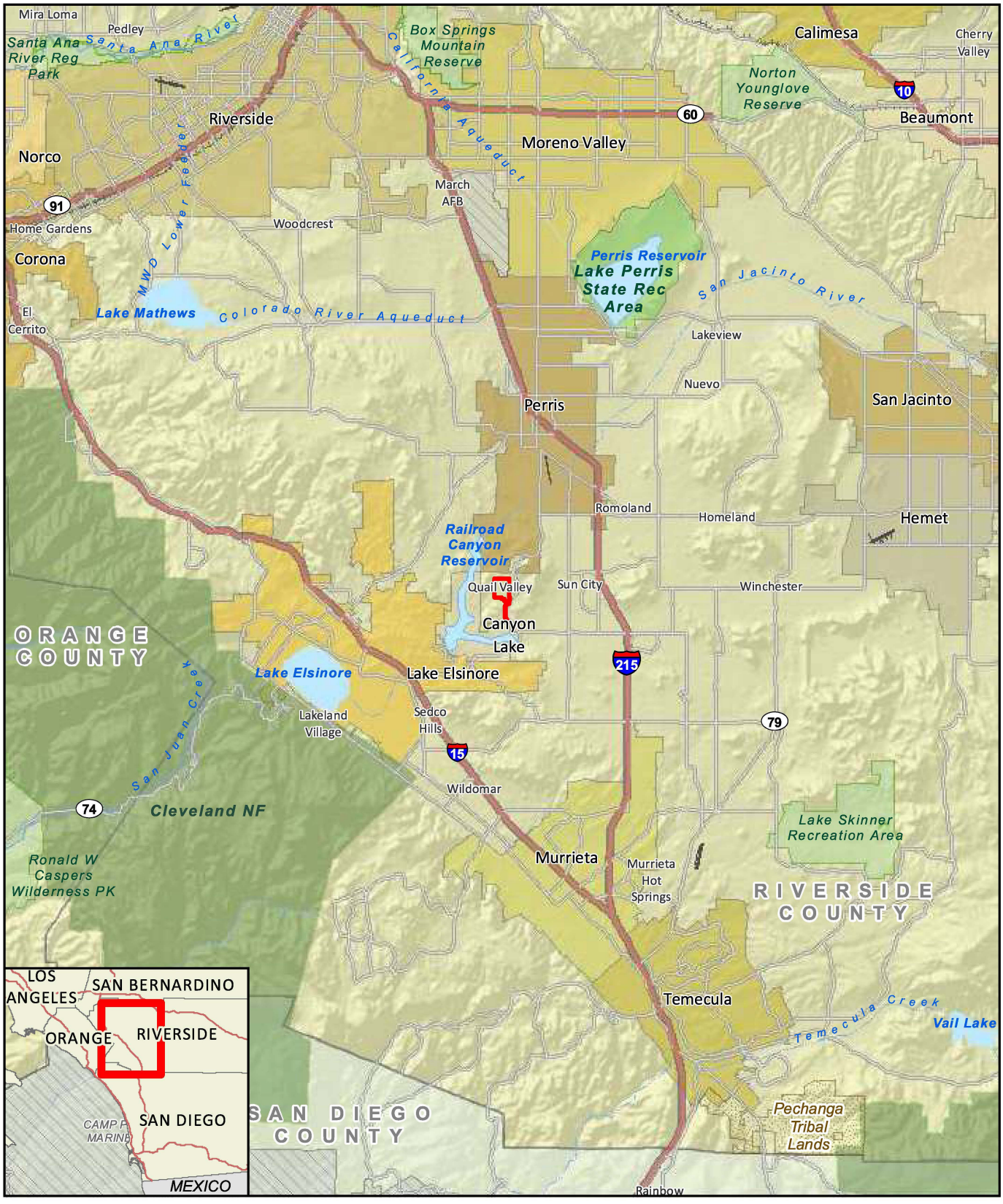

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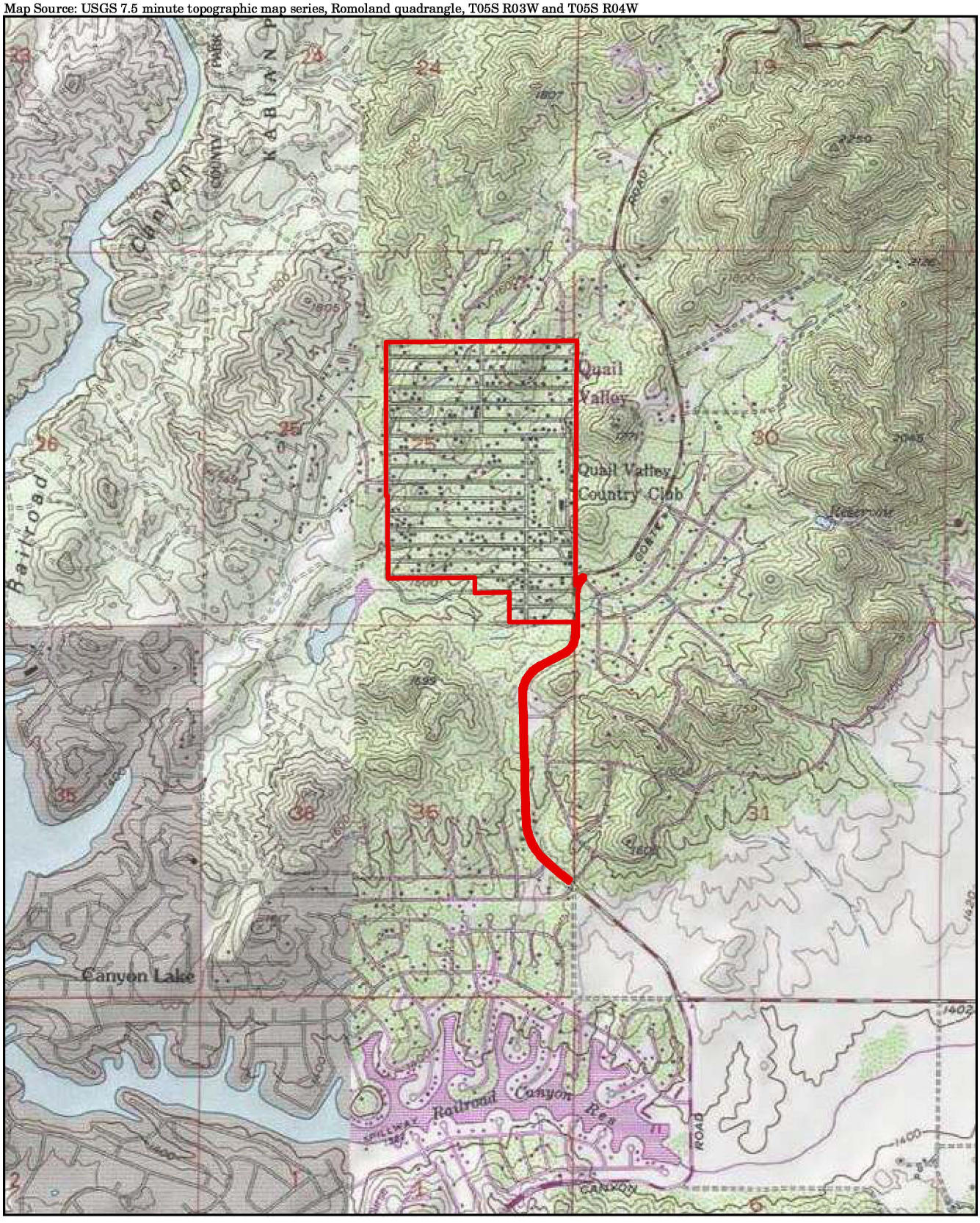
FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, Romoland quadrangle, T05S R03W and T05S R04W



Project Boundary

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FIGURE 2
Project Location on USGS Map

Image Source: Nearmap (flown May 2020)

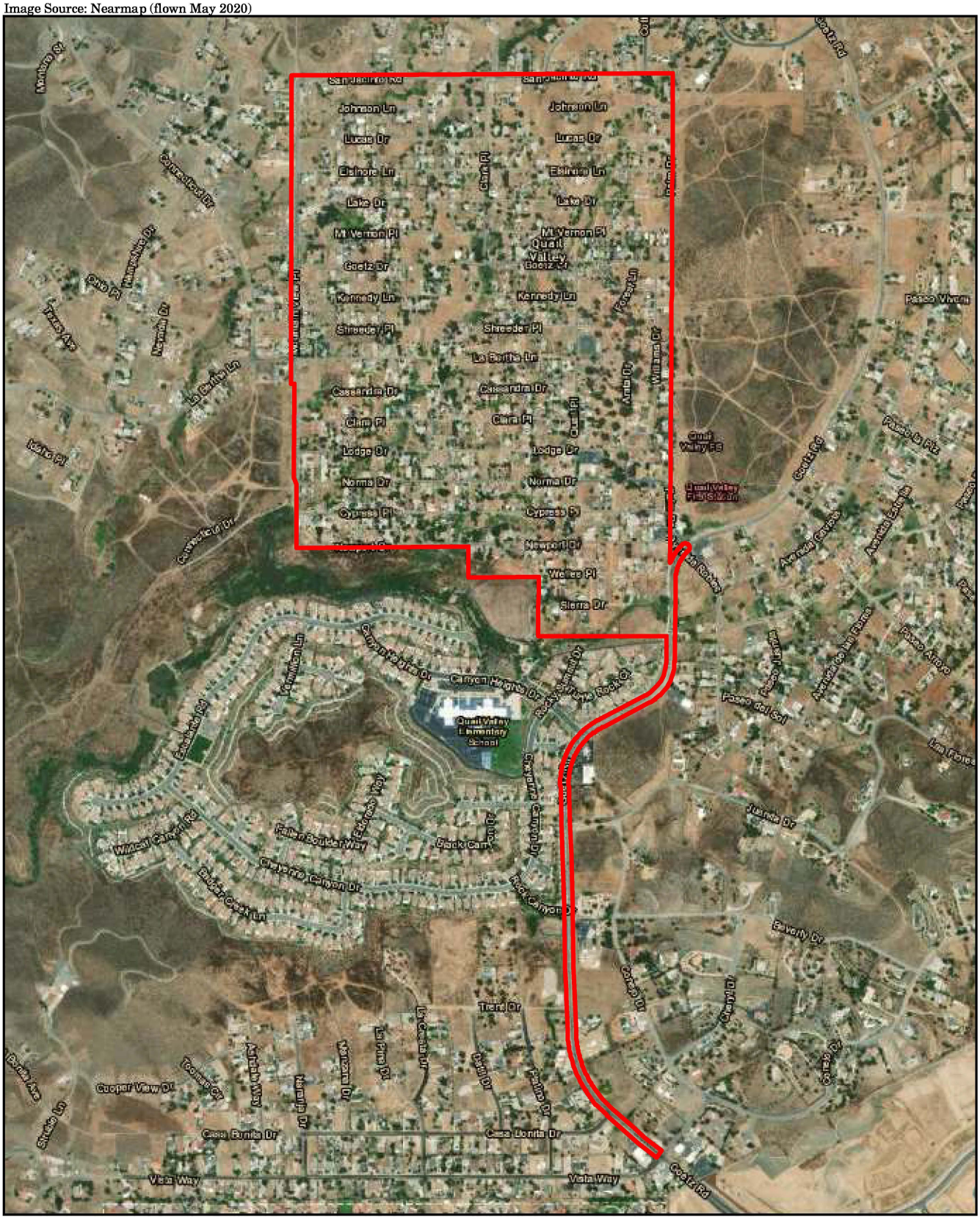

FIGURE 3
Project Location on Aerial Photograph

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2.2 General Biological Survey

RECON performed a general biological survey within the project site and a 500-foot buffer (survey area). The survey was performed on July 22, 2020, between 9:30 a.m. and 2:45 p.m., with temperatures ranging from 78.5 to 93.8 degrees Fahrenheit, winds from 0 to 6 miles per hour, and no cloud cover.

Vegetation communities were mapped in the field on a 1:2,400 scale aerial photograph of the survey area. Plant and animal species apparent at the time of the survey were recorded. Plants were visually identified in the field and wildlife species were identified visually or indirectly by identification of calls, scat, or burrows. Nomenclature in this report follows the Jepson Online Interchange (Jepson Flora Project 2020) and Rebman and Simpson (2014), for common plants, *Sunset Western Garden Book* (Brenzel 2001) for ornamental species, San Diego Natural History Museum (2002) for moths and butterflies, Crother et al. (2017) for amphibians and reptiles, Chesser et al. (2019) for birds, and Bradley et al. (2014) for mammals.

As much of the survey area occurs on private property, the survey was performed from public roadways. All roadways within the survey area were driven and/or walked, and undeveloped areas were investigated. However, some locations were not directly visible from public right-of-way due to the presence of buildings, tall hills, or large vegetation. Such areas were mapped based on aerial imagery and extrapolation from vegetation observed in adjacent accessible areas.

2.3 Western Burrowing Owl Habitat Assessment

Mr. Parker and Mr. Smisek conducted a western burrowing owl habitat assessment on July 22, 2020. The survey guidelines provided in the *Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area* (WRCRCA 2006) require biologists to walk the entire survey area. Due to the presence of private property, direct access to much of the survey area was not possible, so the habitat assessment methods were modified from the survey guidelines. Namely, habitat within the survey area was viewed from accessible rights-of-way. All accessible habitat in the survey areas was inspected, either directly or from accessible rights-of-way, habitat characteristics, dominant species, and habitat structure were noted. The biologists inspected the habitat for presence of potentially suitable burrows.

2.4 Jurisdictional Assessment

RECON wetland specialist Andrew Smisek conducted an assessment of potential jurisdictional waters and wetlands in the survey area on July 22, 2020, concurrent with the biological survey. Jurisdictional assessment methods were based on the guidelines from the U.S. Army Corps of Engineers (USACE; 1987, 2008a, 2008b) to identify potential of wetlands and/or waters under the jurisdiction of USACE, CDFW, and Regional Water

Quality Control Board (RWQCB). Due to the presence of private property, it was not possible to directly access much of the survey area. As a result, it was not possible to conduct a formal delineation according to the USACE guidelines. Areas with topography that could support wetlands or non-wetland waters were investigated, and indicators of hydrology and hydrophytic vegetation were noted during the survey. Additionally, the project location was reviewed using the USFWS National Wetland Inventory (USFWS 2020b).

Wetlands and waters are generally delineated based on the presence of the three wetland parameters: hydrophytic vegetation, hydric soils, and wetland hydrology, each of which is discussed below.

Hydrophytic Vegetation. Hydrophytic vegetation is defined as "the sum total of macrophytic plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content" (USACE 1987). The wetland indicator status of each species recorded on-site was determined by using the list of wetland plants for California provided by the USACE (Lichvar et al. 2016). The wetland indicator status of a plant can be one of the following:

> Obligate (OBL) – Plants that have a 99 percent probability of occurring in wetlands under natural conditions.
>
> Facultative-Wet (FACW) – Plants that occur in wetlands (67–99 percent probability) but are occasionally found in non-wetlands.
>
> Facultative (FAC) – Plants that are equally likely to occur in wetlands or non-wetlands (estimated probability 34–66 percent).
>
> Facultative Upland (FACU) – Plants that are most often found in upland sites (estimated probability 67 –99 percent).
>
> Upland (UPL) – Plants that almost always occur in upland sites (estimated probability greater than 99 percent).
>
> No Indicator (NI) – Plants for which insufficient data are available to determine an indicator status for the local region. These are considered upland species unless other data to support a different status are available.

Hydric Soils. A hydric soil is a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the accumulation of visible indicators of extended saturation (USACE 1987). Information on the soil types sampled in the project site is summarized from the Soil Survey for Riverside County (USDA 1971 and 2020) and the Hydric Soils of California list obtained from the Natural Resource Conservation Service (2020).

Hydrology. Wetland hydrology indicators are used to determine if inundation or saturation has occurred on a site. These indicators are features that suggest current or recent flows through an area but do not provide information about the timing, duration, or

frequency of the event. Hydrology features are generally the most ephemeral of the three wetland parameters (USACE 2008b). Hydrologic information for the site was obtained by reviewing USGS topographic maps and by directly observing hydrology indicators in the field.

2.4.1 Jurisdictional Criteria

2.4.1.1 U.S. Army Corps of Engineers

Under Section 404 of the Clean Water Act, the USACE regulates the dredging or discharge of fill material into waters of the U.S. including wetlands and non-wetland waters of the U.S. Waters of the U.S. are defined as "the territorial seas and traditional navigable waters; perennial and intermittent tributaries that contribute surface water flow to such waters; certain lakes, ponds, and impoundments of jurisdictional waters; and wetlands adjacent to other jurisdictional waters."

Potential USACE jurisdictional wetlands may include those areas that meet all three wetland parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. Potential USACE jurisdictional non-wetland waters may include vegetated or unvegetated streams, open water, and other aquatic areas with strong hydrology indicators such as the presence of an ordinary high water mark (OHWM). An OHWM is defined as:

> . . . that line on the shore established by the fluctuations of water and indicated by physical characteristics such as [a] clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (33 Code of Federal Regulations Part 328.3).

Areas delineated as non-wetland waters may lack wetland vegetation or hydric soil characteristics. Hydric soil indicators may be missing, because topographic position precludes ponding and subsequent development of hydric soils. Absence of wetland vegetation can result from frequent scouring due to rapid water flow.

2.4.1.2 California Department of Fish and Wildlife

Under Sections 1600–1607 of the California Fish and Game Code (CFGC), the CDFW regulates activities that would divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake that supports fish or wildlife. In most cases, CDFW jurisdictional areas overlap USACE jurisdictional areas; however, the CDFW also regulates native riparian vegetation associated with watercourses, regardless of USACE jurisdiction.

2.4.1.3 Regional Water Quality Control Board

The RWQCB is the regional agency responsible for protecting water quality in California. The jurisdiction of the RWQCB includes all waters of the State and all waters of the U.S. as mandated by both Section 401 of the federal Clean Water Act and the California Porter–Cologne Water Quality Control Act. State waters consist of areas that meet one of three wetland parameters (hydrology, hydric soils, or hydrophtyic vegetation), and generally include, but are not limited to, all waters under the jurisdiction of USACE and CDFW.

3.0 Existing Conditions

3.1 Site Topography

The survey area consists of a series of small hills, with elevations ranging from approximately 1,400 feet above mean sea level (amsl) in a stream in the southwest corner of the survey area, to 1,700 feet amsl in the on a hill in the eastern portion of the survey area.

There are several small drainages generally flowing northeast to southwest in low areas through the main portion of the survey area. A larger unnamed stream flows east to west just south of Subarea 4. This larger stream drains into Canyon Lake, approximately 0.8 mile to the southwest.

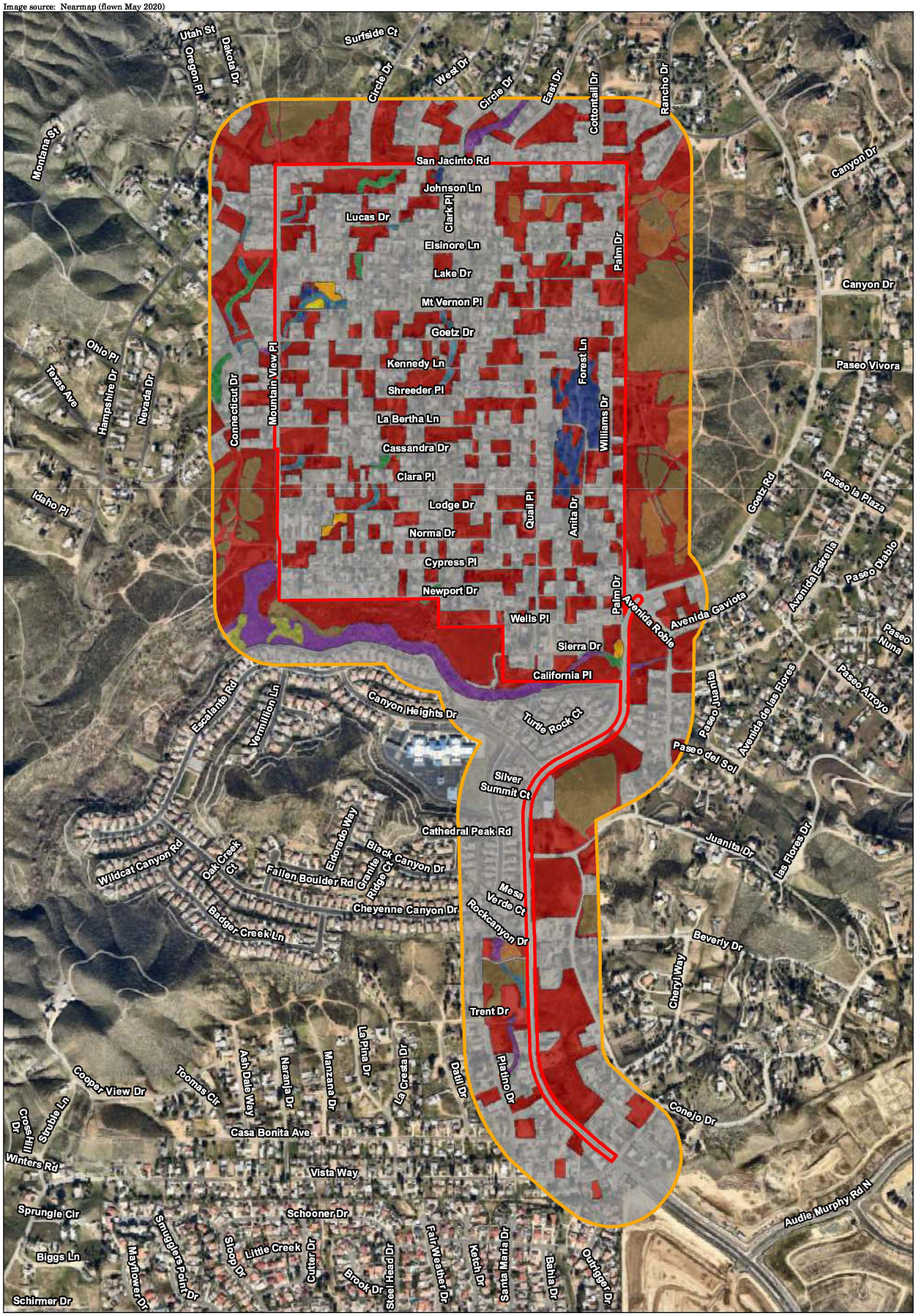
3.2 Botanical Resources

The survey area supports 10 vegetation communities and land cover types: southern riparian scrub, southern riparian woodland, disturbed wetland, non-native riparian, native grassland, Riversidean sage scrub (including disturbed), disturbed habitat, eucalyptus woodland, non-native vegetation, and developed land (Table 1 and Figure 4). A total of 56 plant species were identified within the survey area, including 21 (38 percent) native species and 35 (63 percent) non-native species (Attachment 1). Sensitive plant species are discussed in Section 4.3.

Table 1
Vegetation Communities within the Survey Area
(acres)

Vegetation Community	Project Site	Survey Buffer	Total Survey Area
Southern riparian scrub	0.41	10.14	10.55
Southern riparian woodland	-	1.31	1.31
Disturbed wetland	2.21	1.10	3.31
Non-native riparian	1.27	1.16	2.43
Native grassland	0.20	-	0.20
Riversidean sage scrub	0.80	35.73	36.53
Disturbed habitat	69.45	91.88	161.33
Eucalyptus woodland	5.40	-	5.40
Non-native vegetation	0.98	-	0.98
Developed land	148.74	122.17	270.91
Total	**229.46**	**263.49**	**492.95**

Image source: Nearmap (flown May 2020)



Project Boundary
Survey Area

Vegetation Communities

DEV - Developed
DH - Disturbed Habitat
DW - Disturbed Wetland
EW - Eucalyptus Woodland
NG - Native Grassland
NNR - Non-Native Riparian
NNV - Non-Native Vegetation
RSS - Riversidean Sage Scrub
RSS-D - Riversidean Sange Scrub - disturbed
SRS - Southern Riprian Scrub
SRW - Southern Riparian Woodland

0 Feet 700

FIGURE 4

Vegetation Communities and Potential Habitat

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Southern riparian scrub. Southern riparian scrub is dominated by a variety of broad-leafed, winter-deciduous trees and shrubs. This plant community is typically found along drainages with frequent flooding or other disturbance that prevents succession into a larger tree-dominated woodland. The majority of the southern riparian scrub within the survey area is located along the larger stream, flowing east-west just to the south of Subarea 4 (see Figure 4). The western stretch of this southern riparian scrub, beginning north of Escalante Road, supports a higher vegetation density, whereas the habitat to the east of this area is more open, with an Arizona crossing, a pedestrian bridge, and riprap for erosion control. One other patch of southern riparian scrub occurs along a drainage north of San Jacinto Road in the northern portion of the 500-foot survey buffer (see Figure 4). The southern riparian scrub is dominated by red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), and mule fat (*Baccharis salicifolia*), with occasional Mexican fan palm (*Washingtonia robusta*), palo verde (*Parkinsonia* sp.), and dwarf nettle (*Urtica urens*).

Southern Riparian Woodland. Southern riparian woodland is dominated by moderately larger woody riparian trees with a sparse cover by riparian shrubs and smaller trees (Oberbauer et al. 2008). It occurs along drainages, often in areas with moderate levels of flooding or scour. Within the survey area, southern riparian woodland occurs in two patches along the east-west stream just southwest of Subarea 4 (see Figure 4). It is dominated by Fremont cottonwood (*Populus fremontii*), red willow, Goodding's black willow (*Salix gooddingii*), and Mexican fan palm.

Disturbed Wetland. Disturbed wetland is a wetland vegetation community dominated by low-growing, wetland species that occur in areas that have been significantly modified by human activity. It often occurs in drainages and is generally characterized by non-native wetland species intermixed with occasional native species. Disturbed wetland occurs in numerous patches along the smaller drainages throughout the survey area (see Figure 4). Characteristic plants found in the disturbed wetland include annual beard grass (*Polypogon monspeliensis*), African umbrella plant (*Cyperus involucratus*), spike rush (*Eleocharis* sp.), Bermuda grass (*Cynodon dactylon*), and western sunflower (*Helianthus annuus*).

Non-native Riparian. Non-native riparian habitat consists of thickets of non-native invasive riparian species. It occurs in several small patches in the drainages throughout the survey area (see Figure 4). These patches are dominated by exotic species including giant reed (*Arundo donax*), tamarisk (*Tamarix* sp.), Mexican fan palm, and palo verde.

Native Grassland. Native grassland is a vegetation community dominated by perennial native grass species. There is one small area of native grassland in the survey area, consisting of a patch of salt grass (*Distichlis spicata*) located just north of Mt. Vernon Place, just outside one of the small drainages (see Figure 4).

Riversidean Sage Scrub. Riversidean sage scrub is a relatively open shrub community of soft-woody shrubs that generally reach up to 3 feet in height. It is found in dry areas in Riverside County. There are two small patches of Riversidean sage scrub on the project site and several larger patches within the 500-foot survey buffer. The two small patches in the project site are between Johnson Lane and Lucas Drive, to the east and west of a single-family residence. These patches appear to be cleared or trimmed regularly, likely for

brush management purposes, and have a total shrub cover of approximately 20 percent. The patches outside the project site, in the 500-foot survey buffer have somewhat higher shrub cover, approximately 35 percent, but are intersected by numerous well-established off-road vehicle trails. The Riversidean sage scrub is dominated by California buckwheat, with lesser amounts of brittlebush (*Encelia farinosa*), abundant non-native species, including red brome (*Bromus rubens*), Mediterranean schismus (*Schismus barbatus*), Russian thistle (*Salsola tragus*), tocalote (*Centaurea melitensis*), and long-beak filaree (*Erodium botrys*).

Disturbed Habitat. Disturbed habitat consists of areas that have been previously disturbed by human activities and no longer function as a native or naturalized vegetation community. These areas include previously graded lands such as fire breaks, off-road vehicle trails, and construction staging sites (Oberbauer et al. 2008). The disturbed habitat predominantly consists of cleared, unvegetated areas, with patches of non-native grasses and forbs. The majority of the plants found in the disturbed habitat are non-native species such as wild oats (*Avena* sp.), Mediterranean schismus, red brome, long-beak filaree, and short-pod mustard (*Hirschfeldia incana*). Native species are uncommon in the disturbed habitat, but include scattered California buckwheat, paniculate tarplant (*Deinandra paniculata*), and salt grass.

Eucalyptus Woodland. Eucalyptus woodland occurs in one large patch in an undeveloped area in the eastern portion of the survey area, as well as two small patches adjacent to existing residences. Eucalyptus woodland is dominated by exotic gum trees (*Eucalyptus* sp.). Gum trees are a non-native species that was historically planted in southern California. In some locations eucalyptus trees have become naturalized and spread into surrounding areas, often displacing native habitats.

Non-native Vegetation. Non-native vegetation is mapped in areas dominated by non-native or ornamental shrubs or trees that occur outside the limits of existing developed properties. Areas of ornamental landscaping on developed parcels are not included in this category. The most common species in the non-native vegetation is palo verde, with lesser amounts of Brazilian pepper tree (*Schinus terebinthifolius*) and Mexican fan palm. Understory elements include bull thistle (*Cirsium vulgare*), Bermuda grass (*Cynodon dactylon*), and non-native grasses.

Developed Land. Developed land within the survey area includes existing roads, sidewalks, residences and associated maintained landscaping, and commercial developments. Generally, vegetation in these areas is characterized by ornamental trees and shrubs, with occasional native or non-native species recruiting into more open areas.

3.3 Zoological Resources

Given the nature of the biological survey and lack of access to much of the survey area, the number of wildlife species detected was very low, with only eight species recorded (Attachment 2). These are largely urban-adapted species typical of disturbed areas, including common buckeye (*Junonia coenia grisea*), cabbage white butterfly (*Pieris rapae*),

American crow (*Corvus brachyrhynchos hesperis*), black phoebe (*Sayornis nigricans semiatra*), bushtit (*Psaltriparus minimus melanurus*), house finch (*Haemorhous mexicanus frontalis*), northern mockingbird (*Mimus polyglottos polyglottos*), and Botta's pocket gopher (*Thomomys bottae*). Section 4.4 addresses sensitive wildlife species and their potential to occur.

3.4 Burrowing Owl Habitat Assessment

The western burrowing owl is a CDFW species of special concern. It generally prefers open, short-grass areas with level to gentle topography and well-drained soils, including open sage scrub, desert scrub, grasslands, and disturbed and agricultural areas. These areas are also often associated with burrowing mammals. MSHCP-designated burrowing owl survey area occurs primarily in the 500-foot survey buffer, but extends a small way onto the project site in the eastern and southwestern portions of the site (Figure 5).

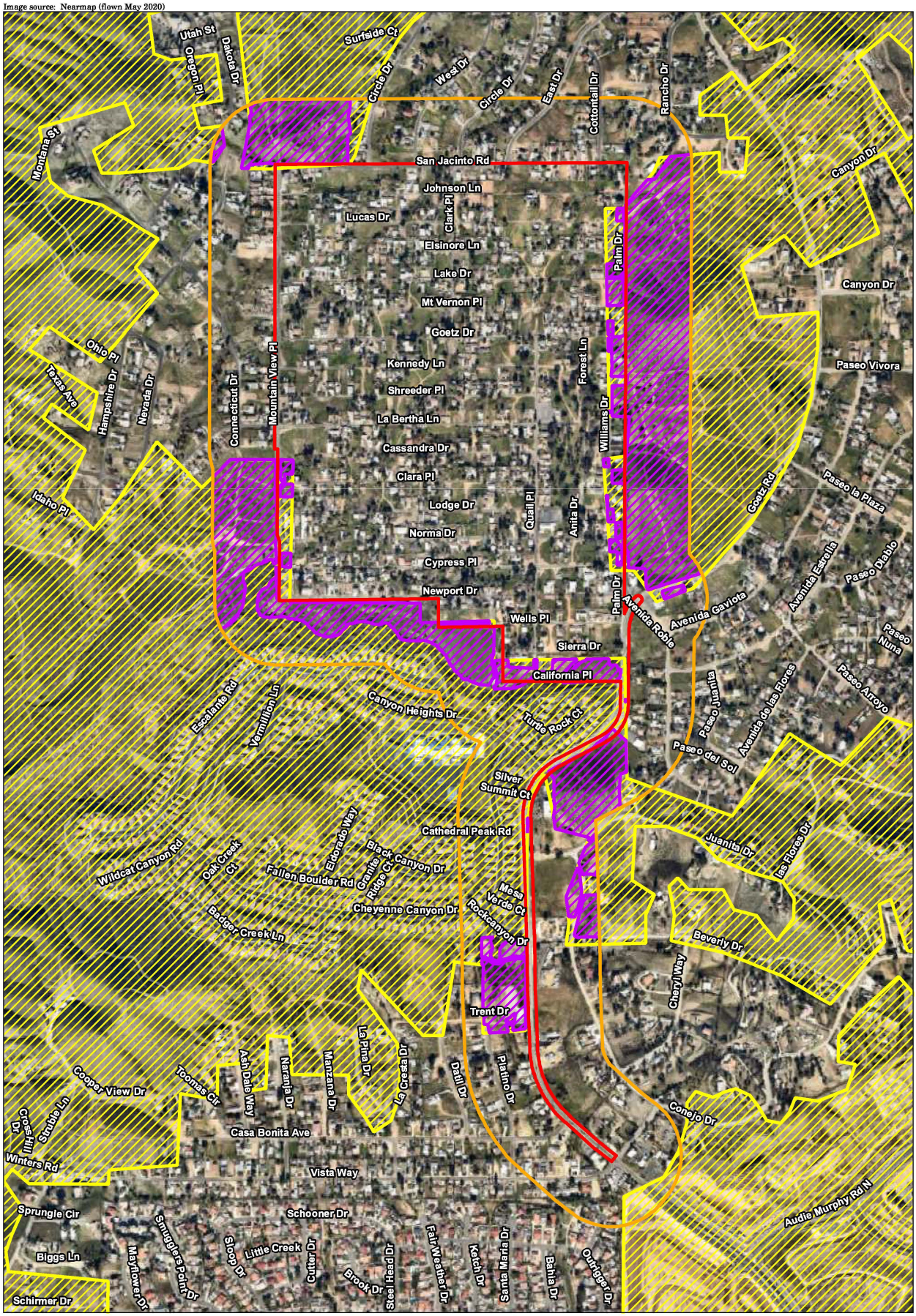
No owls, burrows, or owl sign were detected during the surveys, although suitable habitat is present. Within the MSHCP designated burrowing owl survey area, the Riversidean sage scrub and disturbed habitat would be considered suitable for western burrowing owl includes. The Riversidean sage scrub has a moderate shrub component, which reduces visibility for the owls, affecting their ability to find prey and detect predators. Although this is not ideal for western burrowing owl, the habitat in the survey area is generally somewhat open, so it is not possible to exclude it as potentially suitable. Figure 5 shows suitable habitat for western burrowing owl based on the biological survey and habitat assessment.

Although no California ground squirrels or burrows were observed during the surveys, they are expected to be present throughout the suitable habitat in the 500-foot survey buffer. Potential prey items, including insects, lizards, and small mammals are anticipated to occur. Based on the presence of suitable habitat within the MSHCP designated burrowing owl survey area, this species has moderate potential to occur.

3.5 Potential Jurisdictional Wetlands/Waters

The survey area supports a series of small swales and drainages, generally flowing from the northeast to southwest as these features cross through the northern portion of the survey area (Figure 6). These features drain into a stream channel and riparian corridor that occurs along the northern boundary of a large housing development south and east of the survey area (see Figure 6). This stream channel continues southwest out of the survey area to drain into nearby Canyon Lake. In the southern portion of the survey area, drainage and swale features occur on the east and west side of Goetz Road, generally flowing south out of the survey area and draining into the eastern bay of Canyon Lake.

Image source: Nearmap (flown May 2020)



Project Boundary
Survey Area
MSHCP Burrowing Owl Survey Area
Burrowing Owl Suitable Habitat

Burrowing Owl Habitat Assessment

0 Feet 700

*Note: The suitable habitat shown is limited to portions of the survey area that are within the MSHCP burrowing owl survey area.

FIGURE 5
Western Burrowing Owl
Habitat Assessment

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Image source: Nearmap (flown May 2020)

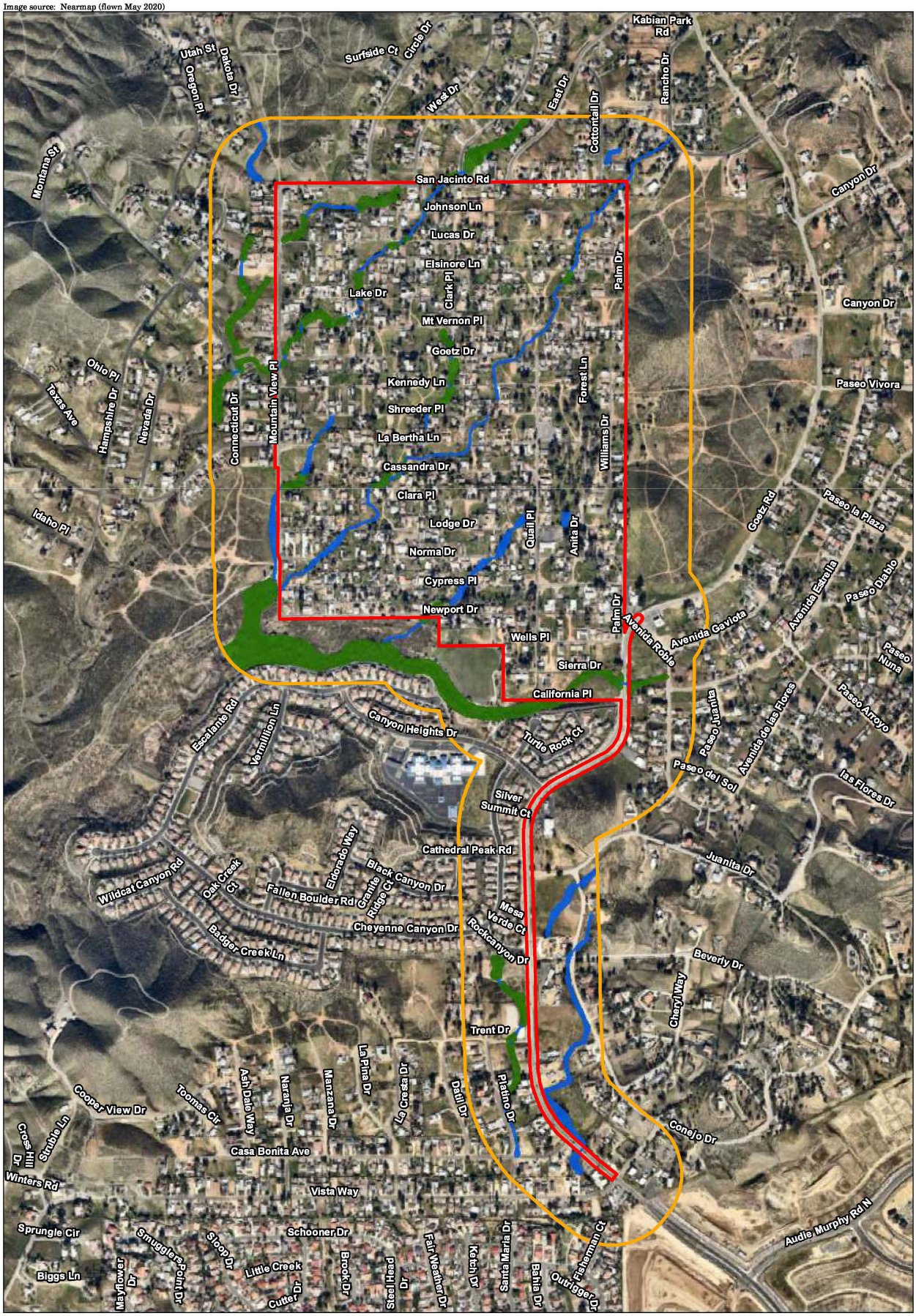

FIGURE 6

Potential Jurisdictional Resources

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Within the survey area, the drainage and swale features exhibit hydrology indicators, including signs of sediment and drift deposits and the presence of a bed and bank. The width and depth of features vary greatly and show signs of disturbance and/or modification as they weave between developed and undeveloped land. Culverts occur where the larger drainages cross roads. However, the majority of crossings occur without a culvert as water appears to flow directly over the road surface.

Most portions of the drainage and swale features are either unvegetated or contain sparsely vegetated disturbed habitat and may be considered jurisdictional as non-wetland waters of the U.S./State (see Figure 6). However, hydrophytic vegetation has developed in some portions in the form of southern riparian scrub, southern riparian woodland, disturbed wetland, and non-native riparian as described above. With the presence of hydrophytic vegetation and hydrology, these areas may be considered jurisdictional as wetland waters of the U.S./State (see Figure 6).

4.0 Sensitive Biological Resources

4.1 Sensitivity Criteria/Regulatory Setting

For purposes of this report, species will be considered sensitive if they are (1) listed or proposed to be listed by state or federal agencies as threatened or endangered; (2) on California Rare Plant Rank (CRPR) 1B (considered endangered throughout its range), CRPR 2 (considered endangered in California but more common elsewhere), CRPR 3 (more information about the plant's distribution and rarity needed), or CRPR 4 (plants of limited distribution) of the CNPS Inventory of Rare and Endangered Vascular Plants of California (2020); or (3) considered rare, endangered, or threatened by CDFW (CDFW 2020a–c).

4.1.1 State Regulations

Under Section 3503 of the CFGC, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. CFGC Section 3503.5 prohibits take, possession, or destruction of any birds in the orders Falconiformes (raptors) or Strigiformes (owls) or of their nests and eggs.

4.1.2 Federal Regulations

The federal Migratory Bird Treaty Act of 1918 (MBTA) was established to provide protection to the breeding activities of migratory birds throughout the U.S. The MBTA protects migratory birds and their breeding activities from direct take. U.S. Department of the Interior Memorandum M-37050 interpreted the federal MBTA to no longer cover incidental take of migratory birds (U.S. Department of the Interior 2017). That interpretation was rejected in federal court on August 11, 2020, a federal district court decision rejected that interpretation.

4.1.3 County Regulations

The project site is located within the boundaries of the Western Riverside MSHCP (WRCRCA 2003). The MSHCP allocates responsibility for assembly and management of its Conservation Areas to local, state, and federal governments, as well as private and public entities engaged in construction that may impact MSHCP covered species. As lead agency, the District is not a participant in the MSHCP; however, the project must still demonstrate it would not prevent implementation of the conservation goals and objectives of the MSHCP.

Criteria Cells. The proposed project is not located within a designated criteria cell so no mitigation for impacts to vegetation communities would be required by the MSHCP.

Riparian/Riverine Areas and Vernal Pools. Section 6.1.2 of the MSHCP addresses protection of riparian habitat, vernal pools, and the listed species dependent on them. No vernal pools were found or are expected to occur in the project site. No vernal pools were observed in the 500-foot survey buffer; however, lack of direct access to private property reduced the ability to view the entirety of the buffer. Any vernal pools that may occur in the survey buffer would lie outside the footprint of the proposed project and are not expected to be a constraint to proposed project.

There are several small patches of wetland habitat within the project site and a riparian corridor in the survey buffer to the south of Subarea 4 that may meet the definition of riparian/riverine per the MSHCP. The riparian corridor in the survey buffer has moderate potential to support least Bell's vireo or other listed species identified in Section 6.1.2 of the MSHCP. An assessment of potential for listed and sensitive species to occur in the survey area is presented in Section 4.3.

Narrow Endemic Species. Section 6.1.3 of the MSHCP identifies Narrow Endemic Plant Species survey areas, which are intended to protect species that have very limited ranges and specific habitat requirements. The survey area does not lie within a Narrow Endemic Plant Species survey area and no narrow endemic species have moderate or high potential to occur.

Urban/Wildlands Interface. Section 6.1.4 of the MSHCP addresses guidelines to address indirect effects on species and habitats occurring in natural areas adjacent to development. Specifically, it addresses drainage, toxics, lighting, noise, and invasive species in areas adjacent to designated MSHCP Conservation Areas. Although there are natural habitats within and adjacent to the survey area, no MSHCP Conservation Areas occur in the survey area, so these guidelines would not apply.

Burrowing Owl Survey Area. Portions of the project are located within the MSHCP designated burrowing owl survey area (see Figure 4), so a habitat assessment and focused surveys are anticipated to be required for this species per Section 6.3.2 of the MSHCP. These requirements are discussed in Section 5.3, below.

4.2 Sensitive Vegetation Communities

Six vegetation communities within the survey area would be considered sensitive: southern riparian scrub, southern riparian woodland, disturbed wetland, non-native riparian, native grassland, and Riversidean sage scrub (including disturbed). These sensitive vegetation communities are most abundant in the 500-foot survey buffer, but also occur in limited patches within the project site, primarily associated with drainages.

4.3 Sensitive Plants

No sensitive or narrow endemic plant species were observed within the survey area during the biological surveys. Five sensitive species have database records within approximately two miles of the project site: smooth tarplant (*Centromadia pungens* ssp. *laevis*; CRPR 1B.1), Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*; CRPR 1B.1), Parry's spineflower (*Chorizanthe parryi* var. *parryi*; CRPR 1B.1), Munz's onion (*Allium munzii*; federally endangered, state threatened, CRPR 1B.1), and thread-leaved Brodiaea (*Brodiaea filifolia*; federally endangered, state threatened, CRPR 1B.). None of these species is expected to occur in the project site due to the high level of disturbance in and a lack of suitable habitat; however, smooth tarplant has moderate potential to occur in the 500-foot survey buffer (Attachment 3).

Smooth tarplant. Smooth tarplant has no state or federal status, but is a CRPR 1B.1 species. It blooms from April through September (Munz 1974) and occurs in grasslands, open scrub habitats, and disturbed areas. The survey was performed during this species' blooming period and no individuals were detected. However, due to limited access to the surrounding 500-foot survey buffer, an exhaustive search was not possible. The database search identified a 2017 record of this species disturbed, vacant lot near the Southern California Edison Newcomb Substation approximately two miles southeast of the project site. Based on the presence of suitable habitat and the presence nearby records, smooth tarplant is considered to have moderate potential to occur in the disturbed habitat and Riversidean sage scrub both within the project site and the surrounding 500-foot survey buffer.

4.4 Sensitive Wildlife

No sensitive wildlife species were observed within the survey area. Two sensitive wildlife species, Cooper's hawk and San Diego black-tailed jackrabbit, have moderate potential to occur on the project site.

Cooper's hawk. Cooper's hawk is a CDFW watch list species and an MSHCP covered species. It has moderate potential to nest within the large stand of Eucalyptus woodland in the eastern portion of the project site. The willow and cottonwood trees in the southern riparian scrub and woodland along the east-west stream to the south of Subarea 4, in the survey buffer, also have moderate potential for Cooper's hawk nesting.

San Diego black-tailed jackrabbit. San Diego black-tailed jackrabbit is a CDFW species of special concern. It has moderate potential to occur within several of the larger patches of the disturbed habitat and other native habitats in the project site, particularly in areas adjacent to the native habitats in the surrounding 500-foot survey buffer.

Nine sensitive species were determined to have moderate potential to occur in the 500-foot survey buffer. These species are listed below and presented in Attachment 3.

Orange-throated whiptail
San Diegan tiger whiptail
Red diamond rattlesnake
Western burrowing owl
Least Bell's vireo
Coastal California gnatcatcher
California horned lark
Southern California rufous-crowned sparrow
Cooper's hawk

Orange throated-whiptail, San Diegan tiger whiptail, and Red-diamond rattlesnake. These species are CDFW species of special concern and MSHCP covered species. They may occur in the Riversidean sage scrub and riparian habitat in the areas surrounding the project site but are not expected to occur on the project site.

Western burrowing owl. The western burrowing owl is a CDFW species of special concern and MSHCP covered species. MSHCP designated burrowing owl survey areas are present in survey area. As discussed in Section 3.4, the Riversidean sage scrub and disturbed habitat in the designated burrowing owl survey area would be considered suitable for western burrowing owl (see Figure 5). This species has low potential to occur within the project site, and moderate potential to occur in the surrounding 500-foot survey buffer.

Least Bell's vireo. Least Bell's vireo is a federal and state-listed endangered species and is an MSHCP covered species. The species is exclusively found in riparian woodlands, forests, and scrubs. It requires dense canopy for foraging and a dense cover understory for nesting (Unitt 2004; USFWS 1998). The disturbed wetland and non-native riparian habitats on-site are dominated by exotic species and are highly disturbed, making them unsuitable for least Bell's vireo. The southern riparian scrub and woodland in the wide portion of the east-west stream in the southwestern portion of the 500-foot survey buffer is moderately suitable; however, the narrower portions in the south-central and southeastern portions of the survey buffer are likely too sparse and disturbed to provide suitable habitat. The small patch of southern riparian scrub in the northern portion of the survey buffer, north of San Jacinto Road and east of Circle Drive, has suitable willows, but is likely too isolated and restricted to provide suitable habitat for this species.

Coastal California gnatcatcher. Coastal California gnatcatcher is a federally listed threatened and a CDFW species of special concern. This species occurs in or near mature coastal sage scrub habitat (Atwood and Bontrager 2001), generally in areas with

lower-growing (less than 3 feet) shrub and sub-shrub species. This species' ideal host shrub is California sagebrush (*Artemisia californica*), but it may also use California buckwheat, encelia, and broom baccharis (*Baccharis sarothroides*; Unitt 2004). The Riversidean sage scrub on the project site is too limited and disturbed to provide suitable habitat; however, the habitat found on the hills in the eastern and northwestern portions of the 500-foot survey buffer is moderately suitable. This habitat has somewhat limited shrub diversity and is largely dominated by California buckwheat, with little or no California sagebrush observed in the accessible areas. The Riversidean sage scrub in the survey buffer to the west of the project site is very sparse and only marginally suitable. The patches to the east and west of Goetz Road south of Subarea 4 are likely too small to support this species.

California horned lark. California horned lark is a CDFW watch list species and a MSHCP covered species. It occurs in arid grasslands, agricultural lands, and other disturbed, sparsely vegetated areas, but is not common in chaparral (Unitt 2004). The disturbed habitat and Riversidean sage scrub on the project site are largely too fragmented and urbanized to provide suitable habitat for California horned lark. However, the Riversidean sage scrub and other open habitats in the 500-foot survey buffer likely provide moderately suitable habitat.

Southern California rufous-crowned sparrow. Southern California rufous-crowned sparrow is a CDFW watch list species and an MSHCP covered species. It is found in sage scrub, broken or burned chaparral habitats, and grasslands with scattered shrubs, and exhibits a strong preference for moderate to steep, south-facing, dry, rocky slopes with moderate percent cover of low shrubs (Unitt 2004; Collins 1999). The habitat on the project site is too urbanized and disturbed to provide suitable habitat for this species; however, the Riversidean sage scrub in the surrounding 500-foot survey buffer provides moderately suitable habitat.

4.5 Potential Jurisdictional Wetlands/Waters

As described in Section 3.5, the survey area supports drainage and swale features, portions of which contain wetland vegetation. These features have potential to be considered jurisdictional wetland or non-wetland waters of the U.S. and/or State. Jurisdictional wetlands and waters are considered sensitive resources and impacts may require permits and mitigation.

4.6 Wildlife Movement Corridors

Wildlife movement corridors are defined as areas that connect suitable wildlife habitat areas in a region otherwise fragmented by rugged terrain, changes in vegetation, or human disturbance. Natural features such as canyon drainages, ridgelines, or areas with vegetation cover provide corridors for wildlife travel. Wildlife movement corridors are important because they provide access to mates, food, and water; allow the dispersal of individuals away from high population density areas; and facilitate the exchange of genetic traits between populations (Beier and Loe 1992). Wildlife movement corridors are considered sensitive by resource and conservation agencies.

No wildlife corridors occur in the project site as it is largely developed and highly disturbed. The riparian corridor along the east-west stream south of the western portion of Subarea 4, in the survey buffer may provide moderate corridor functions; however, it is somewhat disturbed, with road crossings and stormwater control features. The Riversidean sage scrub on the hills surrounding the project site likely provides moderate to high-quality habitat for wildlife, but would not be considered a movement corridor.

5.0 Biological Constraints

The proposed sewer expansion within the project site could be constrained by sensitive biological resources. The project would be required to avoid or mitigate impacts to sensitive biological resources. Biological resources on the property that may be considered constraints include sensitive vegetation communities, plant and wildlife species, and jurisdictional wetlands and waters. For planning purposes, biological constraints are broken into three constraint levels, as follows:

Low These areas may require additional studies or focused surveys. Impacts would not require revegetation or mitigation. No or limited construction monitoring may be required.

Moderate These areas may require additional studies or focused surveys. Impacts may require revegetation and/or mitigation. Limited to moderate construction monitoring may be required.

High These areas may require additional studies or focused surveys. Resource agency permits may be required. Impacts would require restoration/ revegetation and mitigation. Full-time construction monitoring may be required.

The overall constraint level from each of these resources is shown on Figure 7.

5.1 Vegetation Communities

Sensitive Vegetation Communities. Sensitive vegetation communities within the survey area include southern riparian scrub, southern riparian woodland, non-native riparian, disturbed wetland, native grassland, and Riversidean sage scrub. Wetland vegetation communities (southern riparian scrub, southern riparian woodland, non-native riparian, and disturbed wetland) entirely overlap with the jurisdictional wetlands and constraints from these communities are discussed in Section 5.4. Impacts to native grassland and Riversidean sage scrub are not anticipated to require mitigation; however, impacted areas would need to be revegetated in-kind following construction. A biological monitor would be required during construction within or adjacent to these areas. Therefore, the constraint level from these vegetation communities would be considered **moderate**.

Image source: Nearmap (flown May 2020)

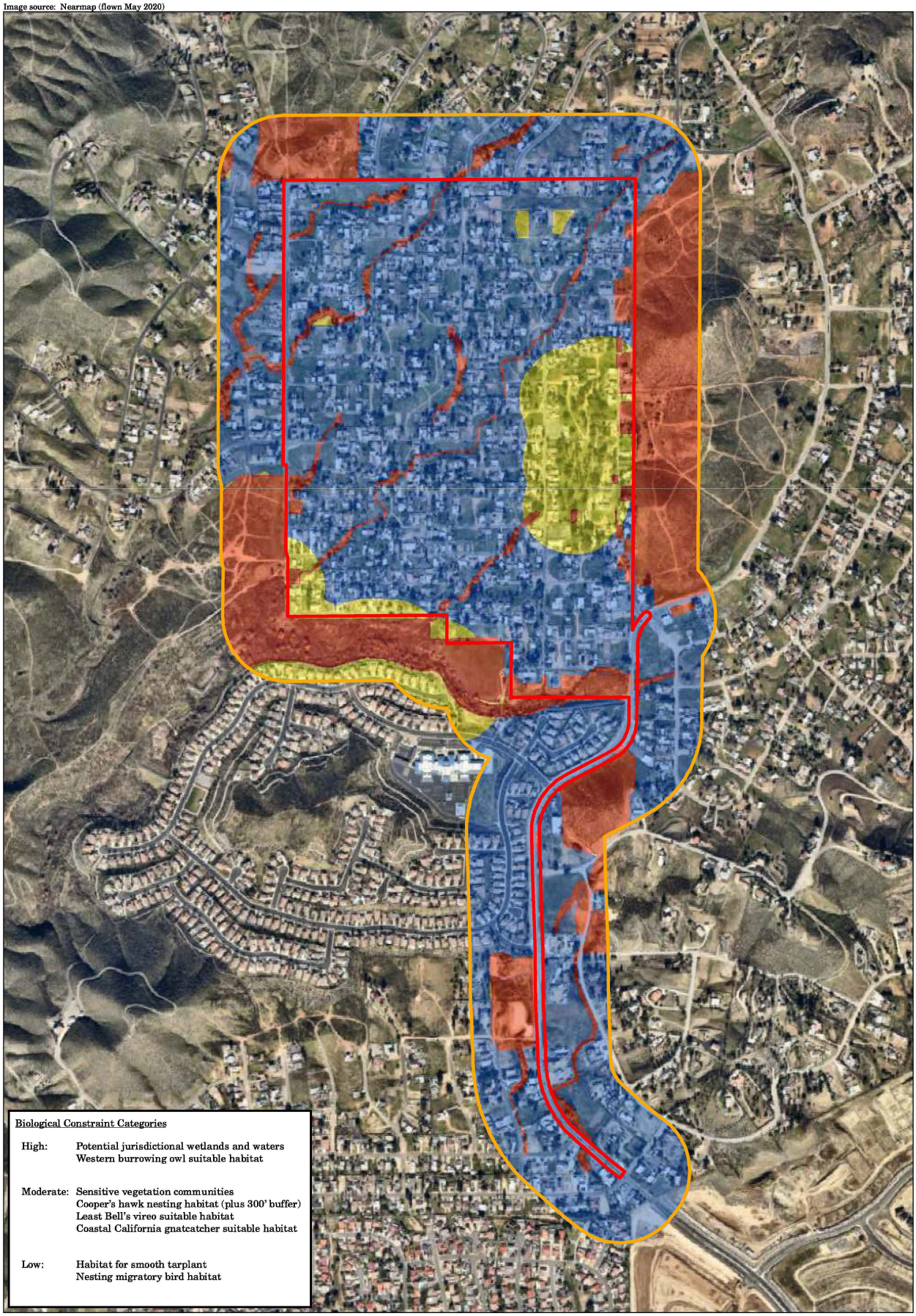

FIGURE 7
Biological Constraints

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5.2 Plant Species

One sensitive plant species, smooth tarplant, has moderate potential to occur in disturbed habitat and Riversidean sage scrub on the project site and surrounding 500-foot survey buffer. Any impacts to smooth tarplant are not expected to affect the long-term survival of the species or the local population. Therefore, potential impacts to smooth tarplant would be less than significant. Nonetheless, to reduce potential impacts to this species, topsoil should be stockpiled during construction and replaced on the regraded landscape following construction. The constraint level from smooth tarplant would be considered **low**.

5.3 Wildlife Species

San Diego black-tailed jackrabbit. San Diego black-tailed jackrabbit has moderate potential to occur on the project site and the surrounding 500-foot survey buffer. San Diego black-tailed jackrabbit is highly mobile and is expected to be capable of avoiding construction equipment. Additionally, due to its low sensitivity, any impacts are not expected to affect the long-term survival of the species or the local population. Therefore, this species is not expected to present a constraint on project implementation.

Cooper's hawk and other raptors. The eucalyptus woodland and southern riparian woodland within the survey area may provide suitable nesting habitat for Coper's hawk and other tree-nesting raptors. As no trees are anticipated to be removed by the project, direct impacts to raptor nesting are not expected occur. However, construction noise and activities have potential to cause indirect impacts on these species. Typically, avoidance and mitigation measures include timing of construction outside the breeding season (February 1 to August 31), establishment, pre-construction nest surveys, establishment of avoidance buffers for any active nests (generally 300 feet), and biological monitoring for any construction adjacent to the avoidance buffer. Based on these avoidance and mitigation requirements, the land within 300 feet of the eucalyptus woodland is given a constraint level of **moderate** (see Figure 7).

Orange throated-whiptail, San Diegan tiger whiptail, and Red-diamond rattlesnake. These species are not expected to occur in the project site, but have potential to occur in the Riversidean sage scrub and riparian habitat in the areas surrounding the project site. Project implementation is not expected to affect the long-term survival of these species or their local populations. Therefore, these species are not expected to present a constraint on project implementation.

Western burrowing owl. Western burrowing owl has potential to occur in Riversidean sage scrub and disturbed habitat in the MSHCP designated burrowing owl survey area along the outer portion of project site and in the 500-foot survey buffer (see Figure 5). Any direct impacts to this species would be significant and require mitigation. Prior to any work within the areas shown as suitable habitat on Figure 5, focused surveys and pre-construction take avoidance surveys may be required per the Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area (WRCRCA 2006). Biological construction monitoring would likely be required for any work

within or adjacent to suitable habitat. Additional avoidance measures and mitigation (potentially including capture and relocation of owls) may be required if owls are present. Based on these factors, suitable habitat for western burrowing owl is given a constraint level of **high** (see Figure 7).

Least Bell's vireo. Least Bell's vireo is not expected to occur on the project site but has moderate potential to occur in the southern riparian scrub and southern riparian woodland along the east-west stream south of the western portion of Subarea 4. As construction is not expected to occur in the survey buffer, no direct impacts to least Bell's vireo are anticipated. However, if construction occurs during the breeding season (February 1 to August 31), construction noise has potential to cause indirect impacts. These impacts would be considered significant and require mitigation. Protocol surveys may be required to determine presence or absence in the riparian habitat in the survey buffer. Typical measures to prevent noise impacts include installation of noise attenuation walls or other barriers, and noise monitoring during construction. Based on these factors, the suitable riparian habitat south of Subarea 4 is given a constraint level of **moderate** (see Figure 7).

Coastal California gnatcatcher. Coastal California gnatcatcher has no potential to occur on the project site but has moderate potential to occur in the Riversidean sage scrub in the 500-foot survey buffer to the east and northwest of the project site. As construction is not expected to occur in the survey buffer, no direct impacts to coastal California gnatcatcher are expected; however, if construction occurs during the breeding season (February 1 to August 31), construction noise has potential to cause indirect impacts. These impacts would be considered significant and require mitigation. Protocol surveys may be required to determine presence or absence of coastal California gnatcatchers in Riversidean sage scrub adjacent to any construction areas. Typical measures to prevent noise impacts include installation of noise attenuation walls or other barriers, and noise monitoring during construction. Based on these factors, all Riversidean sage scrub suitable for coastal California gnatcatcher is given a constraint level of **moderate** (see Figure 7).

California horned lark and southern California rufous-crowned sparrow. California horned lark and southern California rufous-crowned sparrow are not expected to occur on the project site but have potential to occur in the habitat within the surrounding 500 feet. Thus, no direct impacts to these species are anticipated. Indirect noise impacts may occur to these species if they are nesting in the adjacent habitat when construction occurs. However, project implementation is not expected to affect the long-term survival of these species or their local populations. Therefore, these species are not expected to present a constraint on project implementation.

General migratory birds. Migratory birds protected by CFGC Section 3503 have potential to nest throughout the survey area, including in all vegetation communities. Direct impacts to migratory or nesting birds could occur if vegetation removal occurs during the general bird breeding season (February 1 to August 31). Direct impacts to nesting migratory birds would be considered significant and require mitigation. If vegetation clearing would occur during the breeding season, a pre-construction nesting bird survey

may be required. Due to the requirement for pre-construction surveys and construction monitoring, the constraint level from general migratory birds would be considered **low**.

5.4 Potential Jurisdictional Resources

The project area supports a series of drainage and swale features, portions of which contain wetlands (southern riparian scrub, southern riparian woodland, non-native riparian, and disturbed wetland), as discussed above.

Prior to work in these areas, a formal jurisdictional wetland/waters delineation would be required. In addition, any impacts to these areas would likely require a Section 404 permit from the USACE, a Section 401 Water Quality Certification from the RWQCB, and a Section 1602 Streambed Alteration Agreement from the CDFW. The resource agencies are anticipated to require mitigation, including habitat restoration, to meet the "no net loss" requirement for wetlands and waters. In addition, a biological monitor would be required during construction within or adjacent to these areas. Therefore, all areas of potential wetlands and waters are given a constraint level of **high** (see Figure 7).

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ATTACHMENTS

ATTACHMENT 1

Plant Species Observed

Attachment 1 Plant Species Observed			
Scientific Name	Common Name	Habitat	Origin
GYMNOSPERMS			
PINACEAE	**PINE FAMILY**		
Pinus canariensis	Canary Island pine	DEV	I
Pinus halepensis	Aleppo pine	DEV	I
ANGIOSPERMS: MONOCOTS			
ARECACEAE	**PALM FAMILY**		
Phoenix canariensis	Canary Island palm	DW	I
Syagrus romanzoffiana	queen palm	DEV	I
Washingtonia robusta	Mexican fan palm	NNR, SRW, SRS, DW, NNV, DEV, EW	I
CYPERACEAE	**SEDGE FAMILY**		
Cyperus involucratus	African umbrella plant	DW	I
Eleocharis sp.	spike-rush	DW	N
POACEAE (GRAMINEAE)	**GRASS FAMILY**		
Arundo donax	giant reed	NNR	I
Avena sp.	oats	DW, DH, EW	I
Bromus diandrus	ripgut grass	DH, EW	I
Bromus rubens	red brome	DH, RSS	I
Cynodon dactylon	Bermuda grass	DW, DH, NNV	I
Distichlis spicata	salt grass	NG, DH	N
Polypogon monspeliensis	annual beard grass	DW	I
Schismus barbatus	Mediterranean schismus	RSS, DH	I
TYPHACEAE	**CATTAIL FAMILY**		
Typha sp.	cattail	DW	N
ANGIOSPERMS: DICOTS			
AMARANTHACEAE	**AMARANTH FAMILY**		
Amaranthus albus	tumbleweed	DH, EW	I
ANACARDIACEAE	**SUMAC OR CASHEW FAMILY**		
Schinus molle	Peruvian pepper tree	SRW, DEV	I
Schinus terebinthifolius	Brazilian pepper tree	NNV, DEV	I
ASTERACEAE	**SUNFLOWER FAMILY**		
Baccharis salicifolia ssp. *salicifolia*	mule fat	SRS	N
Baccharis sarothroides	broom baccharis	RSS	N
Centaurea melitensis	tocalote	RSS, DH	I
Cirsium vulgare	bull thistle	DW, NNV, DH	I
Cotula coronopifolia	brass-buttons	DW	I
Deinandra paniculata	paniculate tarplant	DH	N
Encelia farinosa	brittlebush	DH, RSS	N
Erigeron [=*Conyza*] *canadensis*	horseweed	DH	N
Eriophyllum confertiflorum var. *confertiflorum*	long-stem golden-yarrow	DH	N
Helianthus annuus	western sunflower	DW, RSS, DH	N
Heterotheca grandiflora	telegraph weed	EW	N
Lactuca serriola	prickly lettuce	DH, DW, EW	I
Oncosiphon piluliferum	stinknet, globe chamomile	DH	I
Sonchus oleraceus	common sow thistle	DH	I
Xanthium strumarium	cocklebur	DW	N

Attachment 1 Plant Species Observed			
Scientific Name	Common Name	Habitat	Origin
BRASSICACEAE (CRUCIFERAE)	**MUSTARD FAMILY**		
Hirschfeldia incana	short-pod mustard	DH, EW	I
CHENOPODIACEAE	**GOOSEFOOT FAMILY**		
Salsola tragus	Russian thistle, tumbleweed	DW, RSS, DH, EW	I
EUPHORBIACEAE	**SPURGE FAMILY**		
Croton [=*Eremocarpus*] *setiger*	turkey-mullein, dove weed	DH	N
FABACEAE (LEGUMINOSAE)	**LEGUME FAMILY**		
Acmispon americanus var. *americanus*	Spanish-clover	DH	N
Parkinsonia sp.	palo verde	SRS. DW, NNR, DH, NNV, DEV	I
GERANIACEAE	**GERANIUM FAMILY**		
Erodium botrys	long-beak filaree	RSS, DH	I
LAMIACEAE	**MINT FAMILY**		
Marrubium vulgare	horehound	DH	I
Trichostema lanceolatum	vinegar weed	DH	N
MALVACEAE	**MALLOW FAMILY**		
Malacothamnus fasciculatus	chaparral mallow	EW	N
Eucalyptus sp.	gum tree	DEV, EW	I
POLYGONACEAE	**BUCKWHEAT FAMILY**		
Eriogonum fasciculatum	California buckwheat	RSS	N
Polygonum sp.	knotweed, smartweed	DH	I
Rumex crispus	curly dock	DW, NNV	I
SALICACEAE	**WILLOW FAMILY**		
Populus fremontii ssp. *fremontii*	Fremont cottonwood	SRW	N
Salix gooddingii	Goodding's black willow	DEV, SRW	N
Salix laevigata	red willow	SRS, SRW	N
Salix lasiolepis	arroyo willow	SRS, SRW	N
SIMAROUBACEAE	**QUASSIA OR SIMAROUBA FAMILY**		
Ailanthus altissima	tree of heaven	DEV	I
TAMARICACEAE	**TAMARISK FAMILY**		
Tamarix sp.	tamarisk	DW, NNR	I
ULMACEAE	**ELM FAMILY**		
Ulmus parvifolia	Chinese elm, lacebark elm	NNR, DEV	I
URTICACEAE	**NETTLE FAMILY**		
Urtica urens	dwarf nettle	SRS	I
ZYGOPHYLLACEAE	**CALTROP FAMILY**		
Tribulus terrestris	puncture vine	DEV	I

HABITATS
DEV = Urban/developed
DH = Disturbed habitat
DW = Disturbed wetland
EW = Eucalyptus woodland
NG = Native grassland
NNR = Non-native riparian
NNV = Non-native vegetation
RSS = Riversidean sage scrub
SRS = Southern riparian scrub
SRW = southern riparian woodland

ORIGIN
N = Native to locality
I = Introduced species from outside locality

ATTACHMENT 2

Wildlife Species Observed

Attachment 2 Wildlife Species Observed			
Scientific Name	Common Name	Occupied Habitat	Evidence of Occurrence
INVERTEBRATES			
PIERIDAE	**WHITES & SULPHURS**		
Pieris rapae	cabbage white (I)	DW, DH	O
NYMPHALIDAE	**BRUSH-FOOTED BUTTERFLIES**		
Junonia coenia grisea	common buckeye	DW	O
BIRDS			
TYRANNIDAE	**TYRANT FLYCATCHERS**		
Sayornis nigricans semiatra	black phoebe	DEV, DH	V, O
CORVIDAE	**CROWS, JAYS, & MAGPIES**		
Corvus brachyrhynchos hesperis	American crow	O	V, O
AEGITHALIDAE	**BUSHTIT**		
Psaltriparus minimus melanurus	bushtit	NNV, RSS	V
MIMIDAE	**MOCKINGBIRDS & THRASHERS**		
Mimus polyglottos polyglottos	northern mockingbird	DH	V
FRINGILLIDAE	**FINCHES**		
Haemorhous mexicanus frontalis	house finch	DH	V
MAMMALS			
GEOMYIDAE	**POCKET GOPHERS**		
Thomomys bottae	Botta's pocket gopher	DH	B

(I) = Introduced species

HABITATS
DEV = Urban/developed
DH = Disturbed habitat
DW = Disturbed wetland
NNV = Non-native vegetation
RSS = Riversidean sage scrub

EVIDENCE OF OCCURRENCE
B = Burrow
O = Observed
V = Vocalization

ATTACHMENT 3

Sensitive Plant and Wildlife Species with Potential to Occur

Attachment 3 Sensitive Plant and Wildlife Species with Potential to Occur					
Species' Common Name/ Scientific Name	Listing Status	Habitat Preference/ Requirements	Detected On-Site?	Potential to Occur On-Site	Basis for Determination of Occurrence Potential
PLANTS – ANGIOSPERMS: DICOTS					
ASTERACEAE SUNFLOWER FAMILY					
Smooth Tarplant *Centromadia pungens* ssp. *laevis*	CNPS Rank 1B.1	Annual herb; chenopod scrub, meadow and seeps, playas, riparian woodland, valley and foothill grasslands; alkaline soils; blooms April–September; elevation less than 2,100 feet. California endemic. Known from San Diego, Riverside, and San Bernardino counties.	No	Low on project site; moderate in survey buffer	No individuals were detected during the biological survey, which was conducted during this species' blooming period. Habitat on the project site is largely too developed to provide suitable habitat for this species. However, the habitat in the surrounding 500-foot survey buffer is suitable. There is a 2017 record of this species in a vacant lot approximately 2 miles to the southeast (CDFW 2020a).
REPTILES					
TEIIDAE WHIPTAIL LIZARDS					
Orange-throated whiptail *Aspidoscelis hyperythra*	CSC, MSHCP	Chaparral, coastal sage scrub with coarse sandy soils and scattered brush.	No	Low on project site, moderate in survey buffer	The habitat on the project site is largely too developed to support this species; however, suitable Riversidean sage scrub occurs through much of the surrounding 500-foot survey buffer. There are numerous database records of this species within 2 miles of the project site (CDFW 2020a).

Attachment 3 Sensitive Plant and Wildlife Species with Potential to Occur					
Species' Common Name/ Scientific Name	Listing Status	Habitat Preference/ Requirements	Detected On-Site?	Potential to Occur On-Site	Basis for Determination of Occurrence Potential
Coastal whiptail *Aspidoscelis tigris stejnegeri*	CSC MSHCP	Coastal sage scrub, chaparral, woodlands, and streamsides where plants are sparsely distributed.	No	Low on project site, moderate in survey buffer	The habitat on the project site is largely too developed to support this species; however, suitable Riversidean sage scrub and riparian areas are abundant in the surrounding 500-foot survey buffer. The nearest record of this species is from 2001 at Audie Murphy Ranch in an agricultural field adjacent to riparian habitat 2 miles to the south of the project site (CDFW 2020a).
CROTALIDAE RATTLESNAKES					
Red diamond rattlesnake *Crotalus ruber*	CSC MSHCP	Desert scrub and riparian, coastal sage scrub, open chaparral, grassland, and agricultural fields. Often found in association with large rocky outcrops.	No	Low on project site, moderate in survey buffer	The Riversidean sage scrub habitat on the project site lacks rocky outcrops and is largely too disturbed to support this species; however the habitat in the surrounding 500-foot survey buffer could provide suitable habitat. The nearest record of this species is from 2001 at Audie Murphy Ranch, in an agricultural field 2 miles to the south of the project site (CDFW 2020a).

Attachment 3 Sensitive Plant and Wildlife Species with Potential to Occur					
Species' Common Name/ Scientific Name	Listing Status	Habitat Preference/ Requirements	Detected On-Site?	Potential to Occur On-Site	Basis for Determination of Occurrence Potential
BIRDS (Nomenclature from Chesser et al. 2019 and Unitt 2004)					
ACCIPITRIDAE HAWKS, KITES, & EAGLES					
Cooper's hawk (nesting) *Accipiter cooperii*	WL MSHCP	Mature forest, open woodlands, wood edges, river groves. Parks and residential areas.	No	Moderate	This species has moderate potential to nest within the patches of eucalyptus woodland on the project site. Patches of southern riparian woodland and southern riparian scrub are only marginally suitable.
STRIGIDAE TYPICAL OWLS					
Western burrowing owl (burrow sites) *Athene cunicularia hypugaea*	CSC MSHCP	Grassland, agricultural land, coastal dunes. Require rodent burrows. Declining resident.	No	Low on project site, moderate in survey buffer	No owls, suitable burrows, or owl sign were detected during the biological survey; however focused surveys have not been conducted. The habitat in the project site is largely too disturbed and developed to support this species, but the disturbed habitat and Riversidean sage scrub in the survey buffer is moderately suitable. There are several records of this species within two miles of the project site (CDFW 2020a).

Attachment 3 Sensitive Plant and Wildlife Species with Potential to Occur					
Species' Common Name/ Scientific Name	Listing Status	Habitat Preference/ Requirements	Detected On-Site?	Potential to Occur On-Site	Basis for Determination of Occurrence Potential
VIREONIDAE VIREOS					
Least Bell's vireo (nesting) *Vireo bellii pusillus*	FE CE MSHCP	Willow riparian woodlands. Summer resident.	No	Not expected on project site, moderate in survey buffer	The riparian habitat on the project site is too limited and sparse to support this species, but the habitat along the east-west drainage to the south of Subarea 4 is more suitable. There are several records of this species in riparian habitat on the San Jacinto River and at Canyon Lake, within 1 to 2 miles of the project site (CDFW 2020a).
ALAUDIDAE LARKS					
California horned lark *Eremophila alpestris actia*	WL MSHCP	Sandy shores, mesas, disturbed areas, grasslands, agricultural lands, sparse creosote bush scrub.	No	Low on project site, moderate in survey buffer	The habitat in the project site is largely too developed to support this species; however, the surrounding 500-foot survey buffer may be moderately suitable. The nearest records of this species are from 2000 in non-native grassland 1.25 southeast of the project site and from 2001 in a agricultural area at Audie Murphy Ranch 2 miles to the south of the project site (CDFW 2020a).

Attachment 3 Sensitive Plant and Wildlife Species with Potential to Occur					
Species' Common Name/ Scientific Name	Listing Status	Habitat Preference/ Requirements	Detected On-Site?	Potential to Occur On-Site	Basis for Determination of Occurrence Potential
POLIOPTILIDAE GNATCATCHERS					
Coastal California gnatcatcher *Polioptila californica californica*	FT CSC MSHCP	Coastal sage scrub, maritime succulent scrub. Resident.	No	Low on project site, moderate in survey buffer	The habitat on the project site is highly disturbed and unsuitable for this species. The Riversidean sage scrub in the surrounding 500-foot survey buffer lacks plant diversity and is dominated by California buckwheat with little to no California sagebrush present. Thus, it is only moderately suitable. There are numerous records of this species in Riversidean sage scrub within two miles of the project site (CDFW 2020a).
PASSERELLIDAE NEW WORLD PASSERINES					
Southern California rufous-crowned sparrow *Aimophila ruficeps canescens*	WL MSHCP	Coastal sage scrub, chaparral, grassland. Resident.	No	Low on project site, moderate in survey buffer	The habitat on the project site is highly disturbed and unsuitable for this species, but the he Riversidean sage scrub in the surrounding 500-foot survey could provide suitable habitat. There are numerous records of this species in Riversidean sage scrub within two miles of the project site (CDFW 2020a).

Attachment 3 Sensitive Plant and Wildlife Species with Potential to Occur					
Species' Common Name/ Scientific Name	Listing Status	Habitat Preference/ Requirements	Detected On-Site?	Potential to Occur On-Site	Basis for Determination of Occurrence Potential
MAMMALS (Nomenclature from Jones et al. 1997 and Hall 1981)					
LEPORIDAE **RABBITS & HARES**					
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	CSC MSHCP	Open areas of scrub, grasslands, agricultural fields.	No	Moderate on project site, moderate in survey buffer	Habitat on site is moderately suitable, containing open areas and patches of riparian habitat. The Riversidean sage scrub in the surrounding 500-foot survey buffer is highly suitable for this species. There are several records of this species within 2 miles of the survey area (CDFW 2020a).

STATUS CODES
FE = Listed as endangered by the federal government
FT = Listed as threatened by the federal government
CE = Listed as endangered by the state of California

Other
CSC = California Department of Fish and Wildlife species of special concern
MSHCP = Multiple Species Habitat Conservation Program
WL = California Department of Fish and Wildlife watch list species
CRPR 1B.1 = Identified by California Native Plant Society as rare, threatened, or endangered in California and elsewhere (over 80% of occurrences threatened; high degree and immediacy of threat).

APPENDIX F – SUPPLEMENTAL GEOTECHNICAL REPORT

GEOTECHNICAL EXPLORATION

QUAIL VALLEY SEWER SUB AREA 4
EASTERN MUNICIPAL WATER DISTRICT (EMWD)
QUAIL VALLEY AREA, MENIFEE AREA, RIVERSIDE COUNTY, CALIFORNIA

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Subject: Geotechnical Exploration
Quail Valley Sewer - Sub Area 4
Eastern Municipal Water District (EMWD)
Quail Valley Area, Menifee, California

In accordance with your authorization, we performed a geotechnical exploration for the subject project located in the Quail Valley Area, Menifee, California. A summary of our findings and our geotechnical recommendations for the design and construction of the proposed pipeline are provided in this report. Based on the results of our exploration and review of previous site-specific geotechnical reports, the major geologic units that exist within the site are dense older alluvial deposits and shallow metasedimentary bedrock. Groundwater was encountered in our borings at depths ranging from approximately 3 feet to 23 feet below ground surface (BGS). The major geotechnical/geologic concerns associated with the proposed sewer system design and construction are the presence of shallow groundwater and bedrock. Pertinent data from the previous site-specific geotechnical report (IFEI, 2020) are incorporated herein. As such, this report should be considered a stand-alone geotechnical report for this project and supersede previous reports prepared for this site.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to call our office.

Sincerely,
Verdantas Inc.

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Distribution: (1) Addressee (PDF copy via email)

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1.0 INTRODUCTION

1.1 Site Description

The proposed sewer system will serve the community of Quail Valley (Sub Area 4) in the City of Menifee, California (see Figure 1, Site Location Map). As shown, this Sub Area 4 will serve the entire Quail Valley community that consists of approximately 500 residential lots that currently rely on individual septic systems for wastewater disposal. The overall area is considered rural with main access through Goetz Road at the southeast corner of the site. Interior streets are generally paved with poor drainage and no sidewalks. Electric overhead power lines exist within most streets that provide service to existing residents. Site topography is relatively flat with minor rolling terrain along the edges. The overall area drains to the south where a main natural drainage exists along the southern boundary of the site and serves to carry surface water southwest to Canyon Lake.

1.2 Project Description

Based on information provided, it's understood that the project will generally involve installation of five (5) small new sewer lift stations and approximately 50,000 feet of new sewer lines that are intended to serve the existing 500 residential lots. We anticipate this pipeline to be located within existing street right-of-way (ROW) and installed at a depth of 5 to 10 feet below existing ground surface (BGS). Construction will likely require the replacement of existing pavement and aggregate base in paved streets, if any.

1.3 Purpose and Scope of Exploration

The purpose of our exploration is to (1) evaluate geotechnical engineering characteristics of the earth materials along the proposed sewer alignment, and (2) provide geotechnical recommendations for design and construction of the proposed project. As described in our proposal, the scope of our evaluation included the following tasks:

- Project Set-up/Site Coordination: Prior to our field exploration, we performed the following tasks:
  - Conducted a site reconnaissance and marked the borings at locations considered accessible and supplement previous borings.
  - Obtained encroachment permit from City of Menifee for site access.
  - Notified DigAlert at least 48 hours prior to drilling to clear the boring location of any conflict with existing underground utilities.
  - Retained a California-licensed driller to drill exploratory borings.

- Field Exploration: Our field exploration consisted of sixteen (16) hollow stem auger borings drilled along the proposed alignments to provide field data for our geotechnical evaluation.
- Geotechnical Laboratory Tests: Geotechnical laboratory tests were performed on selected soil samples collected during our field exploration. This laboratory-testing program was designed to evaluate general physical and engineering characteristics of soil along the proposed alignment.
- Engineering Analysis: Data obtained from our background review, field exploration, and geotechnical laboratory testing program was evaluated to develop geotechnical conclusions and recommendations for the proposed pipeline design and construction.
- Report Preparation: Results of this evaluation have been summarized in this report, presenting our findings and geotechnical recommendations for the proposed pipeline.

This report does not address the potential for encountering hazardous materials along this alignment. Important information about limitations of geotechnical reports, in general, is presented in Appendix D.

1.4 Field Explorations

Previous Study (IFEI, 2020): As a part of the PDR for this project, IFEI prepared performed 24 borings (B-23 and B-24 are not shown on Figure 2 since they were located further south on Goetz Road outside of the study area). The borings were drilled using a truck-mounted drill rig equipped with 8-inch diameter hollow-stem augers. Approximate locations of the borings are depicted on the Boring Location Map (*Figure 2*). This study also included 4 seismic refraction lines, which are included in Appendix B.

This Study: As indicated above, our field exploration consisted of the excavation of sixteen (16) hollow stem auger borings (LB-25 to LB-42) in accessible areas along the proposed alignment to supplement a previous exploration performed for this site. Approximate locations of the borings are depicted on the Boring Location Map (*Figure 2*). Borings LB-36, -37, -38, and -41 were not performed due to conflict with existing underground and overhead utilities. The exploratory borings were excavated utilizing a truck-mounted drill rig using 8-inch hollow-stem flight augers. During the drilling operation, bulk and relatively undisturbed samples were obtained from the borings for laboratory testing and evaluation. Sampling of the borings was conducted by staff from our office. The collected samples were transported to our laboratory for testing. Borings were drilled in existing street shoulders, where feasible, to minimize impact on existing traffic and backfilled with native soils. The logs of borings are presented in Appendix A including those from previous explorations performed by Leighton.

1.5 Laboratory Testing

Laboratory tests were performed on representative samples to provide a basis for development of geotechnical design parameters. Selected samples were tested to determine the following parameters: in-situ moisture and density, maximum dry density and optimum moisture content, sieve analysis (gradation), sand equivalent, soluble sulfate content and chloride, pH and resistivity. The results of our laboratory testing and those performed during the previous investigation (IFEI, 2020) are presented in Appendix C.

2.0 SUMMARY OF GEOTECHNICAL FINDINGS

A summary of our findings from research of pertinent literature, site-specific field exploration, laboratory testing and engineering analysis, is discussed in this section.

2.1 Regional Geology

The site is located within a prominent natural geomorphic province in southwestern California known as the Peninsular Ranges. It is characterized by steep, elongated ranges and valleys that trend northwestward. More specifically, the site is situated within the Perris Block, an eroded mass of Cretaceous and older crystalline rock.

The Perris Block, approximately 20 miles by 50 miles in extent, is bounded by the San Jacinto Fault Zone to the northeast, the Elsinore Fault Zone to the southwest, the Cucamonga Fault Zone to the northwest, and the Temecula Basin to the southeast. The southeast boundary of the Perris block is poorly defined. The Perris Block has had a complex tectonic history, apparently undergoing relative vertical land movements of several thousand feet in response to movement on the Elsinore and San Jacinto Fault Zones. Thin sedimentary and volcanic materials locally mantle the crystalline bedrock. Alluvial and colluvial deposits fill the lower valleys.

2.2 Site Subsurface Conditions/Geology

The site is situated in an old alluvial valley formed by a tributary of the San Jacinto River. As such, site geology generally consists of very old alluvium underlain by Mesozoic age metasedimentary bedrock (see Figure 3). The soils/rock conditions within the site vary depending on location and depth. A summary these conditions is presented below. Detailed descriptions of the soils/rock materials encountered at each boring location are provided in Appendix A.

2.2.1. Artificial Fill

Although it could not be completely differentiated in our borings, artificial fill was encountered and is generally associated with existing pavement and associated subgrade soils (~upper 1 to 2 feet). The artificial fill extended to a depth of 4 to 5 feet BGS as observed in our boring LB-26. The encountered artificial fill generally consisted of silty sand with gravel generated from onsite alluvial soils. This fill is expected to possess an Expansion Index (EI) of less than 50. Where borings were drilled in existing asphalt, the measured thickness of asphaltic concrete (AC) varied from 2 inches to 9 inches. The AC appears to have been placed directly on subgrade soils at most locations.

2.2.2. Very Old Alluvium

Very old alluvial deposits were encountered in most of our borings overlying the bedrock and generally consist of dense silty sand (SM) and sandy gravel (GW-GM). More silt and clay content

(SC/CL) was observed in this alluvium along the southern portion of site close to the existing drainage (B-01, -02 and LB-26). The Expansion Index is expected range from very low to low expansion (0<EI<51).

2.2.3. Mesozoic Phyllite and Quartz-Rich Metasedimentary Rock

The Mesozoic age metasedimentary bedrock encountered was generally fissile black phyllite and highly to moderately weathered. Auger refusal was encountered in the less weathered phyllite in some areas at shallow depth. In the northern and eastern portions of the alignment the bedrock encountered was quartz-rich metasedimentary rock, and generally exhibited similar weathering characteristics to the phyllite encountered. Soils generated from this bedrock during our drilling operation generally consisted of gravelly sand to silty sand with gravel. Oversized rocks should be anticipated during excavation depending on the relative weathering and fracture patterns of the rock encountered. Soils generated from these rock units are anticipated to possess low expansion potential (EI<51).

2.3 Surface and Groundwater

No surface water was observed at the time of our field exploration. Groundwater was encountered at the time of our field exploration at five locations and was also observed at five locations at the time of the previous investigation (IFEI, 2020). Historic groundwater data recorded in EMWD well #12800 (California DWR, 2024) 2 miles SE of Qual Valley measured a depth to groundwater of 7.38 feet in April of 1995.

Table 1. Groundwater and Bedrock Depth

Boring/Location	Approx. Depth to Groundwater (feet)	Depth to Bedrock (feet)
B-02	12	20.5
B-04	15	N/A
B-05	19	N/A
B-07	19	2
B-22	10	3
LB-26	23.75	5
LB-27	13.75	5
LB-31	3.25	10
LB-32	13.25	10
LB-44	18.75	5

However, groundwater conditions can fluctuate seasonally, especially during wet weather events, and be directly impacted by other factors not observed at the time of our field explorations. As such, Contractor should be prepared to manage groundwater seepage during trench excavation, if encountered within the proposed excavation.

2.4 Regional Faulting and Fault Activity

The subject site, like the rest of Southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity is movement along the northwest-trending regional fault systems such as the Elsinore, San Jacinto, and San Andreas Fault Zones. Based on published geologic hazard maps, this site is not located within a currently designated Alquist-Priolo (AP) Earthquake Fault Zone, or a County Fault Zone. The nearest zoned faults are the Wildomar Segment of the Elsinore fault, located approximately 6.3 miles southeast of the site, and the Casa Loma Segment of the San Jacinto Fault, located approximately 13.8 miles northeast of the site (CGS, 2024).

2.5 Seismicity

As is common for virtually all of Southern California, strong ground shaking can be expected at the site during moderate to severe earthquakes in this general region. Intensity of ground shaking at a given location depends primarily upon earthquake magnitude, site distance from the source, and site response (soil type) characteristics. The seismic coefficients were calculated utilizing an interactive program on current OSHPD website using ASCE 7-16 procedures, as well as USGS Unified Hazard Maps. Based on our exploration and review, the site will be underlain by relatively dense very old alluvial materials and bedrock. As such, the site is classified as a Class C site, and the site-specific seismic coefficients are as listed in the following table:

Table 2. 2022 CBC Site Categorization and Seismic Coefficients

Parameters	Central Alignment
Site Longitude (decimal degrees)	-117.244278
Site Latitude (decimal degrees)	33.706192
Site Class Definition	**C**
Mapped Spectral Response Acceleration at 0.2s Period, S_S	1.48
Mapped Spectral Response Acceleration at 1s Period, S_1	0.54
Short Period Site Coefficient at 0.2s Period, F_a	1.20
Long Period Site Coefficient at 1s Period, F_v	1.46
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS}	1.77
Adjusted Spectral Response Acceleration at 1s Period, S_{M1}	0.79
Design Spectral Response Acceleration at 0.2s Period, S_{DS}	**1.18**
Design Spectral Response Acceleration at 1s Period, S_{D1}	**0.53**

2.6 Secondary Seismic Hazards

Secondary seismic hazards such as ground rupture, landsliding, liquefaction, and lateral spreading are discussed below.

2.6.1. Ground Rupture

As indicated above, the site is not located in any designated earthquake hazard zone per the Alquist Priolo Act or Riverside County Hazard Maps. Chance of ground rupture along the proposed alignment is considered low.

2.6.2. Dynamic Settlement / Liquefaction

The proposed pipeline is generally planned to be installed in very old alluvial deposits or metasedimentary rock. Due to the relatively dense nature of these materials, liquefaction and dynamic settlement are not considered a design concern for the project.

2.6.3. Lateral Spreading

Based on Section 2.6.2 above, lateral spreading is not considered a geologic hazard for this pipeline.

2.6.4. Landslides

Based on our site review and published geologic maps, no landslides were noted along the proposed alignment.

3.0 RECOMMENDATIONS

3.1 General

The proposed sewer system for Quail Valley (sub area 4) appears feasible from a geotechnical viewpoint. However, the main geotechnical/geologic factors that may affect the design and construction cost of the proposed system is the presence of shallow groundwater and hard rock in some areas of the site as further described below:

- Trench excavation is likely to encounter hard rock in some areas of the site, depending on the ultimate design depth of the proposed sewer. The bedrock is expected to be highly weathered and generally excavatable within the upper 5 to 10 feet BGS for most alignment. However, resistant, non-weathered core-stones should still be anticipated within this shallow depth. The rock hardness is further discussed in Section 3.2 below. In addition, for more efficient excavation, any proposed lift stations should be located in areas where deeper alluvium exist.
- Groundwater will likely be encountered within the proposed pipeline zone anticipated at some locations (i.e. LB-26 & B-04). In addition, the proposed lift stations are expected to be constructed in low areas of the site and deep excavation will likely encounter groundwater.
- The alluvium in some areas of the site (especially the southern portion near existing drainage) contain high clay content. This clayey soil will likely pose a challenge to contractor to be reused as compacted fill in trench backfill.

3.2 Earthwork Considerations

Earthwork associated with the proposed pipelines should be performed in accordance with applicable EMWD Specifications, “Standard Specifications for Public Works Construction” (Greenbook, latest edition) and the recommendations included in the text of this report.

3.2.1. General

Trench excavation should be performed in accordance with the project plans, specifications, and all applicable OSHA requirements. The contractor should be responsible for providing the "competent person" required by OSHA standards. Contractors should be advised that onsite sandy soils could make excavations particularly unsafe and hence necessary safety precautions should always be taken.

3.2.2. Excavation Characteristics

Based on the results of our exploratory borings, as well as previous explorations and seismic refraction survey, pipeline trenching within the encountered artificial fill, alluvial deposits, and highly weathered metasedimentary bedrock should generally be excavatable with conventional heavy-duty earthmoving/excavation equipment in good working conditions.

Where encountered, the less weathered rock is anticipated to be marginally to non-rippable. However, the degree of trenching difficulty shall be evaluated by the contractor based on means-and-methods or capabilities of contractor’s excavation equipment. Excavation/rippability

characteristics of underlying metasedimentary rock should be evaluated based on the borings logs and the seismic refraction lines (Appendix B). Weathered rock with less than 4,000 ft/sec is typically classified as moderate if excavated by Caterpillar D-9 dozer with a single shank (see Table 3 below). This classification is based on published information from the Caterpillar Performance Handbook (Caterpillar, 2011). Although no similar correlations are published for typical trench excavation equipment, a cut-off velocity of ±3,800 ft/sec may be used as a basis for non-rippable trenching using Cat 235 trackhoe (hydraulic excavator with rock bucket).

Table 3. Rippability Classification

Seismic P-wave Velocity	Rippability
0 to 2,000 feet/second	Easy
2,000 to 4,000 feet/second	Moderate
4,000 to 5,500 feet/second	Difficult, Possible Blasting
5,500 to 7,000 feet/second	Very Difficult, Probable Blasting
Greater than 7,000 feet/second	Blasting Generally Required

Localized high velocities (>4000 feet/second) exist within the upper 10 to 15 feet (i.e. Seismic Line S-2), which indicate the presence of less weathered bedrock. Accordingly, contractors shall make their own evaluation of rock rippability/excavation prior to submitting their bids based on the seismic P-wave velocities and geotechnical/geologic data presented in this report. Special excavation techniques such as hydraulic hammers (“breakers”), jackhammers, blasting, or other specialized equipment should be expected to excavate hard rock. Selection of an appropriate excavation equipment models should be done by an experienced earthwork contractor.

3.2.3. Pipe Subgrade

Prior to pipe installation, the subgrade should be firm, uniform, and free of standing water, loose materials and then properly compacted to provide uniform seating and support to the entire section of the pipe placed on bedding material. Oversize particles larger than 3-inches in largest dimension should be removed from the trench subgrade and replaced with compacted uniform bedding materials. Where groundwater or very moist soils are encountered or the subgrade become disturbed due to localized seepage/surface water or caused by the removal of dense core-stones, the contractor should excavate the disturbed or saturated soils to a maximum depth of 12 inches (or depth of disturbed soils/bedrock) and replace with suitable materials to provide a stable trench bottom. Crushed rock (½-inch maximum size) may be used if found necessary to stabilize bottom of trench/pit prior to placing bedding materials. It is not anticipated that placement of filter fabric separation layer will be required due to the dense nature of onsite soils.

The final subgrade surface should be level, firm, uniform, free of loose materials, and properly graded to provide uniform bearing and support to the entire section of the pipe placed on bedding material. Protruding oversize particles, larger than 3 inches in dimension, if any, should be removed from the trench bottom and replaced with compacted on-site materials. During the digging of depressions for proper sealing of the pipe joints, the pipe should rest on a prepared bottom for as near its full length as is practicable.

3.2.4. Pipe Bedding

EMWD Standard Drawing B-286B is typically referenced for design of pipe bedding and trench backfill. Bedding is generally the material supporting and surrounding the pipe to one foot above

the pipe. The type and thickness of the granular bedding placed underneath and around the pipe, if any, should be selected by the pipe designer. Bedding materials should be vibrated in-place to achieve compaction. Care should be taken to densify the bedding material below the springline of the pipe. Prior to placing the pipe bedding material, the pipe subgrade should be uniform and properly graded to provide uniform bearing and support to the entire section of the pipe placed on bedding material. Based on eth dense nature on onsite soils encountered, migration of fines from the surrounding native and/or fill soils is not expected.

3.2.5. Backfill

Prior to backfilling, pipes should be bedded in and covered with a uniform, granular material that has a Sand Equivalent (SE) of 30 or greater, and a gradation meeting requirements of the pipe manufacturer. Approved pipe bedding material may be mechanically compacted or water-densified in-place provided appropriate water evacuation is utilized. Most onsite soils are expected to be too silty/clayey to be considered for bedding material. A minimum cover of 12 inches of bedding material should be provided above the top of the pipe. As an alternative, crushed rock per EMWD Standards (SB-157) can be used as pipe bedding and pipe zone backfill. Native soils are generally considered suitable as backfill materials over the pipe bedding zone.

- No particles larger than 3 inches in largest dimension.
- Free of all organic matter, debris, or other deleterious material.
- Expansion index (EI) of 51 or less.
- Sand Equivalent greater than 15 (greater than 30 for pipe bedding).
- Contain less than 30 percent by weight retained in 3/4-inch sieve.
- Contain less than 50 percent fines (passing #200 sieve).

These materials should be placed in thin lifts moisture conditioned (or dried back) as necessary, and mechanically compacted to a minimum of 90 percent relative compaction per ASTM D 1557 or as required per EMWD standard specifications. The actual lift thickness should depend on the compaction equipment used. For hand-directed mechanical equipment such as vibratory plates or tampers, the maximum lift thickness should not exceed 4 inches. The contractor should not use jetting to compact trench backfill unless approved by EMWD and the jetting procedures and soils requirements comply with the “GreenBook”. Screening may be required along portions of the alignment if oversized materials (i.e. > 3 inches) are generated during excavation.

3.3 Bearing Capacity and Earth Pressures

3.3.1. Bearing Capacity

A net allowable bearing capacity of 2,500 pounds-per-square-foot (psf) or a modulus of subgrade reaction of 150 pounds-per-cubic-inch (pci) may be used for design of footings of appurtenant structures founded into a minimum of 2 feet of compacted fill or dense very old alluvium. A net allowable bearing capacity of 4,500 psf or a modulus of subgrade reaction of 250 pci may be used if footings are founded into dense rock. A minimum base width of 18 inches for continuous footings and a minimum bearing area of 3 square feet (1.75 ft by 1.75 ft) for pad foundations should be used. Additionally, an increase of one-third may be applied when considering short-term live loads (e.g. seismic and wind).

3.3.2. Earth Pressures

Lateral loads on thrust blocks and other appurtenant structures may be resisted by passive soil pressure and friction, in combination. An allowable passive pressure based on an equivalent fluid

pressure of 300 pounds-per-cubic-foot (pcf), not to exceed 3,500 pounds per square foot (psf) can be used if the pipe is embedded in the dense alluvium or metasedimentary rock (minimum 2 feet embedment). This equivalent fluid pressure may be doubled for isolated thrust blocks. We have not applied a factor-of-safety to these values. A soil-pipeline surface friction of 0.20 for PVC pipes may be applied.

A modulus of soil reaction (E') of 1,200 psi can be used to estimate the stiffness of the soil bedding backfill at the sides and below buried flexible pipelines, if applicable, for the purpose of evaluating deflection caused by weight of the backfill over the pipe. An E' of 1,800 psi or higher can be used where pipeline is underlain by dense metasedimentary rock.

3.4 Pipeline Design

3.4.1. Soils Parameters

Structural design of pipes requires proper evaluation of possible loads acting on the pipe, including dead and live or transient loads. Stresses and strains induced on a buried pipe depend on many factors, including the type of pipe, depth and width of trench, bedding and embedment conditions, soil density, angle of internal friction, coefficient of passive earth pressure, and coefficient of friction at the interface between the backfill and in-situ soils. We recommend the following soil parameters for the proposed pipe design:

Table 4. Soil Parameters for Pipe Design

Soil Parameters	Recommended Values
Average Compacted fill moist unit weight, (pcf)	125 to 135
Angle of internal friction of soils (degrees)	28 to 34
Soil cohesion, c (psf)	200
Sliding friction between pipe and native soils	0.20
Coefficient of friction between backfill and native soils	0.45

3.4.2. External Loads on Flexible Pipe by Soil

Structural design of pipes requires proper evaluation of possible loads acting on the pipe, including dead and live or transient loads. Stresses and strains induced on a buried flexible pipe depend on many factors. The magnitude of the load supported depends on the amount of backfill, type of soil, and pipe stiffness. The approximate dead load per unit length can be calculated from the following formula:

$W = C\gamma\ BD$, Where,

W External soil load on pipe: (pounds per foot of pipe)
C Unitless load coefficient (C = 1.5 for 6 feet deep trench, and 2.0 for 10 feet or deeper trench, assuming a trench width of 3 to 6 feet just above the pipe)
γ Total unit weight of soil above pipe (pounds-per-cubic-foot)
B Width of the trench (width just above top of the pipe, in feet)
D Pipe diameter (feet)

In addition to the load from backfill (above equation), loads due to embankments (if applicable) and other loads (live loads) should be considered.

3.5 Corrosivity Evaluation

Sulfate ions in the soil can lower soil resistivity and can be highly aggressive to Portland cement concrete by combining chemically with certain constituents of the concrete, principally tricalcium aluminate. This reaction is accompanied by expansion and eventual disruption of the concrete matrix. Potentially high sulfate content could also cause corrosion of the reinforcing steel in concrete. Table 4 below summarizes current standards for concrete exposed to sulfate-containing solutions.

Table 5. Sulfate Concentration and Sulfate Exposure

Sulfate In Water (parts-per-million)	Water-Soluble Sulfate (SO_4) in soil (percentage by weight)	Sulfate Exposure
0-150	0.00 - 0.10	Negligible
150-1,500	0.10 - 0.20	Moderate (Seawater)
1,500-10,000	0.20 - 2.00	Severe
>10,000	Over 2.00	Very Severe

The sulfate content was determined in the laboratory for representative onsite soil samples. The results indicate that the water-soluble sulfate range is considered **negligible** along the proposed alignment per Table 4 below.

Many factors can affect corrosion potential of soil including soil moisture content, resistivity, permeability and pH, as well as chloride and sulfate concentration. In general, soil resistivity, which is a measure of how easily electrical current flows through soils, is the most influential factor. Based on the findings of studies presented in ASTM STP 1013 titled “Effects of Soil Characteristics on Corrosion” (February, 1989), the approximate relationship between soil resistivity and soil corrosiveness was developed as shown in Table 5 below.

Table 6. Relationship between Soil Resistivity and Soil Corrosivity

Soil Resistivity (ohm-cm)	Classification of Soil Corrosiveness
0 to 900	Very Severely Corrosive
900 to 2,300	Severely Corrosive
2,300 to 5,000	Moderately Corrosive
5,000 to 10,000	Mildly Corrosive
10,000 to >100,000	Very Mildly Corrosive

Acidity is an important factor of soil corrosivity. The lower the pH (the more acidic the environment), the higher the soil corrosivity will be with respect to buried metallic structures and utilities. As soil pH increases above 7 (the neutral value), the soil is increasingly more alkaline and less corrosive to buried steel structures, due to protective

surface films, which form on steel in high pH environments. The pH of site soils on representative samples varies from 6.80 to 7.60 which is generally considered less active from a corrosion standpoint. Chloride and sulfate ion concentrations, and pH appear to play secondary roles in affecting corrosion potential. High chloride levels tend to reduce soil resistivity and break down otherwise protective surface deposits, which can result in corrosion of buried steel or reinforced concrete structures.

Based on minimum resistivity laboratory test results (see Table 6 below), **the onsite soil is considered very severely to severly corrosive**. Ferrous pipe can be protected by polyethylene bags, tape or coatings, di-electric fittings, concrete encasement or other means to separate the pipe from wet onsite soils. We understand that further testing and/or soil corrosivity evaluation is being performed by others and specific recommendations for corrosion protection is provided by the corrosion engineer.

Table 7. Corrosion Sample Results

Boring #	Sample Depth (ft)	Water-Soluble Sulfate Content (ppm)	Chloride Content (ppm)	pH	Minimum Resistivity (ohm-cm)
LB-28	0.0-5.0	251	60	6.90	2,800
LB-32	0.0-5.0	1070	100	7.60	570
B-02 (previous)	2.5	160	120	7.60	1,000
B-05 (previous)	9.5-10.5	72	90	6.90	920
B-13 (previous)	0.5-2.5	19	33	6.90	2,880
B-16 (previous)	4.0	42	15	7.60	3,480
B-23 (previous)	2.0-6.0	31	12	6.80	2,600

3.6 Temporary Slopes/Excavations

The contractor is responsible for all temporary slopes and trenches excavated at the site and the design of any required temporary shoring. Shoring, bracing, and benching should be performed by the contractor in accordance with the current edition of the *California Construction Safety Orders*, see:

http://www.dir.ca.gov/title8/sb4a6.html

During construction, exposed earth material conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor is responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and geotechnical consultant should be maintained to facilitate construction while providing safe excavations. Existing artificial fill and alluvial soils encountered are classified as OSHA soil Type C. Therefore,

unshored temporary cut slopes should be no steeper than 1½:1 (horizontal:vertical), for a height no-greater-than (≤) 20 feet (*California Construction Safety Orders*, Appendix B to Section 1541.1, Table B-1). Encountered bedrock may be classified as OSHA soil Type B. Therefore, unshored temporary cut slopes should be no steeper than 1:1, for a height no-greater-than (≤) 20 feet. These recommended temporary cut slopes assume a level ground surface for a distance equal to one-and-a-half (x1.5) the depth of excavation. For steeper temporary slopes, deeper excavations, and/or where sloped terrain exists within close proximity to excavation (<1.5xdepth), appropriate shoring methods or flatter slopes may be required to protect the workers in the excavation and adjacent improvements. Such methods should be implemented by the contractor and approved by the geotechnical consultant.

3.7 Temporary Shoring

3.7.1. Trench Excavation

If the sloped open cut excavation is not feasible based on requirements above and due to existing structures, excavations for the proposed pipeline should be supported by a temporary shoring system such as cross-braced hydraulic shoring, conventional shields, sheet piles, soldier piles and wood lagging. The choice should be left to the contractor's judgment since economic considerations and/or the individual contractor's construction experience may determine which method is more economical and/or appropriate. However, the contractor and shoring designer should also consider the presence of groundwater and perform additional geotechnical studies as necessary to select the proper method.

The support of all adjacent existing structures during excavation and construction (including pavements) without distress is the contractor's responsibility. In addition, it should be the contractor's responsibility to undertake a pre-construction survey with benchmarks and photographs of the adjacent properties. Shoring systems should be designed by a California licensed civil or structural engineer. As preliminary design guidelines, we present the following geotechnical parameters for shoring design. The following lateral earth pressures are recommended for temporary shoring supporting encountered alignment soils with level ground behind the shoring. Passive pressure also may be used to compute lateral soil resistance, if necessary, for sheet piles. Earth pressures provided are ultimate values and a safety factor should be applied as appropriate.

Table 8. Static Lateral Earth Pressures

Conditions[1]	Static Equivalent Fluid Weight (pcf)
Active (cantilever)	33
At-Rest (braced)	52
Passive[2]	300

1. For temporary excavations only, with level backfill, not including surcharges
2. Passive equivalent fluid pressure may be doubled for isolated soldier piles spaced at least 2½ diameters on-center. Passive resistance should not exceed 3,000 pounds-per-square-foot (psf)

Above earth pressures may also be used for the design of permanent retaining walls. Determination of appropriate design conditions (active or at-rest) depends on shoring or wall flexibility. If a rotation of more than 0.001 radian (0.06 degrees) is allowed, active pressure conditions apply; otherwise, at-rest condition governs.

Surcharge loads (dead or live) should be added to the indicated lateral earth pressures and should be applied uniformly, if such loads are within a horizontal distance that is less-than the exposed shoring height. The corresponding lateral earth pressure will approximately be 33-percent of the vertical surcharge for active conditions, and 50-percent for at-rest conditions. Surcharge pressures from concentrated loads should be evaluated after geometric constraints and loading conditions are determined on an individual basis.

3.7.2. Temporary Shafts for Trenchless Methods

If braced shoring is used for the deep shafts (i.e. soldier beams with struts), then a uniform distribution of lateral earth pressure of 24***H*** (psf) plus any surcharge loadings occurring as a result of traffic and adjacent foundations should be used. In addition, the contractor/designer should consider the presence of the groundwater in designing the shoring system to resist lateral hydrostatic pressures along the sides and the bottom of the shafts if dewatering is not allowed.

3.8 Pavement Considerations

Where applicable, the upper 8 inches of trench backfill and pavement areas should be scarified, moisture conditioned and recompacted to a minimum of 95 percent relative compaction. Aggregate base should also be compacted to 95-percent of the ASTM D1557 laboratory maximum dry density. If needed, pavement patching should at least match existing pavement section or be design based on actual R-value testing of subgrade soils during construction and appropriate Traffic Index (TI) selected by Engineer and/or City standards.

4.0 CONSTRUCTION CONSIDERATIONS

4.1 Pre-excavation Survey and Settlement Monitoring

A very important geotechnical concern is to avoid damaging any existing improvements adjacent to excavations. It is recommended that the contractor provide settlement monitoring and contingency plans when excavating near existing settlement-sensitive structures or underground utilities.

4.2 Dewatering during Open Trench Excavation

If encountered during trench excavation, groundwater control, such as dewatering, will be required to limit instability of the pipeline trench and aid in foundation construction and soil backfill. Dewatering or any other suitable method for stabilizing excavation bottom may be selected by the contractor based on actual groundwater conditions encountered and based on the contractor's chosen means-and-methods of construction. The selected method by the contractor should be able to effectively mitigate for bottom heave or stabilize subgrade soils during construction/backfilling. However, deep groundwater drawdown should be avoided, to reduce the potential for damaging adjacent structures, if applicable. Dewatering flow/volume will vary significantly based on the specific geologic conditions described in our report and actual depth and geometry of excavated trench or pit. Contractors should be responsible for estimating dewatering quantities and verify subsurface conditions prior to construction.

4.3 Additional Geotechnical Services

Recommendations are based on information available at the time our report was prepared and may change as plans are developed, or if supplemental subsurface exploration is authorized. Leighton Consulting, Inc. should review site, grading and foundation plans, when available, and comment further on geotechnical aspects of the project. Geotechnical observation and testing should be conducted during excavation and all phases of grading. Geotechnical conclusions and preliminary recommendations should be reviewed and verified by us (Leighton Consulting, Inc.) during construction, and revised accordingly if geotechnical conditions encountered vary from our findings and interpretations. Geotechnical observation and testing should be provided:

- During over-excavation of unsuitable soil,
- During compaction of all fill materials,
- During trench backfilling and compaction,
- During pavement subgrade and base and/or sub-base preparation, and
- When any unusual conditions are encountered.

5.0 LIMITATIONS

This report was necessarily based in part upon data obtained from a limited number of observances, site visits, soil samples, tests, analyses, histories of occurrences, spaced subsurface explorations and limited information on historical events and observations. Such information is necessarily incomplete. The nature of many sites is such that differing characteristics can be experienced within small distances and under various climatic conditions. Changes in subsurface conditions can and do occur over time. This exploration was performed with the understanding that the project as described in Section 1.2 of this report.

This report was prepared for Michael Baker International based on Michael Baker International' needs, directions, and requirements at the time of our investigation. This report is not authorized for use by, and is not to be relied upon by any party except Michael Baker International, and its successors and assigns as owner of the property, with whom we have contracted for the work. Use of or reliance on this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Verdantas (*formerly Leighton Consulting, Inc*.) from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Verdantas Inc.

The client is referred to Appendix D regarding important information provided by the Geoprofessional Business Association (GBA) on geotechnical engineering studies and report and their applicability.

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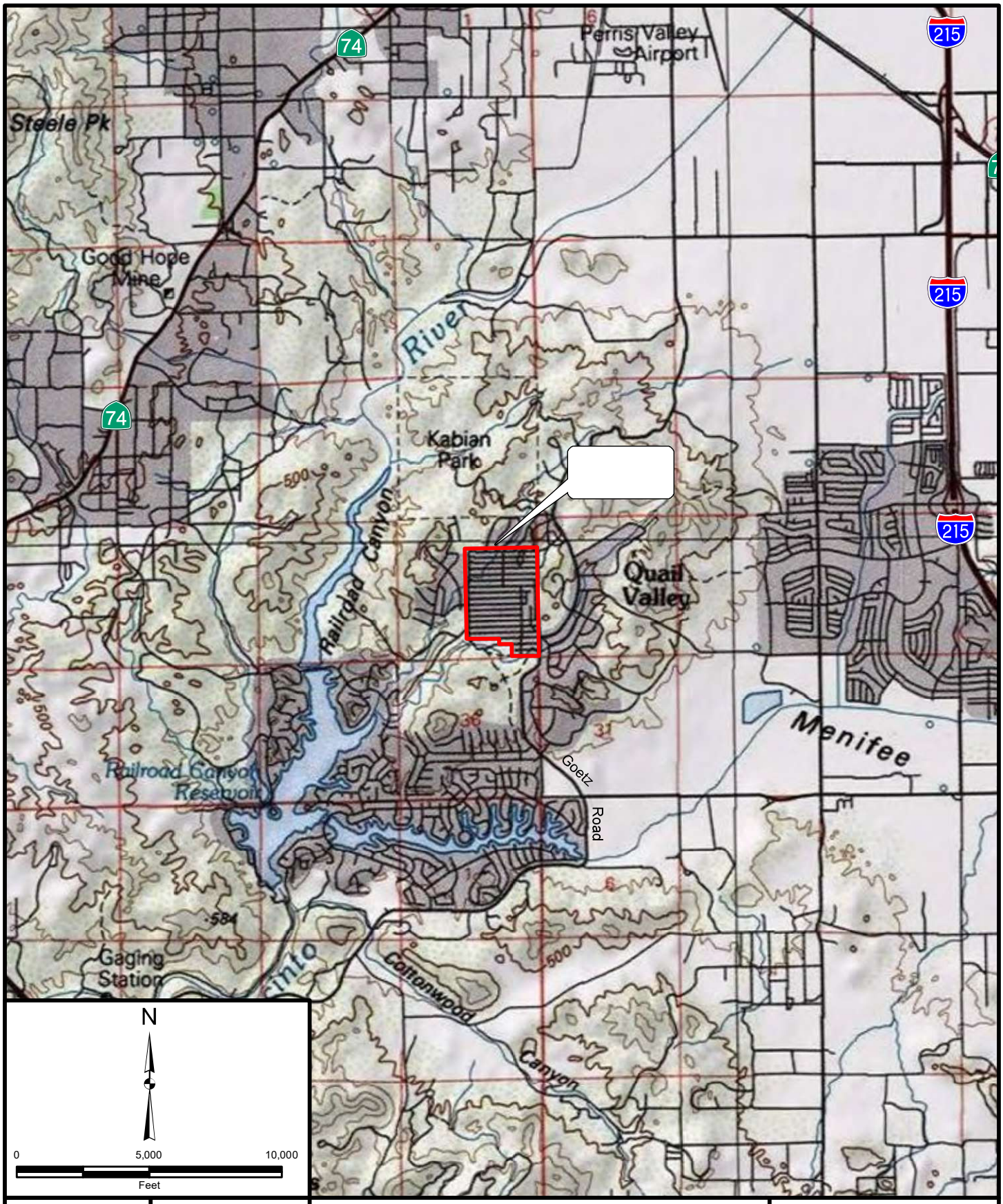

Project: 13985.001	Eng/Geol: BAA
Scale: 1 " = 5,000 '	Date: July 2024

Reference: Copyright:© 2013 National Geographic Society, i-cubed

SITE LOCATION MAP

Geotechnical Exploration
EMWD, Quail Valley Sewer Sub Area 4
Quail Valley, Menifee, California

FIGURE 1

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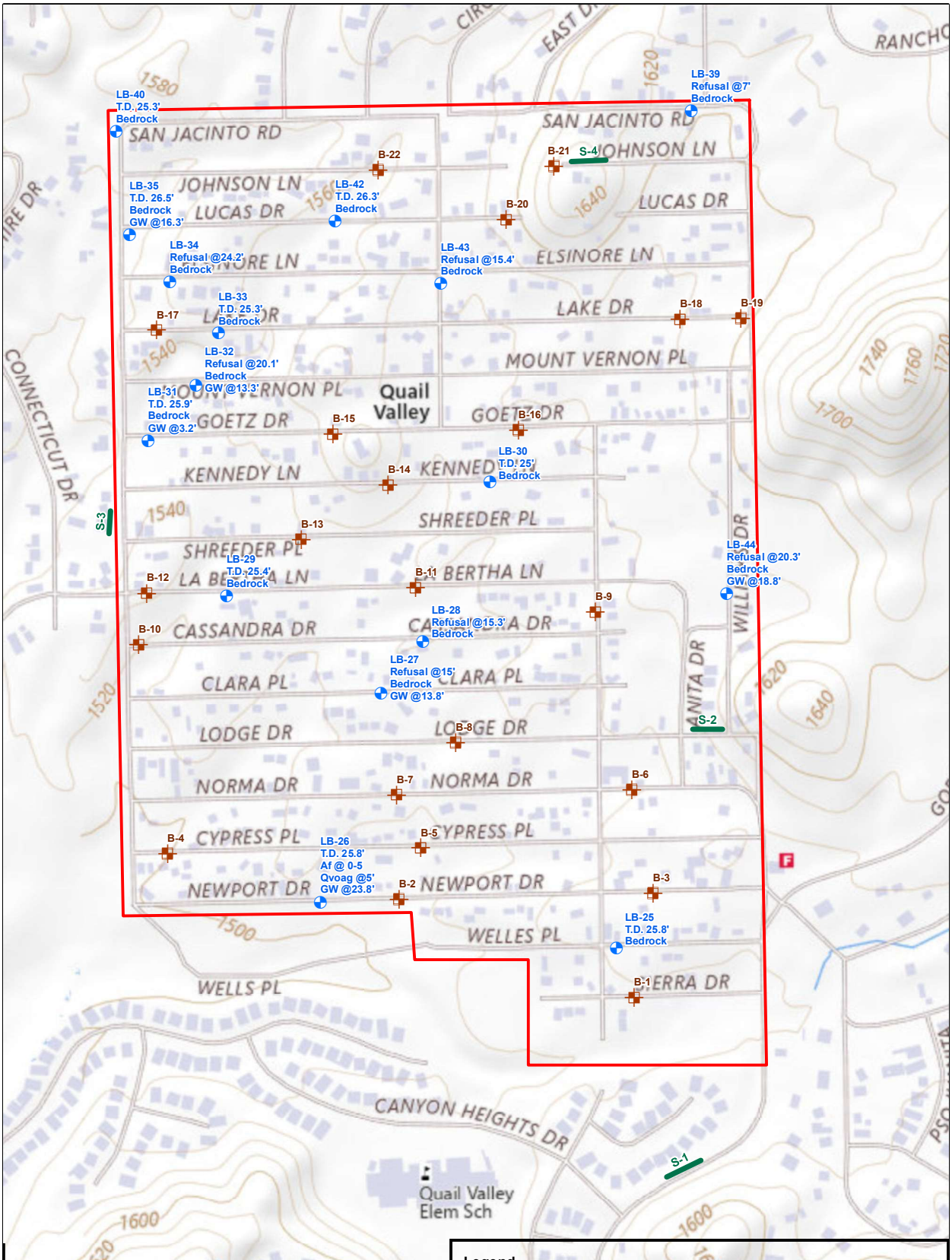
Map Saved as J:\Drafting\13985\001\GIS\13985.001_F01_SLM_2024-06-24.mxd on 7/1/2024 2:58:35 PM Author: KVM (kmanchikanti)



Legend

LB-44 Refusal @20.3' Bedrock GW @18.8' — Approximate location of boring showing total depth (T.D.), groundwater conditions and depth to bedrock in feet below existing grade (Leighton, current study)

B-22 — Approximate Boring Location (IFEI, 2020)

S-4 — Approximate Location of Seismic Refraction Traverse

Approximate Site Boundary

N

0 400 800
Feet

Notes:
1. Overburden soils (soil horizon over bedrock, where encountered) generally consist of dense older alluvium, except of LB-26 where up to 5 feet of fill were encountered.

2. Bedrock is Mesozoic Phyllite and Quartz-Rich Metasedimentary Rock as further described in report

Project: 13985.001	Eng/Geol: BAA
Scale: 1 " = 400 '	Date: July 2024

Reference: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems;

Map Layout is Portrait (8.5" x 11"). Prj: BLM. 2024-06-24.mxd on 7/26/2024 2:04:30 PM Author: KVM (kmanchikanti)

BORING LOCATION MAP

Geotechnical Exploration
EMWD, Quail Valley Sewer Sub Area 4
Quail Valley, Menifee, California

FIGURE 2

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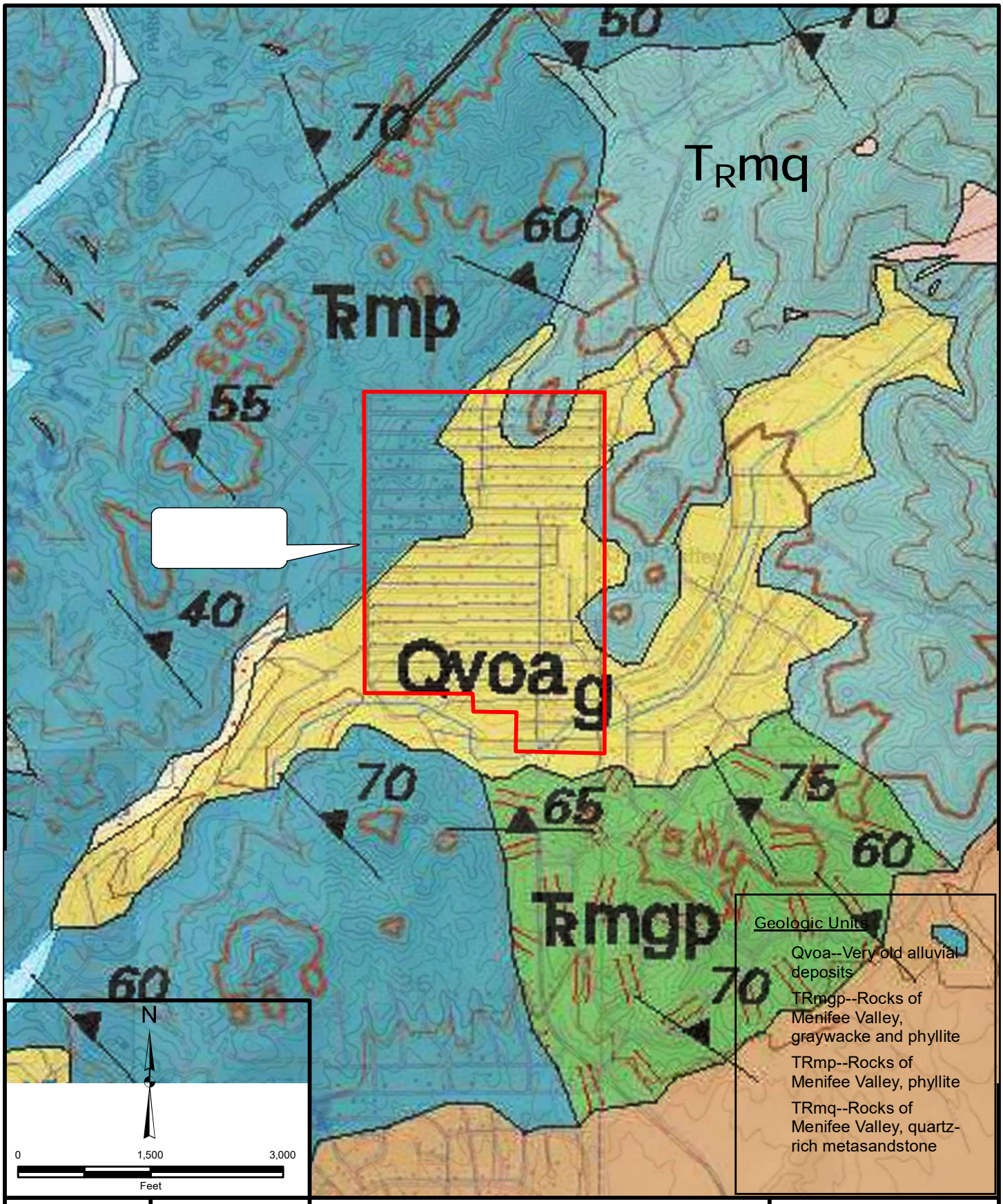

Project: 13985.001	Eng/Geol: BAA
Scale: 1 " = 1,500 '	Date: July 2024

Reference: Geologic Map of the Santa Ana and San Bernardino Quads (30'x60') by Morton & Miller, 2006.

REGIONAL GEOLOGY MAP

Geotechnical Exploration
EMWD, Quail Valley Sewer Sub Area 4
Quail Valley, Menifee, California

FIGURE 3

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Map Saved as J:\Drafting\13985\001\GIS\13985.001_F03_RGM_2024-06-24.mxd on 7/1/2024 3:23:09 PM Author: KVM (kmanchikanti)

Appendix A

Field Exploration / Logs or Exploratory Borings (This and Previous Studies)

Our field exploration consisted of a site reconnaissance and a subsurface exploration program consisting of hollow-stem auger soil borings. Approximate locations of the borings are depicted on the Boring Location Map (*Plate 1*). Encountered soils were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D 2488). Logs of these subsurface explorations, as well as a key to the classification of the soil, are included as part of this appendix.

Relatively undisturbed soil samples were obtained at selected intervals within the borings using a California ring sampler, with 2.42-inch inside diameter brass rings, driven into the soil with a 140-pound hammer free falling 30-inches in general accordance with ASTM Test Method D3550. The numbers of blows required for each 6 inches of drive penetration were noted in the field and are recorded on the boring logs. Unless otherwise indicated, the blows per foot recorded on the boring logs represent the number of blows required to drive 18 inches in 6 inch increments. In addition, disturbed bag (or bulk) samples were also obtained from soil cuttings. Types of samples obtained from each location are shown on the boring logs at corresponding depths. Our borings were backfilled with soil cuttings obtained during the drilling. Representative earth-material samples obtained from these subsurface explorations were transported to our Temecula geotechnical laboratory for evaluation and appropriate testing.

The attached subsurface exploration logs and related information depict subsurface conditions only at the locations indicated and at the particular date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

GEOTECHNICAL BORING LOG LB-25

Project No.	13985.001	**Date Drilled**	6-3-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0			B-1				GW-GM	**Very Old Alluvium**; Well graded GRAVEL w/ SILT and SAND, reddish brown to brown, fine to coarse gravel, slightly moist	
	5			R-1	35 50/4"	118	4		**Phyllite**; gray with iron staining, highly to moderately weathered, moderately fractured, very dense	
	10			R-2	50/3"	118	7			
	15			R-3	50/5"				No Recovery	
	20			S-1	50/1"				No Recovery	
	25			S-2	26 50/4"				No Recovery	
	30								Total Depth=25'10" Groundwater not encountered Backfilled with cuttings on 6/3/2024	

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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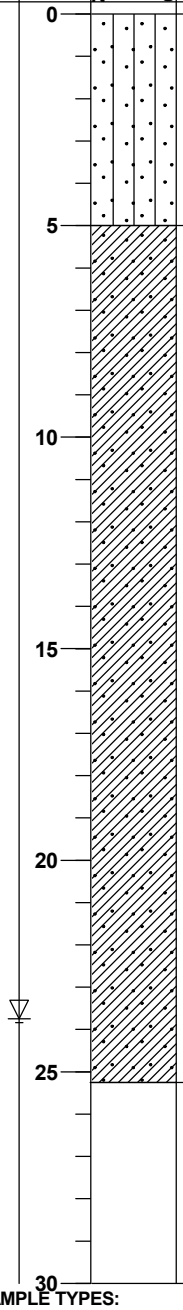
*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-26

Project No.	13985.001	**Date Drilled**	6-3-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO



Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SM	**Artificial Fill (undocumented)**; SILTY SAND with gravel, dark olive brown, fine to coarse sand, slightly moist, (-200=21% Fines), (Max density of 133 pcf @8.5% moisture), (SE=14)	SA, MD, SE
	5			R-1	28 50/5"	131	7	SC	**Very Old Alluvium**; CLAYEY SAND, red, very dense, medium to coarse sand, moist, trace medium gravel	
	10			R-2	6 19 43	123	12			-200
				B-2		124	13			
	15			R-3	13 27 50					
	20			R-4	18 60/5.5"				very moist	
	25			R-5	50/3"				No Recovery Total Depth=25'3" Groundwater encountered at 23'9" Backfilled with cuttings on 6/3/2024	
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-27

Project No.	13985.001	**Date Drilled**	6-3-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0			B-1				GW-GM	**Very Old Alluvium**; Well graded GRAVEL w/ SILT, light yellowish brown, fine to coarse gravel, moist	
	5			R-1	50/5"	124	2		**Phyllite**; light brown and gray, highly weathered, highly to moderately fractured, slightly moist, very dense	
	10			R-2	16 50/3"	107	4		moderately to slightly fractured	
	15			S-1	50/.5"				No Recovery	
									Auger Refusal at 15' .5" Groundwater encountered at 13'10" Backfilled with cuttings on 6/3/2024	
	20									
	25									
	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

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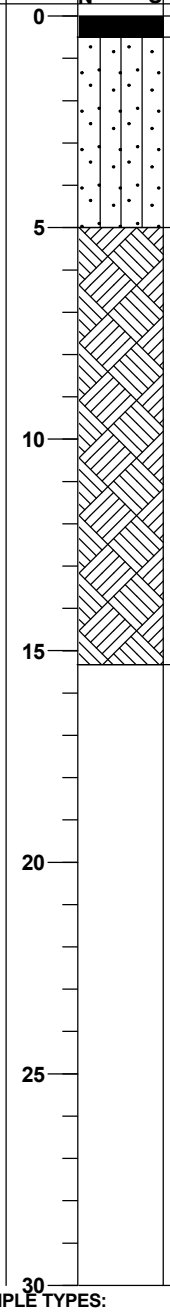
GEOTECHNICAL BORING LOG LB-28

Project No.	13985.001	**Date Drilled**	6-3-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO



Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0								4.5" of ASPHALT CONCRETE, 1.5" base	
				B-1				SM	**Very Old Alluvium**; SILTY SAND w/ gravel, yellowish brown to brown, fine to medium sand, slightly moist (Max density of 129.5 pcf @8.5% moisture)	MD, CR
	5			R-1	50/5"	117	6		**Phyllite**; yellowish brown to brown, highly to moderately weathered, highly to moderately fractured, slightly moist, very dense	
	10			R-2	50/2"				No Recovery	
	15			S-1	50/4"				No Recovery	
									Auger Refusal at 15'4" Groundwater not encountered Backfilled with cuttings and capped with SC800 coldpatch asphalt on 6/3/2024	
	20									
	25									
	30									

Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

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GEOTECHNICAL BORING LOG LB-29

Project No.	13985.001	**Date Drilled**	6-3-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0			B-1				GW-GM	**Very Old Alluvium**; Well graded GRAVEL w/ SILT, brown, fine to coarse gravel, slightly moist	
	5			R-1	50/6"	101	1		**Phyllite**; brown, moderately weathered, moderately fractured, slightly moist, very dense	
	10			R-2	50/3"					
	15			S-1	50/5"				light gray	
	20			S-2	35 36 32		10.1	CL	GRAVELLY CLAY, brown and orange, hard, fine gravel, slightly moist	
	25			S-3	50/5"				light gray, moderately weathered, moderately fractured, slightly moist, very dense	
	30								Total Depth=25'5" Groundwater not encountered Backfilled with cuttings on 6/3/2024	

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LB-30

Project No.	13985.001	**Date Drilled**	6-3-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0			B-1				GW-GM	**Very Old Alluvium**; Well graded GRAVEL w/ SILT, light brown, fine to coarse, slightly moist	
	5			R-1	11 50/2"				**Metasedimentary Rock**; brown, friable, completely weathered, highly fractured, slightly moist, very dense	
	10			R-2	50/2"					
	15			S-1	50/5"				brown to gray, highly weathered, highly fractured	
	20			S-2	50/2"				No Recovery	
	25			S-3	50/0"				No Recovery Total Depth=25' Groundwater not encountered Backfilled with cuttings on 6/3/2024	
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-31

Project No.	13985.001	**Date Drilled**	6-4-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SM	**Very Old Alluvium**; SILTY SAND w/ gravel, dark olive brown, fine to medium sand, moist, (Max density of 140 @5.5% moisture), (R-value=50)	MD, RV
	5			R-1	17 23 28	127	9		dense, fine to coarse sand, wet, trace gravel	
	10			R-2	31 50/3"	124	8		**Phyllite**; orange and black, friable, completely weathered, highly fractured, slightly moist, very dense	
	15			R-3	50/2"				No Recovery	
	20			S-1	50/3"					
	25			S-2	28 50/5"					
	30								Total Depth=25'11" Groundwater encountered at 3'2" Backfilled with cuttings on 6/4/2024	

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

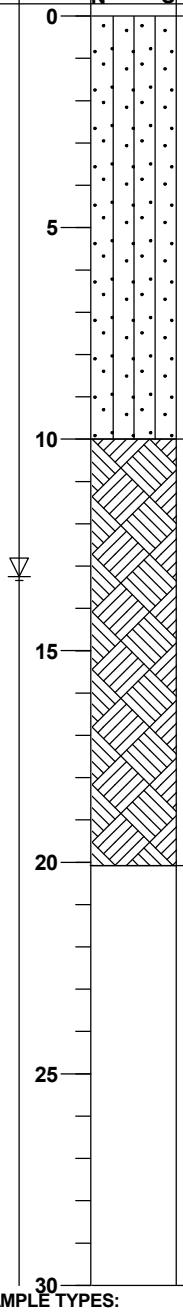
TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-32

Project No.	13985.001	**Date Drilled**	6-4-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO



Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SM	**Very Old Alluvium**; SILTY SAND w/ gravel, bluish gray, fine to medium sand, moist, (-200=43% Fines), (Max density of 123 pcf @10.5% moisture)	SA, MD, CR
	5			R-1	8 13 14	126	12		medium dense	
	10			R-2	36 50/5"	134	9		**Phyllite**; orange and black, friable, completely weathered, highly fractured	
	15			S-1	50/3"				No Recovery	
	20			S-2	50/1"				No Recovery	
	25								Auger Refusal at 20'1" Groundwater encountered at 13'3" Backfilled with cuttings on 6/4/2024	
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-33

Project No.	13985.001	**Date Drilled**	6-4-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0			B-1				SM	**Very Old Alluvium**; SILTY SAND w/ gravel, dark brown, fine to medium sand, moist	
	5			R-1	19 27 45	123	10		**Phyllite**; orange and black, friable, completely weathered, highly fractured	
	10			R-2	50/6"	109	9			
	15			S-1	50/4"		1.7		highly to moderately weathered, highly to moderately fractured	
	20			S-2	50/5.5"					
	25			S-3	50/3"				Total Depth=25'3" Groundwater not encountered Backfilled with cuttings on 6/4/2024	
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

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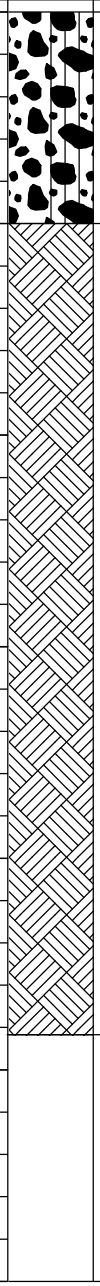
GEOTECHNICAL BORING LOG LB-34

Project No.	13985.001	**Date Drilled**	6-4-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO



Elevation Feet	Depth Feet	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0		B-1				GW-GM	**Very Old Alluvium**; Well graded GRAVEL w/ Silt, yellowish brown, fine to medium gravel, slightly moist	
	5		R-1	50/4"	92	2		**Phyllite**; orange and black, friable, completely weathered, highly fractured	
	10		S-1	25 50/5"		8.4			
	15		S-2	31 50/3"		8.4			
	20		S-3	35 50/5"					
	25		S-4	50/2"				No Recovery Auger Refusal at 24'2" Groundwater not encountered Backfilled with cuttings on 6/4/2024	
	30								

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

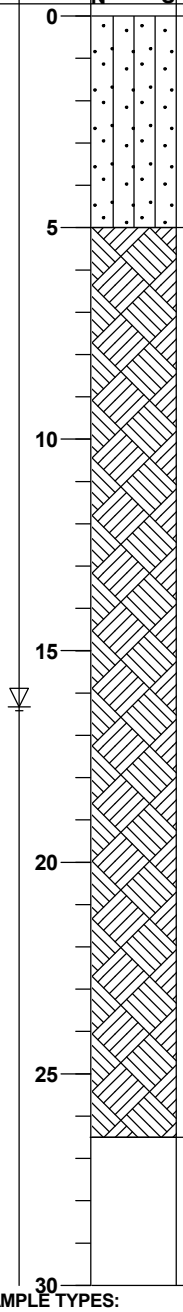
TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-35

Project No.	13985.001	**Date Drilled**	6-4-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO



Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0			B-1				SM	**Very Old Alluvium**; SILTY SAND w/ gravel, brown, fine sand, moist, (EI=13)	EI
				B-2					dark bluish gray	
	5			R-1	50/6"	112	6		**Phyllite**; orange and black, friable, completely weathered, highly fractured	
	10			R-2	50/5"	105	6			
	15			S-1	39 50/6"					
	20			S-2	39 50/3.5"					
	25			S-3	13 17 36					
									Total Depth=26'6" Groundwater encountered at 16'4" Backfilled with cuttings on 6/4/2024	
	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

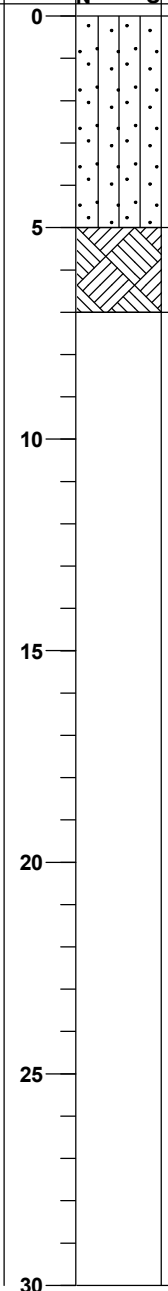
-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

verdantas

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LB-39

Project No.	13985.001	**Date Drilled**	6-5-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO



Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SM	**Very Old Alluvium**; SILTY SAND w/ gravel, reddish brown, fine to medium sand, moist brown to light brown, moist, fine to medium sand, trace coarse gravel	
	5			R-1	50/2"				**Metasedimentary Rock**; Orange, friable, highly weathered, highly to moderately fractured	
				S-1	50/0"				Auger Refusal at 7' Groundwater not encountered Backfilled with cutting on 6/5/2024	

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

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GEOTECHNICAL BORING LOG LB-40

Project No.	13985.001	**Date Drilled**	6-5-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0								**ASPHALT**; 2" asphalt, no base	
				B-1				GP-GM	**Very Old Alluvium**; Poorly graded GRAVEL w/ Silt, dark bluish gray, coarse gravel, moist	
	5			R-1	10 50/6"	113	6		**Phyllite**; Orange and black, friable, highly weathered rock, highly fractured	
	10			R-2	50/3"					
	15			R-3	50/3"				No Recovery	
	20			S-1	50/5"					
	25			S-2	50/4"				Total Depth=25'4" Groundwater not encountered Backfilled w/ cuttings and patched with cold ashpalt mix on 6/5/2024	
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

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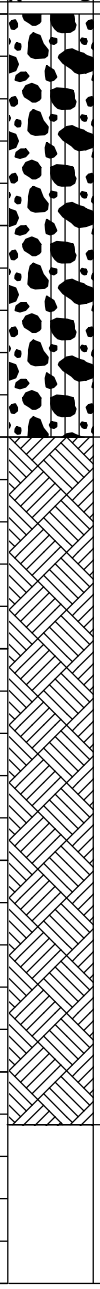
GEOTECHNICAL BORING LOG LB-42

Project No.	13985.001	**Date Drilled**	6-4-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO



Elevation Feet	Depth Feet	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0		B-1				GW-GM	**Very Old Alluvium**; Well graded GRAVEL w/ Silt, light bluish gray, fine to coarse gravel, slightly moist	
	5		R-1	50/2"				No Recovery	
	10		S-1	50/5.5"		1.8		**Metasedimentary Rock**; Orange and black, friable, completely weathered, highly fractured	
	15		S-2	50/2"				No Recovery	
	20		S-3	33 50/2"				highly weathered, highly to moderately fractured	
	25		S-4	17 38 50/3"					
	30							Total Depth=26'3" Groundwater not encountered Backfilled with cuttings on 6/4/2024	

Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

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GEOTECHNICAL BORING LOG LB-43

Project No.	13985.001	**Date Drilled**	6-4-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				ML	**Very Old Alluvium**; SILT w/ sand, yellow, moist, (-200= 54% Fines)	
	5			R-1	50/3"				**Metasedimentary Rock**; No Recovery, difficult drilling	
	10			S-1	50/3"				No Recovery, difficult drilling	
	15			S-2	50/5"				No Recovery, difficult	
									Auger Refusal at 15'5" Groundwater not encountered Backfilled with cuttings on 6/4/2024	
	20									
	25									
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

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GEOTECHNICAL BORING LOG LB-44

Project No.	13985.001	**Date Drilled**	6-5-24
Project	Quail Valley Sewer	**Logged By**	JPO
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JPO

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0			B-1				ML	**Very Old Alluvium**; SILT, brown, moist,	
	5			R-1	50/2"				**Metasedimentary Rock**; Orange and black, friable, completely weathered, highly fractured	
	10			S-1	50/2"				No Recovery	
	15			S-2	50/2"				highly weathered, highly to moderately fractured	
	20			S-3	50/3"				No Recovery Auger Refusal at 20'3" Groundwater encountered at 18' 9" Backfilled with cuttings on 6/5/2024	
	25									
	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

verdantas

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LOG OF BORING B-01

DRILLING RIG	**CME-75**	DATE DRILLED	**7/27/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**KC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (4-1/2 inches)			AU			
2	CL		**SANDY CLAY,** dark red-brown, moist, stiff.			AU			
3			**SANDY CLAY,** yellowish-brown (11YR 5/6), moist, very hard, moderately cemented.						
4	CL								
5						SS	30 50	12	123
6						AU			
7			**CLAYEY SAND,** with trace gravel, very fine- to fine, brown (7.5YR 4/2), moist, dense.						
8	SC								
9									
10						SPT AU	42 50	13	118
11			**CLAYEY SAND with GRAVEL,** very fine- to medium, dark yellowish-brown (10YR 4/4), slightly moist, very dense.						
12	SC								
13									
14			**SANDY CLAY,** dark yellowish-brown (10YR 4/4), moist, very dense.						
15						SS	36 50	16	115
16	CL								
17									
18									
19									
20			**PHYLLITE,** moderately weathered, dark yellowish-brown (10YR 4/4), slightly moist, moderately fractured, very dense.			SS	50/5"	16	115
			End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO.

A-3

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:22 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-02

DRILLING RIG	**CME-75**	DATE DRILLED	**7/27/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
			ASPHALT CONCRETE, (7-1/2 inches)						
1	SC		**CLAYEY SAND,** very fine- to fine, black, moist, medium dense, organics.			AU			
2						AU			
3	CL		**SANDY CLAY,** fine- to medium, light olive-brown, very moist, loose to medium dense.						
4									
5						AU			
6	CL		**SANDY CLAY,** yellowish-brown (10 YR 5/6), moist, stiff.			SS	7 10	17	112
7									
8									
9						AU			
10	GW-GC		**SANDY GRAVEL with CLAY,** fine- to coarse-grained, brown (7.5YR 4/2), moist to wet, very dense.			SS	37 50/3"	13	123
11									
12		▽							
13									
14	SC		**CLAYEY SAND,** fine- to medium, dark yellowish-brown (10YR 4/6), wet, very dense.						
15						SS	50/5"		
16									
17									
18									
19	SM		**SILTY SAND with GRAVEL,** fine- to medium, strong brown (7.5YR 4/6), wet, very dense.						
20									
21			**METASEDIMENTARY SANDSTONE,** moderately weathered, strong brown (7.5YR 4/6), wet, slightly fractured, very dense.			SS	38 50	12	130
			End of boring at 21 feet. Groundwater encountered at 12 feet. Backfilled with bentonite and native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-4

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:22 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-03

DRILLING RIG	**CME-75**	DATE DRILLED	**7/27/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1	SC-SM		**ASPHALT CONCRETE,** (4 inches) **SILTY, CLAYEY SAND,** very fine- to fine-grained, strong brown, slightly moist, medium dense.			AU			
2						AU			
3	SC		**CLAYEY SAND,** with trace gravel, fine- to medium, gray-brown, slightly moist, medium dense.						
4						AU			
5	GW		**GRAVEL with SAND,** with trace clay, strong brown (7.5YR 4/6), moist, dense.			SS	38 50/2"	5	136
6									
7						AU			
8	GW-GM		**SANDY GRAVEL with SILT,** fine- to coarse-grained, grayish-brown (10YR 5/2), moist, very dense.						
9									
10						SS	50/2"		
11									
12									
13									
14									
15						SS	50/3"	6	117
16									
17									
18									
19									
20						SS	26 50/3"	4	122
			End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-5

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:22 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-04

DRILLING RIG	**CME-75**	DATE DRILLED	**7/27/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**KC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1	SM		**ASPHALT CONCRETE,** (5 inches)						
2	SC		**SILTY SAND,** very fine- to fine, brown, slightly moist, medium dense.						
3			**CLAYEY SAND,** very fine- to fine, dark brown, moist, medium dense.						
4	GW-GM		**SILTY GRAVEL WITH SAND,** fine- to coarse-grained, brown (10YR 4/3), wet, dense.			AU			
5									
6						SS	27 50	7	133
7									
8									
9						AU			
10	SC		**CLAYEY SAND with GRAVEL,** fine- to coarse, dark grayish-brown (2.5Y 4/2), moist to wet, dense.			SS	50/5"		
11									
12									
13									
14									
15		▽							
16						SS	37 50	10	133
17									
18									
19									
20	GW-GC		**CLAYEY GRAVEL with SAND,** fine- to coarse-grained, light olive-brown (2.5Y 5/3), wet, very dense.			SS	50/4"	13	
			End of boring at 20.3 feet. Groundwater encountered at 15 feet. Backfilled with bentonite and native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-6

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:22 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-05

DRILLING RIG	**CME-75**	DATE DRILLED	**7/27/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1	SM		**ASPHALT CONCRETE,** (4 inches)						
			ARTIFICIAL FILL, SILTY SAND, fine- to medium, gray-brown, moist, medium dense.						
2									
3	SC		**CLAYEY SAND,** fine- to medium, dark gray-brown, moist, medium dense.						
4						AU			
5	SM		**SILTY SAND with GRAVEL,** very fine- to fine, strong-brown (10YR 4/6), moist, very dense.		X	SS	40 50	10	124
6									
7						AU			
8			**SANDY CLAY with GRAVEL,** dark yellowish-brown (10YR 4/6), moist, very dense.						
9									
10	CL				X	SS	45 50	14	123
11									
12									
13									
14	SC		**CLAYEY SAND with GRAVEL,** very fine- to fine, dark yellowish-brown (10YR 4/6), moist, very dense, moderately cemented.						
15					X	SS	33 50	15	126
16			**GRAVEL with CLAY and SAND,** dark gray-brown, moist to wet, very dense.						
17									
18	GC								
19		▽							
20					X	SS	50/5"		
			End of boring at 20 feet. Groundwater encountered at 19 feet. Backfilled with bentonite and native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-7

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-06

DRILLING RIG	**CME-75**	DATE DRILLED	**7/27/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**KC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (7 inches)			AU			
2			**SILTY SAND,** fine- to coarse, olive, slightly moist, loose to medium dense.						
3	SM								
4									
5						AU			
6			**SILTY SAND with GRAVEL,** fine- to coarse, olive (5Y 4/4), slightly moist, very dense.			SS	50/5"	4	
7									
8									
9									
10	SM					SS	50/4"	5	119
11									
12									
13									
14									
15									
16			**METASEDIMENTARY SANDSTONE,** highly to moderately weathered, dark olive-gray (5Y 3/2), moist, slightly fractured, very dense.			SS	27 50/5"	7	129
17									
18									
19									
20									
			End of boring at 20.1 feet. No groundwater encountered. Backfilled with native soils.			SS	50/1"		

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-8

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-07

DRILLING RIG	**CME-75**	DATE DRILLED	**7/27/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**KC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (7 inches)						
2	SM		**SILTY SAND with GRAVEL,** fine- to medium, light olive-brown, slightly moist, medium dense.			AU			
3			**METASEDIMENTARY SANDSTONE,** (SILTY SAND with GRAVEL), highly to slightly weathered, gray (5Y 5/1), dry to slightly moist, moderately fractured, very dense, very rocky.						
4									
5						SS	26 50/3"	2	130
6									
7									
8									
9						SS	50/1"		
10									
11	SM		- very hard drilling, slightly weathered -						
12									
13									
14						SS	50/2"		
15									
16									
17									
18									
19		▽				SS	50/2"	2	
20									
			End of boring at 20 feet. Groundwater encountered at 19 feet. Backfilled with bentonite and native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO.

A-9

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-08

DRILLING RIG	**CME-75**	DATE DRILLED	**7/28/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (4 inches)						
1	SC		**CLAYEY SAND,** fine- to medium, olive, moist, medium dense.						
2						AU			
3			**SILTY SAND with GRAVEL,** very fine- to fine, olive (5Y 4/4), moist, medium dense.						
4	SM								
5						SS	50/5"	10	112
6			**METASEDIMENTARY SANDSTONE,** moderately to slightly weathered, olive to dark olive-gray (5Y 4/4 to 5Y 3/2), slightly moist, moderately fractured, very dense, slightly to very rocky.			AU			
7									
8									
9									
10									
11						SS	50/5"	2	117
12									
13									
14									
15									
16			- very hard drilling to depth -			SS	50/3"		
17									
18									
19									
20									
						SS	50/2"	3	
			End of boring at 20.2 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area**
	Menifee, CA
PROJECT NUMBER	**E080-058**

FIGURE NO. A-10

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-09

DRILLING RIG	**CME-75**	DATE DRILLED	**7/28/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
			ASPHALT CONCRETE, (7 inches)						
1	SC		**ARTIFICIAL FILL,** CLAYEY SAND, fine- to medium, strong brown, moist, medium dense.			AU			
2			**METASEDIMENTARY SANDSTONE,** (SILTY CLAYEY GRAVEL with SAND), moderately to slightly weathered, olive (5Y4/3), slightly moist, moderately to highly fractured, very dense, very rocky.						
3									
4					☒	SS	50/5"	5	146
5									
6			- very hard drilling to depth -						
7	GC								
8									
9					☒	SS	50/5"	2	
10									
11									
12									
13									
			End of boring at 13 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area**
	Menifee, CA
PROJECT NUMBER	**E080-058**

FIGURE NO. A-11

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-10

DRILLING RIG	**CME-75**	DATE DRILLED	**7/28/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (6 inches)						
2	SC		**CLAYEY SAND,** fine- to medium, gray-brown, moist, medium dense.						
3						AU			
4			**PHYLLITE,**(CLAYEY SAND with GRAVEL), moderately to slightly weathered, dark greenish-gray (10Y 4/1)moist, moderately to highly fractured, hard.						
5									
6					☒	SS	47 50	9	120
7									
8									
9									
10					☒	SS	50/5"	4	128
11									
12	SC								
13									
14									
15									
16			- very rocky, moderately fractured -		☒	SS	25 50/1"	2	
17									
18									
19									
20					☒	SS	50/2"	3	
			End of boring at 20.2 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-12

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-11

DRILLING RIG	**CME-75**	DATE DRILLED	**7/28/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (7 inches)						
2	SC		**ARTIFICIAL FILL,** CLAYEY SAND, very fine- to fine, dark brown, moist, medium dense.			AU			
3			**PHYLLITE,** (CLAYEY SAND with GRAVEL), moderately to slightly weathered, dark olive-brown (2.5Y 3/3), slightly moist, moderately fractured, very dense.						
4									
5			- very hard drilling to 7 feet, slightly weathered -		☒	SS	16 50/3"	1	
6									
7									
8									
9									
10					☒	SS	50/5"	1	
11	SC		- very rocky -						
12									
13									
14					☒	SS	50/4"	3	125
15									
16			- very rocky - - easy drilling to depth -						
17									
18									
19					☒	SS	50/2"		
20									
			End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-13

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-12

DRILLING RIG	**CME-75**	DATE DRILLED	**7/28/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (9 inches)						
1	SC-SM		**SILTY CLAYEY SAND with GRAVEL,** very fine- to fine, dark yellowish-brown (10YR 3/4), moist, medium dense.			AU			
2									
3									
4									
5									
6						SS	9 10	9	125
7									
8									
9									
10			**PHYLLITE,** moderately to slightly weathered, olive-brown (2.5Y 4/3), slightly moist, moderately fractured, very dense.			AU			
10						SS	50/4"	6	109
11									
12									
13									
14									
15									
15						SS	50/5"	2	
16			- very rocky to depth, very hard drilling -						
17									
18									
			End of boring at 18 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-14

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-13

DRILLING RIG	**CME-75**	DATE DRILLED	**7/28/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (5 inches)						
2	SC		**CLAYEY SAND,** with trace gravel, fine- to medium, gray-brown, moist, medium dense.						
3			**PHYLLITE,** (SILTY SAND with GRAVEL), highly to slightly weathered, dark grayish-brown (2.5Y 4/2), slightly moist, slightly to highly fractured, very dense.			AU			
4									
5						SS	23 50/5"	16	121
6									
7									
8									
9									
10						SS	34 45	10	123
11	SM								
12									
13									
14									
15						SS	30 50/4"	7	130
16			- highly weathered, slightly fractured -						
17			- slightly weathered, highly fractured to depth -						
18									
19									
20						SS	50/5"	6	111
			End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-15

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-14

DRILLING RIG	**CME-75**	DATE DRILLED	**7/28/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1	SC-SM		**ASPHALT CONCRETE,** (5-1/2 inches)						
2			**SILTY, CLAYEY SAND,** fine- to medium, gray-brown, moist, medium dense.			AU			
3			**PHYLLITE,** (CLAYEY GRAVEL with SAND) highly to slightly weathered, olive-brown (2.5Y 4/4), slightly moist, slightly to moderately fractured, very dense.						
4									
5									
6			- easy drilling to depth -			SS	44 50/3"	8	124
7									
8									
9									
10									
11	GC		- moderately weathered, highly fractured, olive-brown (2.5Y4/3) to depth -			SS	50/5"	5	122
12									
13									
14									
15									
16						SS	50/3"	4	
17									
18									
19									
20									
						SS	50/4"	4	
			End of boring at 20.3 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-16

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-15

DRILLING RIG	**CME-75**	DATE DRILLED	**7/29/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
			ASPHALT CONCRETE, (7-1/2 inches)						
1	GC		**PHYLLITE,** (CLAYEY GRAVEL with SAND), very slightly weathered, gray-brown, slightly moist, moderately fractured, very dense.			AU			
2									
3									
			End of boring at 3.5 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area**
	Menifee, CA
PROJECT NUMBER	**E080-058**

FIGURE NO. A-17

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-16

DRILLING RIG	**CME-75**	DATE DRILLED	**7/29/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
			ASPHALT CONCRETE, (6-1/2 inches)						
1	SC		**ARTIFICIAL FILL,** CLAYEY SAND, very fine- to fine, gray-brown, moist, medium dense.						
2									
3	SM		**ARTIFICIAL FILL,** SILTY SAND, fine- to medium, dark brown, moist, medium dense.						
4			**METASEDIMENTARY SANDSTONE,** (CLAYEY GRAVEL with SAND), slightly to moderately weathered, dark gray (2.5Y 4/1), slightly moist, highly fractured, very dense.			AU			
5									
6			- rocky -			SS	40 50/2"	2	
7									
8									
9									
10									
11	GC		- rocky -			SS	20 50/3"	1	
12									
13									
14									
15									
16			- rocky -			SS	26 50/2"	1	136
17									
18									
19									
20									
						SS	35 50/2"	4	121
			End of boring at 20.7 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-18

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-17

DRILLING RIG	**CME-75**	DATE DRILLED	**7/30/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (6 inches)						
2	SM		**ARTIFICIAL FILL,** SILTY SAND, with trace clay, fine- to medium, olive, moist, medium dense.						
3			**PHYLLITE,** (POORLY GRADED GRAVEL with CLAY and SAND), highly to slightly weathered, gray-brown, slightly moist, slightly to moderately fractured, very dense.						
4									
5					X	SS	32 50/5"	12	147
6									
7									
8									
9									
10			- rocky, slightly weathered -		X	SS AU	50/5"	8	124
11	GP-GC								
12									
13									
14									
15			- rocky, slightly weathered -		X	SS	50/5"		
16									
17									
18									
19									
20			- rocky, slightly weathered -		X	SS	50/5"	3	119
			End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-19

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-18

DRILLING RIG	**CME-75**	DATE DRILLED	**7/30/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
			ASPHALT CONCRETE, (6 inches)						
1	SM		**ARTIFICIAL FILL,** SILTY SAND, fine- to coarse, dark yellowish-brown, moist, medium dense.						
2	GM		**METASEDIMENTARY SANDSTONE,** (SILTY GRAVEL) slightly weathered, dark gray, (2.5Y 4/1), dry to slightly moist, highly fractured, very dense, very rocky.			AU			
3									
4									
5									
6						SS	12 50/4"	0	
			End of boring at 6 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-20

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-19

DRILLING RIG	**CME-75**	DATE DRILLED	**7/29/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (4-1/2 inches)						
2			**ARTIFICIAL FILL,** SILTY SAND, with trace clay, fine- to medium, olive, moist, medium dense.			AU			
3			**METASEDIMENTARY SANDSTONE,** (SILTY SAND with GRAVEL), highly to moderately weathered, olive-brown (2.5Y 4/4), slightly moist, moderately to slightly fractured, very dense.						
4					☒	SS	50/5"	8	112
5									
6									
7									
8									
9					☒	SS	50/5"	6	118
10									
11	SM								
12									
13									
14			- rocky, with clay, highly weathered -		☒	SS	50/5"	11	122
15									
16									
17									
18									
19			- severely weathered -		☒	SS	50/3"	7	114
20									
			End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area**
	Menifee, CA
PROJECT NUMBER	**E080-058**

FIGURE NO. A-21

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-20

DRILLING RIG	**CME-75**	DATE DRILLED	**7/29/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (5 inches)						
2	SM		**ARTIFICIAL FILL,** SILTY SAND, fine- to coarse, olive, slightly moist, medium dense.			AU			
3			**METASEDIMENTARY SANDSTONE,** (SILTY CLAYEY SAND with GRAVEL), slightly to highly weathered, olive-brown (2.5Y 4/3), slightly moist, highly fractured, very dense.						
4									
5									
6			- rocky -			SS	40 50/2"	5	
7									
8									
9									
10									
11	SC-SM		- highly weathered -			SS	21 50/2"	7	120
12									
13									
14									
15									
16			- slightly weathered -			SS	50/1"		
17									
18									
19									
20									
			End of boring at 20.1 feet. No groundwater encountered. Backfilled with native soils.			SS	50/1"		

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-22

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-21

DRILLING RIG	**CME-75**	DATE DRILLED	**7/29/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE,** (3 inches)			AU			
			METASEDIMENTARY SANDSTONE, (SILTY GRAVEL with SAND), highly to moderately weathered, olive-brown (2.5Y 4/4), slightly moist, highly to weakly fractured, very dense, rocky.						
4						SS	50/5"	7	106
8	GM								
9			- clayey gravel with sand -			SS	24 50/4"	11	111
14			- weakly weathered -			SS	50/1"	4	
15			End of boring at 15 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO. A-23

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-22

DRILLING RIG	**CME-75**	DATE DRILLED	**7/30/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
			ASPHALT CONCRETE, (8 inches)						
1			**SILTY SAND with GRAVEL,** with trace clay, fine- to coarse, gray, moist, medium dense.			AU			
2	SM		- very hard drilling to depth -						
3						AU			
4			**PHYLLITE,** (SILTY CLAYEY GRAVEL with SAND) highly to weakly weathered, very dark gray (5Y 3/1), moist to wet, moderately fractured, hard.						
5									
6						SS	32 50	8	117
7									
8	GC								
9									
10			▽			SS	50/1"		
11									
12									
13			End of boring at 13 feet. Auger refusal. Groundwater encountered at 9.8 feet. Backfilled with bentonite and native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area** **Menifee, CA**
PROJECT NUMBER	**E080-058**

FIGURE NO.

A-24

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-23

DRILLING RIG	**CME-75**	DATE DRILLED	**7/29/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE over AGGREGATE BASE,** (6-1/2 inches over 13 inches)			AU			
2									
3	SM		**ARTIFICIAL FILL,** SILTY SAND with GRAVEL, fine- to medium, olive, moist, medium dense.						
4									
5	SC		**CLAYEY SAND,** very fine- to fine, dark yellowish-brown (10YR 3/6), moist, medium dense to dense.						
6						SS	35	11	123
7						AU	50		
8			**PHYLLITE,** (SILTY SAND with GRAVEL), moderately to slightly weathered, very dark gray (2.5Y 3/1), slightly moist to moist, highly fractured, very dense.						
9									
10									
11			- rocky, slightly weathered -			SS	50/4"	2	
12									
13									
14									
15						AU			
16			- rocky to depth, hard drilling -			SS	50/4"	5	
17									
18									
19									
20									
21						SS	50/3"	1	
22									
23	SM								
24									
25									
26						SS	50/2"	2	
27									
28									
29									
30									
31						SS	50/2"	3	
32									
33									
34									
35									
36						SS	50/2"		
37			- very hard drilling -						
38									
39									
40									
			End of boring at 40.1 feet. No groundwater encountered. Backfilled with native soils.			SS	50/1"		

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area**
	Menifee, CA
PROJECT NUMBER	**E080-058**

FIGURE NO. A-25

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-24

DRILLING RIG	**CME-75**	DATE DRILLED	**7/30/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
1			**ASPHALT CONCRETE over AGGREGATE BASE,** (5-1/2 inches over 12 inches)						
2						AU			
3	SM		**SILTY SAND with GRAVEL,** fine- to medium, dark yellowish-brown, moist, medium dense to dense.						
4						AU			
5			**PHYLLITE,** (SILTY SAND with GRAVEL) highly to slightly weathered, dark gray (2.5Y 4/1), slightly moist, highly fractured, very dense.						
6						SS	40 50/4"	5	126
7									
8									
9									
10									
11			- rocky, slightly weathered -			SS	50/5"	5	121
12									
13	SM								
14			- hard drilling -						
15									
16						SS	36 50/2"	2	
17									
18			- very hard drilling -						
19									
20									
21						SS	50/3"	1	
22									
			End of boring at 22 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**ERSC**
PROJECT NAME	**EMWD Sub Area 4**
PROJECT LOCATION	**Quail Valley Area**
	Menifee, CA
PROJECT NUMBER	**E080-058**

FIGURE NO. A-26

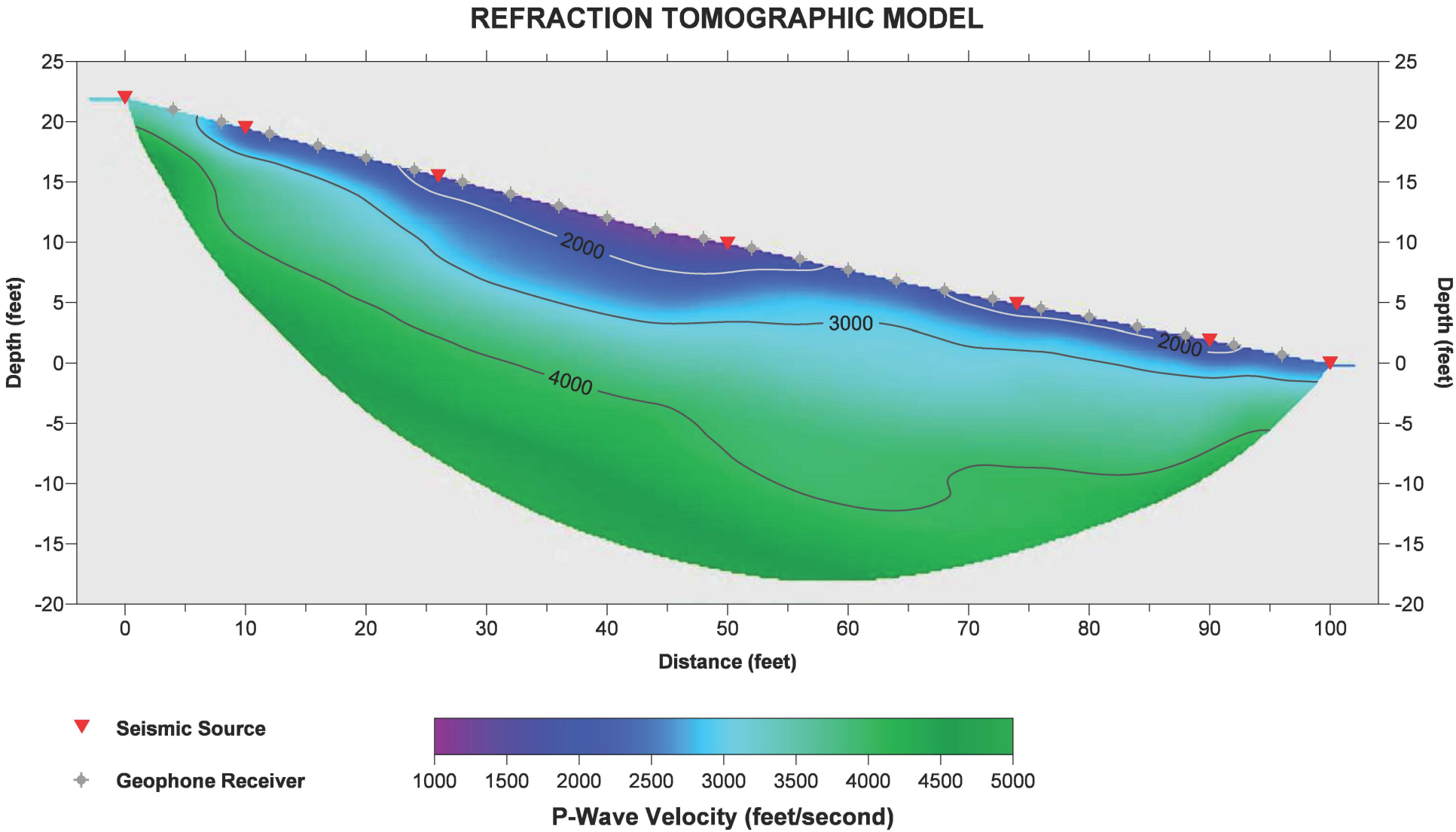
IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

Appendix B

Seismic Lines (Previous Study)

SEISMIC LINE S-1

< West - East >



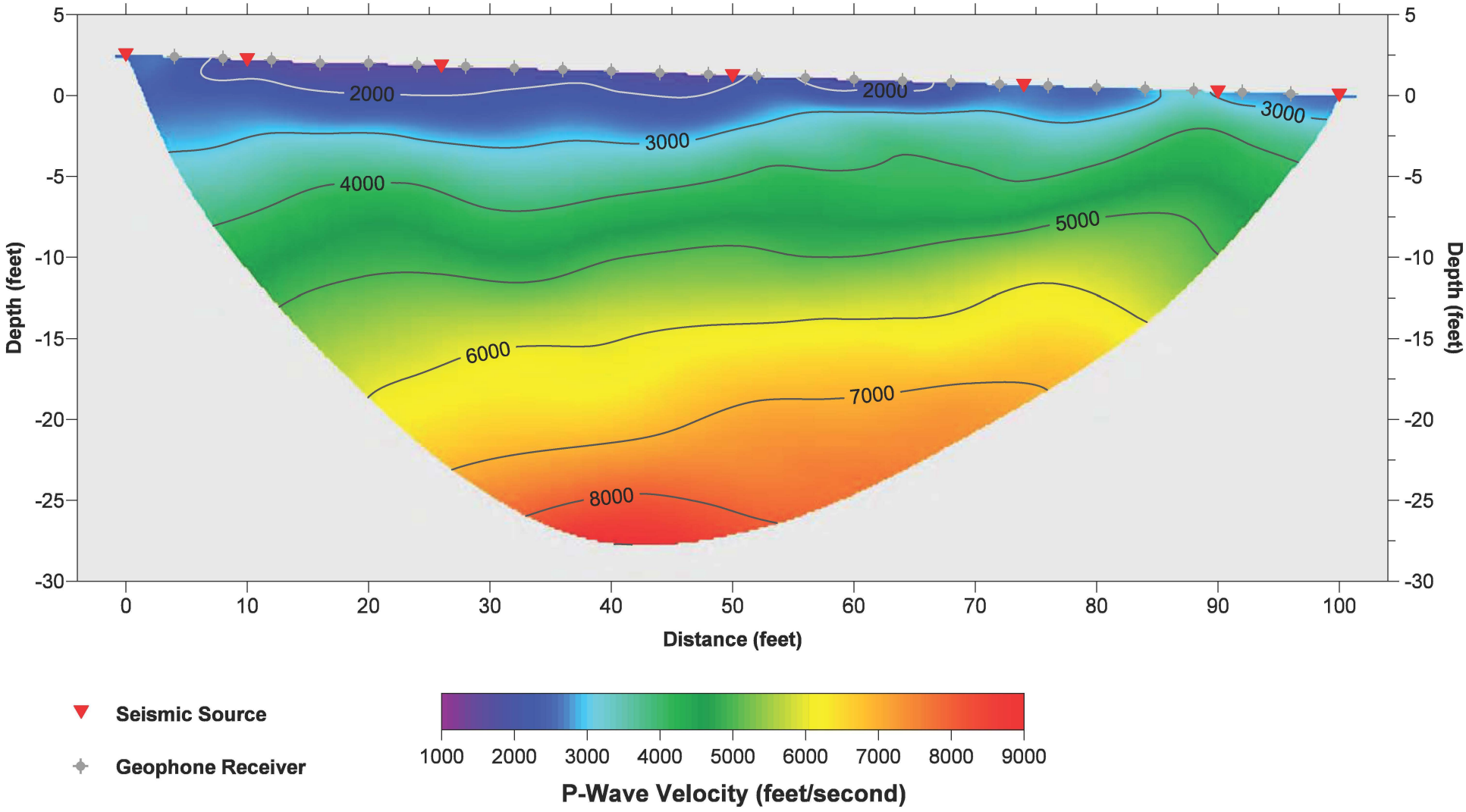
SCALE: 1:1 (Horizontal = Vertical)

RMS error 4.6%; Rayfract Version 4.01

SEISMIC LINE S-2

< South - North >

REFRACTION TOMOGRAPHIC MODEL



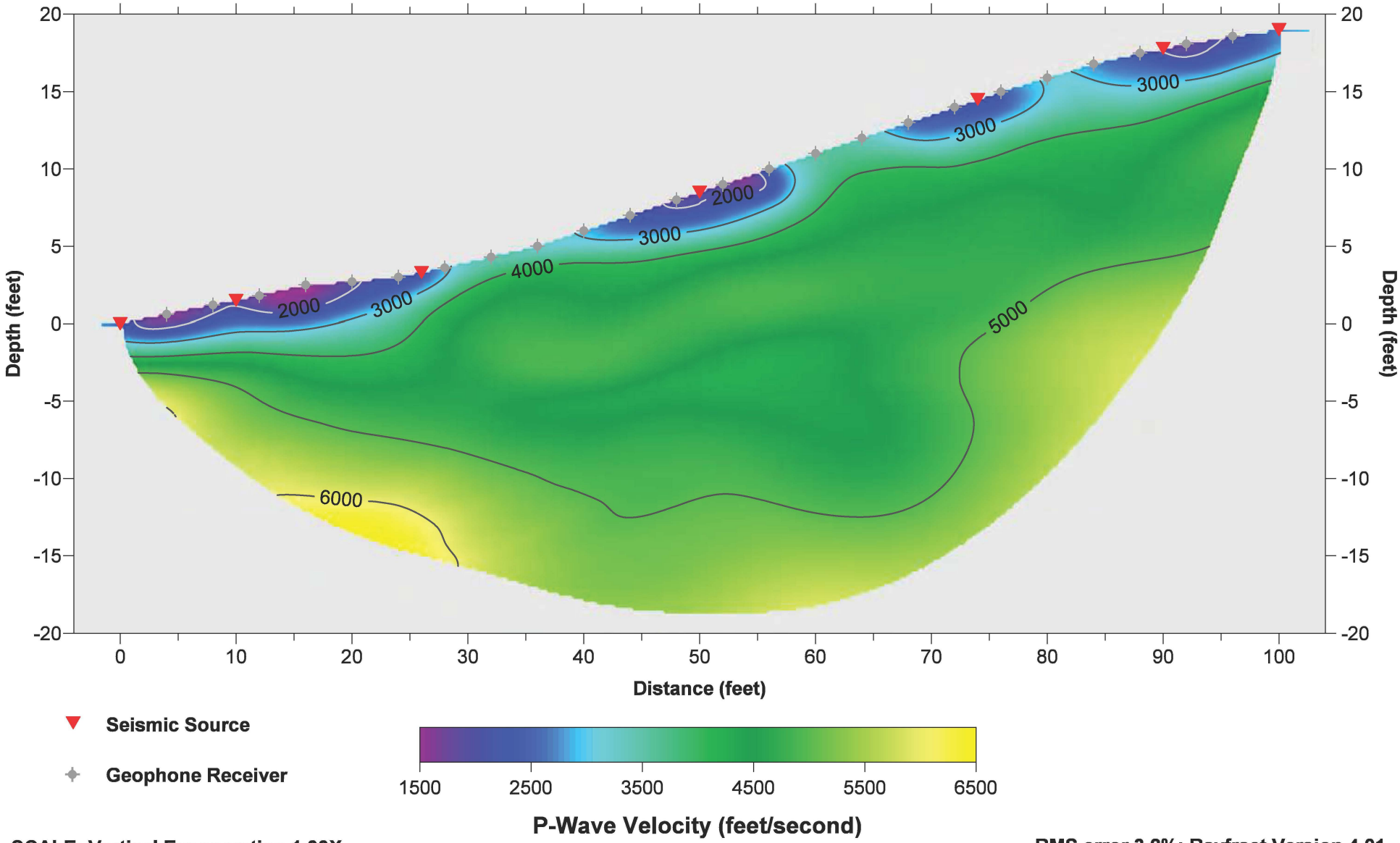
SCALE: Vertical Exaggeration 1.33X

RMS error 2.1%; Rayfract Version 4.01

SEISMIC LINE S-3

< East - West >

REFRACTION TOMOGRAPHIC MODEL



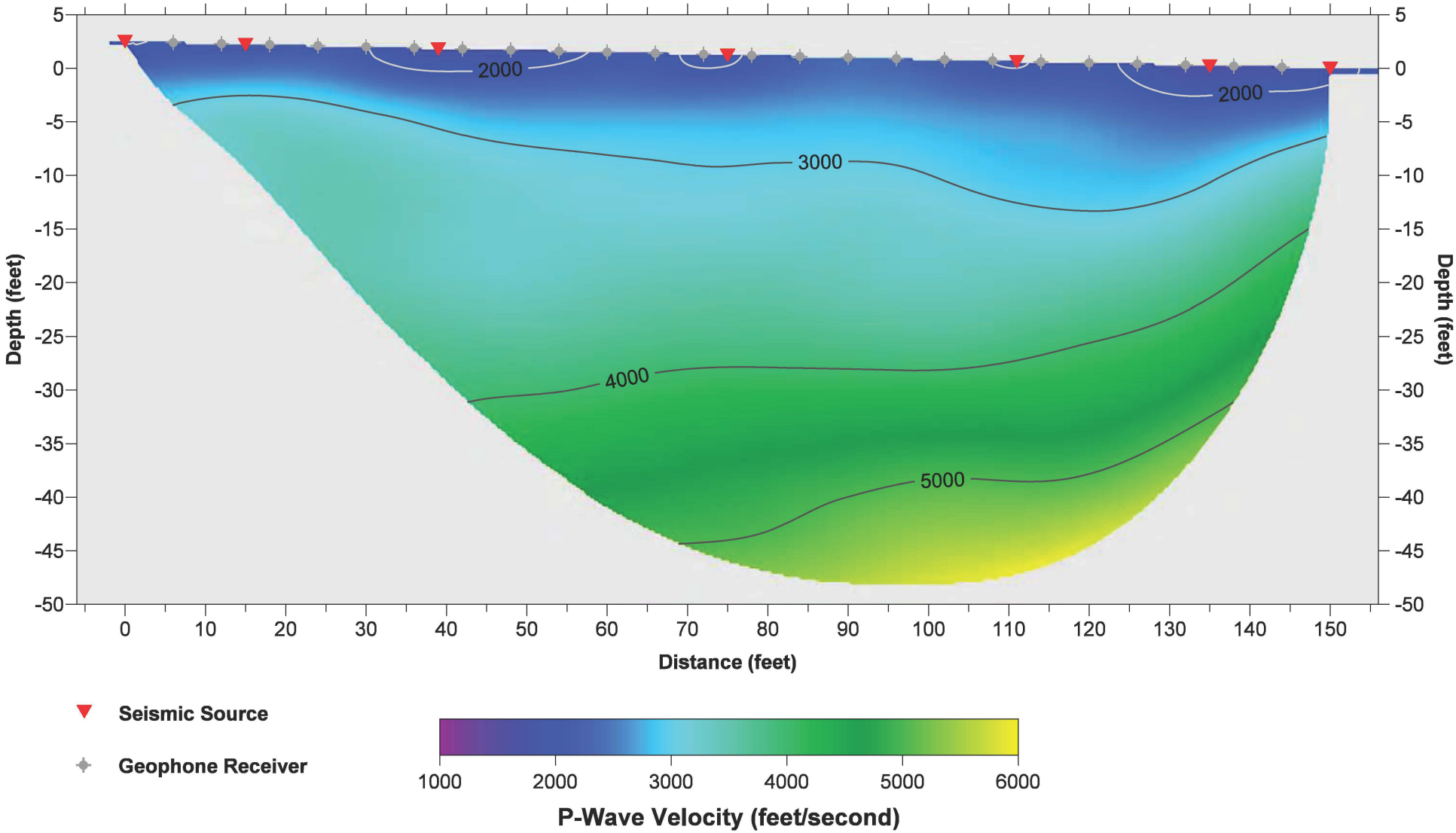
SCALE: Vertical Exaggeration 1.33X

RMS error 3.2%; Rayfract Version 4.01

SEISMIC LINE S-4

North 61° East >

REFRACTION TOMOGRAPHIC MODEL



SCALE: Vertical Exaggeration 1.33X

RMS error 2.4%; Rayfract Version 4.01

Appendix C

Results of Laboratory Testing (This and Previous Studies)

MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	EMWD Quail Valley Sewer Geo	Tested By:	F. Mina	Date:	07/03/24
Project No.:	13985.001	Input By:	M. Vinet	Date:	07/08/24
Boring No.:	LB-26	Depth (ft.):	0.0		
Sample No.:	B-1				
Soil Identification:	Silty Sand with Gravel (SM)g, Dark Olive Brown.				

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize particles

Preparation Method:	X	Moist	Scalp Fraction (%)		Rammer Weight (lb.) = 10.0
		Dry	#3/4		Height of Drop (in.) = 18.0
Compaction Method	X	Mechanical Ram	#3/8	36.1	
		Manual Ram	#4		Mold Volume (ft³) 0.03350

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	5447	5545	5546	5485		
Weight of Mold (g)	3518	3518	3518	3518		
Net Weight of Soil (g)	1929	2027	2028	1967		
Wet Weight of Soil + Cont. (g)	1110.9	1050.7	1307.0	1105.3		
Dry Weight of Soil + Cont. (g)	1032.4	965.0	1192.5	986.2		
Weight of Container (g)	276.9	278.7	414.6	278.7		
Moisture Content (%)	10.4	12.5	14.7	16.8		
Wet Density (pcf)	126.9	133.4	133.5	129.4		
Dry Density (pcf)	115.0	118.6	116.3	110.8		

Maximum Dry Density (pcf)	118.6	Optimum Moisture Content (%)	12.5
Corrected Dry Density (pcf)	133.0	Corrected Moisture Content (%)	8.5

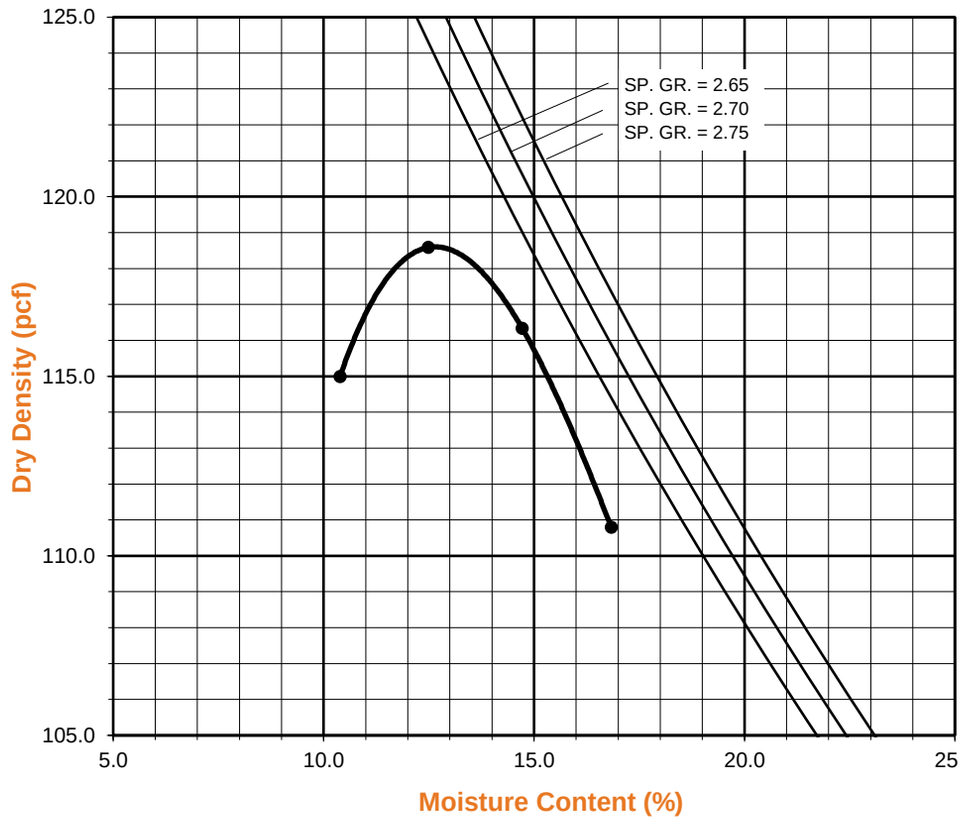
☐ Procedure A
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

☒ Procedure B
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

☐ Procedure C
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
48:31:21
GR:SA:FI

Atterberg Limits:
LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	EMWD Quail Valley Sewer Geo	Tested By:	F. Mina	Date:	06/25/24
Project No.:	13985.001	Input By:	M. Vinet	Date:	07/08/24
Boring No.:	LB-28	Depth (ft.):	0.0		
Sample No.:	B-1				
Soil Identification:	Silty Sand with Gravel (SM)g, Dark Yellowish Brown.				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft^3) 0.07530

Ram Weight = 10 lb.; Drop = 18 in.

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	9940	10258	10157			
Weight of Mold (g)	5460	5460	5460			
Net Weight of Soil (g)	4480	4798	4697			
Wet Weight of Soil + Cont. (g)	1179.5	1272.7	1210.5			
Dry Weight of Soil + Cont. (g)	1125.0	1195.3	1122.1			
Weight of Container (g)	275.1	277.5	278.9			
Moisture Content (%)	6.4	8.4	10.5			
Wet Density (pcf)	131.2	140.5	137.5			
Dry Density (pcf)	123.3	129.5	124.5			

Maximum Dry Density (pcf) 129.5 Optimum Moisture Content (%) 8.5

PROCEDURE USED

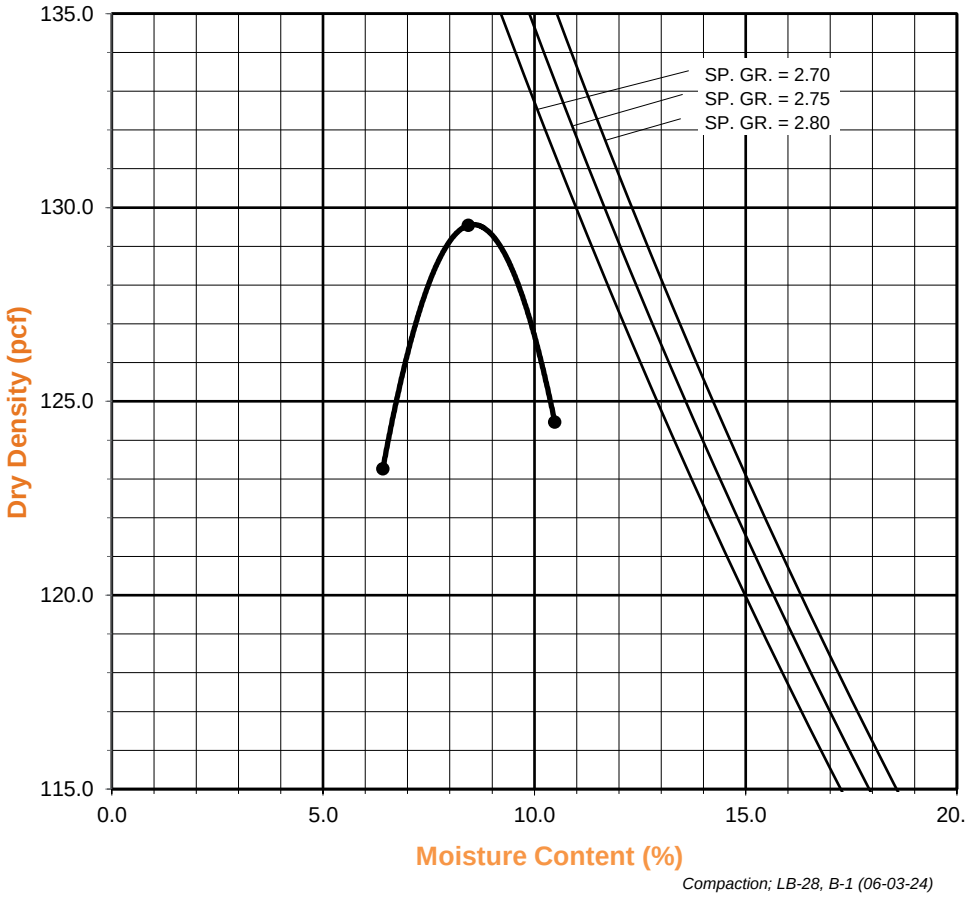
[ ] Procedure A
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] Procedure B
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[X] Procedure C
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
GR:SA:FI

Atterberg Limits:
LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	EMWD Quail Valley Sewer Geo	Tested By:	F. Mina	Date:	07/03/24
Project No.:	13985.001	Input By:	M. Vinet	Date:	07/08/24
Boring No.:	LB-31	Depth (ft.):	0.0		
Sample No.:	B-1				
Soil Identification:	Silty Sand with Gravel (SM)g, Dark Olive Brown.				

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize particles

Preparation Method:	X	Moist	Scalp Fraction (%)		Rammer Weight (lb.) = 10.0
		Dry	#3/4	12.4	Height of Drop (in.) = 18.0
Compaction Method	X	Mechanical Ram	#3/8		
		Manual Ram	#4		Mold Volume (ft³) 0.07530

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	10187	10399	10323			
Weight of Mold (g)	5459	5459	5459			
Net Weight of Soil (g)	4728	4940	4864			
Wet Weight of Soil + Cont. (g)	1175.7	1350.7	1290.5			
Dry Weight of Soil + Cont. (g)	1140.0	1290.0	1214.5			
Weight of Container (g)	276.5	275.0	277.9			
Moisture Content (%)	4.1	6.0	8.1			
Wet Density (pcf)	138.4	144.6	142.4			
Dry Density (pcf)	132.9	136.5	131.7			

Maximum Dry Density (pcf)	136.5	Optimum Moisture Content (%)	6.0
Corrected Dry Density (pcf)	140.0	Corrected Moisture Content (%)	5.5

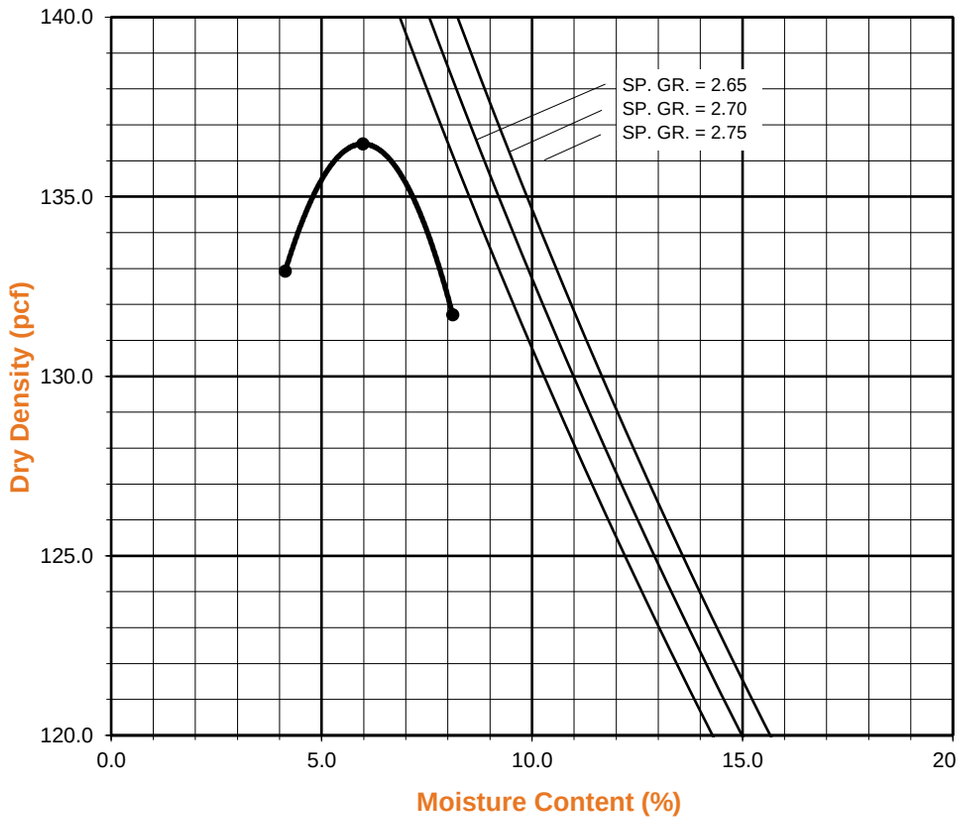
☐ Procedure A
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

☐ Procedure B
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

☒ Procedure C
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
GR:SA:FI

Atterberg Limits:
LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	EMWD Quail Valley Sewer Geo	Tested By:	F. Mina	Date:	06/27/24
Project No.:	13985.001	Input By:	M. Vinet	Date:	07/08/24
Boring No.:	LB-32	Depth (ft.):	0.0		
Sample No.:	B-1				
Soil Identification:	Silty Sand with Gravel (SM)g, Dark Olive Brown.				

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize particles

Preparation Method:	X	Moist	Scalp Fraction (%)		Rammer Weight (lb.) = 10.0
		Dry	#3/4		Height of Drop (in.) = 18.0
Compaction Method	X	Mechanical Ram	#3/8	6.8	
		Manual Ram	#4		Mold Volume (ft³) 0.03350

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	5492	5558	5526			
Weight of Mold (g)	3518	3518	3518			
Net Weight of Soil (g)	1974	2040	2008			
Wet Weight of Soil + Cont. (g)	1021.2	1060.2	1097.1			
Dry Weight of Soil + Cont. (g)	956.7	980.2	1000.0			
Weight of Container (g)	280.1	275.0	277.9			
Moisture Content (%)	9.5	11.3	13.4			
Wet Density (pcf)	129.9	134.2	132.1			
Dry Density (pcf)	118.6	120.6	116.5			

Maximum Dry Density (pcf)	120.7	Optimum Moisture Content (%)	11.2
Corrected Dry Density (pcf)	123.0	Corrected Moisture Content (%)	10.5

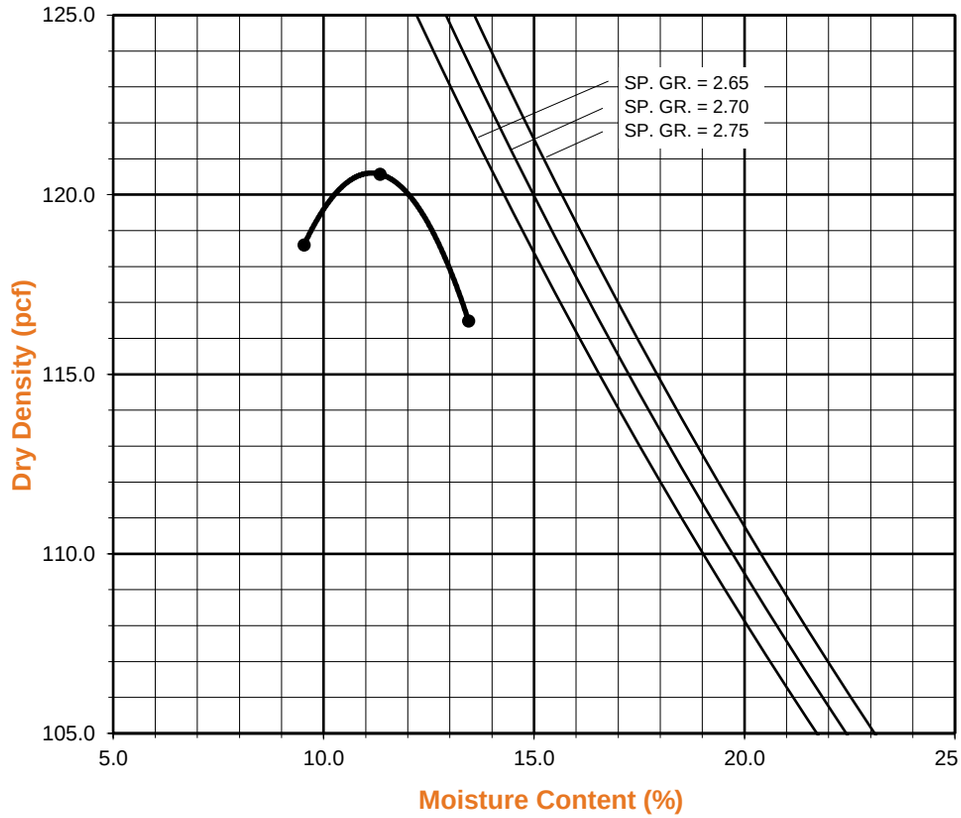
☐ Procedure A
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

☒ Procedure B
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

☐ Procedure C
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
10:47:43
GR:SA:FI

Atterberg Limits:
LL,PL,PI



TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: EMWD Quail Valley Sewer Geo Tested By : M. Vinet Date: 07/08/24

Project No. : 13985.001 Data Input By: M. Vinet Date: 07/08/24

Boring No.	LB-28	LB-32		
Sample No.	B-1	B-1		
Sample Depth (ft)	0.0	0.0		
Soil Identification:	Silty Sand with Gravel (SM)g	Silty Sand with Gravel (SM)g		
Wet Weight of Soil + Container (g)	100.00	100.00		
Dry Weight of Soil + Container (g)	100.00	100.00		
Weight of Container (g)	0.00	0.00		
Moisture Content (%)	0.00	0.00		
Weight of Soaked Soil (g)	100.00	100.00		

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	1	2		
Crucible No.	1	2		
Furnace Temperature (°C)	850	850		
Time In / Time Out	Timer	Timer		
Duration of Combustion (min)	45	45		
Wt. of Crucible + Residue (g)	25.0423	24.9215		
Wt. of Crucible (g)	25.0362	24.8955		
Wt. of Residue (g) (A)	0.0061	0.0260		
PPM of Sulfate (A) x 41150	251.02	1069.90		
PPM of Sulfate, Dry Weight Basis	251	1070		

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30	30		
ml of AgNO3 Soln. Used in Titration (C)	0.8	1.2		
PPM of Chloride (C -0.2) * 100 * 30 / B	60	100		
PPM of Chloride, Dry Wt. Basis	60	100		

pH TEST, DOT California Test 643

pH Value	6.90	7.60		
Temperature °C	21.0	21.0		

SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	EMWD Quail Valley Sewer Geo		Tested By :	M. Vinet	Date: 07/08/24
Project No. :	13985.001		Data Input By:	M. Vinet	Date: 07/08/24
Boring No.:	LB-28		Depth (ft.) :	0.0	
Sample No. :	B-1				

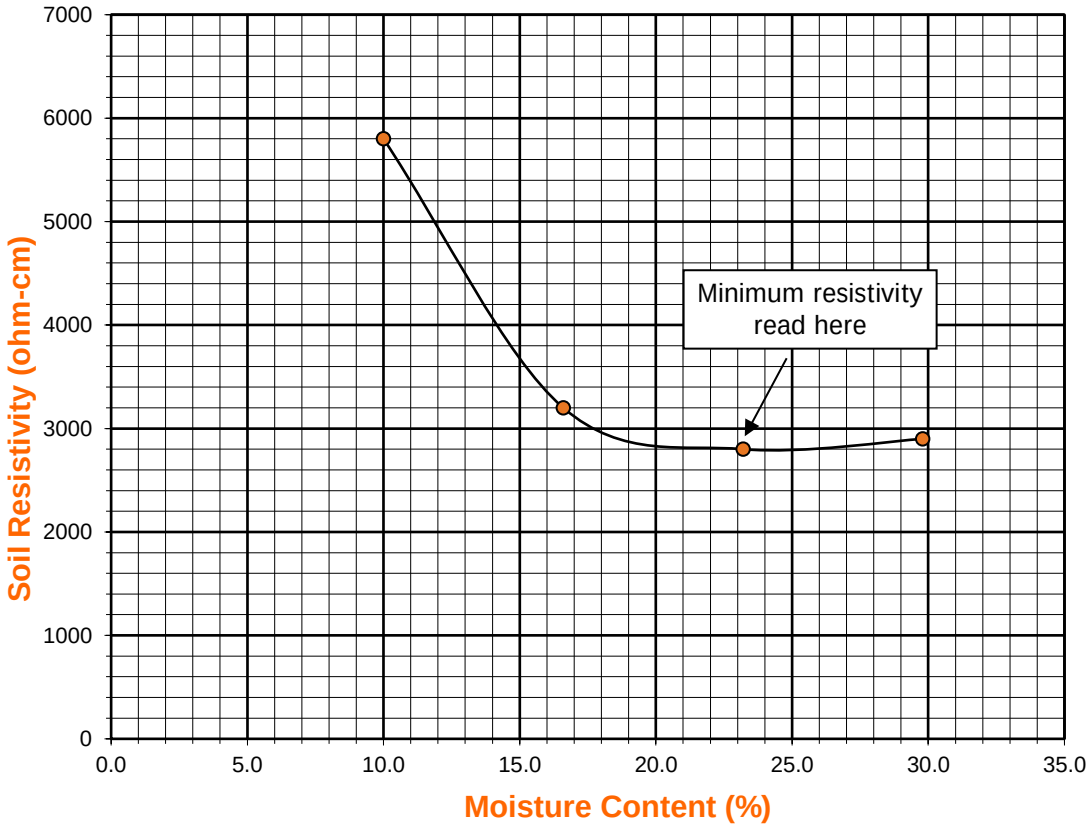
Soil Identification:* Silty Sand with Gravel (SM)g

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	50	10.00	5800	5800
2	83	16.60	3200	3200
3	116	23.20	2800	2800
4	149	29.80	2900	2900
5				

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	100.00
Dry Wt. of Soil + Cont. (g)	100.00
Wt. of Container (g)	0.00
Container No.	A
Initial Soil Wt. (g) (Wt)	500.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
2800	23.2	251	60	6.90	21.0



SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	EMWD Quail Valley Sewer Geo		Tested By :	M. Vinet	Date: 07/08/24
Project No. :	13985.001		Data Input By:	M. Vinet	Date: 07/08/24
Boring No.:	LB-32		Depth (ft.) :	0.0	
Sample No. :	B-1				

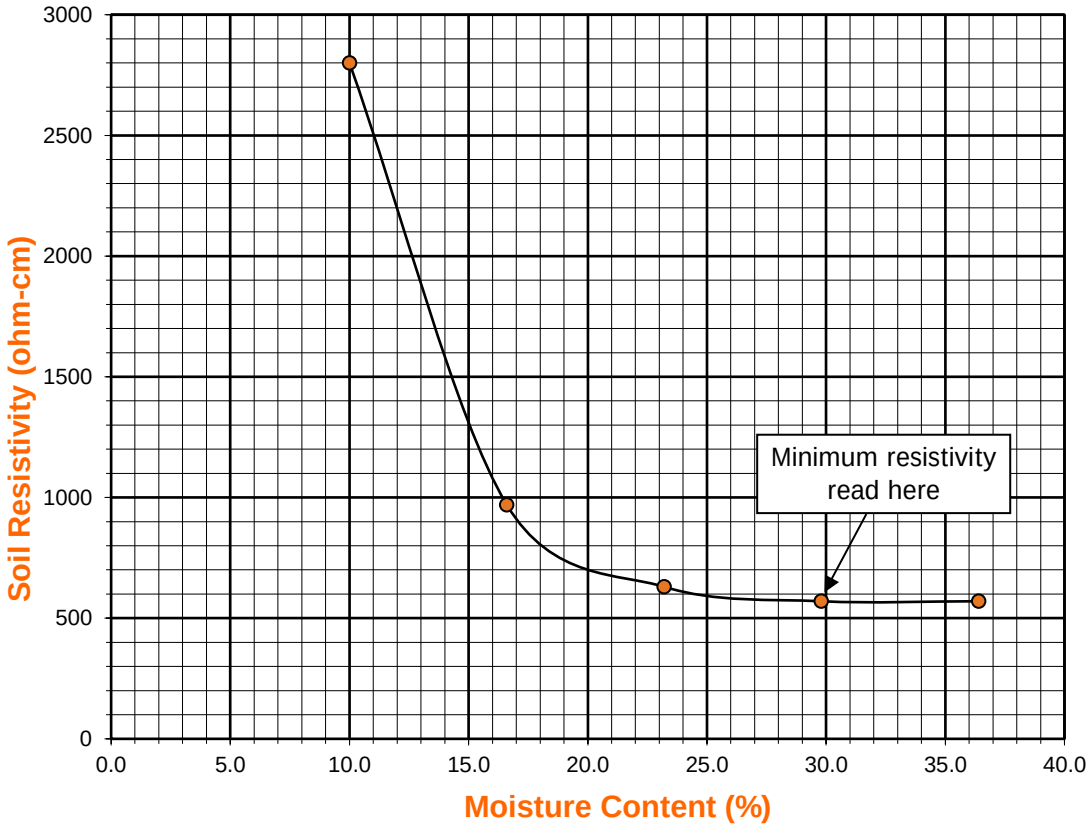
Soil Identification:* Silty Sand with Gravel (SM)g

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	50	10.00	2800	2800
2	83	16.60	970	970
3	116	23.20	630	630
4	149	29.80	570	570
5	182	36.40	570	570

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	100.00
Dry Wt. of Soil + Cont. (g)	100.00
Wt. of Container (g)	0.00
Container No.	A
Initial Soil Wt. (g) (Wt)	500.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
570	29.8	1070	100	7.60	21.0



EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	EMWD Quail Valley Sewer Geo	Tested By:	G. Stearns	Date:	6/24/24
Project No. :	13985.001	Checked By:	M. Vinet	Date:	7/8/24
Boring No.:	LB-35	Depth:	0.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Sandy Silt s(ML), Yellowish Brown.				

Dry Wt. of Soil + Cont. (gm.)	1500.3
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	1500.3
Weight Soil Retained on #4 Sieve	102.2
Percent Passing # 4	93.2

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0132
Wt. Comp. Soil + Mold (gm.)	626.1	658.0
Wt. of Mold (gm.)	209.1	209.1
Specific Gravity (Assumed)	2.70	2.70
Container No.	10	10
Wet Wt. of Soil + Cont. (gm.)	350.8	658.0
Dry Wt. of Soil + Cont. (gm.)	328.6	386.1
Wt. of Container (gm.)	50.8	209.1
Moisture Content (%)	8.0	16.3
Wet Density (pcf)	125.8	133.6
Dry Density (pcf)	116.5	115.0
Void Ratio	0.447	0.467
Total Porosity	0.309	0.318
Pore Volume (cc)	64.0	66.7
Degree of Saturation (%) [S meas]	**48.3**	**94.1**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
6/24/24	9:55	1.0	0	0.5000
6/24/24	10:05	1.0	10	0.5000
	Add Distilled Water to the Specimen			
6/25/24	7:25	1.0	1280	0.5132
6/25/24	8:25	1.0	1340	0.5132

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	13.2
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Height	**13**

Rev. 03-08

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	EMWD QUAL VALLEY	Tested By:	FM	Date:	7/24/24
Project No. :	13985.001	Checked By:		Date:	
Boring No.:	LB - 26	Depth:	10' - 15'		
Sample No. :	B - 2	Location:			
Sample Description:	DARK REDDISH BROWN SC - SM.				

Dry Wt. of Soil + Cont. (gm.)	4848.1
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	4848.1
Weight Soil Retained on #4 Sieve	288.4
Percent Passing # 4	94.1

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0298
Wt. Comp. Soil + Mold (gm.)	589.8	620.0
Wt. of Mold (gm.)	177.3	177.3
Specific Gravity (Assumed)	2.70	2.70
Container No.	7	7
Wet Wt. of Soil + Cont. (gm.)	350.8	620.0
Dry Wt. of Soil + Cont. (gm.)	327.3	380.2
Wt. of Container (gm.)	50.8	177.3
Moisture Content (%)	8.5	16.4
Wet Density (pcf)	124.4	129.7
Dry Density (pcf)	114.7	111.4
Void Ratio	0.470	0.514
Total Porosity	0.320	0.339
Pore Volume (cc)	66.2	72.4
Degree of Saturation (%) [S meas]	**48.8**	**86.4**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
7/24/24	7:30	1.0	0	0.5000
7/24/24	7:40	1.0	10	0.5000
	Add Distilled Water to the Specimen			
7/25/24	2:00	1.0	1100	0.5298
7/25/24	3:00	1.0	1160	0.5298

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	29.8
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Height	**30**

Rev. 03-08

R-VALUE TEST RESULTS

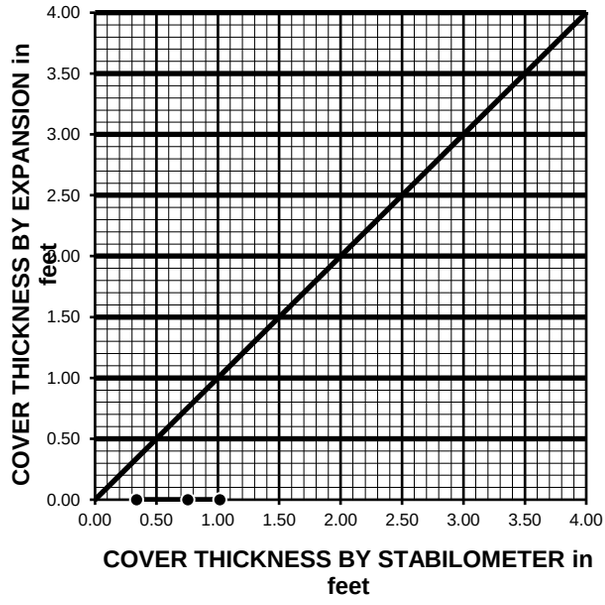
ASTM D 2844

Project Name:	EMWD Quail Valley Sewer Geo	Date:	7/3/24
Project Number:	13985.001	Technician:	F. Mina
Boring Number:	LB-31	Depth (ft.):	0.0
Sample Number:	B-1		
Sample Description:	Silty Sand with Gravel (SM)g, Dark Olive Brow	Sample Location:	N/A

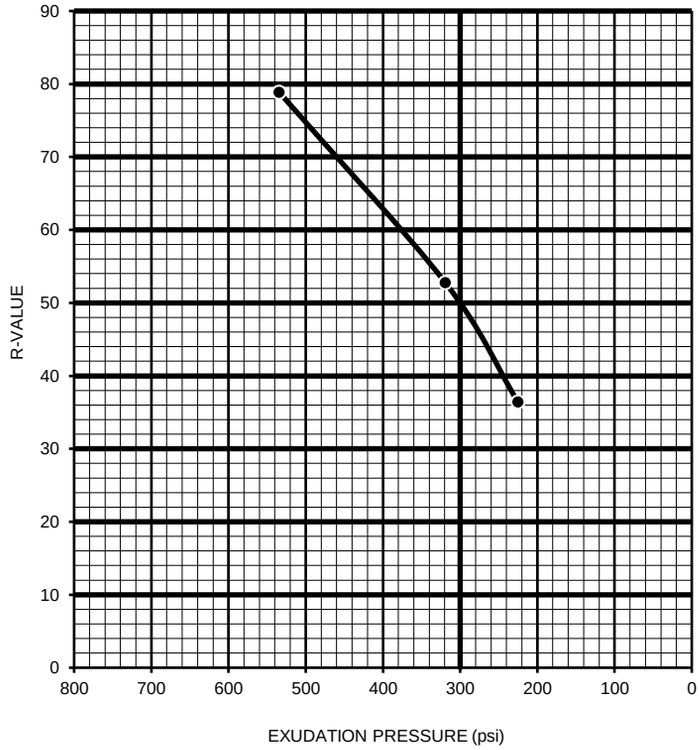
TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	7.7	8.3	9.3
HEIGHT OF SAMPLE, Inches	2.50	2.48	2.50
DRY DENSITY, pcf	121.9	122.2	122.3
COMPACTOR AIR PRESSURE, psi	350	350	350
EXUDATION PRESSURE, psi	535	319	225
EXPANSION, Inches x 10exp-4	0	0	0
STABILITY Ph 2,000 lbs (160 psi)	22	51	75
TURNS DISPLACEMENT	4.20	4.78	4.95
R-VALUE UNCORRECTED	79	53	36
R-VALUE CORRECTED	79	53	36

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.34	0.76	1.02
EXPANSION PRESSURE THICKNESS, ft.	0.00	0.00	0.00

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	N/A
R-VALUE BY EXUDATION:	50
EQUILIBRIUM R-VALUE:	50

SAND EQUIVALENT TEST

ASTM D 2419 / DOT CA Test 217

Project Name:	EMWD Quail Valley Sewer Geo	Tested By:	M. Vinet	Date:	7/8/24
Project No. :	13985.001	Computed By:	M. Vinet	Date:	7/8/24
Client:	Michael Baker International, Inc	Checked By:	M. Vinet	Date:	7/8/24

Boring No.	Sample No.	Depth (ft.)	Soil Description	T1	T2	T3	T4	R1	R2	SE	Average SE
LB-26	B-1	0	Silty Sand with Gravel (SM)g	12:00	12:10	12:12	12:32	11.8	1.5	13	**14**
				12:02	12:12	12:14	12:34	11.5	1.6	14	

T1 = Starting Time

T2 = (T1 + 10 min) Begin Agitation

T3 = Settlement Starting Time

T4 = (T3 + 20 min) Take Clay Reading (R1)

Sand Equivalent = R2 / R1 * 100

Record SE as Next Higher Integer

Leighton

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS

ASTM D 6913

Project Name: EMWD Quail Valley Sewer Geo
Tested By: MRV Date: 07/08/24
Project No.: 13985.001
Checked By: MRV Date: 07/08/24
Boring No.: LB-26
Depth (feet): 0.0
Sample No.: B-1
Soil Identification: Silty Sand with Gravel (SM)g, Dark Olive Brown.

Calculation of Dry Weights	Whole Sample	Sample Passing #4	Moisture Contents	Whole Sample	Sample passing #4
Container No.:	R2	XY	Wt. of Air-Dry Soil + Cont.(g)	6924.2	595.1
Wt. Air-Dried Soil + Cont.(g)	6924.2	595.1	Wt. of Dry Soil + Cont. (g)	6401.0	595.1
Wt. of Container (g)	1198.5	277.4	Wt. of Container No._____(g)	1198.5	277.4
Dry Wt. of Soil (g)	5200.5	317.7	Moisture Content (%)	10.1	0.0

Passing #4 Material After Wet Sieve		
	Container No.	XY
	Wt. of Dry Soil + Container (g)	470.4
	Wt. of Container (g)	277.4
	Dry Wt. of Soil Retained on # 200 Sieve (g)	193.0

U. S. Sieve Size		Cumulative Weight of Dry Soil Retained (g)		Percent Passing (%)
	(mm.)	Whole Sample	Sample Passing #4	
2"	50.000	0.0		100.0
1 1/2"	37.500	590.7		88.6
1"	25.000	916.2		82.4
3/4"	19.000	1188.6		77.1
1/2"	12.500	1669.3		67.9
3/8"	9.500	1877.9		63.9
#4	4.750	2499.5		51.9
#8	2.360		24.6	47.9
#16	1.180		49.2	43.9
#30	0.600		78.6	39.1
#50	0.300		114.6	33.2
#100	0.150		152.7	27.0
#200	0.075		187.1	21.3
PAN				

GRAVEL: 48 %
SAND: 31 %
FINES: 21 %
GROUP SYMBOL: (SM)g

Cu = D60/D10 = N/A
Cc = $(D30)^2/(D60*D10)$ = N/A

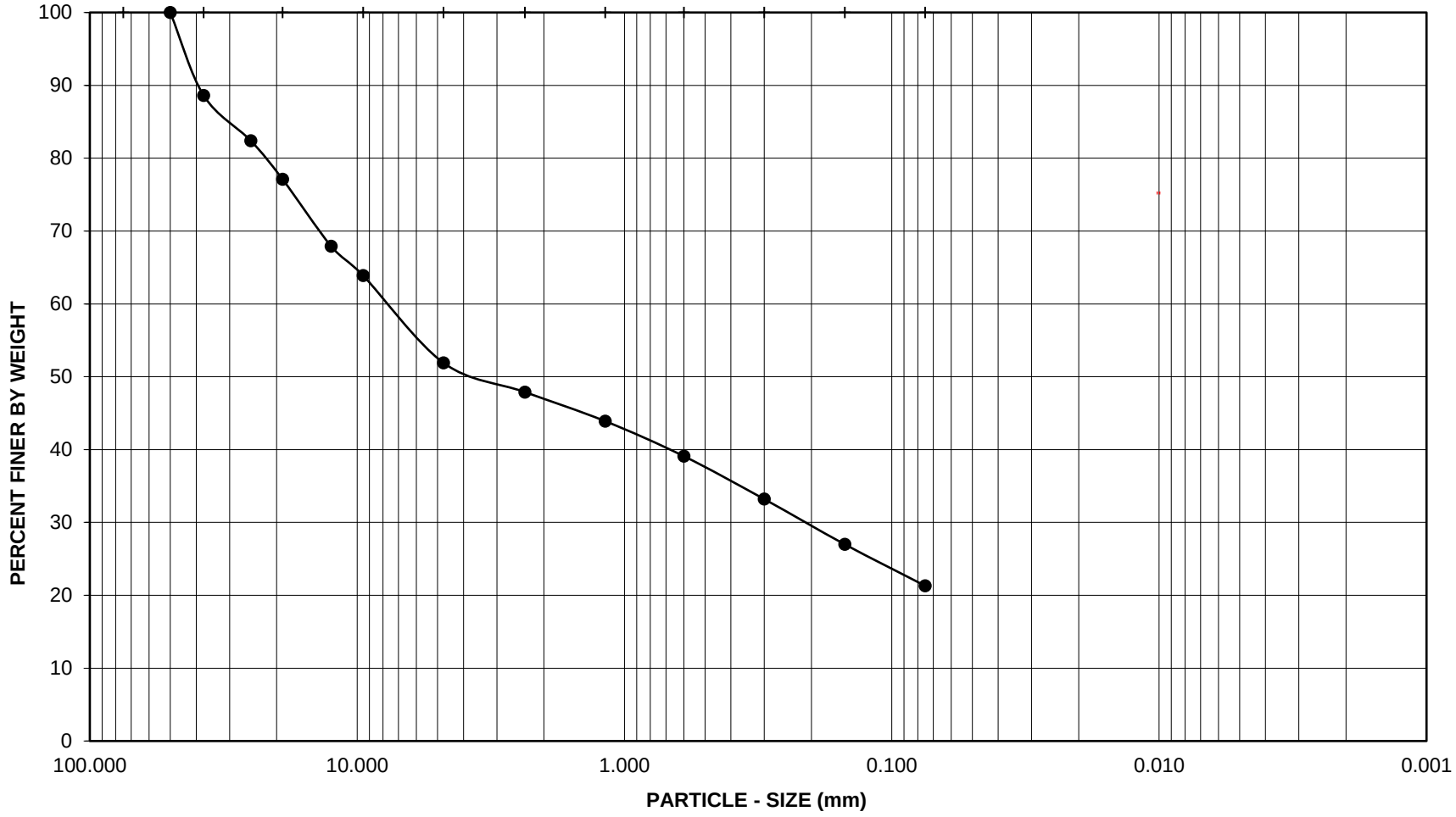
Remarks:

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: EMWD Quail Valley Sewer Geo

Project No.: 13985.001

Boring No.: LB-26 Sample No.: B-1

Depth (feet): 0.0 Soil Type : (SM)g

Soil Identification: Silty Sand with Gravel (SM)g, Dark Olive Brown.

GR:SA:FI : (%) 48 : 31 : 21

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Jul-24

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS

ASTM D 6913

Project Name: EMWD Quail Valley Sewer Geo Tested By: MRV Date: 07/08/24

Project No.: 13985.001 Checked By: MRV Date: 07/08/24

Boring No.: LB-32 Depth (feet): 0.0

Sample No.: B-1

Soil Identification: Silty Sand (SM), Olive Brown.

Calculation of Dry Weights	Whole Sample	Sample Passing #4	Moisture Contents	Whole Sample	Sample passing #4
Container No.:	A	M	Wt. of Air-Dry Soil + Cont.(g)	3128.3	994.5
Wt. Air-Dried Soil + Cont.(g)	3128.3	994.5	Wt. of Dry Soil + Cont. (g)	2717.7	994.5
Wt. of Container (g)	0.0	666.0	Wt. of Container No._____(g)	0.0	666.0
Dry Wt. of Soil (g)	2717.9	328.5	Moisture Content (%)	15.1	0.0

Passing #4 Material After Wet Sieve		
	Container No.	M
	Wt. of Dry Soil + Container (g)	838.6
	Wt. of Container (g)	665.9
	Dry Wt. of Soil Retained on # 200 Sieve (g)	172.7

U. S. Sieve Size		Cumulative Weight of Dry Soil Retained (g)		Percent Passing (%)
	(mm.)	Whole Sample	Sample Passing #4	
2"	50.000			100.0
1 1/2"	37.500	0.0		100.0
1"	25.000	57.5		97.9
3/4"	19.000	101.5		96.3
1/2"	12.500	157.9		94.2
3/8"	9.500	182.5		93.3
#4	4.750	265.9		90.2
#8	2.360		12.4	86.8
#16	1.180		29.7	82.0
#30	0.600		51.7	76.0
#50	0.300		83.9	67.2
#100	0.150		125.7	55.7
#200	0.075		171.8	43.0
PAN				

GRAVEL: 10 %

SAND: 47 %

FINES: 43 %

GROUP SYMBOL: SM

Cu = D60/D10 = N/A

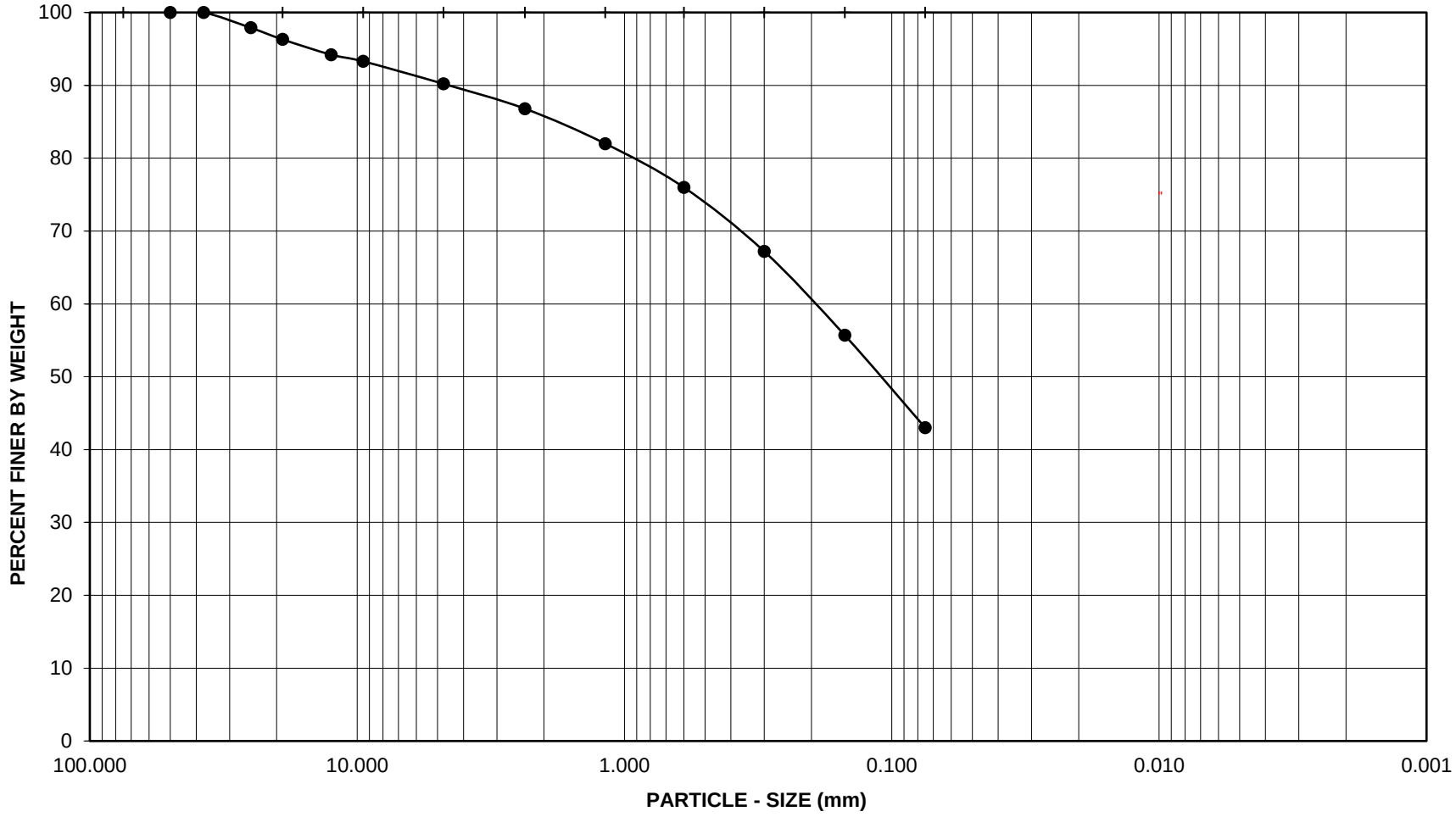
Cc = $(D30)^2/(D60*D10)$ = N/A

Remarks:

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING — U.S. STANDARD SIEVE NUMBER — HYDROMETER

3.0" 1 1/2" 3/4" 3/8" #4 #8 #16 #30 #50 #100 #200



Project Name: EMWD Quail Valley Sewer Geo

Project No.: 13985.001

Boring No.: LB-32 Sample No.: B-1

Depth (feet): 0.0 Soil Type : SM

Soil Identification: Silty Sand (SM), Olive Brown.

GR:SA:FI : (%) 10 : 47 : 43

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Jul-24

APPENDIX B

LABORATORY TESTING

Representative soil samples obtained from our borings were returned to our laboratory for additional observations and testing. Descriptions of the tests performed are provided below.

Unit Weight and Moisture Content: Ring samples were weighed and measured to evaluate their unit weight. A small portion of each sample was then tested for moisture content. The testing was performed per ASTM D2937 and D2216. The results of the testing are shown on the boring logs (Figure Nos. A-3 through A-26).

Sieve Analysis: Twenty-six (26) soil samples were selected for sieve analysis testing in accordance with ASTM D6913. These tests provide information for classifying the soil in accordance with the Unified Classification System. This classification system categorizes the soil into groups having similar engineering characteristics. The results of this testing are shown on Figure Nos. B-3 and B-8.

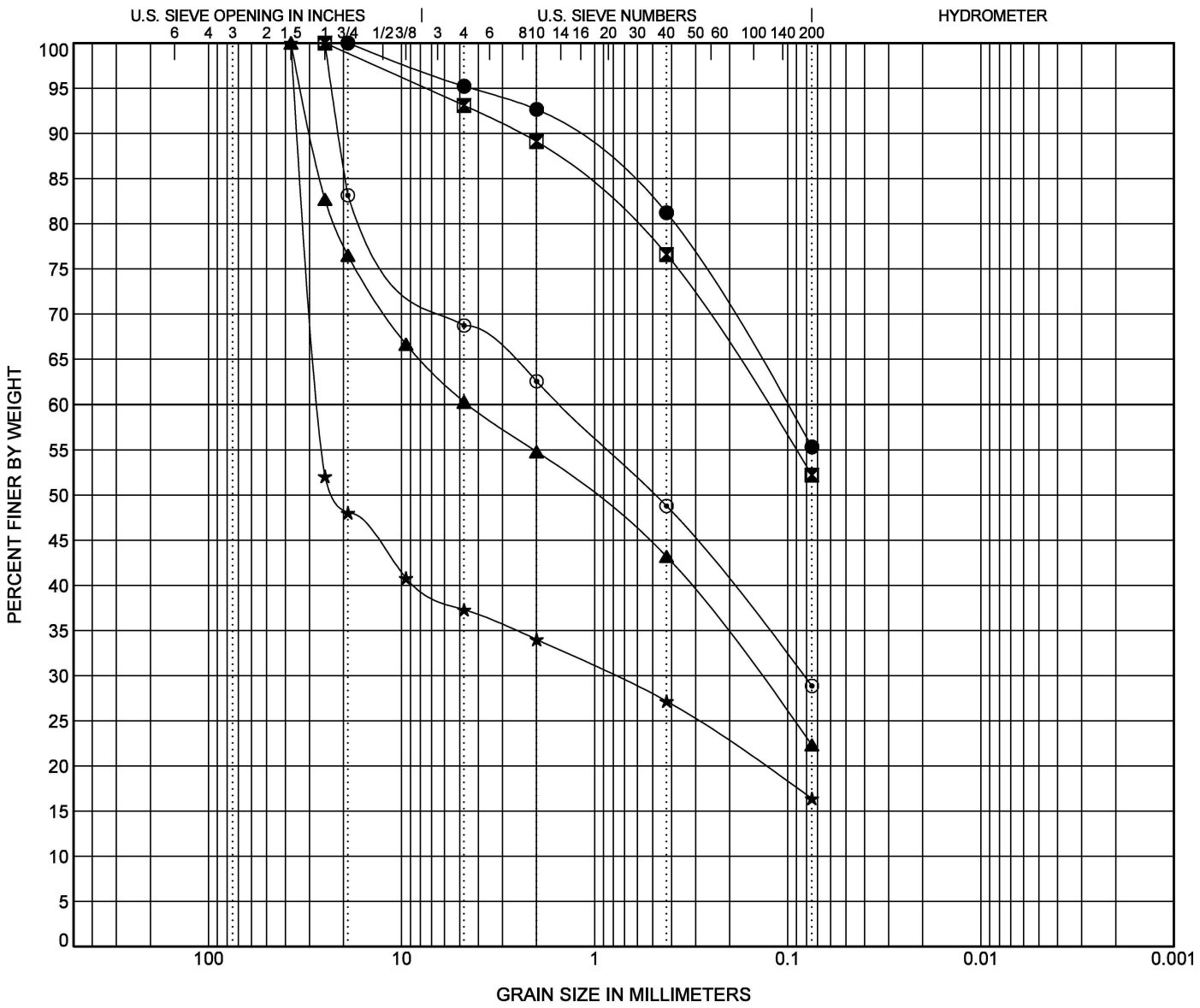
Atterberg Limits: Twelve (12) samples were selected for Atterberg limits testing in accordance with ASTM D4318. These tests provide information regarding soil plasticity and are also used for classifying the soil in accordance with the Unified Classification System. The results are shown on Figure Nos. B-3 and B-8.

Sand Equivalent: Twenty-four samples were selected for sand equivalent testing in accordance with ASTM D2419. This test is used to indicate the relative proportions of clay-size or plastic fines and dust in granular soil and fine aggregate. Sand equivalent test results are shown in the following table.

Boring No.	Depth (ft.)	SE
B-01	2.0 - 6.0	9
B-02	2.0 - 5.0	9
B-03	4.0 - 7.0	18
B-04	3.5 - 9.0	14
B-05	3.5 - 7.0	15
B-05	7.0 - 13.0	10
B-06	5.0 - 15.5	31
B-07	2.0 - 20.0	20
B-08	1.8 - 5.3	18

Boring No.	Depth (ft.)	SE
B-09	1.3 - 13.0	14
B-10	3.0 - 20.0	25
B-11	2.0 - 19.1	19
B-12	0.8 - 9.5	13
B-13	2.5 - 20.0	26
B-14	1.3 - 20.3	24
B-16	3.5 - 20.6	18
B-17	9.3 - 20.0	22
B-19	1.3 - 20.0	20
B-20	2.0 - 20.0	19
B-21	0.3 - 15.0	27
B-22	3.0 - 13	18
B-23	1.6 - 4.0	15
B-24	1.4 - 4.0	25
B-24	4.0 - 22.0	29

Direct Shear Strength: Five (5) samples were selected for direct shear strength testing in accordance with ASTM D3080. This testing measures the shear strength of the soil under various normal pressures and is used to develop parameters for foundation bearing capacity and lateral earth pressure. Test results are shown on Figure No. B-9.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-01	2.0	SANDY CLAY(CL)	41	18	23		
⊠	B-02	2.0	SANDY CLAY(CL)					
▲	B-03	4.0	GRAVEL with SAND(GW)					
★	B-04	3.5	SILTY GRAVEL with SAND(GW-GM)					
⊙	B-05	3.5	SILTY, CLAYEY SAND with GRAVEL(SC-SM)	25	18	7		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01	2.0	19	0.103			4.8	39.9	55.3	
⊠	B-02	2.0	25	0.131			6.9	40.9	52.2	
▲	B-03	4.0	37.5	4.546	0.142		39.7	38.0	22.3	
★	B-04	3.5	37.5	26.737	0.809		62.7	20.9	16.4	
⊙	B-05	3.5	25	1.504	0.083		31.3	39.9	28.8	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

FIGURE NO. B-3

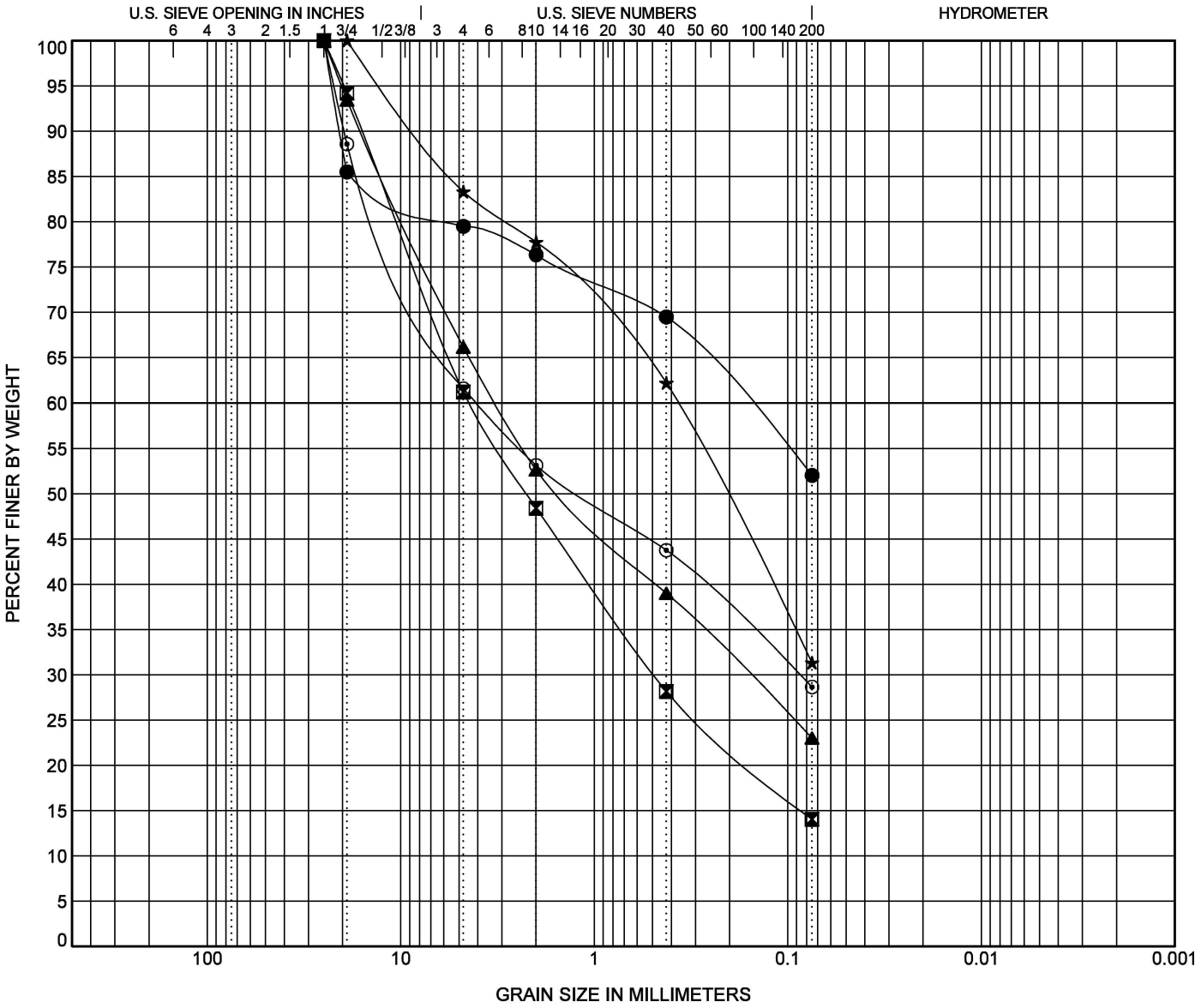
CLIENT ERSC

PROJECT NUMBER E080-058

PROJECT NAME EMWD Sub Area 4

PROJECT LOCATION Quail Valley Area
Menifee, CA

IFE SIEVE ANALYSIS - GINT STD US LAB.GDT - 11/23/20 11:10 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-05	7.0	SANDY CLAY with GRAVEL(CL)	27	14	13		
⊠	B-06	5.0	SILTY SAND with GRAVEL(SM)					
▲	B-07	2.0	SILTY SAND with GRAVEL(SM)	25	23	2		
★	B-08	1.8	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
⊙	B-09	1.3	CLAYEY SAND(SC)					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-05	7.0	25	0.166			20.5	27.5	52.0	
⊠	B-06	5.0	25	4.385	0.489		38.8	47.2	14.0	
▲	B-07	2.0	25	3.208	0.16		33.9	43.1	23.0	
★	B-08	1.8	19	0.376			16.7	52.0	31.3	
⊙	B-09	1.3	25	4.054	0.088		38.5	32.9	28.6	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

FIGURE NO. B-4

CLIENT ERSC

PROJECT NAME EMWD Sub Area 4

PROJECT NUMBER E080-058

PROJECT LOCATION Quail Valley Area
Menifee, CA

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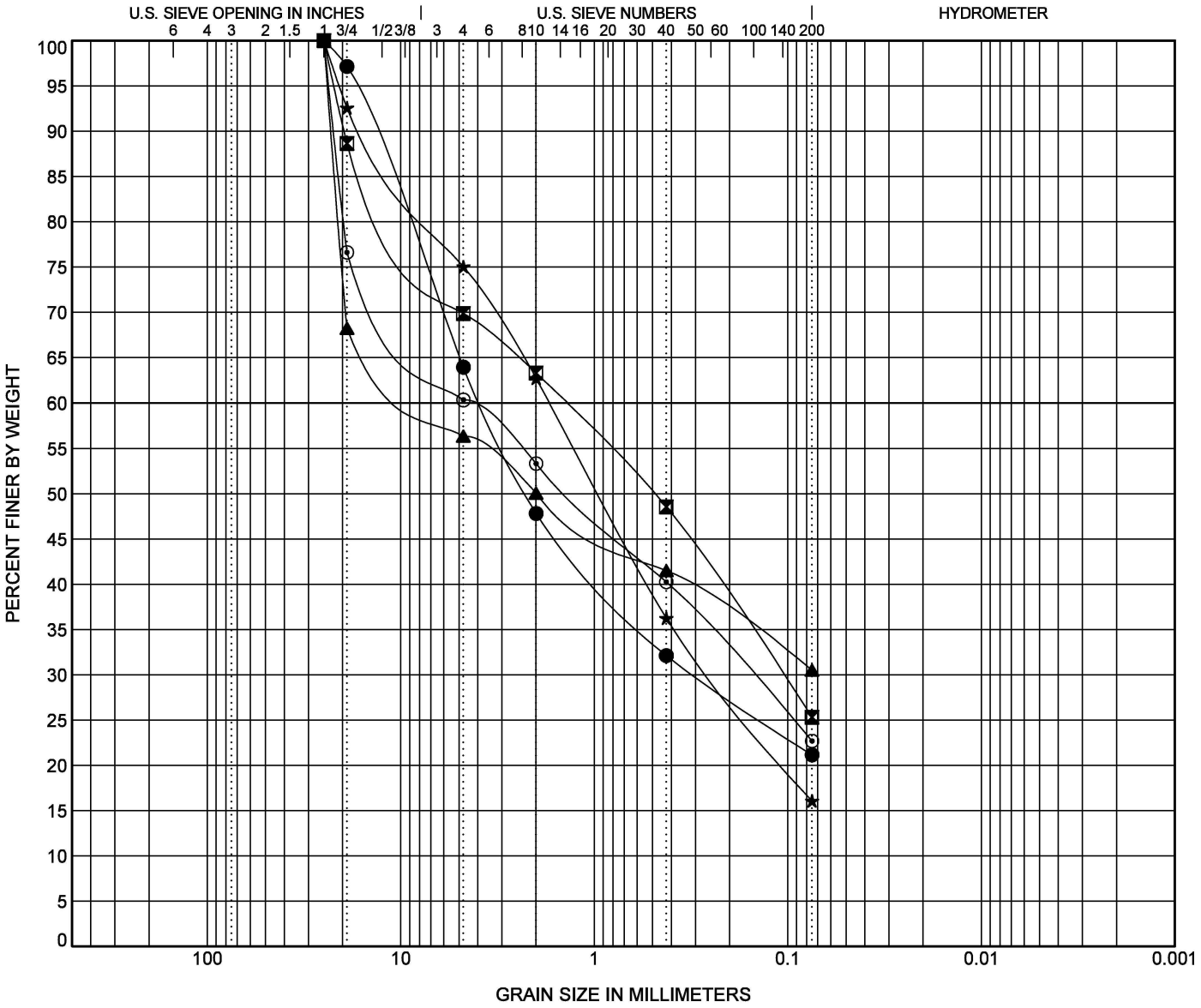


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-10	3.0	CLAYEY SAND with GRAVEL(SC)					
⊠	B-11	2.0	CLAYEY SAND with GRAVEL(SC)					
▲	B-12	0.8	SILTY CLAYEY SAND with GRAVEL(GC)	22	17	5		
★	B-13	3.5	SILTY SAND with GRAVEL(SM)					
⊙	B-14	1.3	CLAYEY GRAVEL with SAND(GC)					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-10	3.0	25	3.85	0.304		36.1	42.8	21.1	
⊠	B-11	2.0	25	1.418	0.106		30.1	44.5	25.3	
▲	B-12	0.8	25	7.276			43.6	25.9	30.5	
★	B-13	3.5	25	1.709	0.249		25.0	59.0	16.1	
⊙	B-14	1.3	25	4.568	0.155		39.7	37.6	22.7	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

FIGURE NO. B-5

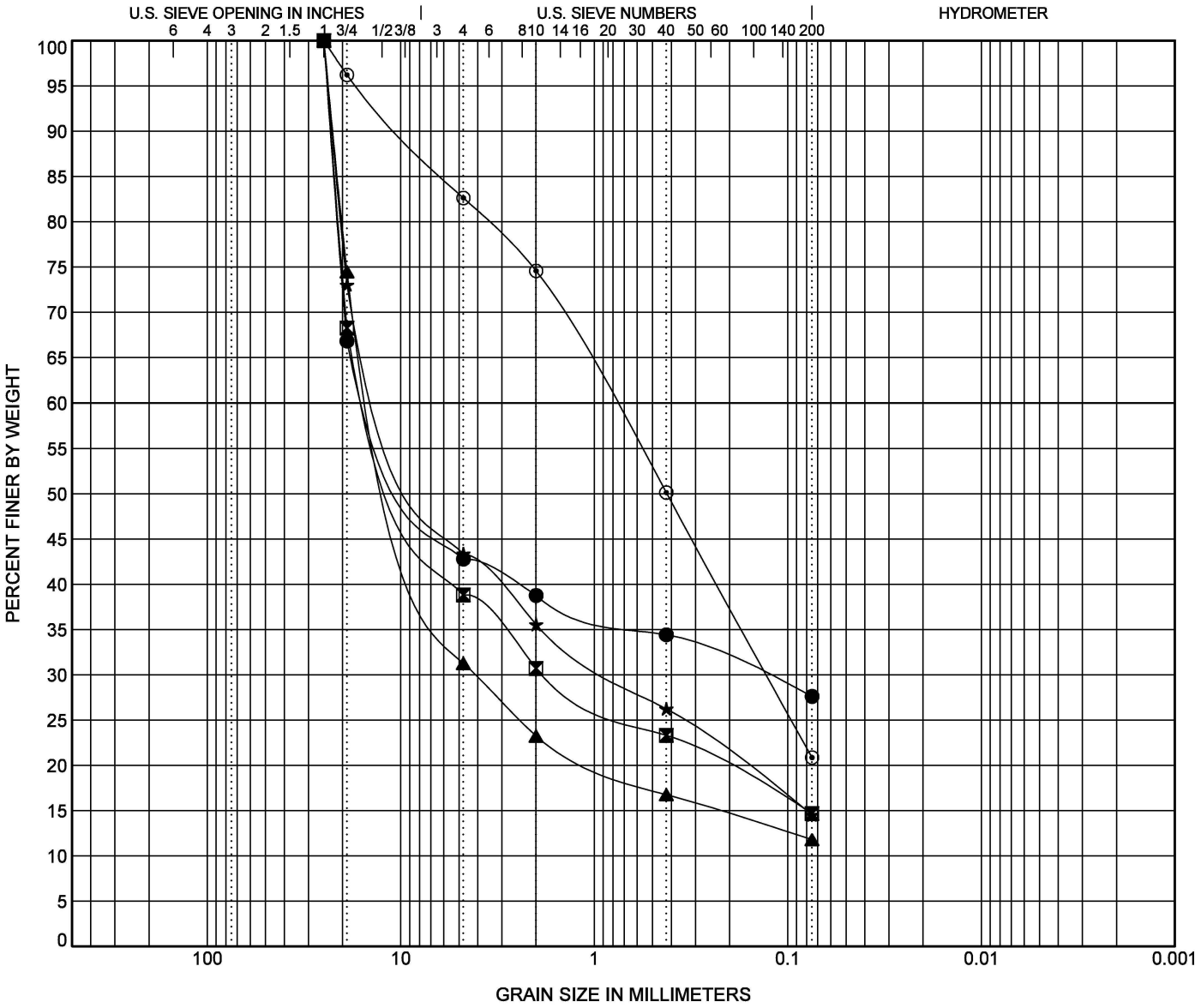
CLIENT ERSC

PROJECT NUMBER E080-058

PROJECT NAME EMWD Sub Area 4

PROJECT LOCATION Quail Valley Area
Menifee, CA

IFE SIEVE ANALYSIS - GINT STD US LAB.GDT - 11/23/20 11:11 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-15	0.6	CLAYEY GRAVEL with SAND(GC)					
⊠	B-16	3.5	CLAYEY GRAVEL with SAND(GC)					
▲	B-17	9.3	POORLY GRADED GRAVEL with CLAY and SAND(GP-GC)	51	32	19	35.81	296.42
★	B-18	1.3	SILTY GRAVEL(SM)					
⊙	B-19	1.3	SILTY SAND with GRAVEL(SM)					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-15	0.6	25	12.833	0.138		57.2	15.2	27.6	
⊠	B-16	3.5	25	12.884	1.729		61.2	24.2	14.7	
▲	B-17	9.3	25	11.952	4.154		68.8	19.5	11.8	
★	B-18	1.3	25	10.342	0.796		56.6	28.9	14.5	
⊙	B-19	1.3	25	0.795	0.129		17.4	61.8	20.8	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

FIGURE NO. B-6

CLIENT ERSC

PROJECT NAME EMWD Sub Area 4

PROJECT NUMBER E080-058

PROJECT LOCATION Quail Valley Area
Menifee, CA

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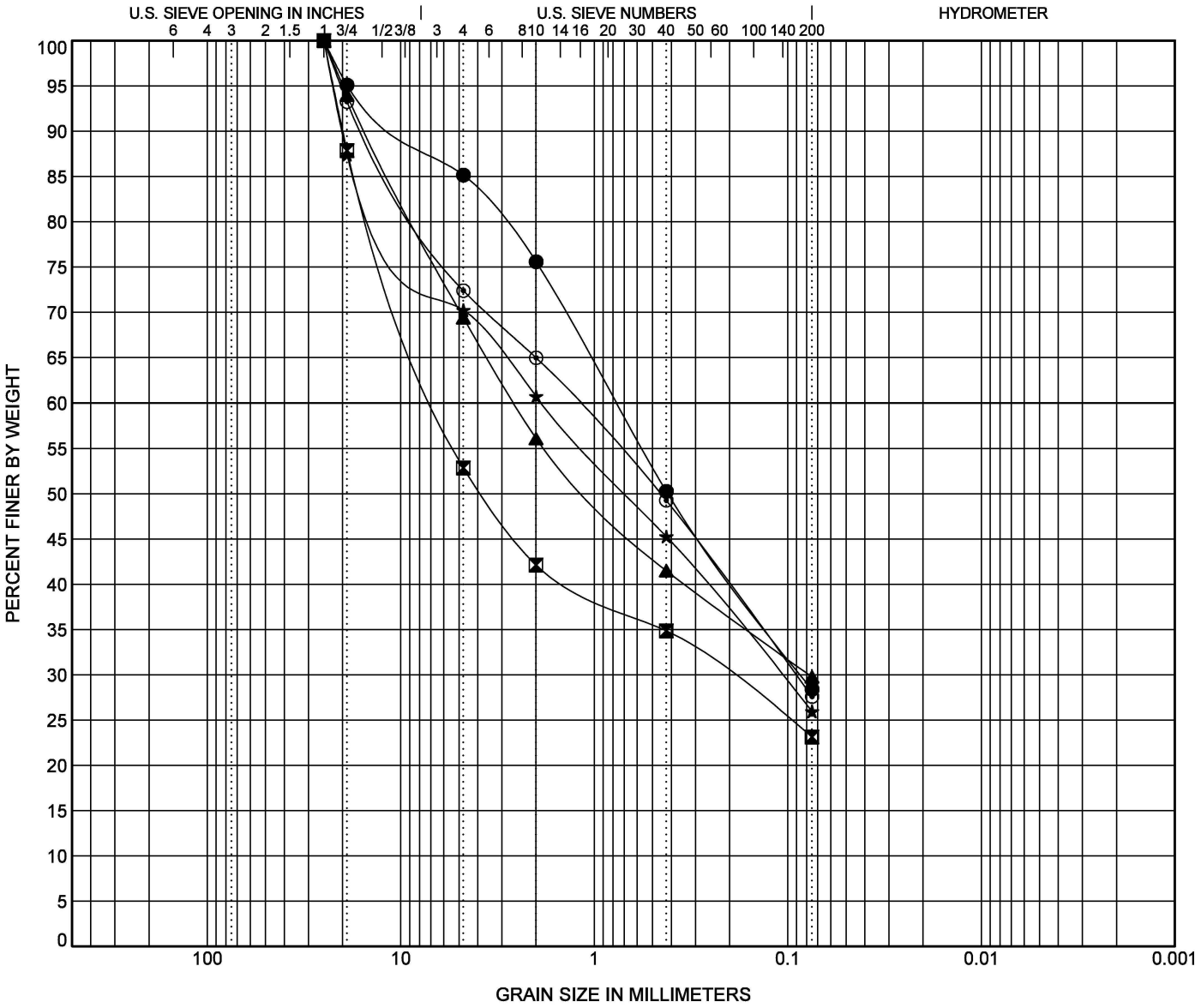


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-20	2.0	SILTY, CLAYEY SAND(SC-SM)	25	21	4		
⊠	B-21	0.3	SILTY SAND(SM)					
▲	B-22	3.0	SILTY, CLAYEY SAND with GRAVEL(SC-SM)	25	18	7		
★	B-23	1.6	SILTY SAND with GRAVEL(SM)	22	19	3		
⊙	B-24	1.5	SILTY SAND with GRAVEL(SM)	NP	NP	NP		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-20	2.0	25	0.772	0.085		14.9	56.8	28.4	
⊠	B-21	0.3	25	6.305	0.208		47.1	29.7	23.1	
▲	B-22	3.0	25	2.582	0.078		30.6	39.6	29.8	
★	B-23	1.6	25	1.868	0.108		29.8	44.3	25.9	
⊙	B-24	1.5	25	1.228	0.091		27.6	44.8	27.6	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

FIGURE NO. B-7

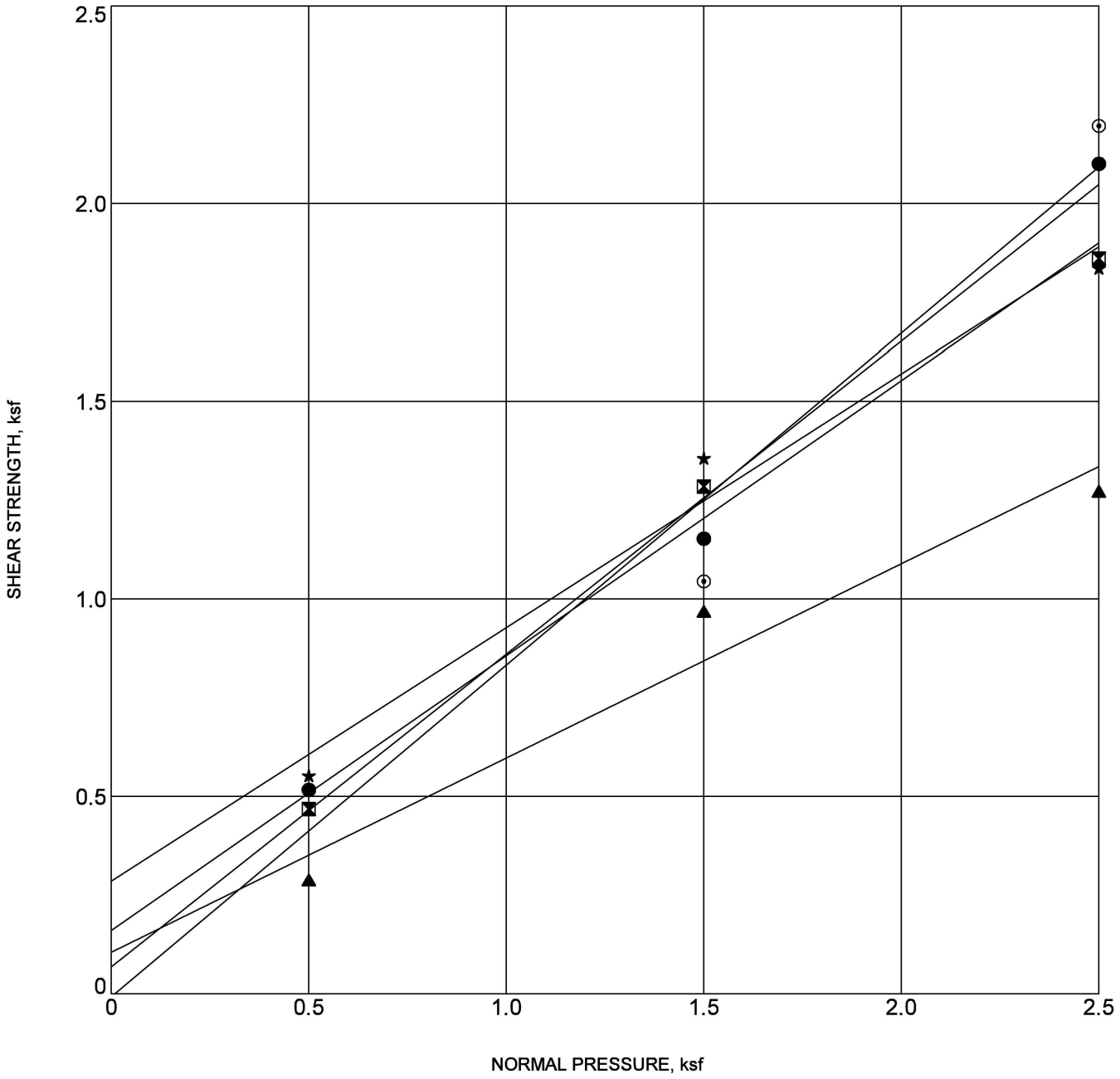
CLIENT ERSC

PROJECT NAME EMWD Sub Area 4

PROJECT NUMBER E080-058

PROJECT LOCATION Quail Valley Area
Menifee, CA

IFE SIEVE ANALYSIS - GINT STD US LAB.GDT - 11/23/20 11:11 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ



	BOREHOLE	DEPTH	Classification	γ_d	MC%	c	ϕ
●	B-08	5.0	SILTY SAND with GRAVEL(SM)	110	4	0.1	38
⊠	B-12	5.5	SILTY CLAYEY SAND with GRAVEL(GC)	121	8	0.2	35
▲	B-22	5.5	SILTY CLAYEY GRAVEL with SAND(GC)	118	3	0.1	26
★	B-23	5.5	CLAYEY SAND(SC)	115	9	0.1	40
⊙	B-24	10.0	SILTY SAND with GRAVEL(SM)	107	3	0.0	40

DIRECT SHEAR TEST (ASTM D3080)

Inland Foundation Engineering, Inc.

FIGURE NO. B-9

CLIENT ERSC
PROJECT NUMBER E080-058
PROJECT NAME EMWD Sub Area 4
PROJECT LOCATION Quail Valley Area
Menifee, CA

IFE SINGLE DIRECT SHEAR - GINT STD US LAB.GDT - 11/23/20 15:13 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

Table 1 - Laboratory Tests on Soil Samples

Inland Foundation Engineering
Quail Valley
Your #E080-058, HDR Lab #20-0551SCS
5-Oct-20

Sample ID			B-2 @ 2.5'	B-5 @ 9.5-10.5'	B-13 @ 0.5'-2.5'	B-16	B-23 @ 2-6'
Resistivity		**Units**					
as-received		ohm-cm	2,160,000	3,040	168,000	112,000	128,000
saturated		ohm-cm	1,000	920	2,880	3,480	2,600
pH			7.6	6.9	6.9	7.6	6.8
Electrical Conductivity		mS/cm	0.32	0.16	0.09	0.09	0.10
Chemical Analyses							
Cations							
calcium	Ca^{2+}	mg/kg	45	18	19	12	12
magnesium	Mg^{2+}	mg/kg	14	8.7	9.9	5.6	5.7
sodium	Na^{1+}	mg/kg	226	103	25	50	47
potassium	K^{1+}	mg/kg	18	22	13	13	11
Anions							
carbonate	CO_3^{2-}	mg/kg	72	ND	ND	ND	ND
bicarbonate	HCO_3^{1-}	mg/kg	619	198	171	189	159
fluoride	F^{1-}	mg/kg	9.3	14	9.6	2.8	5.0
chloride	Cl^{1-}	mg/kg	120	90	33	15	12
sulfate	SO_4^{2-}	mg/kg	160	72	19	42	31
phosphate	PO_4^{3-}	mg/kg	ND	ND	ND	ND	ND
Other Tests							
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	6.0	8.0	35	8.6	113
sulfide	S^{2-}	qual	na	na	na	na	na
Redox		mV	na	na	na	na	na

Resistivity per ASTM G187, Cations per ASTM D6919, Anions per ASTM D4327, and Alkalinity per APHA 2320-B.
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

431 West Baseline Road · Claremont, CA 91711
Phone: 909.962.5485 · Fax: 909.626.3316

Appendix D

GBA Important Information About Your Geoenvironmental Report

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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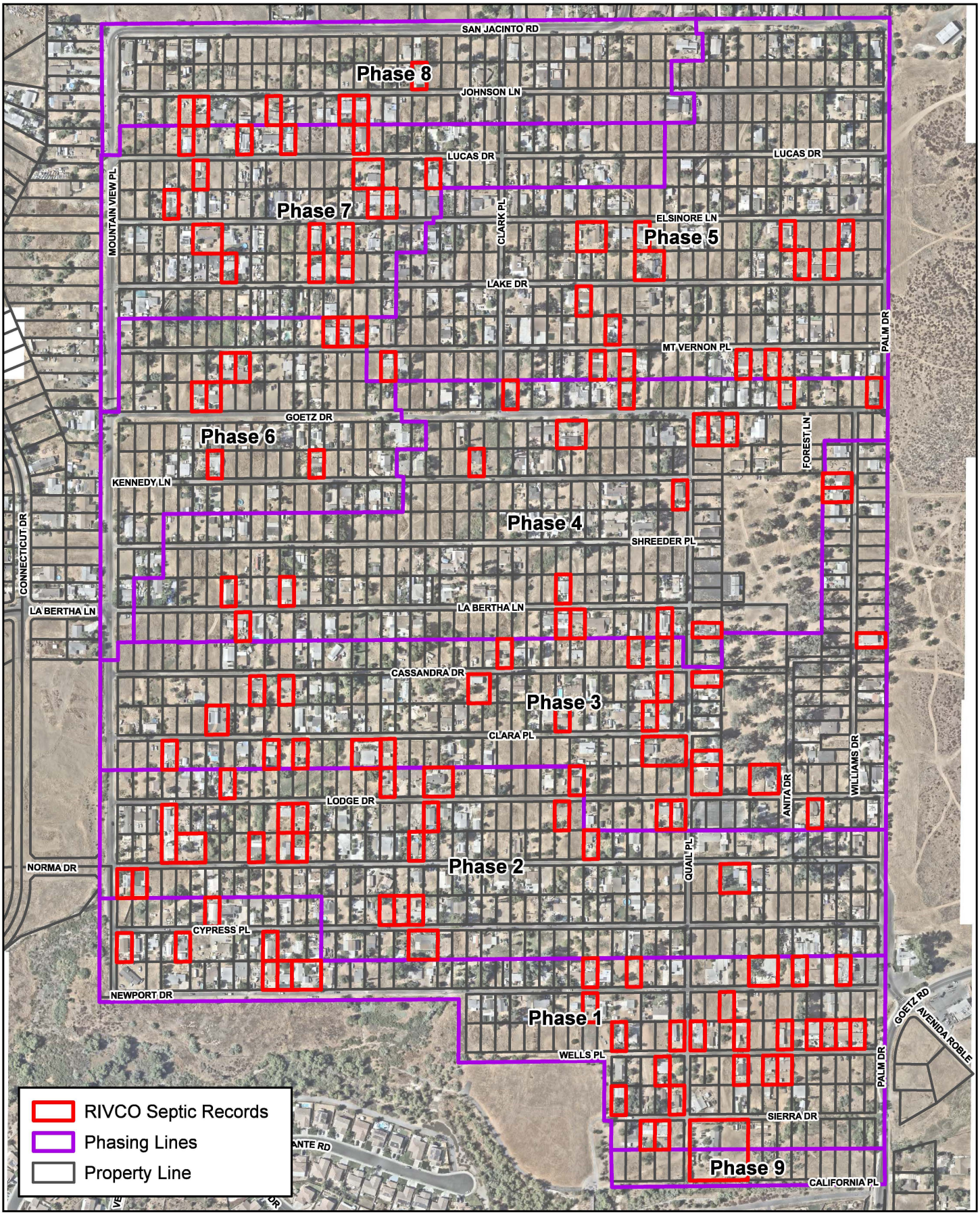
APPENDIX G – SEPTIC SYSTEM RECORDS



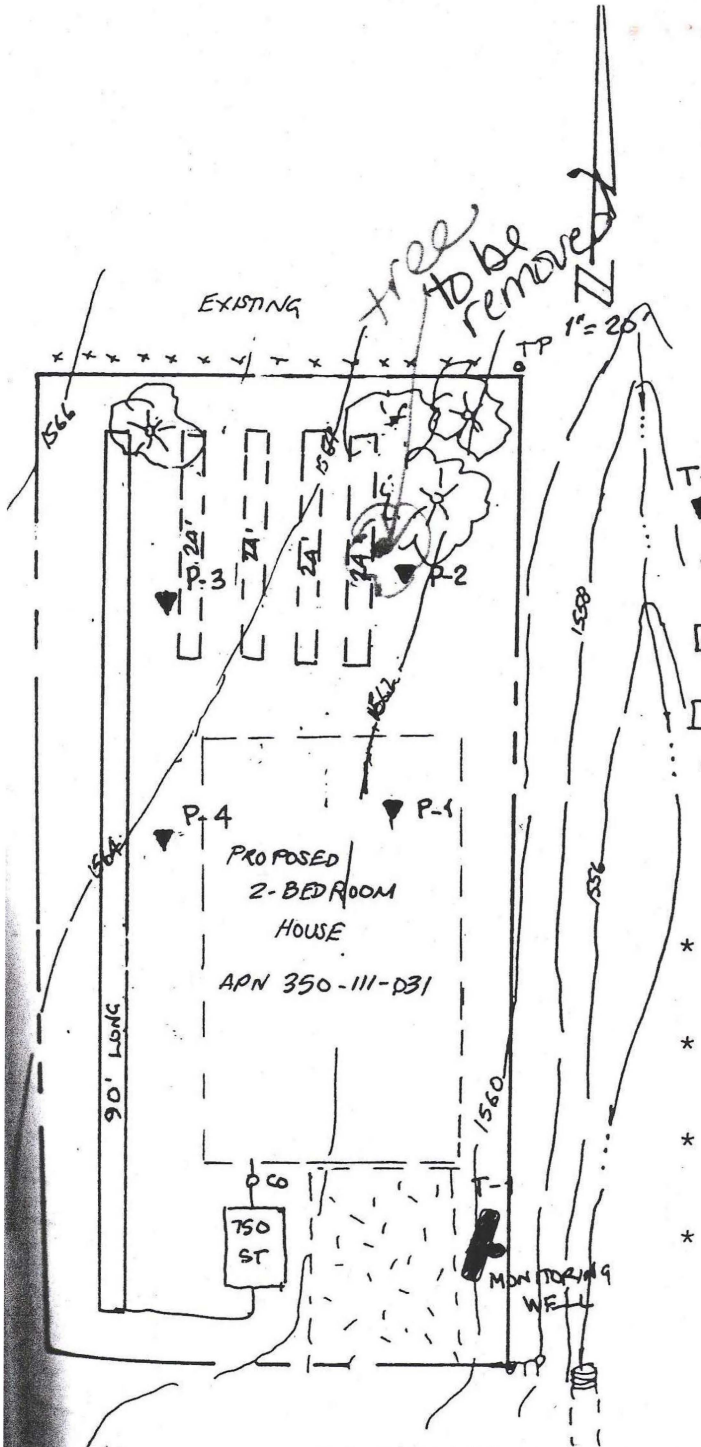
QUAIL VALLEY
SEPTIC TO SEWER CONVERSION

Michael Baker INTERNATIONAL

0 200 400 Feet

Source: ESRI, Michael Baker International

GIS Exhibit 7 - Parcels with County Records Received



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST LOCATION

PRIMARY LEACHING CHAMBERS

100% EXPANSION LEACHING CHAMBERS

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 45 SQUARE FEET IS 33⅓ SQUARE FEET OF ABSORPTION AREA.
* LEACHING CHAMBERS IS 90 LINEAR FEET OF 3 FOOT WIDE CHAMBERS.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

350·111·031

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

_____ Food
_____ Trailer Park
_____ Motel, Apt., Hotel
✓ Dwelling 2 bedroom max
_____ Commercial Building
_____ Swimming Pool

✓ Sewage Disposal plastic chambers
750 Gal. Septic Tank
270 Sq. Ft. of Leach Line
_____ No. ___ Dia ____ BI ____ TD ____ MD Seepage Pi
_____ Connection to Sewer
_____ Connect to Existing S.S.D.S.

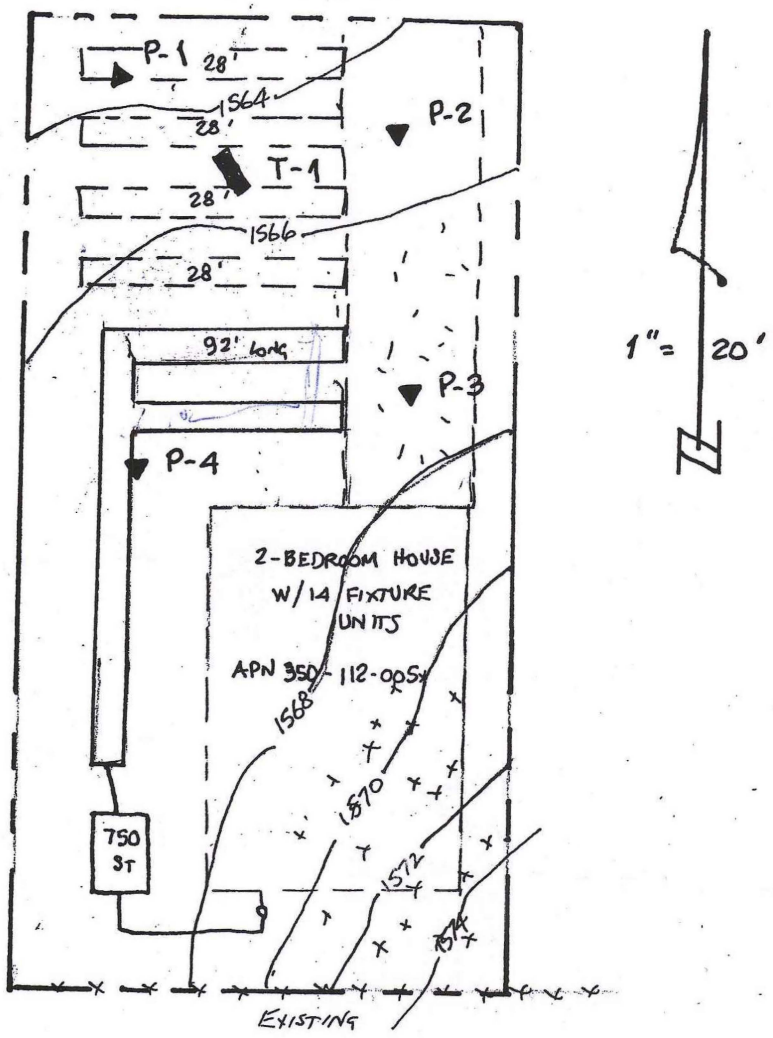
✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction. 2178 PLA

DATE 5·9·02 BY D. Pitt D. Pitt

E JOHNSON LANE

176
66
+10
-25
75
6W T-



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

HARD ROCK AREAS

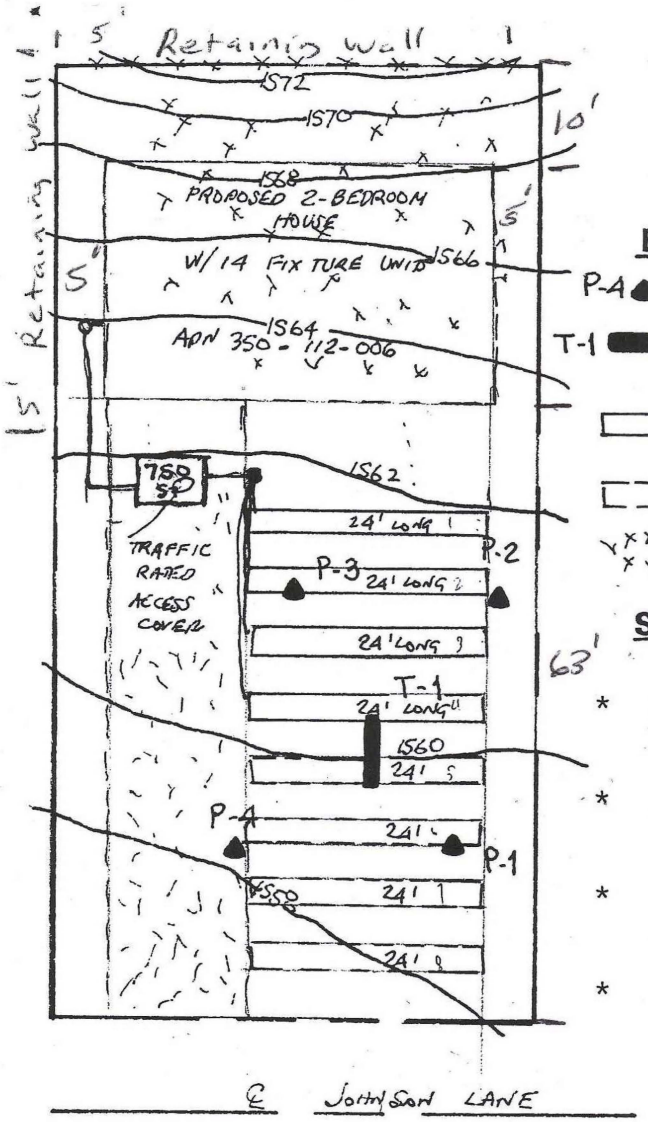
SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTURE UNITS REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 55 SQ. FT. IS 413 SQ. FT. OF ABSORPTION AREA.
* LEACH LINES WITH 3 FEET OF ROCK IS 83 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.
* 10% INCREASE FOR SLOPE/COVER FACTOR IS 92 LINEAR FEET.
* NO PORTION UNDER DRIVEWAYS, PORCHES, ETC.

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE 3/31/10
STATE of CALIFORNIA

23736-01 **PLATE 1**

APN 350 112 006



EXPLANATION

P-A ● PERCOLATION TEST

T-1 ▬ EXPLORATORY TRENCH

▭ PRIMARY LEACH LINES

▭ 100% EXPANSION LEACH LINES

× HARD ROCK AREAS

N

1" = 20'

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTURE UNITS REQUIRES 750 GALLON SEPTIC TANK.

* APPLICATION RATE OF 60 SQUARE FEET IS 450 SQUARE FEET OF ABSORPTION AREA.

* LEACH LINES WITH 3 FEET OF ROCK IS 90 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.

* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

PLANS ACCEPTABLE FOR APPLICATION PURPOSES ONLY

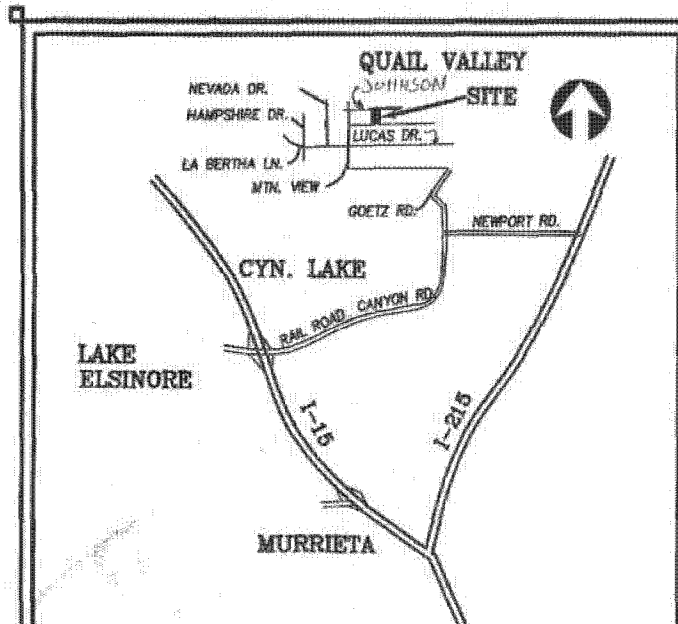
APR 21 2004

RIVERSIDE COUNTY PLANNING DEPARTMENT

BY: DEPUTY

PRECISE GRADING PLAN

PREPARED FOR:
LOT 11 & 12 OF MB 12/28 LAKE ELSNORE LODGE NO. 2
IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA
A.P.N.: 350-112-011 & 012



VICINITY MAP
NO SCALE
THOMAS GUIDE 2003-PAGE 837-E-7

EROSION CONTROL NOTE:

GRADING WHICH DISTURBS LESS THAN 1 ACRES SHALL PROVIDE EFFECTIVE CONTROL OF EROSION , SEDIMENT AND ALL OTHER POLLUTANTS FROM OCTOBER 15 THROUGH APRIL 15. THE PERMITTEE SHALL BE RESPONSIBLE FOR THE INSTALLATION AND MONITORING OF EFFECTIVE EROSION AND SEDIMENT CONTROLS. THIS SHALL INCLUDE BUT NOT NECESSARILY BE LIMITED TO THE FOLLOWING:

SANDBAGS (MINIMUM 2-HIGH) SHALL BE PLACED AT THE FLOWLINE DISCHARGE NEIGHBORING PARCELS OR PUBLIC OR PRIVATE RIGHT-OF-WAYS TO DISTILL THE SEDIMENTATION FROM THE HEREIN GRADING PROJECT. SUCH SEDIMENTATION SHALL BE REMOVED AS REQUIRED PRIOR TO THE ESTABLISHMENT OF PERMANENT EROSION CONTROL FACILITIES AND MATURED GROUNDCOVERS.

OWNER/APLLICANT

EVAN MAI
24867 MAITRI RD.
CORNA CA. 92883-5150
TEL: (909)-227-0120

REPRESENTATIVE/ENGINEER:

MR. ART BANANAL, R.C.E.
MEGALAND ENGINEERING & ASSOCIATES
28481 RANCHO CALIFORNIA RD. ,STE. 201
TEMECULA, CA 92590
TEL: (909) 695-5694
FAX: (909) 694-5084

AREA OF DISTURBANCE

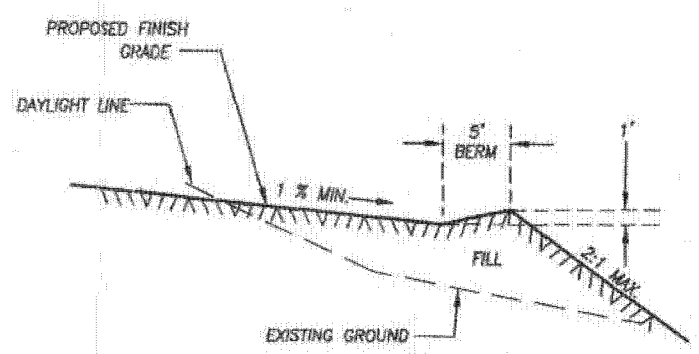
AREA: 10,000 S.F.
ACREAGE: .23

EARTHWORK QUANTITIES

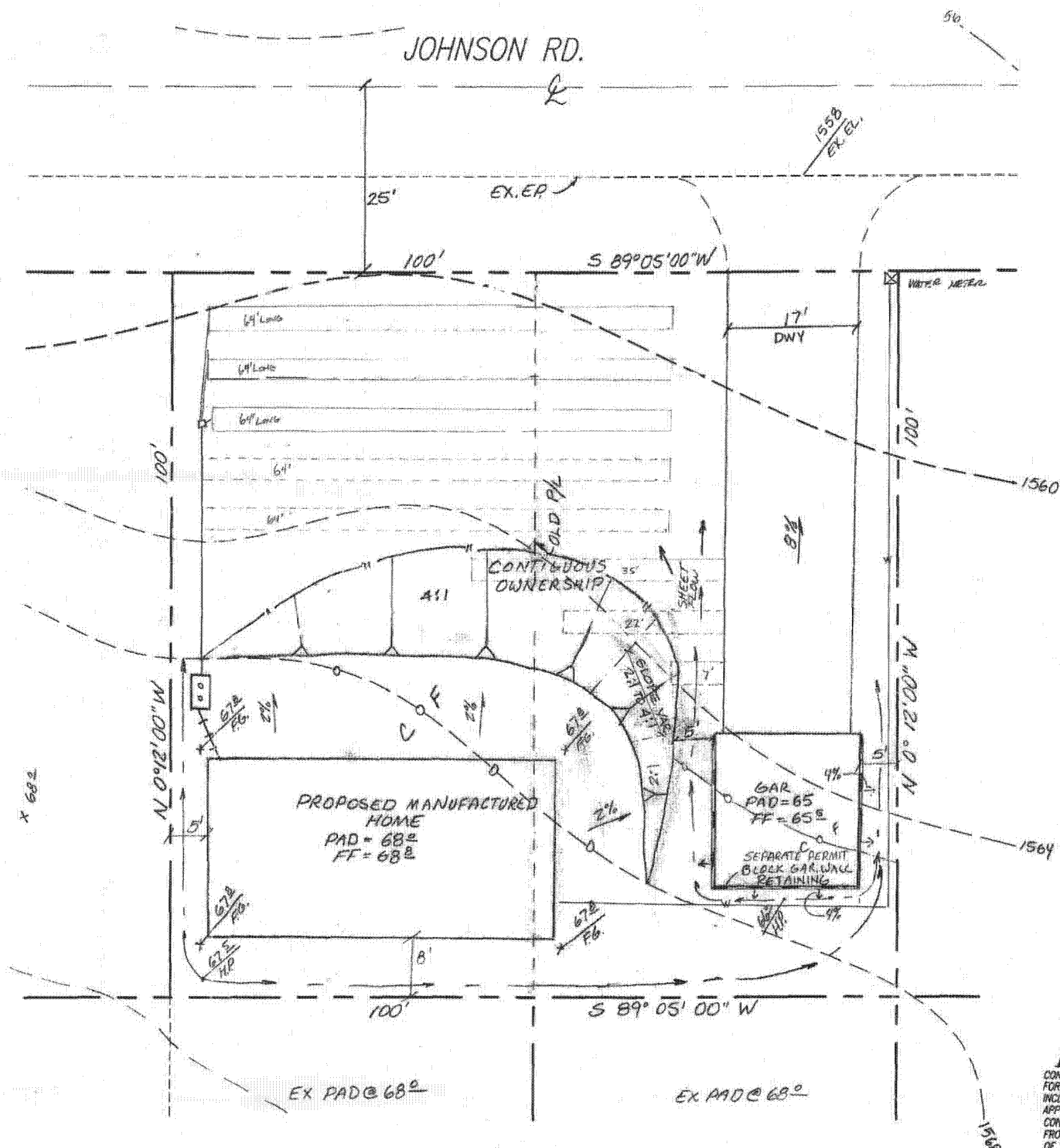
RAW CUT: 544 C.Y.
RAW FILL: 544 C.Y.
SITE BALANCE: -0- C.Y.

NOTE: CONTRACTOR/OWNER TO VERIFY EARTHWORK

10 0 5 10 20 40
1"=10'
GRAPHIC SCALE
CONTOUR INTERVAL = 4'



EARTHEN BERM DETAIL
NOT TO SCALE



COUNTY OF RIVERSIDE GRADING NOTES:

1. ALL GRADING SHALL CONFORM TO THE UNIFORM BUILDING CODE, APPENDIX CHAPTER 33, AS AMENDED BY ORDINANCE NO. 457.
2. ALL PROPERTY CORNERS SHALL BE CLEARLY DELINEATED IN THE FIELD PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION/GRADING.
3. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHOULD BE PROVIDED TO PREVENT PONDING WATER DAMAGE TO ADJACENT PROPERTIES.
4. DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS.
5. NO FILL SHALL BE PLACED ON EXISTING GROUND UNTIL THE GROUND HAS BEEN CLEARED OF WEEDS, DEBRIS, TOPSOIL, AND OTHER DELETERIOUS MATERIAL.
6. MAXIMUM CUT AND FILL SLOPE = 2:1.
7. STABILITY CALCULATIONS WITH A FACTOR OF AT LEAST ONE AND FIVE TENTH (1.5) SHALL BE SUBMITTED BY A SOILS ENGINEER TO THE BUILDING AND SAFETY DEPARTMENT FOR CUT AND FILL SLOPES OVER 30" IN VERTICAL HEIGHT.
8. PROVIDE 5' WIDE BY 1' HIGH BERM, OR EQUIVALENT, ALONG THE TOP OF ALL FILL SLOPES OVER 5' HIGH.
9. PROVIDE A BROW DITCH DESIGNED TO HANDLE 100 YR. Q STORM FLOWS, ALONG THE TOP OF CUT SLOPES.
10. MINIMUM BUILDING PAD AND DRAINAGE SWALE SLOPE SHALL BE = 1% IF CUT OR FILL IS LESS THAN 10', 2% IF CUT OR FILL IS GREATER THAN 10'. DRAINAGE SWALES SHALL BE A MINIMUM OF 0.2' DEEP AND BE CONSTRUCTED A MINIMUM OF 2' FROM THE TOP OF CUT OR FILL SLOPES.
11. NO OBSTRUCTION OF FLOOD PLAINS OR NATURAL WATER COURSES SHALL BE PERMITTED.
12. ALL EXISTING DRAINAGE COURSES ON THE PROJECT SITE MUST CONTINUE TO FUNCTION, ESPECIALLY DURING STORM CONDITIONS. PROTECTIVE MEASURES AND TEMPORARY DRAINAGE PROVISIONS MUST BE USED TO PROTECT ADJOINING PROPERTIES DURING GRADING OPERATIONS.
13. FINISH GRADE SHALL BE SLOPED AWAY FROM ALL EXTERIOR WALLS AT NOT LESS THAN 1/2" PER FOOT FOR A MINIMUM OF 3'.
14. CUT AND FILL SLOPES EQUAL TO OR GREATER THAN 3' IN VERTICAL HEIGHT SHALL BE PLANTED WITH GRASS OR GROUND COVER TO PROTECT THE SLOPE FROM EROSION AND INSTABILITY IN ACCORDANCE WITH ORDINANCE NO. 457 PRIOR TO FINAL GRADING INSPECTION.
15. EROSION CONTROL: ALL SLOPES REQUIRED TO BE PLANTED SHALL BE PROVIDED WITH ROSEA ICE PLANT (OR EQUAL) GROUND COVER AT 12" ON CENTER. SLOPES EXCEEDING 15' IN VERTICAL HEIGHT SHALL BE PLANTED WITH APPROVED TREES SPACED NOT TO EXCEED 20' ON CENTER OR SHRUBS NOT TO EXCEED 10', OR A COMBINATION OF SHRUBS AND TREES NOT TO EXCEED 15' IN ADDITION TO A GRASS MIX OR GROUND COVER. SLOPES EXCEEDING 4' IN VERTICAL HEIGHT SHALL BE PROVIDED WITH AN IN-GROUND IRRIGATION SYSTEM. SLOPES EQUAL TO OR LESS THAN 4', MAY BE IRRIGATED BY HOSE BIB LOCATED AT THE TOP OR TOE OF THE SLOPE, SPACED TO MAKE USE OF A HOSE NO LONGER THAN 50' IN LENGTH. THE IRRIGATION SYSTEM SHALL BE PROVIDED WITH AN APPROPRIATE BACKFLOW DEVICE PER U.P.C., CHAPTER 10.
16. ALL GRADING SHALL BE DONE IN CONFORMANCE WITH RECOMMENDATIONS OF THE PRELIMINARY SOILS REPORT BY ____________, DATED ________. TWO SETS OF THE FINAL COMPACTION REPORT SHALL BE SUBMITTED TO THE BUILDING AND SAFETY DEPARTMENT WHICH SHALL INCLUDE FOUNDATION DESIGN RECOMMENDATIONS & CERTIFICATION THAT GRADING HAS BEEN DONE IN CONFORMANCE WITH THE RECOMMENDATIONS OF THE SITE INVESTIGATION REPORT.
17. IF STEEP SLOPING TERRAIN OCCURS UPON WHICH FILL IS TO BE PLACED, IT MUST BE CLEARED, KEYED, AND BENCHED INTO FIRM NATURAL SOIL FOR FULL SUPPORT. PREPARATION SHALL BE APPROVED BY A SUITABLY QUALIFIED AND REGISTERED PROFESSIONAL PRIOR TO PLACEMENT OF FILL MATERIAL.
18. ALL GRADING SHALL BE DONE UNDER THE SUPERVISION OF A COMPETENT SOILS ENGINEER WHO SHALL CERTIFY THAT ALL FILL HAS BEEN PROPERLY PLACED AND WHO SHALL SUBMIT A FINAL COMPACTION REPORT FOR ALL FILLS OVER 1' DEEP.
19. FINAL COMPACTION REPORT WILL BE REQUIRED FOR ALL FILLS GREATER THAN 1' DEEP.
20. A SUITABLY QUALIFIED AND REGISTERED PROFESSIONAL SHALL SUBMIT TO THE BUILDING AND SAFETY DEPARTMENT WRITTEN CERTIFICATION OF COMPLETION OF ROUGH GRADING IN ACCORDANCE WITH THE APPROVED GRADING PLAN PRIOR TO REQUESTING INSPECTION AND ISSUANCE OF THE BUILDING PERMIT. CERTIFICATION SHALL INCLUDE LINE, GRADE, ELEVATION AND LOCATION OF CUT/FILL SLOPE.
21. A SUITABLY QUALIFIED AND REGISTERED PROFESSIONAL SHALL SUBMIT CERTIFICATION OF BUILDING PAD ELEVATION. WHERE SPECIFIC ELEVATIONS ARE REQUIRED, THE ELEVATION (WITH RESPECT TO MEAN SEA LEVEL) SHALL BE GIVEN. IF AN ELEVATION WITH RESPECT TO ADJACENT GROUND SURFACE IS REQUIRED, THE ACTUAL DISTANCE ABOVE THE ADJACENT GROUND SHALL BE GIVEN.
22. A SUITABLY QUALIFIED AND REGISTERED PROFESSIONAL SHALL SUBMIT TO THE BUILDING AND SAFETY DEPARTMENT WRITTEN CERTIFICATION OF COMPLETION OF FINAL GRADING IN ACCORDANCE WITH THE APPROVED PLANS FOR ALL GRADING DESIGNATED AS "ENGINEERED GRADING".
23. THE CONTRACTOR SHALL NOTIFY THE DISTRICT BUILDING AND SAFETY DEPARTMENT AT LEASE 24 HOURS IN ADVANCE REQUESTING FINISH LOT GRADE AND DRAINAGE INSPECTION. THIS INSPECTION MUST BE APPROVED PRIOR TO BUILDING PERMIT FINAL INSPECTION FOR EACH LOT.
24. CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT, AT LEAST 48 HOURS PRIOR TO DIGGING AT (800) 422-4133.

ENGINEER'S NOTE:

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPT FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

SOURCE OF TOPOGRAPHY

RIVERSIDE COUNTY FLOOD CONTROL

COUNTY OF RIVERSIDE DEPARTMENT OF BUILDING & SAFETY APPROVED
REVIEWED BY 3/01/04
Approval of these plans shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of the state or county laws. This set of plans must be kept on the job until completion.

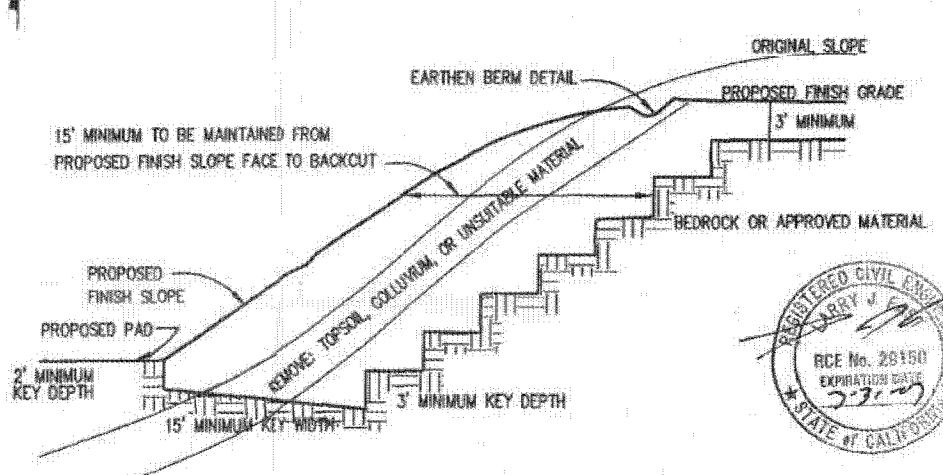
Grading
P. Neal

BGR# 031147

BGR 031147 / PERMITTEE

LEGEND:

Symbol	Meaning
ø— 1333	PROPOSED ELEVATION
x— 1333	EXIST. ELEVATION (SURVEY SHOTS)
C/F	CUT/FILL LINE
—(100)—	EXISTING CONTOUR
R/W	RIGHT OF WAY
P/L	PROPERTY LINE
CL	CENTERLINE
H.P.	HIGH POINT
L.P.	LOW POINT
FL	FLOWLINE
FS	FINISH SURFACE
FF	FINISH FLOOR
V V	2:1 SLOPE (UNLESS OTHERWISE NOTED)
V V	EXISTING SLOPE



CONTOUR GRADING AND BENCHING
NOT TO SCALE

REGISTERED CIVIL ENGINEER LARRY J. [illegible] RCE No. 28150 EXPIRATION DATE 3-31-07 STATE of CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER ARTURO M. BANANAL No. 36117 Exp. 6/30/04 CIVIL STATE OF CALIFORNIA

DIGALERT
DIAL TOLL FREE 1-800-422-4133
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

BENCHMARK
COUNTY OF RIV. M-50.69 AT QUAIL VALLEY 40' N OF GOETZ RD 27' S OF S.W. COR OF RIV. CO. FIRE STATION. 3' E OF W. END OF PLANTER BOX. BRASS DISC. ELEV. 1551.27

REVISIONS

SEAL: COUNTY

SEAL: REGISTERED PROFESSIONAL ENGINEER ARTURO M. BANANAL No. C 36117 Exp. 06/30/04 CIVIL STATE OF CALIFORNIA

PREPARED BY:
ARTURO M. BANANAL, REGISTERED CIVIL ENGINEER NO. 36117 EXP. 06/30/04

APPROVED BY: ____________
RIVERSIDE CO. CALIF. FOR TRANSPORTATION DEPT.

DATE: ____________

SCALE
Horizontal: AS SHOWN
Vertical: N/A

MEGALAND ENGINEERS & ASSOCIATES
CIVIL ENGINEERS*PLANNERS*ARCHITECTS*SURVEYORS
28481 Rancho California Rd., Ste 201 * Temecula * CA * 92590
TEL # (909) 695-5694 FAX # (909) 695-5084

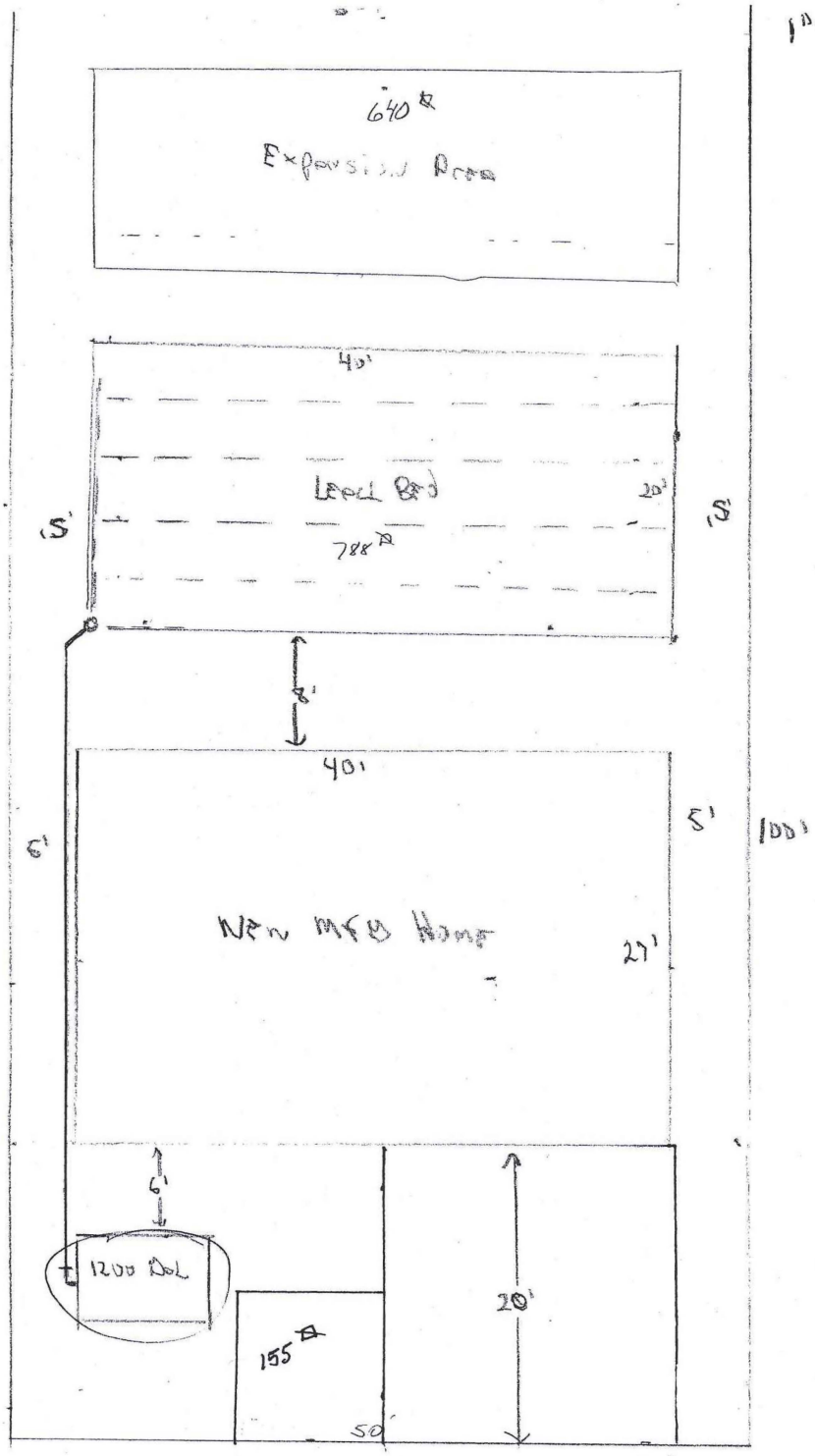
COUNTY OF RIVERSIDE
PRECISE GRADING PLAN
FOR
SINGLE FAMILY RESIDENCE
LOT 11 & 12 OF MB 12/28 LODGE NO. 2
APN :350-112-011 & 012

1 OF 1 SHEETS

EVAN MAI JOB# 069-02

Wayne C. Rice
C42 583643
8-26-06

1" = 10'



350 112 016

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

~~Dana Johnson Lane~~ Diamond Valley Rd.

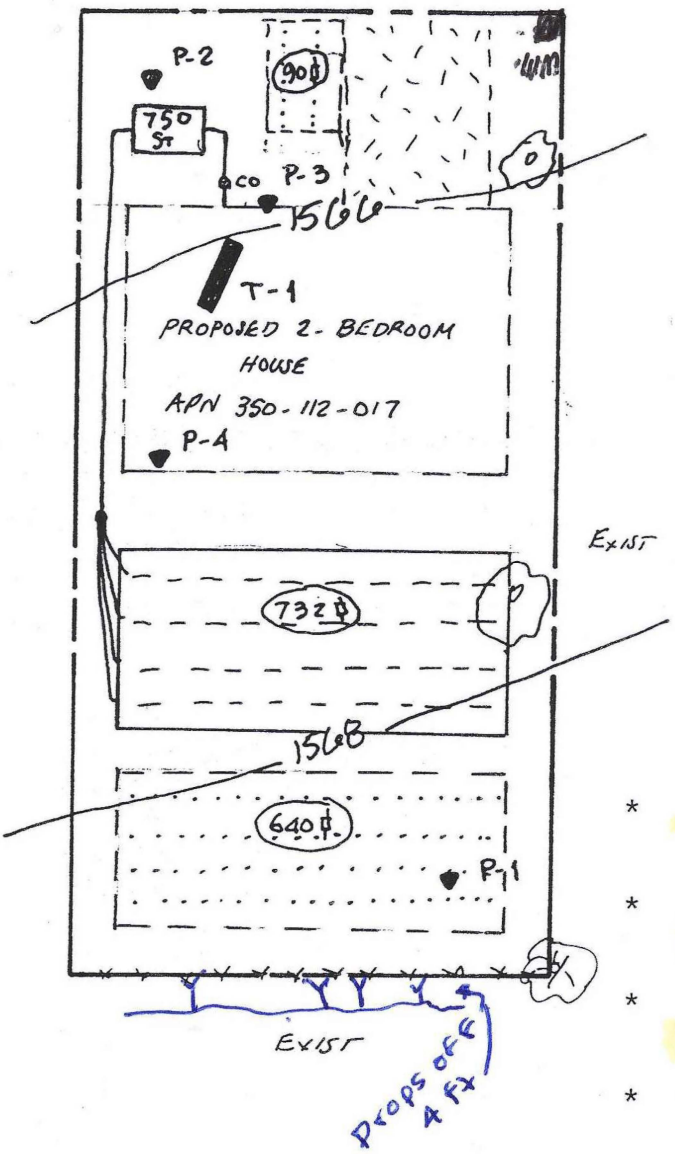
350-112-016

✓ Dwelling 2/14
___ Commercial
___ Seepage Pits
___ Connect To Sewer

1200 Gal. Septic Tank Apps choice > Existing
788 Sq. Ft. Of Leach ~~Line~~ BED
___ No. Dia ___ BI ___ TD ___ MD ___
✓ Connect To Existing System

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 8/26/06 EHS _____



1" = 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 65 SQUARE FEET IS 488 SQUARE FEET OF ABSORPTION AREA.
* LEACH BEDS WITH 1.5 FEET OF ROCK IS 732 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

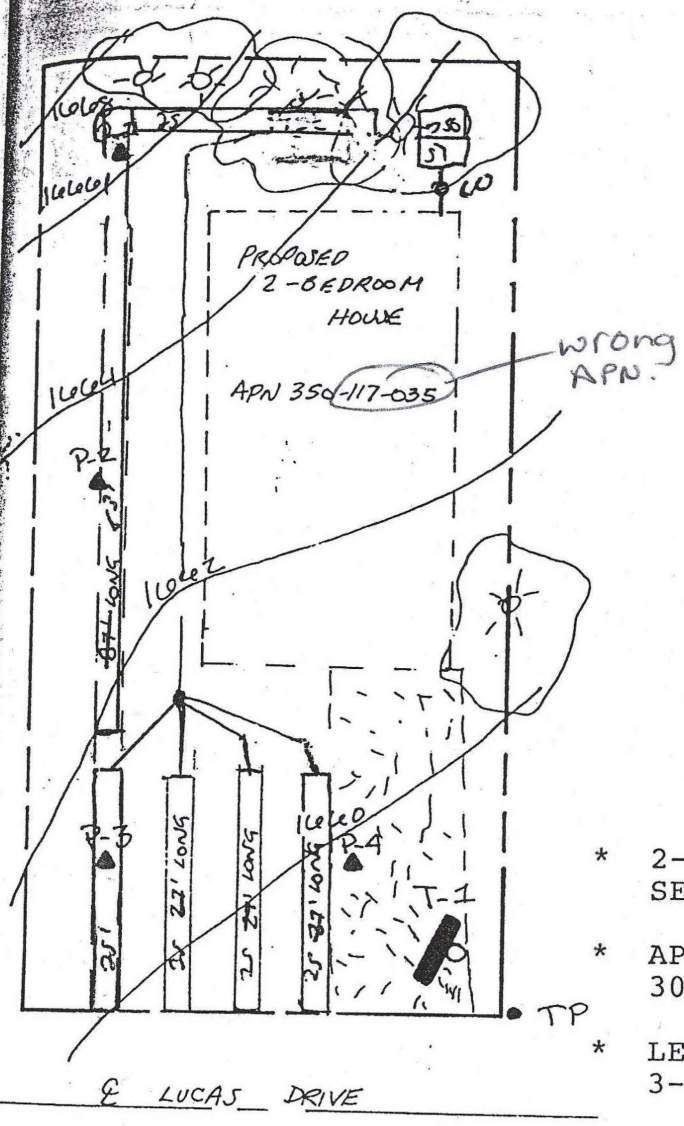
✓ Dwelling 2 BDRM — 750 Gal. Septic Tank
___ Commercial — 732 Sq. Ft. of Leach ~~Line~~ BED
___ Seepage Pits — ___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer — ___ Connect to Existing System

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 8/15/03 EHS _____

REGISTERED CIVIL ENGINEER LARRY L. FAHL RCE No. 28150 EXPIRATION DATE 3-31-05 STATE of CALIFORNIA

23456-01 **PLATE 1**



1"=20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACHING CHAMBERS

100% EXPANSION LEACHING CHAMBERS.

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 40 SQUARE FEET IS 300 SQUARE FEET OF ABSORPTION AREA.
* LEACHING CHAMBERS IS 80 LINEAR FEET OF 3-FOOT WIDE CHAMBER.
* NO PORTION OF SYSTEM UNDER DRIVEWAYS, ETC.

350 112035

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

____Food	✓ Sewage Disposal
____Trailer Park	750 Gal. Septic Tank 5 chamber per Line
____Motel, Apt., Hotel	240 Sq. Ft. of Leach Line
✓ Dwelling 2bdrm	____No. ___Dia____BI____TD____MD Seepage Pit
____Commercial Building	____Connection to Sewer
____Swimming Pool	____Connect to Existing S.S.D.S.

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.

✓ Water supply serving this installation must be from an approved source

✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.

✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.

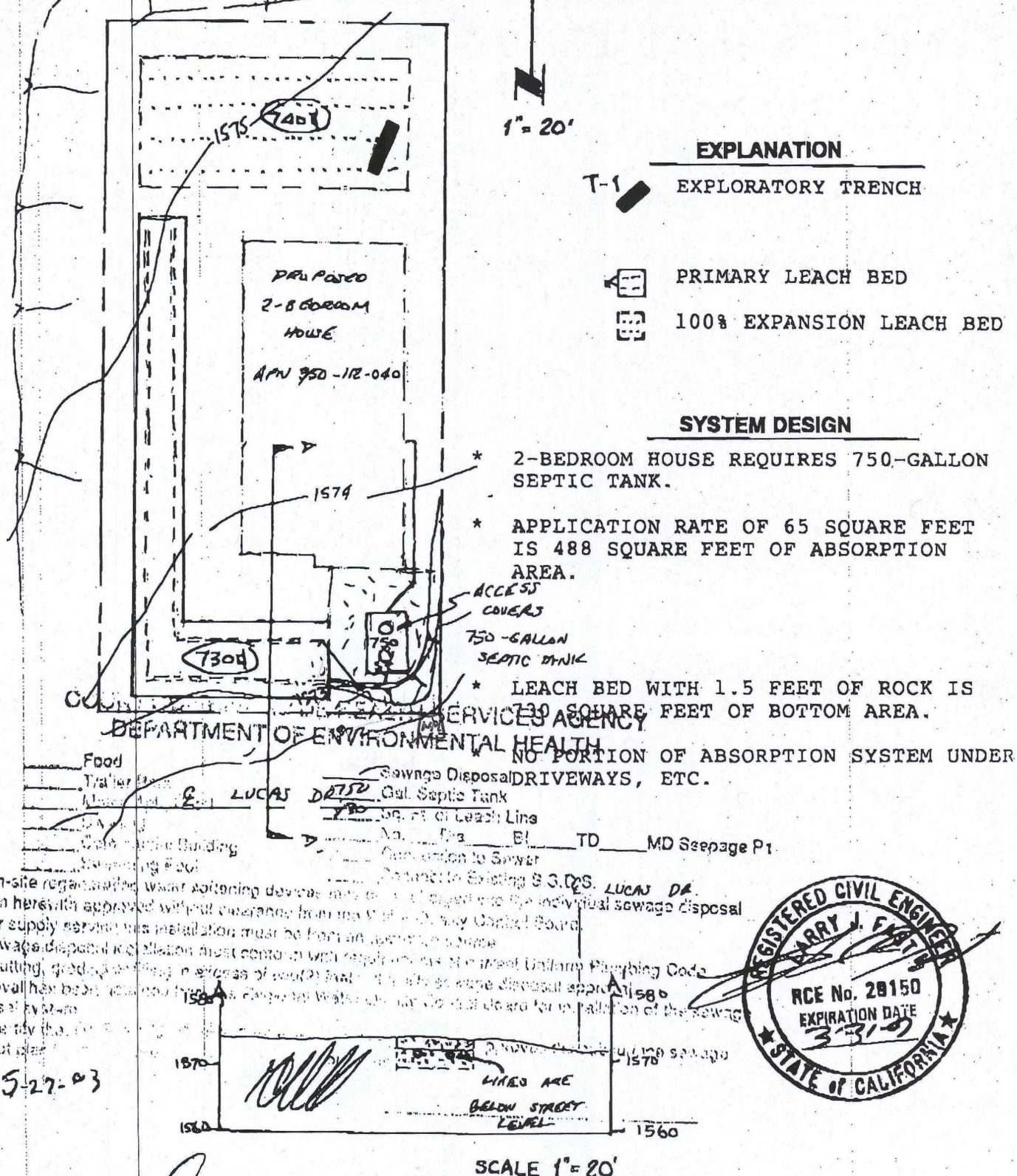
✓ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 5feb03 BY [signature]

23116-01 **PLATE 1**

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/~~leachline~~ trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes.



EXPLANATION

T-1 EXPLORATORY TRENCH

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 65 SQUARE FEET IS 488 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 1.5 FEET OF ROCK IS 730 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

COUNTY SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

Food
Trailer
E. LUCAS DRIVE
Sewage Disposal
Gal. Septic Tank
Lin. Ft. of Leach Line
No. ___ Dia ___ Bl ___ TD ___ MD Seepage Pit
Connection to Sewer
Connect to Existing S.D.S. LUCAS DR.

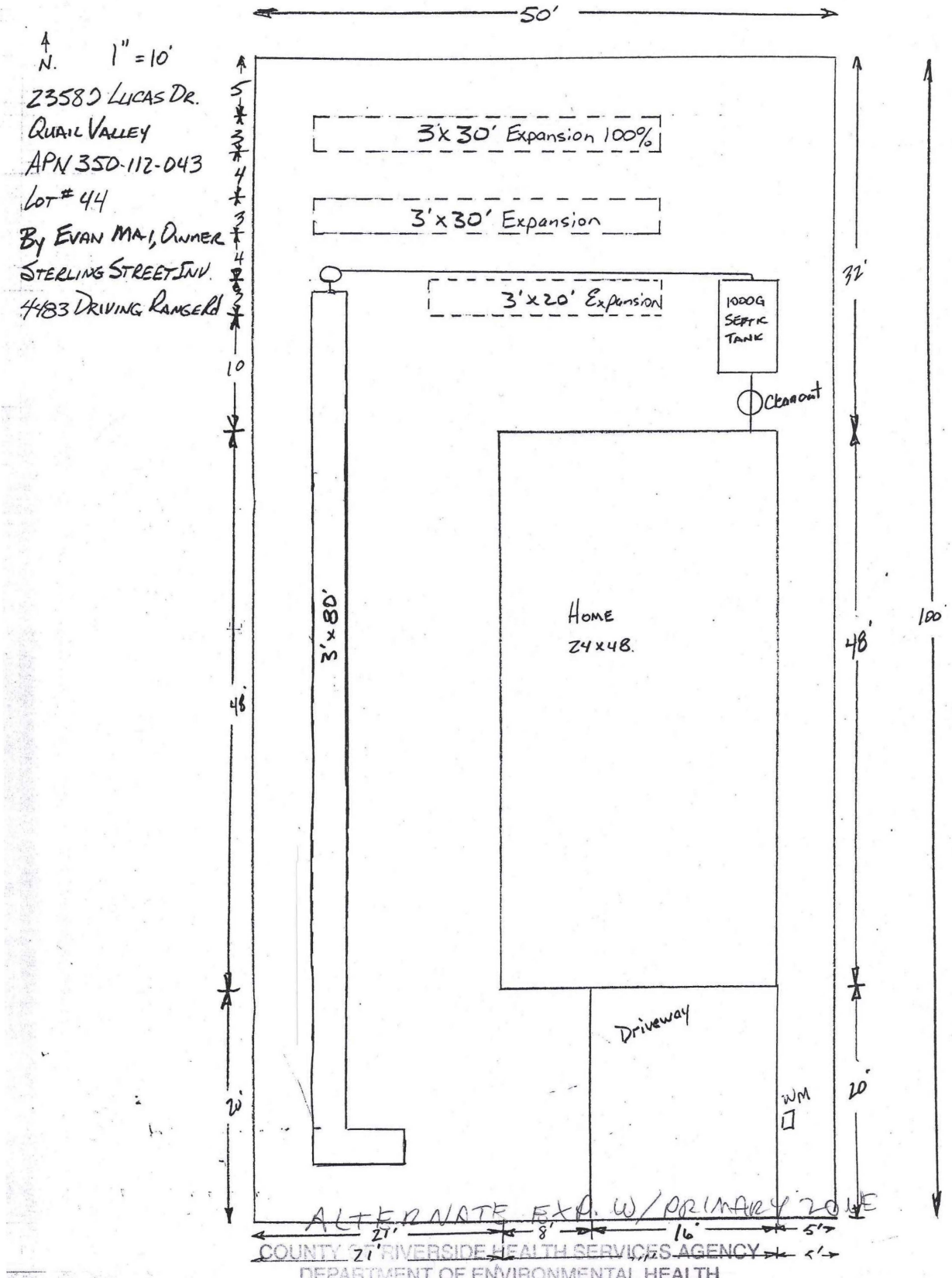
No on-site regenerative water softening devices shall be connected to individual sewage disposal system herewith approved without clearance from the Santa Ana Regional Water Quality Control Board.
Water supply service for this installation must be from an approved source.
No sewage disposal installation shall come in contact with any part of the Uniform Plumbing Code.
Any cutting, grading or filling in excess of 50 cubic yards will require a grading permit.
Approval has been given to Water Quality Control Board for use of disposal system.
This is to certify that the disposal plot plan

DATE 5-27-03

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 28150
EXPIRATION DATE 3-31-05
STATE of CALIFORNIA

350-112-040

Revised 5/25/03
28402-01 PLATE 1



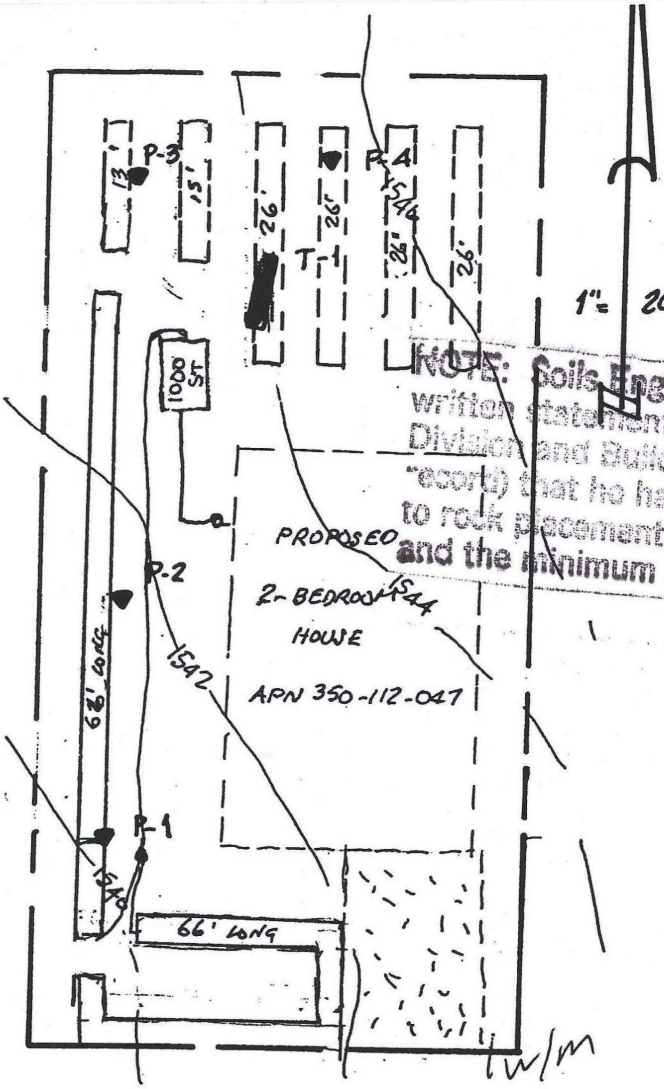
COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

____Food	✓ Sewage Disposal
____Trailer Park	1000 Gal. Septic Tank
✓ Motel, Apt., Hotel	20 Sq. Ft. of Leach Line 36" DEEP ROCK
____Dwelling	____No. ____Dia ____BI ____TD ____MD Seepage Pit
____Commercial Building	____Connection to Sewer
____Swimming Pool	____Connect to Existing S.S.D.S.

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
✓ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 3/31/03 BY D. Villalta



NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health Services Division and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leaching trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes.

EXPLANATION

T-1	EXPLORATORY TRENCH
P-4	PERCOLATION TEST
	PRIMARY LEACH LINES
	100% EXPANSION LEACH LINES

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 1000-GALLON SEPTIC TANK.
* APPLICATION RATE OF 60 SQ. FT. IS 600 SQ. FT. OF ABSORPTION AREA.
* UTILIZING LEACH LINES WITH 3 FEET OF ROCK IS 120 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.
* 10% INCREASE FOR SLOPE FACTOR IS 132 LINEAR FEET OF TRENCH.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVE-WAYS, ETC.

E LUCAS DRIVE

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

1.1. overlaps

✓ Dwelling	1000 Gal. Septic Tank
___ Commercial	660 Sq. Ft. of Leach Line
___ Seepage Pits	___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer	___ Connect to Existing System

36" Rock Below Line

Revised 12/03

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.

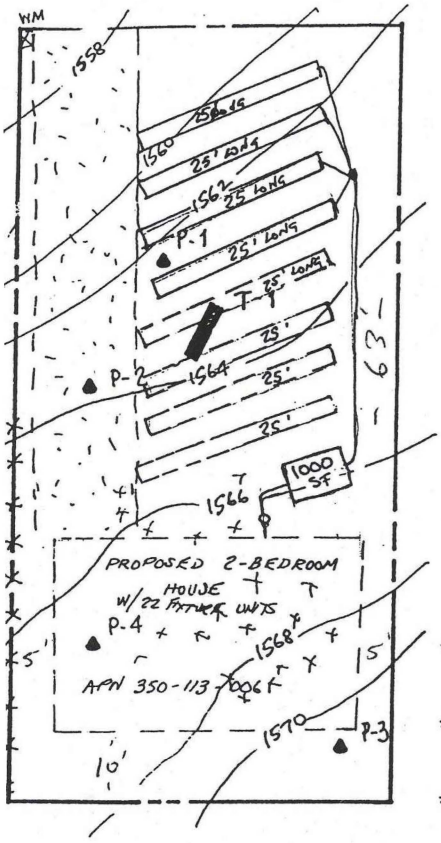
___ All sewage disposal installation shall conform to the current UPC

___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 4/22/04 EHS

23451-01 **PLATE 1**

8 LUCAS DRIVE



1"= 20'

EXPLANATION

T-1 ▬ EXPLORATORY TRENCH

P-4 ▲ PERCOLATION TEST

▭ PRIMARY LEACH LINES

▭ 100% EXPANSION LEACH LINE

HARD ROCK AREAS

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 22 FIXTURE UNITS REQUIRES 1000-GALLON SEPTIC TANK.

* APPLICATION RATE OF 50 SQUARE FEET IS 500 SQUARE FEET OF ABSORPTION AREA.

* LEACH LINES WITH 3 FEET OF ROCK IS 100 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.

* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

350-113-006

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

X Dwelling 3Bed — 1000 Gal. Septic Tank — 4 lines 25'/ea
___ Commercial — 500 Sq. Ft. of Leach Line — w/36" of rock
___ Seepage Pits 23 — ___No.___Dia___BI___TD___MD
___ Connect to Sewer — ___Connect to Existing System

X No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
X All sewage disposal installation shall conform to the current UPC
X Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 12/3/03 EHS M.A. Mendoza

Revised 11/03
23432-01 PLATE 1

PLOT PLAN

NAME RAYMOND PHONE # (909) 929-1817

SIT ADDRESS 23671 LUCAS DR, QUAIL VALLEY

TRACT/PARCEL MAP Rick Elsworth Lodge Blk 2

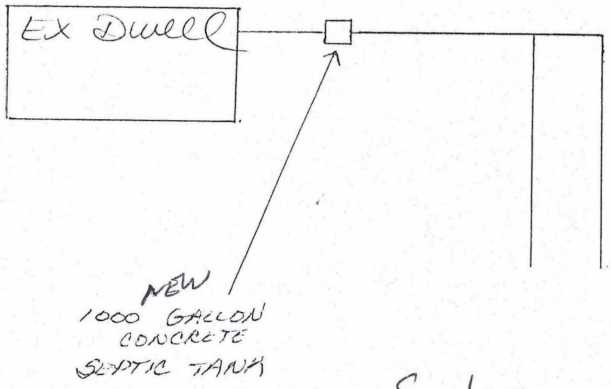
ASSESSORS PARCEL NUMBER 350-113-017

PROVIDE NORTH ARROW

REAR PROPERTY LINE

NOT TO SCALE

SIDE PROPERTY LINE



Replacement System

350-113-017

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

"AS BUILT"

_____Food
_____Trailer Park
_____Motel, Apt., Hotel
__/__Dwelling
_____Commercial Building
_____Swimming Pool

_____Sewage Disposal
_____Gal. Septic Tank
_____Sq. Ft. of Leach Line
_____No. ___Dia____Bl____TD____MD Seepage Pit
_____Connection to Sewer
__/__Connect to Existing S.S.D.S.

___No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
__/__Water supply serving this installation must be from an approved source
__/__All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
__/__Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
__/__Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

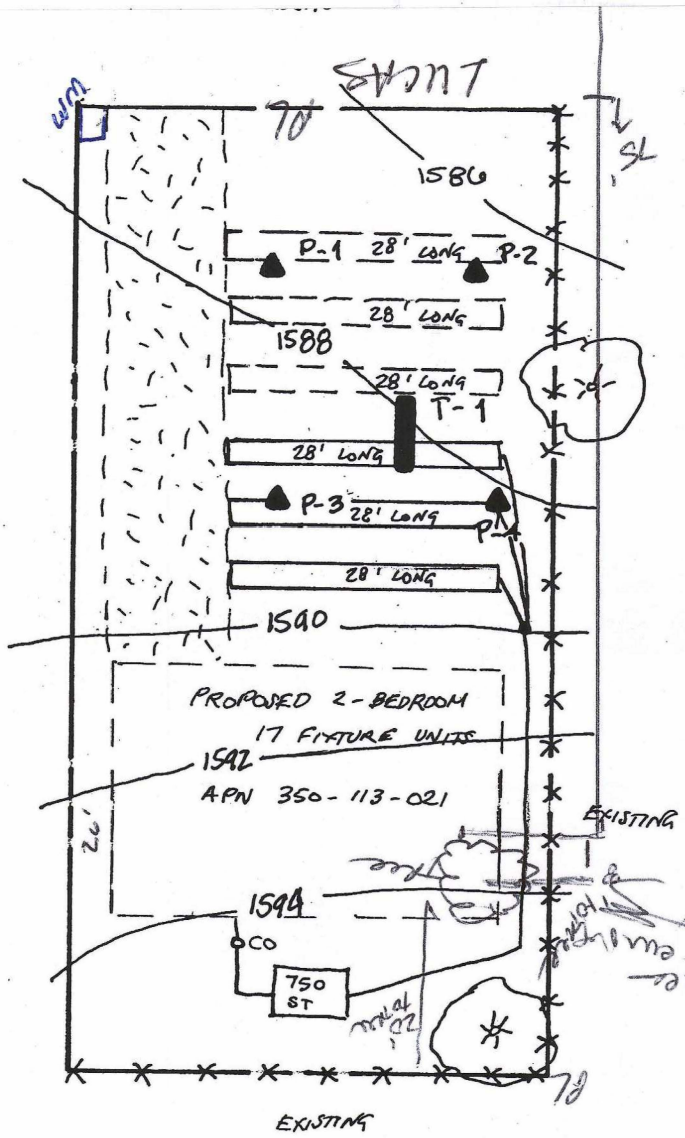
DATE 6/21/96 BY _____

PLANS ACCEPTABLE FOR APPLICATION PURPOSES ONLY
JUL 21 1996
RIVERSIDE COUNTY PLANNING DEPARTMENT
BY:

FRONT PROPERTY LINE

LUCAS DR.

STREET



1" = 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 17 FIXTURE UNI REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 55 SQUARE FEET IS 412 SQUARE FEET OF ABSORPTION AREA
* UTILIZING 3-FEET OF ROCK REQUIRES 82 LINEAR FEET OF 3-FOOT WIDE LEACH LINE
* NO PORTION OF ABSORPTION SYSTEM BENEATH DRIVEWAYS, ETC.

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal
250 Gal. Septic Tank
248 Sq. Ft. of Leach Line
__No.__Dia__BI__TD__MD
__Connect to Existing System

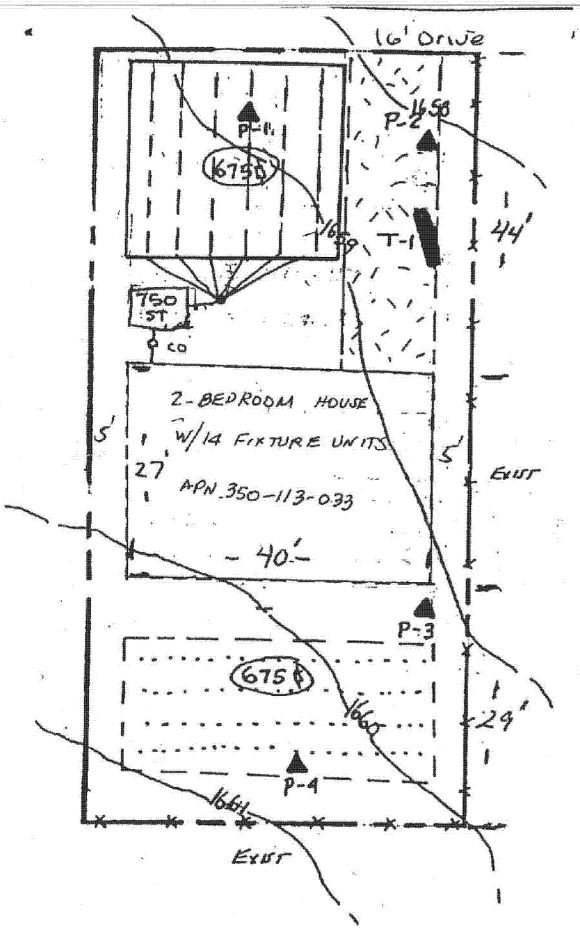
__Dwelling
__Commercial
__Seepage Pits
__Connect to Sewer

__No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
__All sewage disposal installation shall conform to the current UPC
__Any structure in the area of the proposed [illegible] shall require a new approval by this Dept.
Date: 4/24/03
PRS

REGISTERED CIVIL ENGINEER
ANTHONY J. FAZIO
No. 28150
EXPIRATION DATE
3-31-07
STATE of CALIFORNIA

350-113-021

23632-01 **PLATE 1**



EXPLANATION

T-1 ▬ EXPLORATORY TRENCH

P-4 ▲ PERCOLATION TEST LOCATION

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 60 SQUARE FE IS 450 SQUARE FEET OF ABSORPTION AREA
* LEACH BED WITH 1.5 FEET OF ROCK IS 675 SQUARE FEET OF BOTTOM ARE
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

PLANS ACCEPTABLE FOR APPLICATION PURPOSES ONLY

MAR 22 2004

RIVERSIDE COUNTY PLANNING DEPARTMENT

BY: Franklin Stuart

Revised 3/15/04

23159-01 **PLATE 1**

350-113-033

COUNTY OF RIVERSIDE

DEPARTMENT OF ENVIRONMENTAL HEALTH

Sewage Disposal

✓ (14FU) **Dwelling** 4 people — Leach Bed

__ **Commercial**

__ **Seepage Pits**

__ **Connect to Sewer**

750 **Gal. Septic Tank**

450 **Sq. Ft. of Leach Line**

__ No.__ Dia__ BI__ TD__ MD 1.5 ft Rock

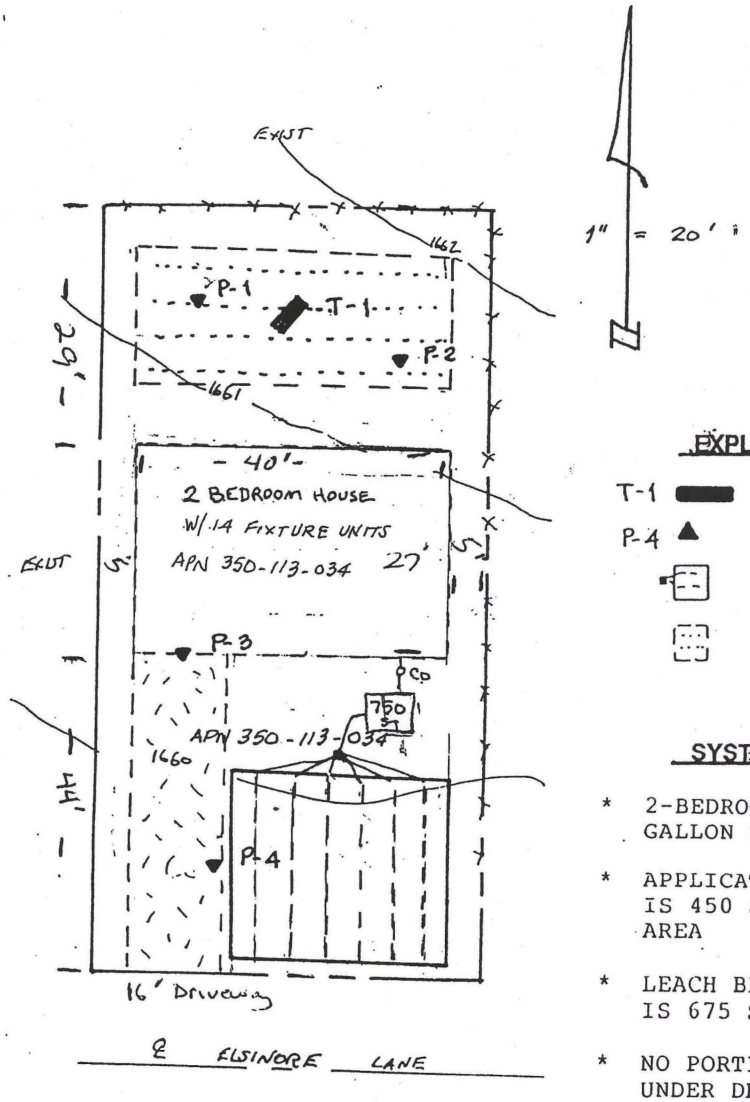
__ Connect to Existing System required

✓ **No on-site water softening devices shall be discharged into the septic system unless clearance from the Calif. Regional Water Quality Control Board.**

✓ **All sewage disposal installation shall conform to the current UPC**

✓ **Any existing [illegible] shall be [illegible]**

Date 4/5/04



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST LOCATION

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 60 SQUARE FEET IS 450 SQUARE FEET OF ABSORPTION AREA
* LEACH BED WITH 1.5 FEET OF ROCK IS 675 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

PLANS ACCEPTABLE FOR APPLICATION PROCESSING

MAR 22 2004

RIVERSIDE COUNTY PLANNING DEPARTMENT

By: Frankie Stuart

Revised 3/15/04

350-113-034

23158-01 **PLATE 1**

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

Leach Bed 675
1.5 ft Rock
below leach line

✓ **Dwelling** (14 FU) 4 People — 750 Gal. Septic Tank
Commercial — 450 Sq. Ft. of Leach Line
Seepage Pits — No. Dia. FT TD MD
Connect to Sewer — Connect to Existing System

✓ **No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.**
✓ **All sewage disposal installation shall conform to the current UPC**
Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 4/5/04 EHS G. Lyon

PLOT PLAN
23530 ELSinore Lyn
350-113-048-2
OWNer HAZEL MAZON

Replacement Leach Line

350-113-048

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
___ Dwelling
___ Commercial Building
___ Swimming Pool

1000 Gal. Septic Tank
450 Sq. Ft. of Leach Line NEED 500 EXISTING
___ Seepage Pit
___ Connection to Sewer

___ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
___ Water supply serving this installation must be from an approved source.
___ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation only.

Date 7-25-91 By [signature] REHS

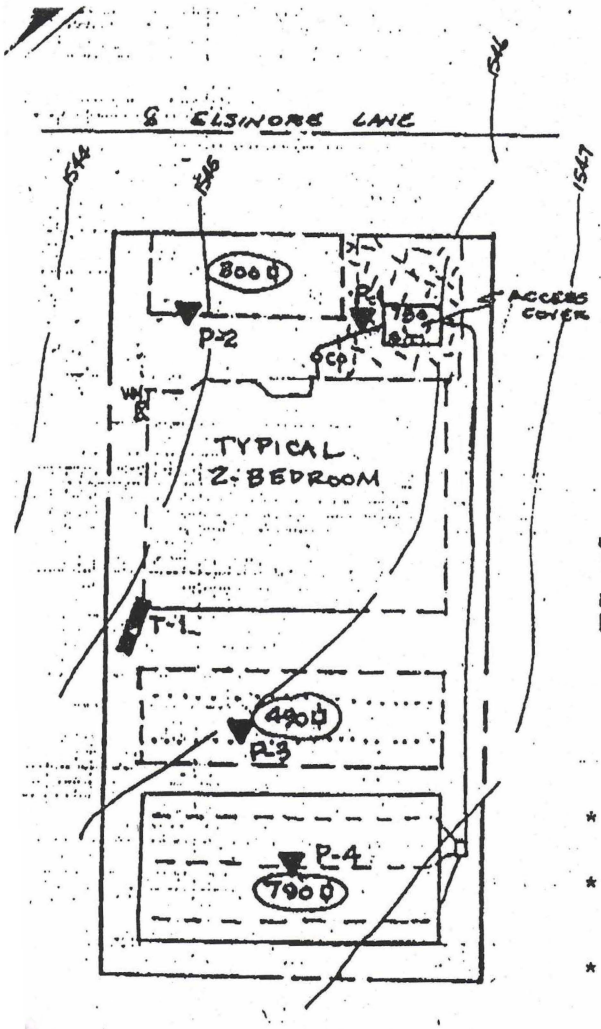
Exist Dwelling
2bed (House)
5'
Dwelling
30' 30'
PL
140'
Existing
1000 Gallon
Septic TANK
5'
5'
Exist Leach Line
75'
EA

FLAT
X

EXISTING SANITARY SYSTEM
IS PLOTTED CORRECTLY

Dan Merritt

DAN MERRITT
C-42 #249013 EXPIRES 1-31-93



1" = 20'

EXPLANATION

T-1 EXPLORATORY TRENCH W/WELL

P-4 PERCOLATION TEST

PRIMARY &

100% EXPANSION LEACH BEDS

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 70 SQUARE FEET IS 575 SQUARE FEET OF ABSORPTION AREA
* LEACH BEDS WITH 1.5 FEET OF GRAVEL IS 790 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION AREA UNDER DRIVEWAYS, ETC. SEPTIC TANK CAN BE PLACED UNDER DRIVEWAY BUT MUST HAVE ACCESS COVER

350-191-03

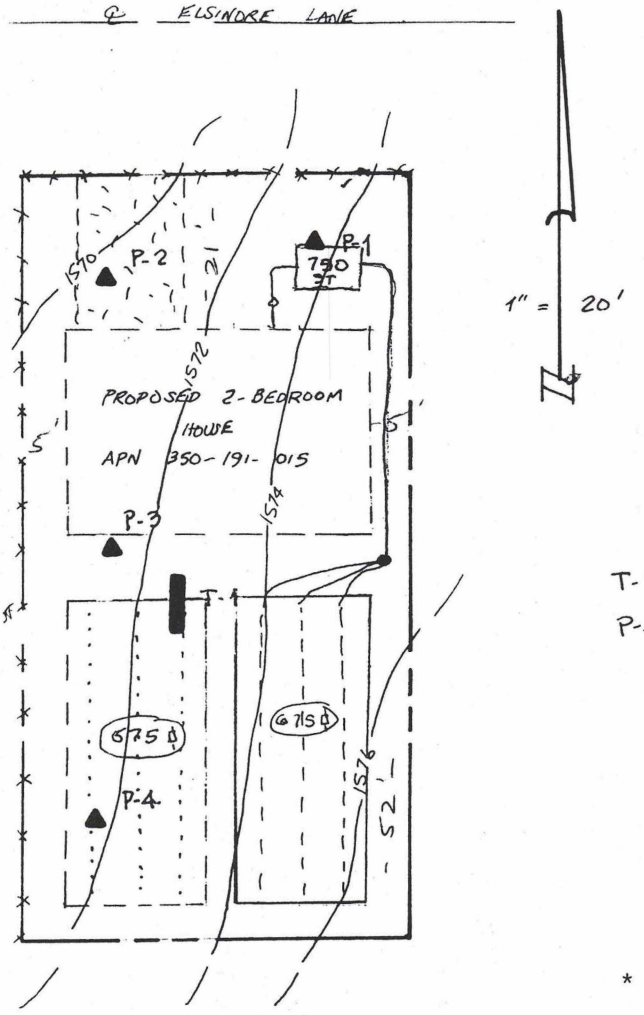
COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

____Food	X Sewage Disposal Leach Bed
____Trailer Park	750 Gal. Septic Tank
____Motel, Apt., Hotel	790 Sq. Ft. of Leach Line
X Dwelling 2 Bedroom	____No. ___Dia____Bl____TD____MD Seepage Pi
____Commercial Building	____Connection to Sewer
____Swimming Pool	____Connect to Existing S.S.D.S.

X No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
X Water supply serving this installation must be from an approved source
X All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
X Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval)
___Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 11/1/02 M.A. Mendez



EXPLANATION

T-1 ▬	EXPLORATORY TRENCH
P-4 ▲	PERCOLATION TEST
	PRIMARY LEACH BED
	100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 60 SQUARE FEET IS 450 SQUARE FEET OF ABSORPTION AREA.
* LEACH BEDS WITH 1.5 FEET OF ROCK IS 675 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

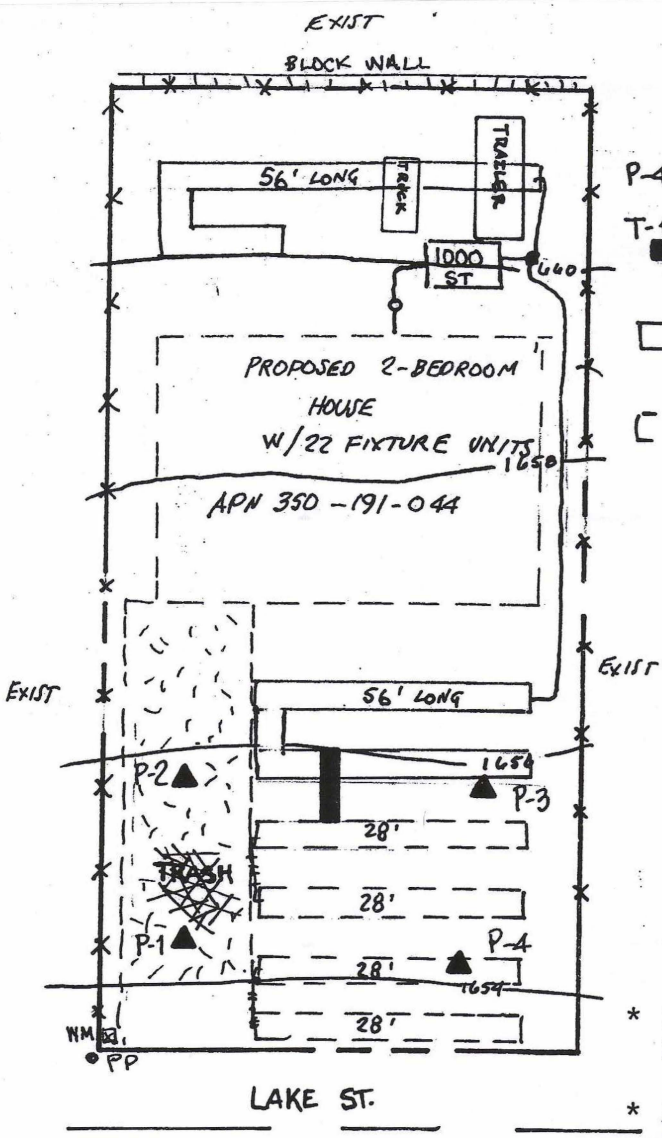
350-191-015

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

X Dwelling 2 Bed — 750 Gal. Septic Tank
___ Commercial — 675 Sq. Ft. of Leach ~~Line~~ Bed (40'x17')
___ Seepage Pits 14 FT — ___No.___Dia___BI___TD___MD
___ Connect to Sewer — ___Connect to Existing System

X No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
X All sewage disposal installation shall conform to the current UPC
X Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 12/3/03 EHS M.A. Mercado



EXPLANATION

P-4▲ PERCOLATION TEST

T-1 EXPLORATORY TRENCH

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

1" = 20'

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 22 FIXTURE UNITS REQUIRES 1000-GALLON SEPTIC TANK
* APPLICATION RATE OF 55 SQUARE FEET IS 550 SQUARE FEET OF ABSORPTION AREA
* LEACH LINES WITH 3 FEET OF ROCK IS 110 LINEAR FEET OF 3-FOOT WIDE LEACH LINE
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, WALKWAYS, PORCHES, ETC

350 191 044

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling 2+DEN
___ Commercial
___ Seepage Pits
___ Connect to Sewer

1000 Gal. Septic Tank 3FT ROCK
550 Sq. Ft. of Leach Line REQUIRED
___ No.__ Dia __ BI __ TD __ MD
___ Connect to Existing System

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE 3-31-07
STATE of CALIFORNIA

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 19 May 04 EHS Mark Hanadel

24414-01 **PLATE 1**

1" = 20'

COUNTY OF RIVERSIDE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES

___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
___ Dwelling (4bv)
___ Commercial Building
___ Swimming Pool

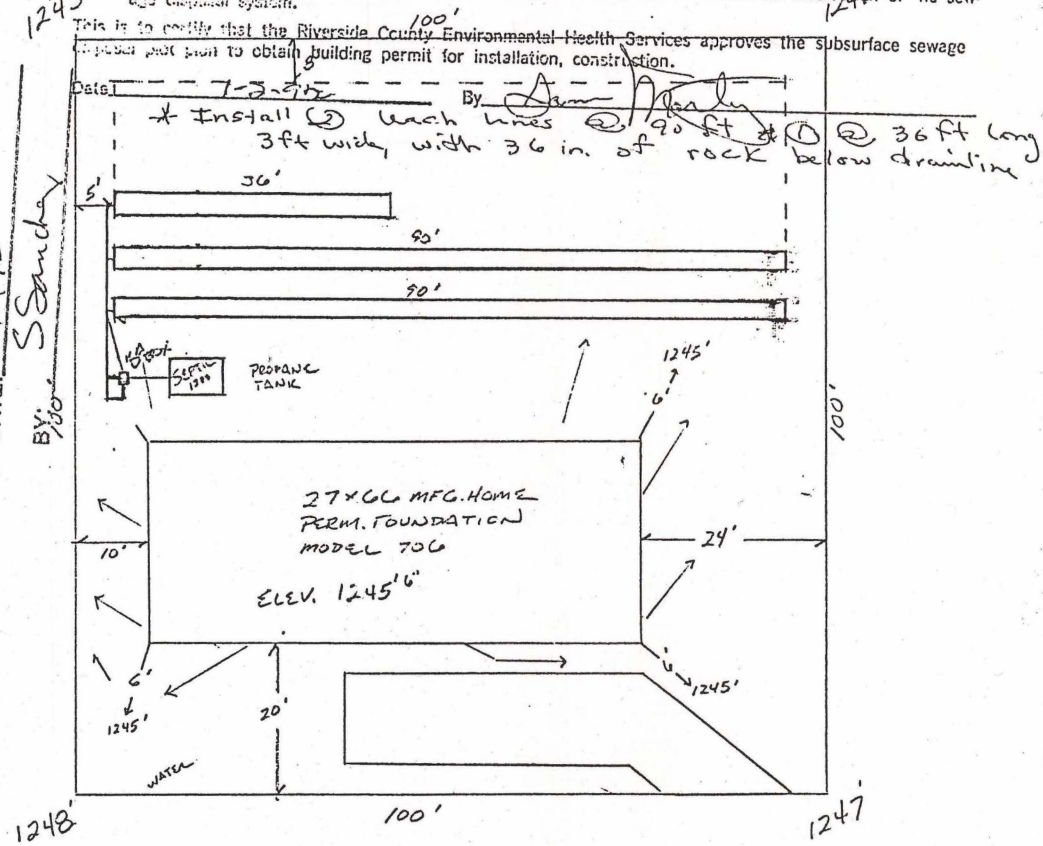
✓ Sewage Disposal
200 Gal. Septic Tank (1 max)
1080 Sq. Ft. of Leach Line *
___ x ___ Seepage Pit
___ Connection to Sewer

___ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
___ Water supply serving this installation must be from an approved source.
___ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
1 Approval has been obtained from the Regional Water Quality Control Board for installation of he sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

Date 1-3-92 By [signature]

LAND USE APPROVAL
DATE: 1/2/92
BY: S Sanchez



ELSINORE LANE

CUSTOMER DAVIS
ADDRESS ELSINORE LANE QUAIL VALLEY RIV. COUNTY
AP # 350-191 057 LOTS 6 & 7

INDICATES FLOW

* NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health Services Division and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leaching trenches prior to rock placement, and has found that they meet all his recommendations, and the minimum requirements of the UBC/Riverside County Codes.

COUNTY OF RIVERSIDE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES

350-191-057

FOR LOAN PURPOSES ONLY

___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
___ Dwelling
___ Commercial Building
___ Swimming Pool

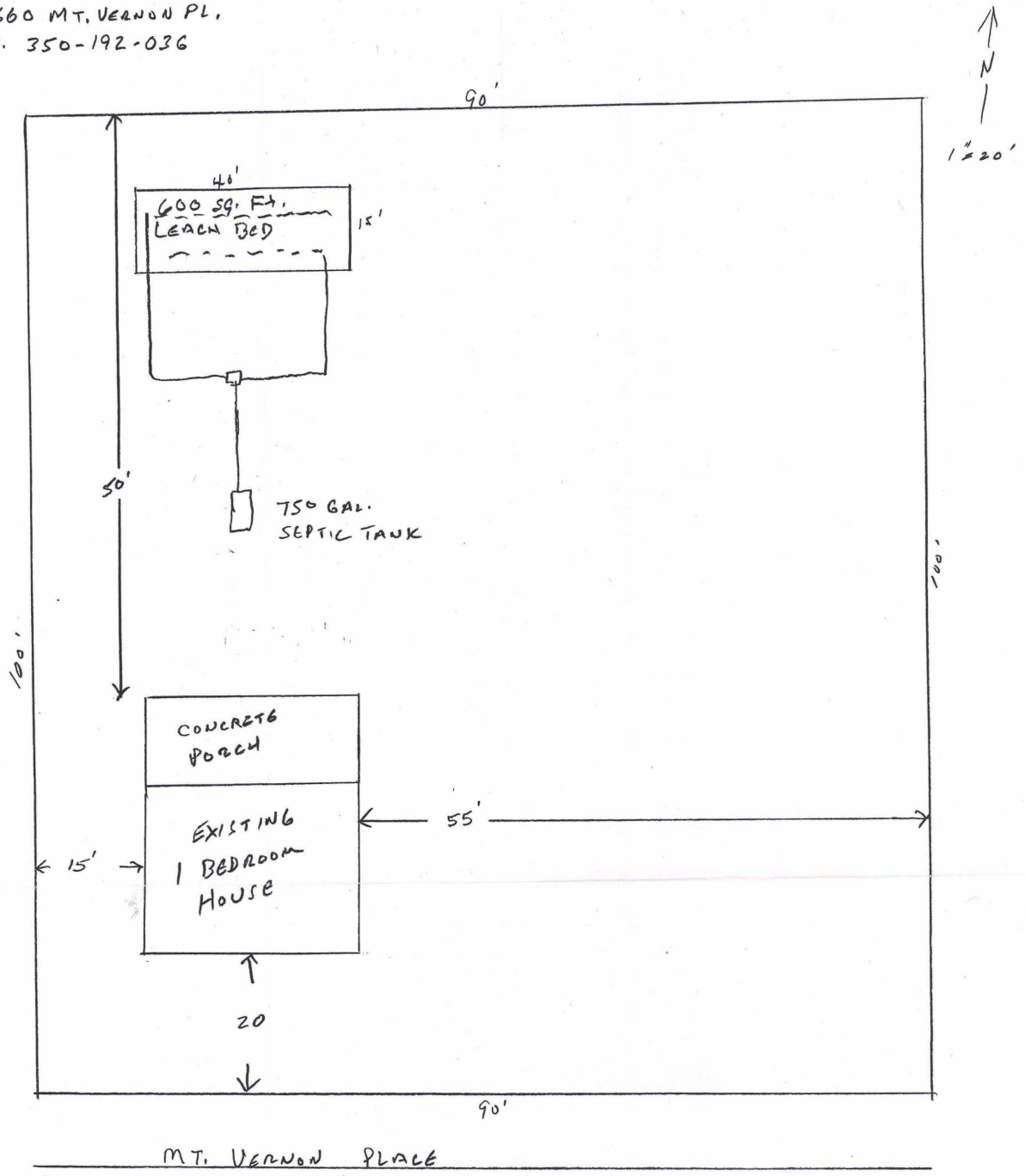
___ Sewage Disposal
___ Gal. Septic Tank
___ Sq. Ft. of Leach Line
___ x ___ Seepage Pit
___ Connection to Sewer

___ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
___ Water supply serving this installation must be from an approved source.
___ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of he sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

Date 3-6-92 By [signature] REHS IV

23660 MT. VERNON PL.
APN. 350-192-036



APN 350-192-036

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

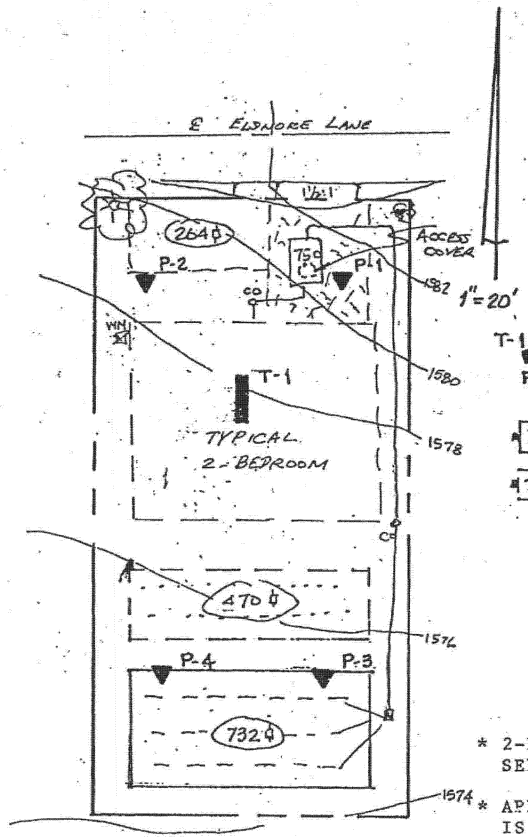
REPLACEMENT

____Food	✓ Sewage Disposal
____Trailer Park	750 Gal. Septic Tank
____Motel, Apt., Hotel	~~600~~ Sq. Ft. of Leach ~~Line~~ BED
✓ Dwelling 1 BDRM	____No. ___Dia____BI____TD____MD Seepage Pit
____Commercial Building	____Connection to Sewer
____Swimming Pool	____Connect to Existing S.S.D.S.

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 7-13-98 BY Clarence Hanson



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY &

100% EXPANSION LEACH BEDS

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 65 SQUARE FEET IS 488 SQUARE FEET OF ABSORPTION AREA
* LEACH BED WITH 1.5 FEET OF GRAVEL IS 732 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, HORSE CORRALS, ETC.
* ACCESS COVER REQUIRED FOR SEPTIC TANK PLACED UNDER DRIVEWAY

92121-01 **PLATE 1**

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
1 Dwelling (2br only)
___ Commercial Building
___ Swimming Pool

___ Sewage Disposal
750 Gal. Septic Tank (only)
488 Sq. Ft. of Leach Line Bed
___ x ___ Seepage Pit
___ Connection to Sewer

___ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved. Permit conditions from the Water Quality Control Board.
___ Water supply serving this installation must be from an approved source.
___ All sewage disposal installation shall conform with requirements of current Uniform Plumbing Code.
___ Any cutting, grading or filling in excess of 2 feet in the area of the sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

Date 2-23-93 By Joan Trotty

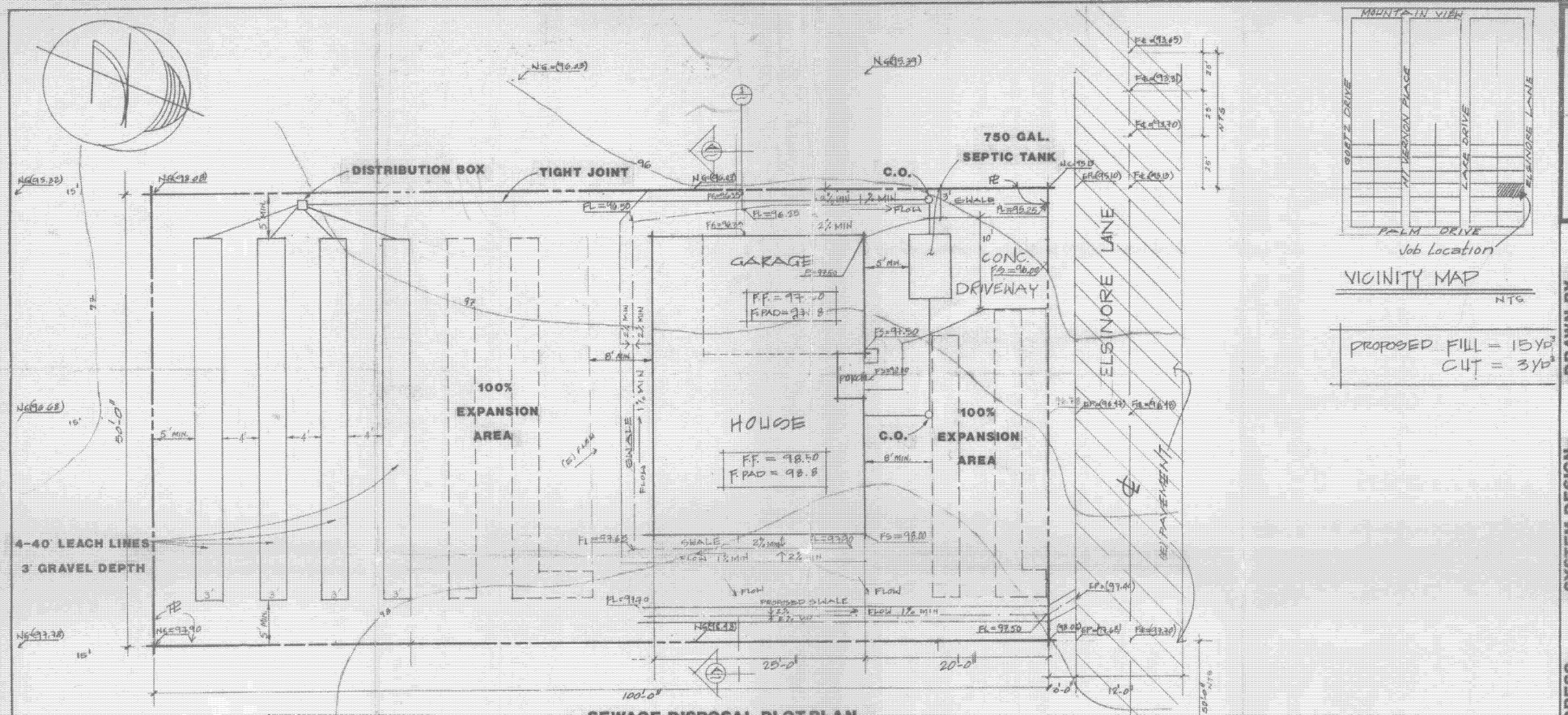
COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

SUBSURFACE SEWAGE DISPOSAL

These approved plans shall be VOID (1) if:

1. Any part of the sewage disposal system is moved more than 10 feet from the original approved site.
2. Percolation rate changes more than 10 minutes /inch in the area of the sewage disposal system.
3. Any cutting, grading or filling in excess of 2 feet in the area of the subsurface sewage disposal area.

This plot plan indicates that there may not be a suitable area for a swimming pool, patio or other structures due to sewage disposal expansion requirements. Special consideration should be given before construction of any of the above is anticipated.



SEWAGE DISPOSAL PLOT PLAN

SCALE: 3/16" = 1'-0"

BENCH MARK TEMPORARY AT 90'-0" FROM CORNER : NORTHEAST OF PROPERTY OVER CENTER LINE ASSUMMED ELEVATION : 100.00

LEGEND

- N.G Natural Grade
- Fc finish center line
- E.P end pavement
- P property line
- ℄ center line
- (101.00) existing elevation
- 101.00 Proposed elevation
- Fs finish surface
- FPAD Elevation pad
- FL flow line
- Fg finish grade
- FF finish floor

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH
SUBSURFACE SEWAGE DISPOSAL

Those approved plans shall be VOIDED when:

1. Any part of the sewage disposal system is moved more than 10 feet from the original approved site.
2. Percolation rate changes more than 10 minutes /inch in the area of the sewage disposal system.
3. Any cutting, grading or filling in excess of 2 feet in the area of the subsurface sewage disposal area.

Septic tank and sewer lines must be /50 ft. from any wells, including expansion areas. Leach lines must be 100 ft. minimum and sewage pits must be 150 ft. minimum from any wells.

This plot plan indicates that there may not be a suitable area for a swimming pool, patio or other structures due to sewage disposal expansion requirements. Special consideration should be given before construction of any of the above is anticipated.

APN 350-201-024

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SERVICES

Food Establishment
Trailer Park
Meat, Ass., Hotel
Dwelling 2500 sf
Commercial Building
Swimming Pool

Sewage Disposal
750 Gal. Septic Tank
100 lin. Ft. of Leach Line
Sewage Pit
Connection to Sewer

No on-site replenishing water softening devices may be discharged into the individual sewage disposal system herewith approved without discharge over the Water Quality Control Board.
Water supply serving this installation must be from an approved source.
All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
Any existing grading or filling in excess of two (2) feet will nullify sewage disposal approval.
Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

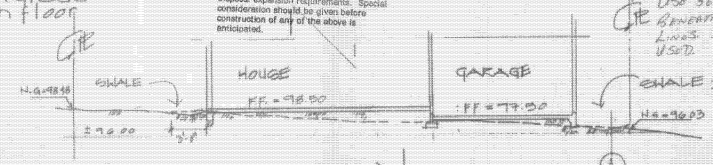
This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

Date 4/30/92 By Wayne Harrison

NOTE: USE 36" OF ROCK BENEATH THE LEACH LINES. SIDEWALK ALLOWANCE USED.

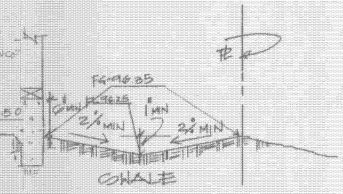
The Design Shown Complies With March 3, 1982 Test Rate & Design Criteria By Earth Tech

CERTIFIED ENGINEERING GEOLOGIST — WILLIAM L. STEWART — CEG 1182 — STATE OF CALIFORNIA — 4/30/92



SECTION A-A

SCALE: 3/16" = 1'-0"



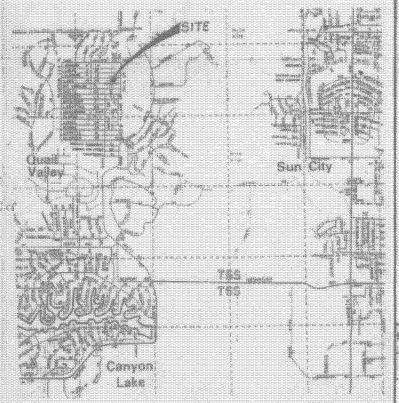
DETAIL ①

NTS

VICINITY MAP

NTS

PROPOSED FILL = 15yd³
CUT = 3yd³



VICINITY MAP

N.T.S.

OWNER
ROBERT CHANG
1800 PEPPER ST. #9
ALHAMBRA, CA. 91801
818-284-7107

JOB ADDRESS
23975 ELSINORE LANE
SUN CITY, CA. 92587
APN 350-201-024
BLOCK "F" LOT 24 MB 12/22

SYSTEM DESIGN
2 BEDROOM HOUSE
750 GAL. SEPTIC TANK W/ ACCESS COVER
300 SQ. FT./ 100 GAL.
150 LF. LEACH LINE MIN. 4 LINES @ 40 EACH

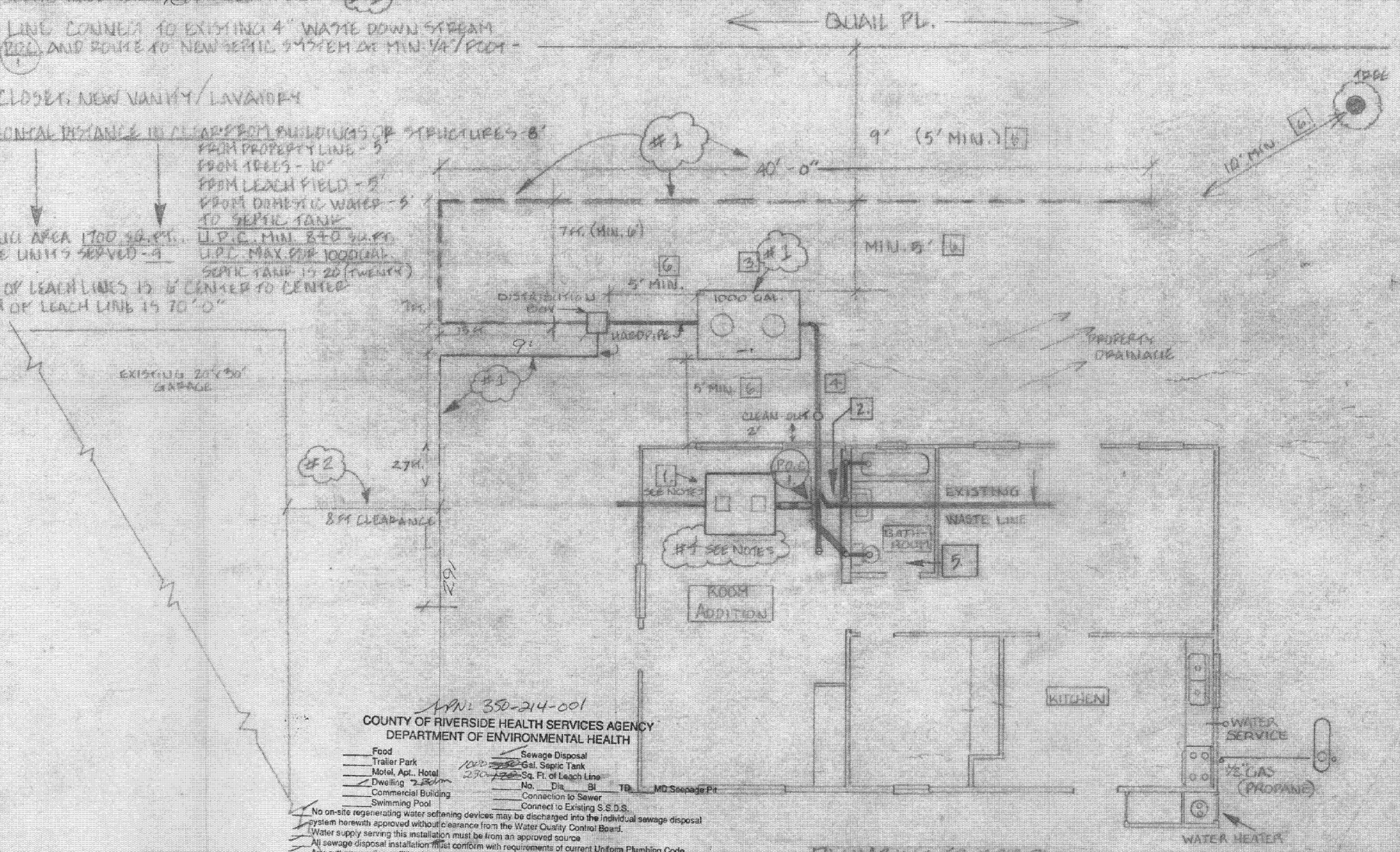
DRAWN BY
PATRICK SCHEFFLER
714-677-5183
REVISED 4/29/92

KONSTRO DESIGN
1426 CENTINELA AVE. SUITE 9 INGLEWOOD CA. 90302
PH. (213) 216-6944

DRAWN BY: PJS
DATE: 4/28/92
SHEET 1 OF 1 SHEETS

PLUMBING NOTES:

1. EXISTING SEPTIC TANK TO BE BACKFILLED WITH SAND, COMPACTED TO 95% COMPACTION AND CAPPED WITH 6" CONCRETE - SEE PLUMBING CODE APPENDIX I, SECTION 11 (b)
2. EXISTING WASTE SYSTEM TO BE REROUTED TO NEW SEPTIC TANK LOCATION
3. NEW 1000 GAL SEPTIC TANK AND ~~77~~ 24 LINEAL FT LEACH LINE 1=40' 1=38'
4. NEW 4" WASTE LINE CONNECT TO EXISTING 4" WASTE DOWN STREAM OF RESTROOM (PIPE 1) AND ROUTE TO NEW SEPTIC SYSTEM AT MIN. ¼"/FOOT - GRADE.
5. NEW WATER CLOSET, NEW VANITY/LAVATORY
6. MINIMUM HORIZONTAL DISTANCE IN CLEAR FROM BUILDINGS OR STRUCTURES 8'
   FROM PROPERTY LINE - 5'
   FROM TREES - 10'
   FROM LEACH FIELD - 2'
   FROM DOMESTIC WATER - 5' TO SEPTIC TANK
   U.P.C. MIN. 870 SQ.FT.
   U.P.C. MAX FOR 1000 GAL. SEPTIC TANK IS 20 (TWENTY)
   - TOTAL LEACHING AREA 1700 SQ.FT.
   - TOTAL FIXTURE UNITS SERVED - 9
   - MIN. SPACING OF LEACH LINES IS 6' CENTER TO CENTER
   - TOTAL LENGTH OF LEACH LINE IS 70'-0"



PLUMBING FLOOR PLAN

¼" = 1'-0" SCALE

APN: 350-214-001

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

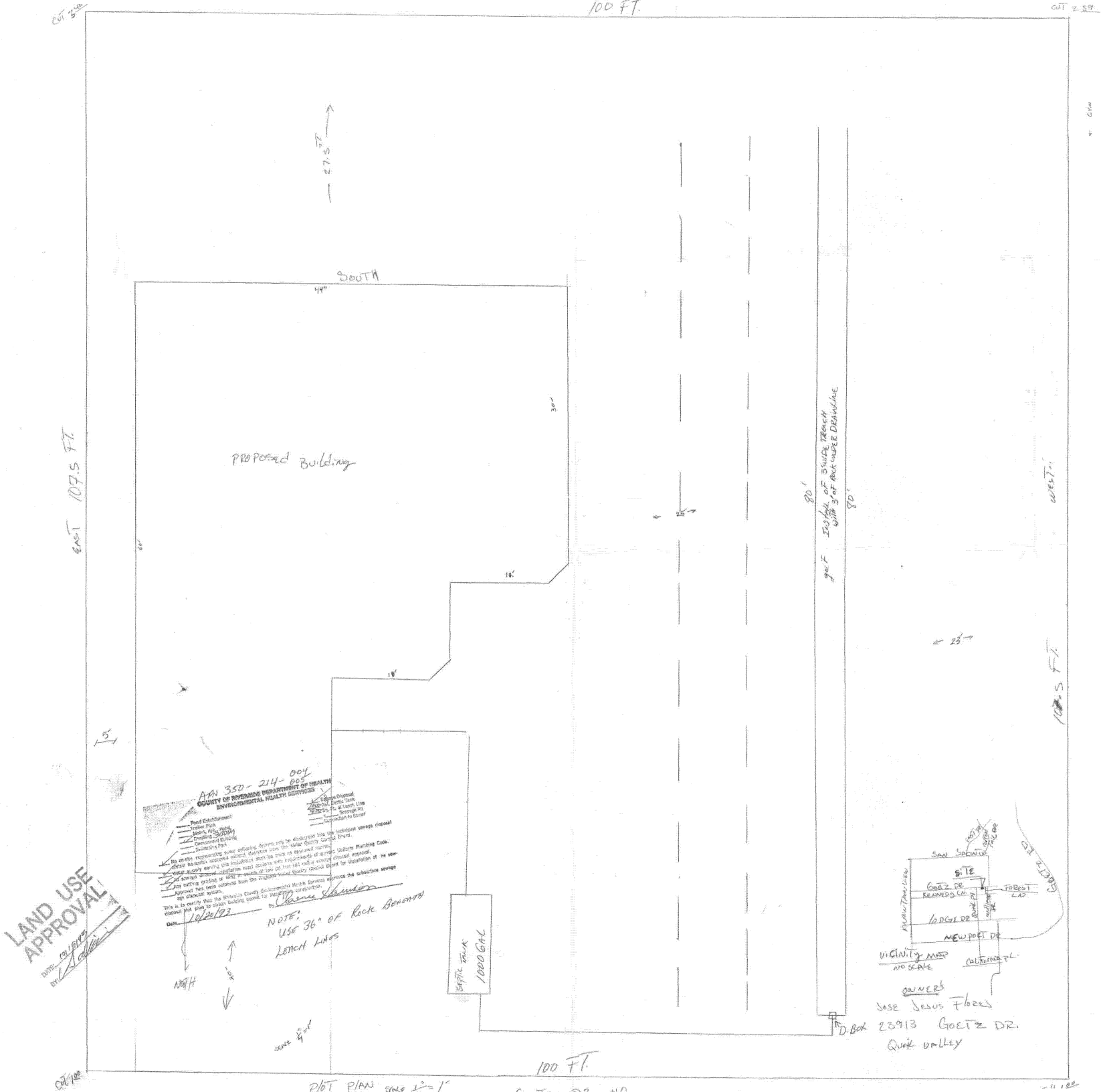
____Food
____Trailer Park
____Motel, Apt., Hotel
__/__Dwelling 2 Bdrm
____Commercial Building
____Swimming Pool

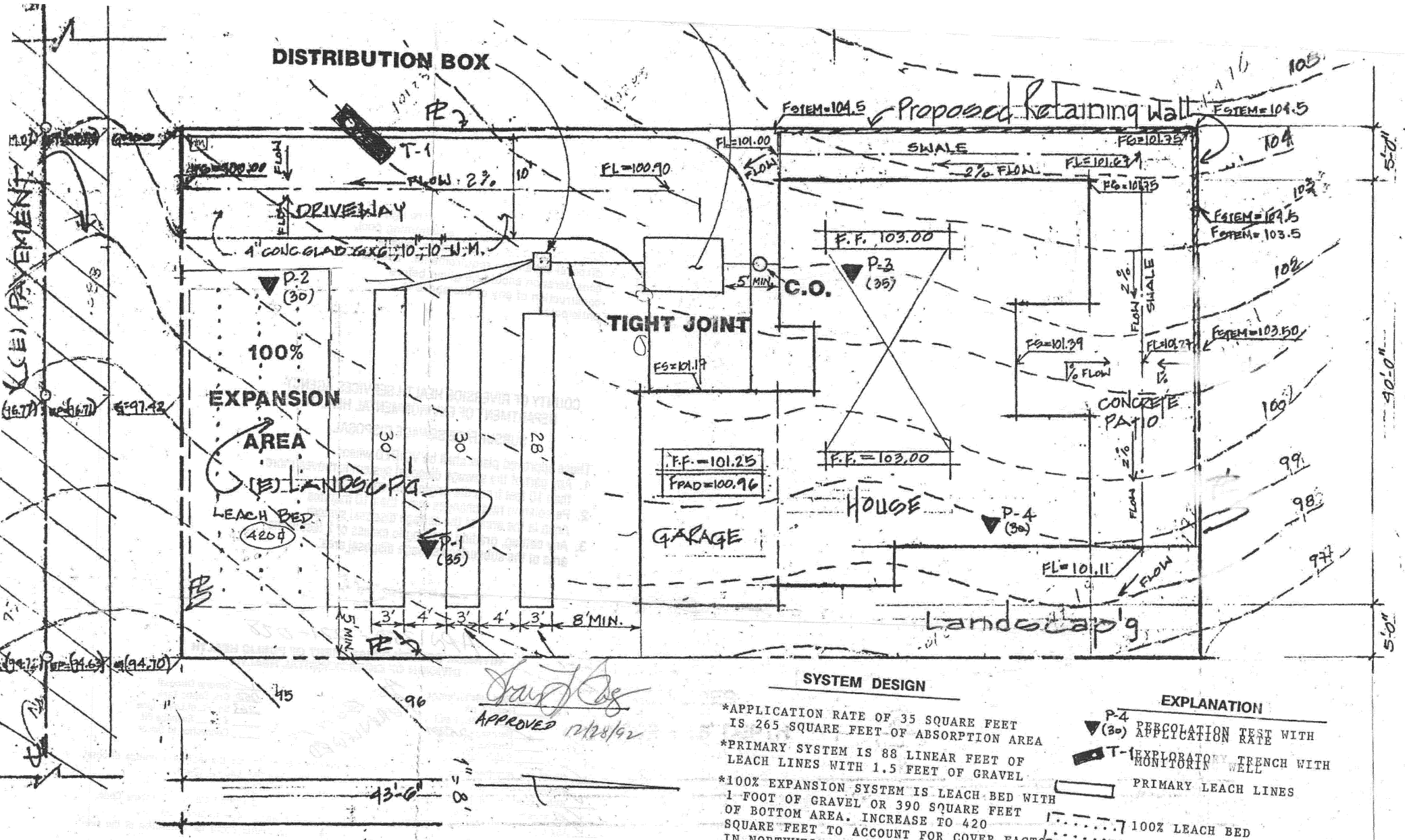
__/__Sewage Disposal
1000 ~~750~~ Gal. Septic Tank
270 ~~220~~ Sq. Ft. of Leach Line
____No. ___Dia. ___Bl ___TD ___MD Seepage Pit
____Connection to Sewer
____Connect to Existing S.S.D.S.

__/__No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
__/__Water supply serving this installation must be from an approved source
__/__All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
____Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
____Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 6/25/96 BY Margaret Bruny
6/25/96 Cleshee Harrison


100 FT.
27.5 FT
SOUTH
44'
PROPOSED BUILDING
EAST 107.5 FT.
WEST
80'
25'
18'
15'
APN 350-214-005
COUNTY OF RIVERSIDE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
Pond Establishment
Trailer Park
Motel, Apts., Hotel
Dwelling Subdivision
Commercial Building
Swimming Pool
Dwelling Unit
Public Disposal
Septic Tank
Seepage Pit
Connection to Sewer
Water supply approved
Sewage disposal approved
Any cutting, grading or filling in excess of 50 cu. yds. has not been approved by the Riverside County Environmental Health Services Approves this subsurface sewage disposal plot plan for issuance of building permits for new construction.
By
Date 10/20/92
NOTE: USE 36" OF Rock Between Leach Lines
SEPTIC TANK 1000 GAL
NORTH
SCALE 1/4"=1'
100 FT.
PLOT PLAN SCALE 1"=1'
LAND USE APPROVAL
DATE 10/20/92
BY
SAN JACINTO
SITE
GOAT DR.
KEARNEY CH.
FOREST LAD
LODGE DR.
NEWPORT DR.
CALIFORNIA PL.
VICINITY MAP
NO SCALE
OWNERS
JOSE JESUS FLORES
23913 GOAT DR.
QUAIL VALLEY
D. BOX



Approved 12/28/92

SYSTEM DESIGN

*APPLICATION RATE OF 35 SQUARE FEET IS 265 SQUARE FEET OF ABSORPTION AREA

*PRIMARY SYSTEM IS 88 LINEAR FEET OF LEACH LINES WITH 1.5 FEET OF GRAVEL

*100% EXPANSION SYSTEM IS LEACH BED WITH 1 FOOT OF GRAVEL OR 390 SQUARE FEET OF BOTTOM AREA. INCREASE TO 420 SQUARE FEET TO ACCOUNT FOR COVER FACTOR IN NORTHWEST CORNER

* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC

EXPLANATION

P-4 (30) PERCOLATION TEST WITH APPLICATION RATE

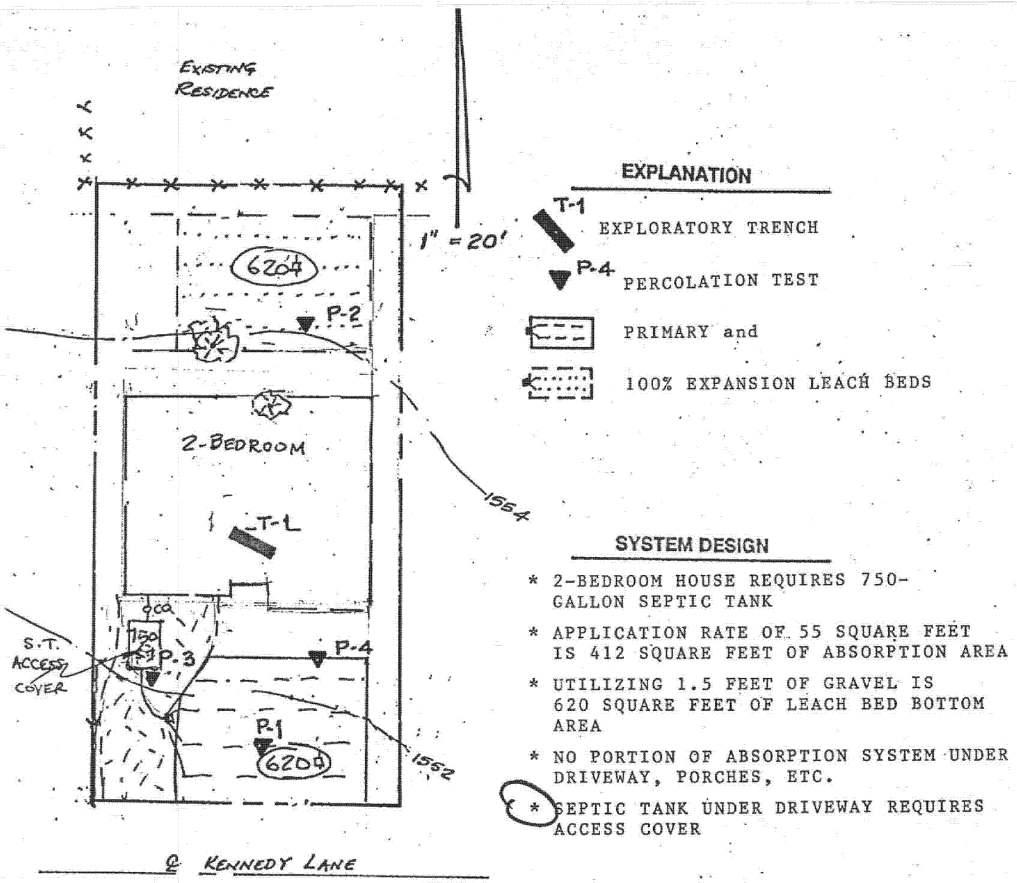
T-1 EXPLORATORY TRENCH WITH MONITORING WELL

PRIMARY LEACH LINES

100% LEACH BED

REVISED 12/28/92

91114-01 PLATE 1



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY and

100% EXPANSION LEACH BEDS

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 55 SQUARE FEET IS 412 SQUARE FEET OF ABSORPTION AREA
* UTILIZING 1.5 FEET OF GRAVEL IS 620 SQUARE FEET OF LEACH BED BOTTOM AREA
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAY, PORCHES, ETC.
* SEPTIC TANK UNDER DRIVEWAY REQUIRES ACCESS COVER

92002-01 **PLATE 1**

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

- ____ Food Establishment
- ____ Trailer Park
- ____ Motel, Apt., Hotel
- ____ Dwelling (2 br only)
- ____ Commercial Building
- ____ Swimming Pool

Sewage Disposal
750 Gal. Septic Tank
620 Sq. Ft. of Leach Line Bed
____ X ____ Seepage Pit
____ Connection to Sewer

____ No on-site regenerating water softening devices shall be discharged into the individual sewage disposal system herewith approved without approval from the Regional Water Quality Control Board.
____ Water supply serving this installation shall be from a ____ source.
____ All sewage disposal installation shall conform with the ____ Uniform Plumbing Code.
____ Any cutting, grading or filling in excess of ____ shall require re-approval.
____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation / construction.

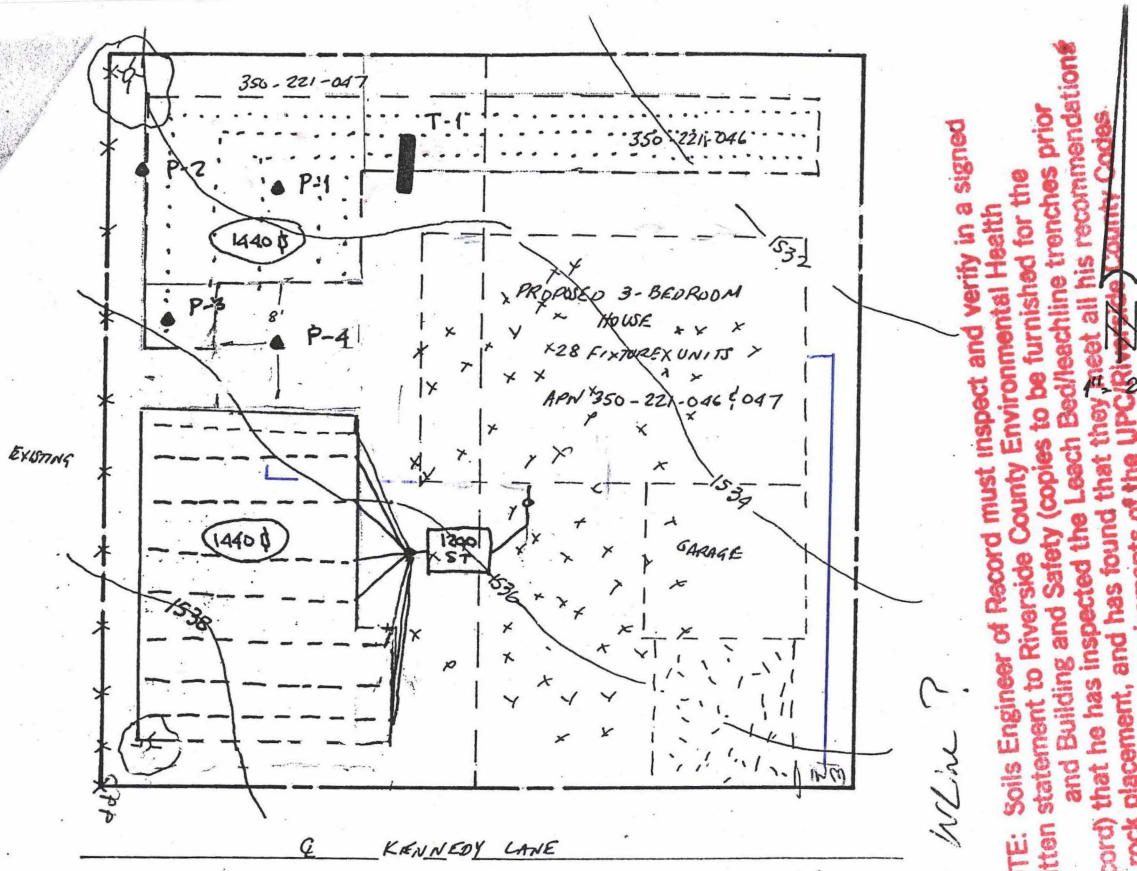
Date 2-20-92 By

This plot plan indicates that there may not be a suitable area for a swimming pool, patio or other structures due to sewage disposal expansion requirements. Special consideration should be given before construction of any of the above is anticipated.

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

SUBSURFACE SEWAGE DISPOSAL

These approved plans shall be VOIDED when:
1. Any part of the sewage disposal system is moved more than 10 feet from the original approved site.
2. Percolation rate changes more than 10 minutes /inch in the area of the sewage disposal system.
3. Any cutting, grading or filling in excess of 2 feet in the area of the subsurface sewage disposal area.



NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leachline trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/IPC/CPC/Riverside County Codes.

In Line ?

EXPLANATION

T-1 ▬ EXPLORATORY TRENCH

P-A ▲ PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

HARD ROCK AREAS

SYSTEM DESIGN

* 3-BEDROOM HOUSE WITH 28 FIXTURE UNITS REQUIRES 1200-GAL. SEPTIC TANK
* APPLICATION RATE OF 80 SQUARE FEET IS 960 SQ. FT. OF ABSORPTION AREA.
* UTILIZING LEACH BEDS WITH 1.5 FEET OF ROCK IS 1440 SQ. FT. OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

REGISTERED CIVIL ENGINEER
LARRY J. FAS
RCE No. 29150
EXPIRATION DATE 3-31-07
STATE of CALIFORNIA

Revised 1/04

23991-01 **PLATE 1**

350 221 046 & 047

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

___ Dwelling 3/27
___ Commercial
___ Seepage Pits
___ Connect to Sewer

1200 Gal. Septic Tank
1440 Sq. Ft. of ~~Leach Line~~ Leach Bed
___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Existing System

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept

Date: 9 Feb 04 EHS

350-223-041

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

X Dwelling 2BR — 1000 Gal. Septic Tank
___ Commercial 23 PC — 650 Sq. Ft. of Leach Line — 975 sqft. Bed
___ Seepage Pits — ___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer — ___ Connect to Existing System

X No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
X All sewage disposal installation shall conform to the current UPC
X Any grading [illegible] area of the proposed leach lines shall require a new approval by this Dept.
Date: 1-09 [illegible] EHS [illegible]

Dec 19 03 05:36p Anthony & Susan Migliore 909-302-0552 p.1

BRS 040505

N

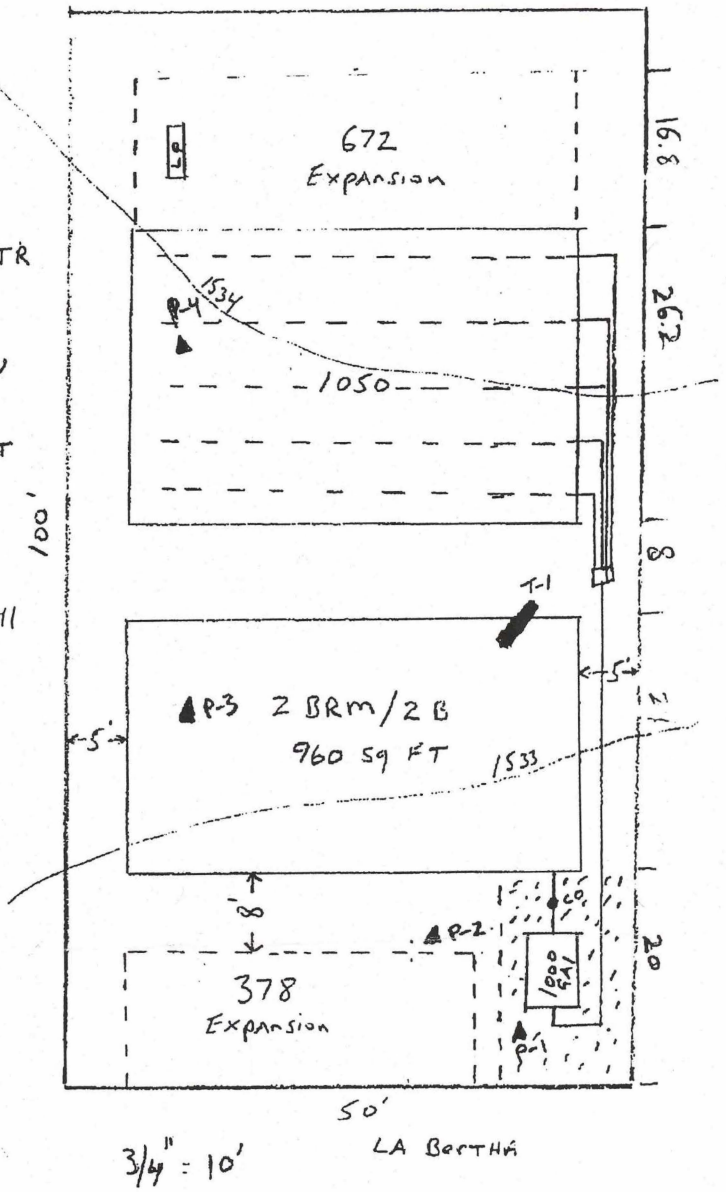
3" = 40'
1' = 13.33

SYSTEM DESIGN

- 2 BEDROOM 2 BATH
- 1000 GALLON TANK/TR
- APPLICATION RATE OF 70 SQ FT = 700 SQ FT OF ABSORBTION AREA
- LEACH BED WITH 1.5 FT OF ROCK IS 1050 SQ FT 3.5 FT OF COVER

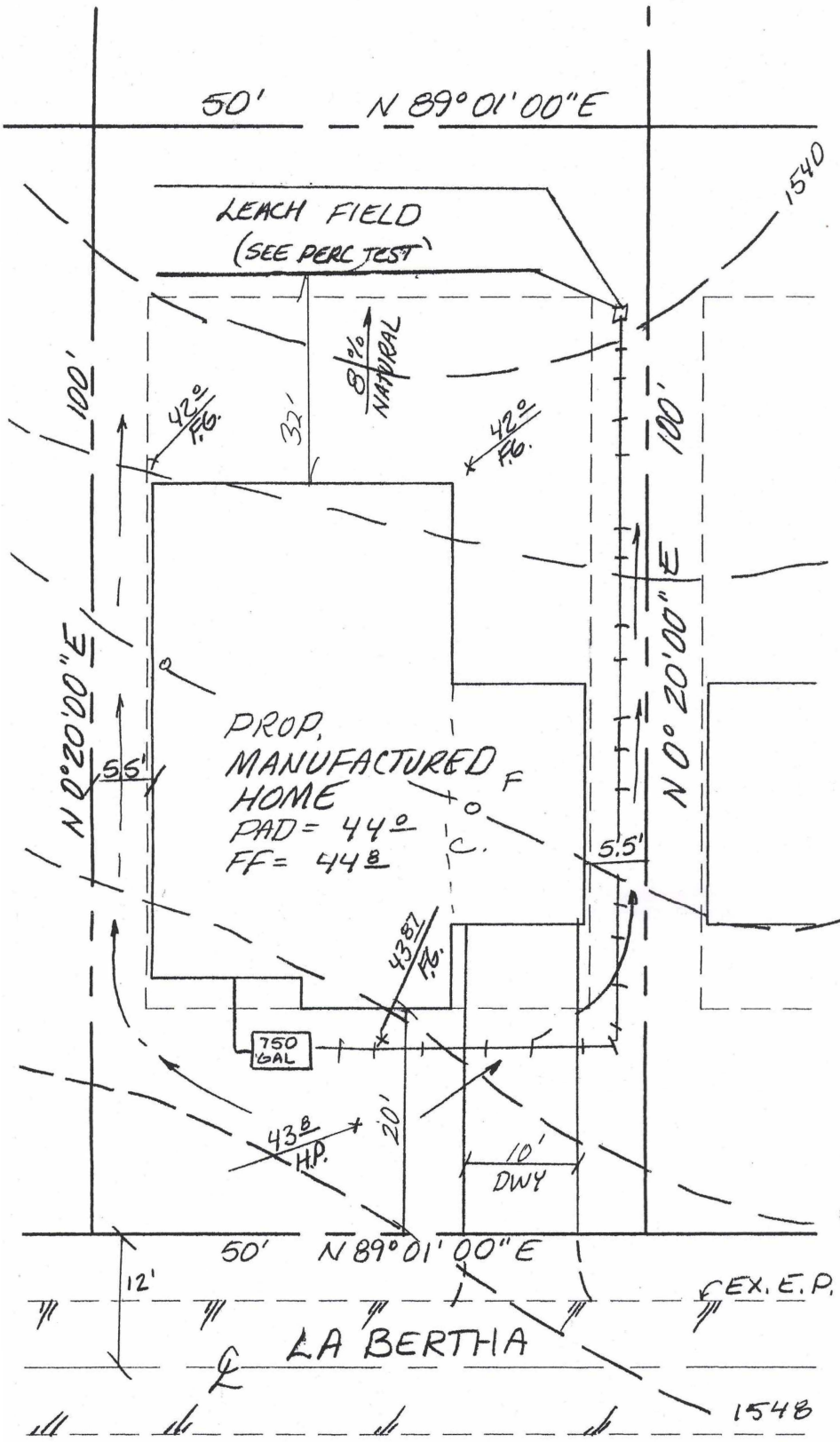
Apn 350 223 041

23588 LA Bertha



3/4" = 10'

LA Bertha



352-223-03

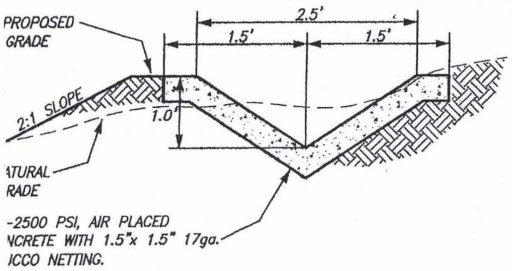
COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

- X Dwelling Garage — Gal. Septic Tank
- ___ Commercial — Sq. Ft. of Leach Line
- ___ Seepage Pits plumbing — No.__Dia__BI__TD__MD
- ___ Connect to Sewer — Connect to Existing System

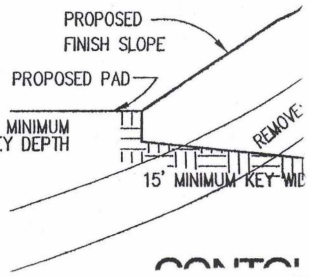
___No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___All sewage disposal installation shall conform to the current UPC
___Any grading in the area of the proposed leach lines shall require a new approval by this Dept.
Date 11/7/03 By M.O. Mendez

PLANNING DEPARTMENT
NOV 07 2003
RECEIVED

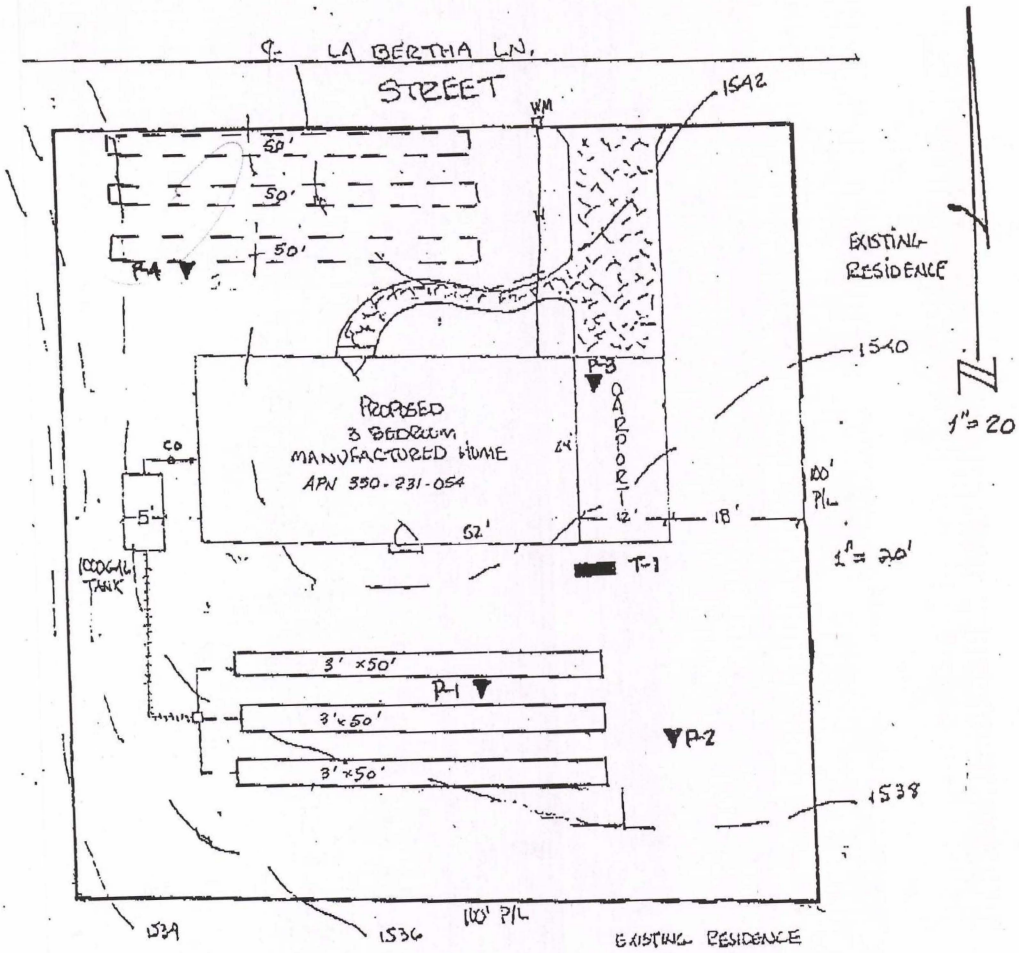
15' MINIMUM TO BE MAINTAINED FR
PROPOSED FINISH SLOPE FACE TO



BROW/DRAIN DITCH DETAIL



CONTOL



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACHING CHAMBER

100% EXPANSION LEACHING CHAMBER

SYSTEM DESIGN

* 3-BEDROOM HOUSE REQUIRES 1000-GALLON SEPTIC TANK.
* APPLICATION RATE OF 55 SQUARE FEET IS 550 SQUARE FEET OF ABSORPTION AREA.
* LEACHING CHAMBERS IS 150 LINEAR FEET OF 3 FOOT WIDE CHAMBERS.

APN 350 231 054

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

Revised 9/15/00

93125-01 **PLATE 1**

___ Food
___ Trailer Park
___ Motel, Apt., Hotel
1 Dwelling 3 bedroom
___ Commercial Building
___ Swimming Pool

plastic chamber
___ Sewage Disposal
1000 Gal. Septic Tank
440 Sq. Ft. of Leach Line
___ No. ___ Dia ___ Bl ___ TD ___ MD Seepage Pit
___ Connection to Sewer
___ Connect to Existing S.S.D.S.

___ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
___ Water supply serving this installation must be from an approved source
___ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

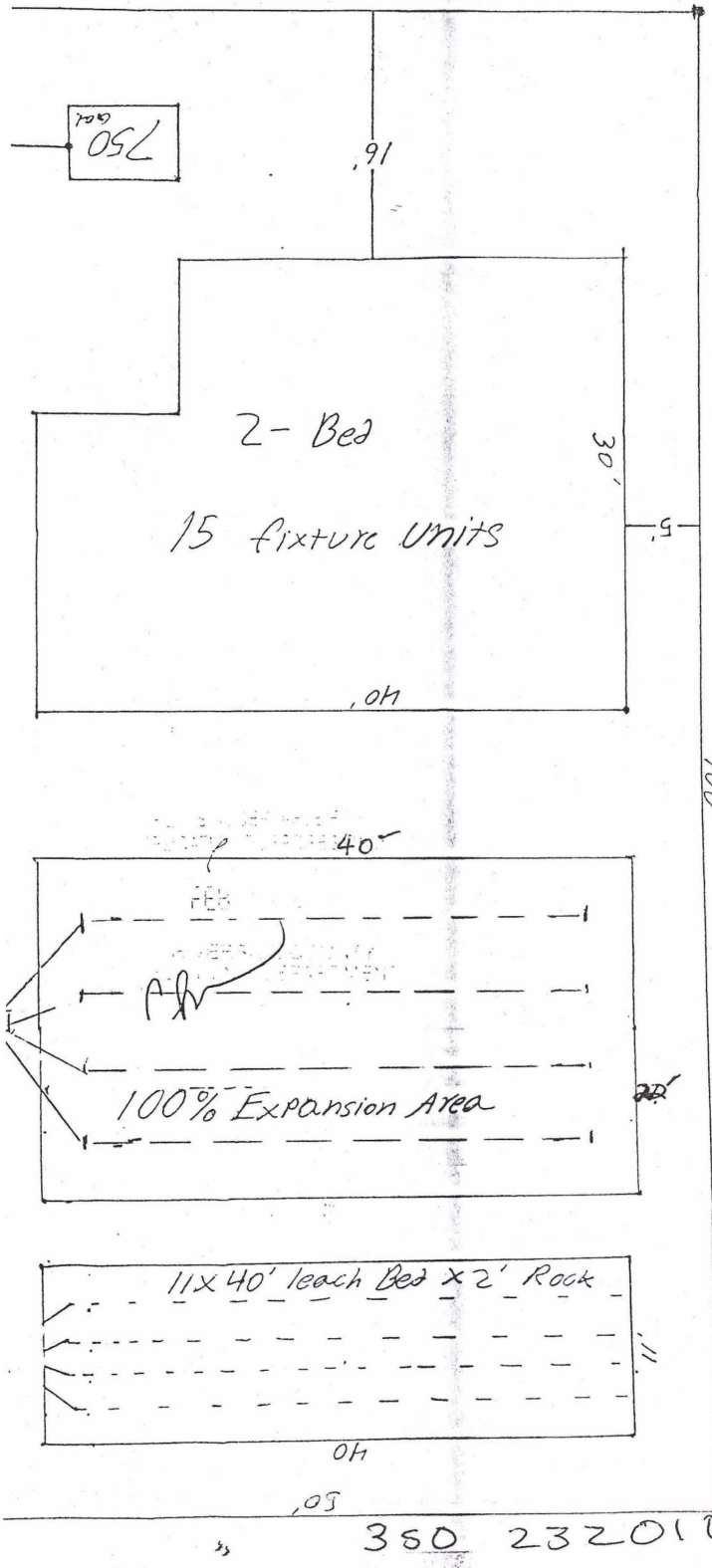
It is is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 9-28-00

Mark Stocum

23581 Cassandra Dr.

Prepared 02/17/2005



Robert Chang
23581 Cassandra Dr
Quail Valley CA 92587

APN# 350-232-010

Scal 1:10

DAVIS PLUMBING CO.
P.O. BOX 871
PERRIS, CA 92572
Lic. #365794

Exp/11/30/06

Norman S. Davis

leach lines failing
Need to use 100% Expansion

350 232010

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

Replacement Leach

- ✓ Dwelling 2 Bed
- ___ Commercial
- ___ Seepage Pits
- ___ Connect to Sewer

750 Gal. Septic Tank Existing
___ Sq. Ft. of Leach Line Leach Bed
___ No. ___ Dia ___ BI ___ TD ___ MD 22ft x 40ft.
___ Connect to Existing System 1-5ft ROCK

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept

Date: 25Feb05 EHS

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
ONSITE WASTEWATER TREATMENT SYSTEM

City of MENIFEE
PMT 16-02283

Existing

- ✓ Dwelling
- ___ Commercial
- ___ Seepage Pits
- ___ Connect to Sewer
- ___ Connect to Existing

750 Gal. Septic Tank
450 Sq. Ft. of Leach Line 3 ft of rock
___ No. Dia ___ BI ___ TD ___ MD ___
___ Concrete Pump Chamber

- Installation of leach lines are not to exceed 6 ft. in depth
- Install risers to grade, leaving lids accessible for cleaning. Note: Larger tanks (2000 gallons or greater) require 2 risers to access primary chamber.
- Approved cleanable effluent filters must be installed to facilitate servicing.
- No on-site water softening devices shall be discharged into the septic system without clearance from the California Regional Water Quality Control Board.
- Installation shall conform to the current UPC.
- Any grading in the area of proposed drip lines shall require new approval by this Department.

Date: 7/15/16 EHS: [signature]

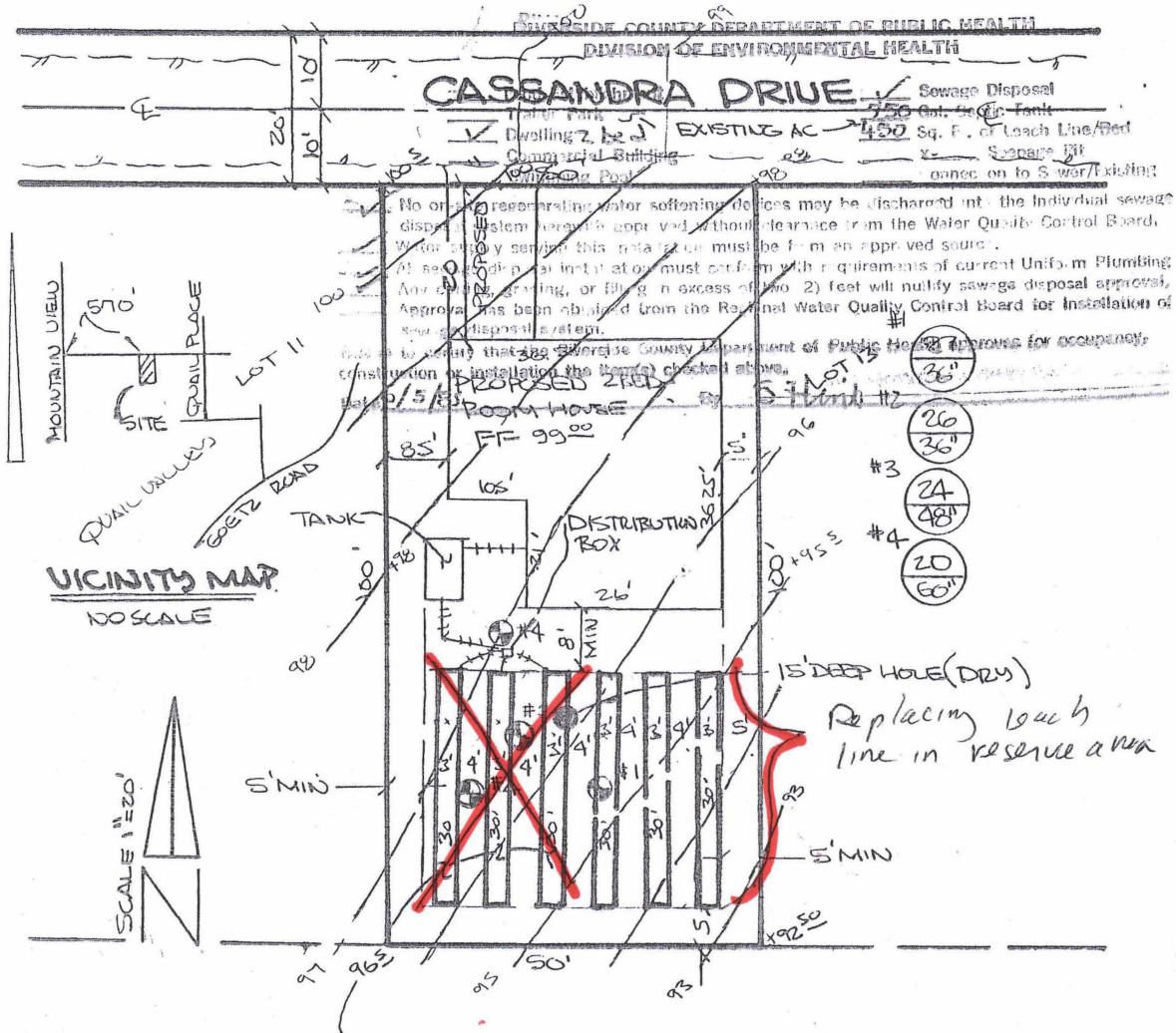
SEPTIC SYSTEM LAYOUT

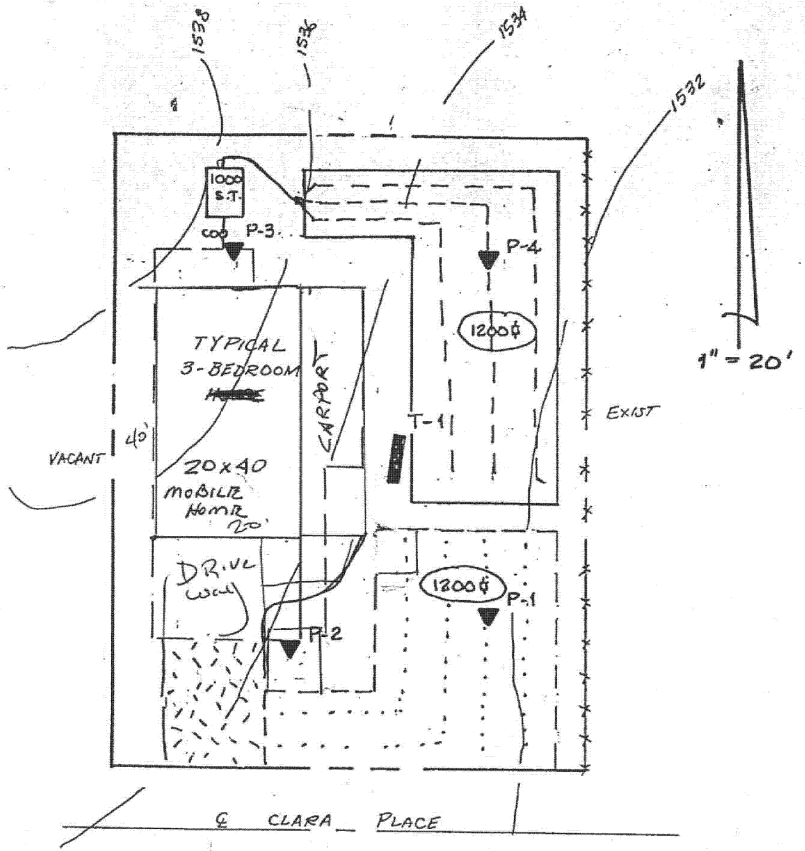
ENGINEER OF WORK:

PAGE 6
W.O. QV-107
DATE: 9-12-84

NOTE: A)NO ROCK OUTCROPPINGS ARE ON THIS PROPERTY
B)NO WELLS ARE LOCATED WITHIN 200' OF THIS PROPERTY
C)NO GRADING IS PROPOSED IN THE LEACH FIELD AREA

SYSTEM RECOMMENDATIONS: 750 GALLON SEPTIC TANK
INSTALL 90 LF OF 3' WIDE TRENCH WITH 3' OF ROCK UNDER DRAINLINE FOR A 2 BEDROOM HOUSE, PLUS 100% RESERVE.





EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

HARD ROCK AREAS

PRIMARY &

100% LEACH BEDS

SYSTEM DESIGN

* 3-BEDROOM HOUSE REQUIRES 1000-GALLON SEPTIC TANK
* APPLICATION RATE OF 80 SQUARE FEET IS 800 SQUARE FEET OF ABSORPTION AREA
* LEACH BEDS WITH 1.5 FEET OF GRAVEL IS 1200 SQUARE FEET BOTTOM AREA
* NO PORTION OF ABSORPTION AREA UNDER DRIVEWAYS, HORSE CORRALS

92119-01 **PLATE 1**

APN 350-232-058

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH

___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
___ Dwelling
___ Commercial Building
___ Swimming Pool

___ Sewage Disposal
1000 Gal. Septic Tank
1200 Sq. Ft. of Leach Line
___ X ___ Seepage Pit
___ Connection to Sewer

___ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
___ Water supply serving this installation must be from an approved source.
___ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation construction.

Date 9-29-93 By

This plot plan indicates that there may not be a suitable area for a swimming pool, patio or other structures due to sewage disposal expansion requirements. Special consideration should be given before construction of any of the above is anticipated.

PLOT PLAN

NAME John Neville PHONE 244-4001

SITUS ADDRESS 23705 Cassandra Quail Valley

TRACT/PARCEL MAP LAKE ELSINORE LODGE LOT 25

ASSESSOR'S PARCEL NO. 350 232 059

Provide North Arrow

REAR PROPERTY LINE

SIDE PROPERTY LINE

SIDE PROPERTY LINE

FRONT PROPERTY LINE

STREET

23705 Cassandra

PERMIT NO. _____

SITE PLAN

NAME MARY HANCOCK PHONE (909) 943 1550

SITUS ADDRESS 23531 CLARA PLACE, QUAIL VALLEY

ASSESSORS PARCEL NO. 350-233-004

Provide North Arrow →

1"=20'

REAR PROPERTY LINE

Jim Block

SIDE PROPERTY LINE

EXISTING LEACH LINES

PROPOSE 1-80' LONG LEACH LINE W/ INFULTRATOR CHAMBER.

EXISTING 750 GALLON SEPTIC TANK

DWELLING

350233004 2 BEDROOM

SIDE PROPERTY LINE

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

____Food	✓ Sewage Disposal
____Trailer Park	750 Gal. Septic Tank existing
____Motel, Apt., Hotel	300 Sq. Ft. of Leach Line
✓ Dwelling 2 Bed	____No. ___Dia____Bl____TD____MD Seepage Pit
____Commercial Building	____Connection to Sewer
____Swimming Pool	____Connect to Existing S.S.D.S.

✓ No on-site regenerating water softening devices ~~may be discharged into the individual sewage disposal~~ system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

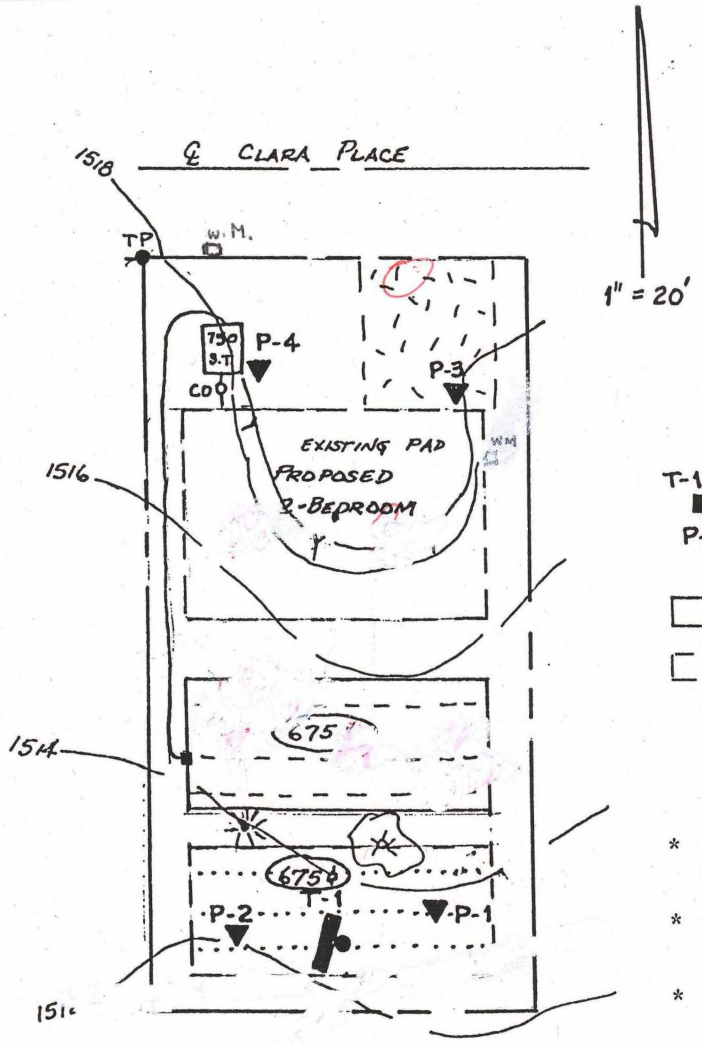
This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 6-20-01 BY Juan Stockem

FRONT PROPERTY LINE

use Plastic chamber

CLARA PLACE **STREET**



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST LOCATION

PRIMARY AND 100%

EXPANSION LEACH BEDS

SYSTEM DESIGN

* 2- BEDROOM HOUSE REQUIRES 750 GALLON SEPTIC TANK.
* APPLICATION RATE OF 45 REQUIRES 450 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 1.5 FEET OF GRAVEL IS 675 SQUARE FEET OF BOTTOM AREA.
* NO PORTION UNDER DRIVEWAYS, ETC.

350-233-011

RIVESIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
✓ Dwelling 2 bed (House)
___ Commercial Building
___ Swimming Pool

✓ Sewage Disposal
750 Gal. Septic Tank
~~675~~ Sq. Ft. of Leach ~~Line~~ BED 675 ϕ
___ x ___ Seepage Pit
___ Connection to Sewer

___ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without a permit from the [illegible] County Control Board.
___ Water supply serving this installation must be from an approved source.
___ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___ Any cutting grading or filling in excess of two (2) feet will nullify above disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

91115-01

PLATE 1

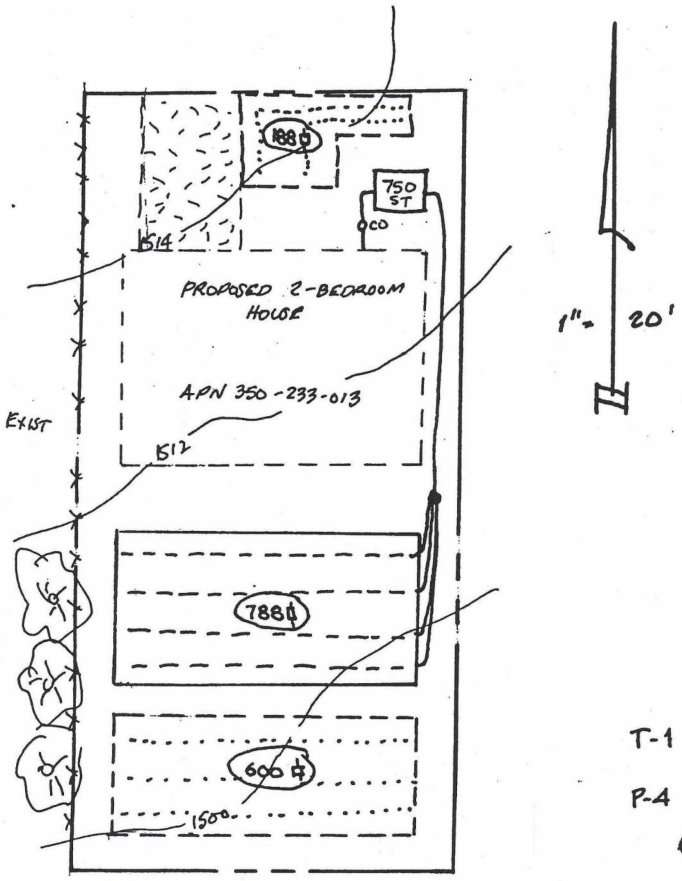
This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

Date 11-7-91 By Pamela Smith

Note: * "use 1.5 ft of rock below leach bed, No side wall allowance".

This plot plan indicates that there may not be a suitable area for a swimming pool, patio or other structures due to sewage disposal expansion requirements. Special consideration should be given before construction of any of the above is anticipated.

E CLARA PLACE



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750 GALLON SEPTIC TANK.

* APPLICATION RATE OF 70 SQUARE FEET IS 525 SQUARE FEET OF ABSORPTION AREA.

* LEACH BEDS WITH 1.5 FEET OF ROCK IS 788 SQUARE FEET OF BOTTOM AREA.

* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

RCE No. 29150
EXPIRATION DATE 3/31/05
STATE of CALIFORNIA

23691-01 PLATE 1

350-233-013

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling 14 FU — 750 Gal. Septic Tank — Leach Bed
___ Commercial — 525 Sq. Ft. of Leach Line — 788 ϕ
___ Seepage Pits — ___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer — ___ Connect to Existing System

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
✓ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 3/4/04 EHS

PLOT PLAN

NAME Maria Dominguez PHONE 244-1740

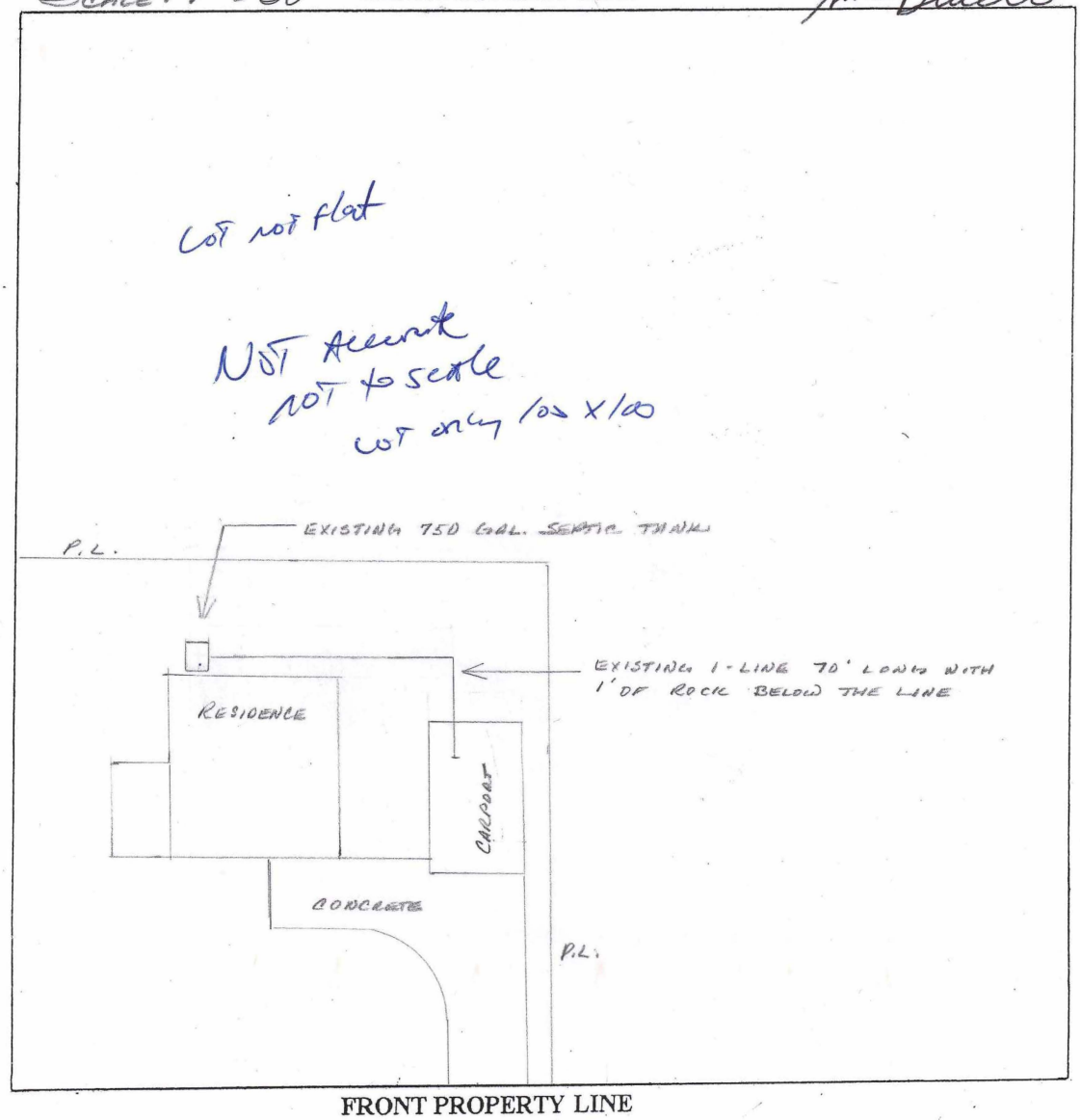
SITE ADDRESS 23641 Clara Pl. — Quail Valley

TRACT/PARCEL MAP _____ LOT _____

ASSESSOR'S PARCEL NO. 350-233-017

PROVIDE NORTH ARROW N

Scale: 1" = 30' REAR PROPERTY LINE Ann Blackb

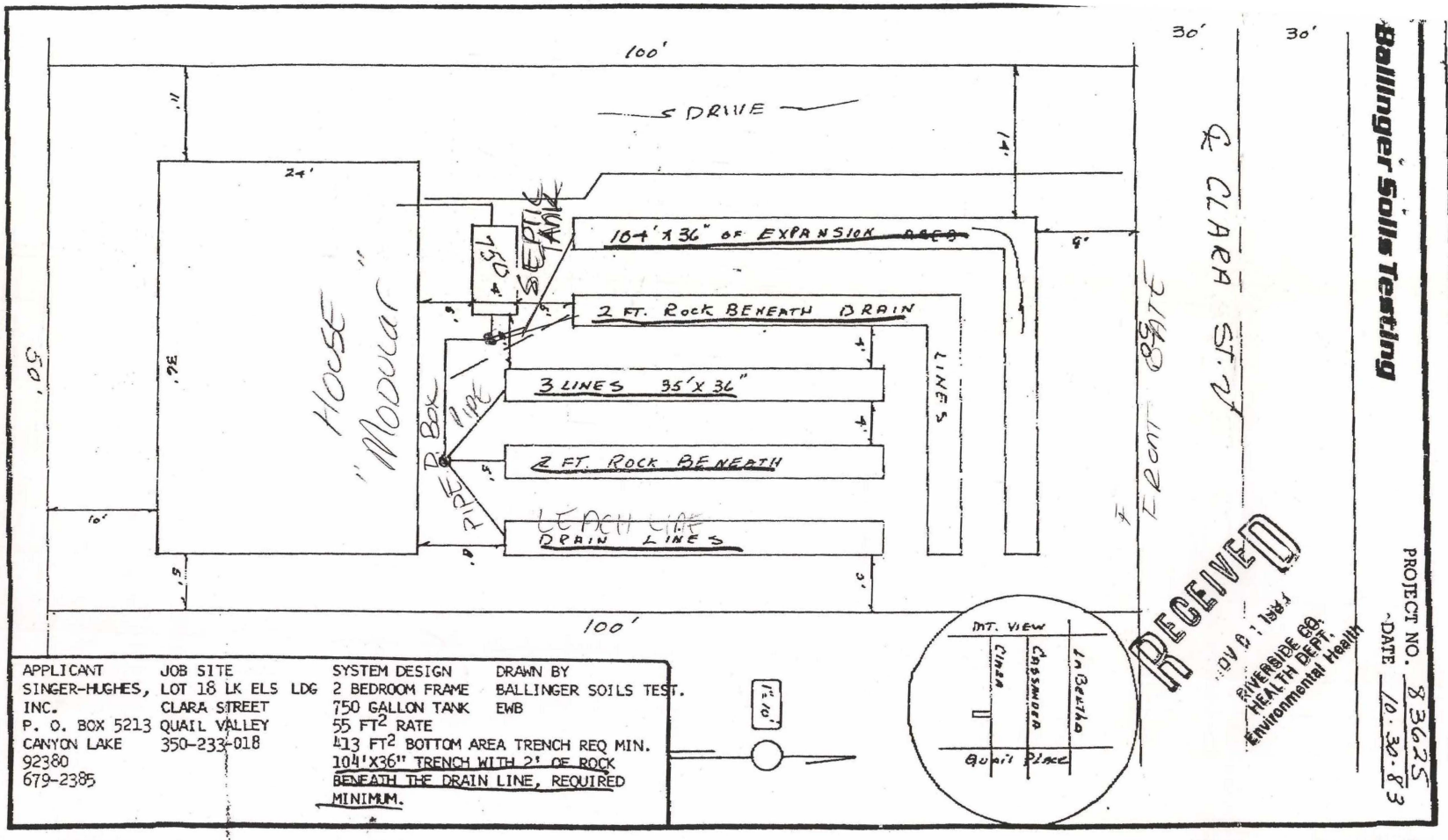


SIDE PROPERTY LINE

SIDE PROPERTY LINE

FRONT PROPERTY LINE

CLARA PLACE ~~STREET~~



Ballinger Soils Testing

PROJECT NO. 83625

DATE 10-30-83

RECEIVED
NOV 01 1983
RIVERSIDE CO. HEALTH DEPT. Environmental Health

11/17/92 16:11 002

APPLICANT	JOB SITE	SYSTEM DESIGN	DRAWN BY
SINGER-HUGHES, INC.	LOT 18 LK ELS LDG	2 BEDROOM FRAME	BALLINGER SOILS TEST.
P. O. BOX 5213	CLARA STREET	750 GALLON TANK	EWB
CANYON LAKE	QUAIL VALLEY	55 FT^2 RATE	
92380	350-233-018	413 FT^2 BOTTOM AREA TRENCH REQ MIN.	
679-2385		104'X36" TRENCH WITH 2' OF ROCK BENEATH THE DRAIN LINE, REQUIRED MINIMUM.	

[redacted]

350-233-018

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

SUBSURFACE SEWAGE DISPOSAL

These approved plans shall be VOIDED when:
1. Any part of the sewage disposal system is moved more than 10 feet from the original approved site.
2. Percolation rate changes more than 10 minutes /inch in the area of the sewage disposal system.
3. Any cutting, grading or filling in excess of 2 feet in the area of the subsurface sewage disposal area.

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SERVICES

___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
✓ Dwelling 3BDRM
___ Commercial Building
___ Swimming Pool

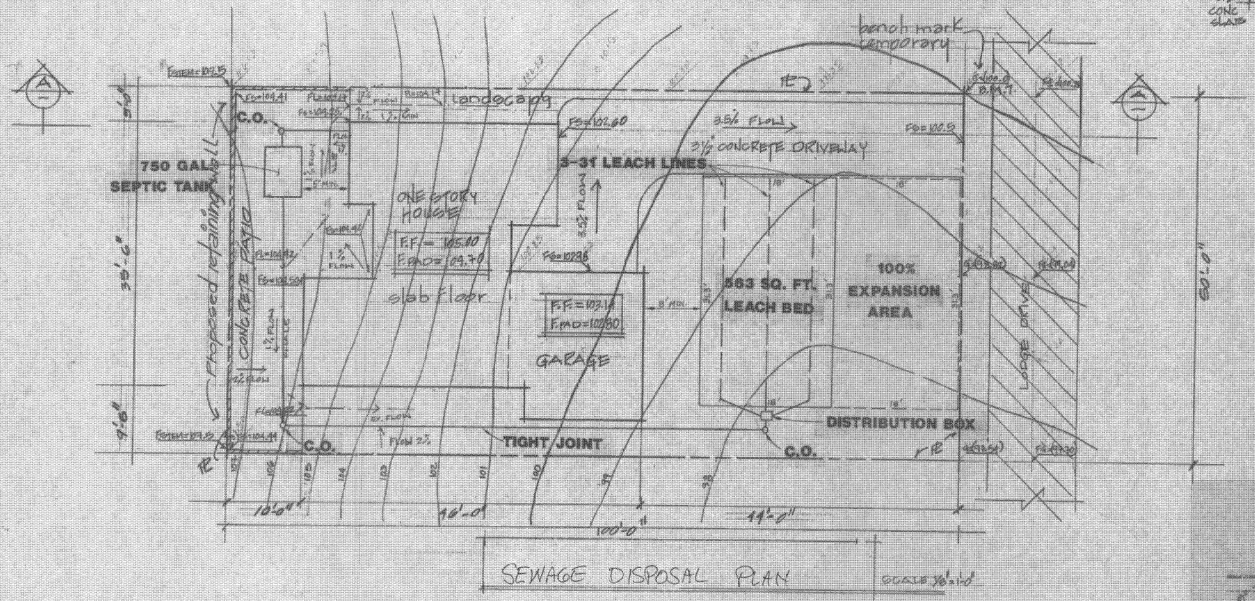
INSTALL 100% EXPANSION

✓ Sewage Disposal
750 Gal. Septic Tank
413 Sq. Ft. of Leach Line
___ x ___ Seepage Pit
___ Connection to Sewer

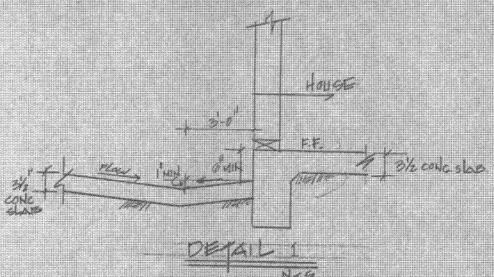
✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source.
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation construction.

Date 1/4/92 By Clarence Ballinger



SEWAGE DISPOSAL PLAN SCALE 1/8"=1'-0"



LEGEND

F.F.	Finish Floor
F.L.	Flow Line
G	grade
F.S.	finish surface
F.C.	finish center line
P.L.	Property line
F.PAD	Elevation pad
	swale
X=(102.00)	Existing Elevation
X=107.60	Proposed Elevation

APN 350-233-033

COUNTY OF RIVERSIDE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES

REVISED

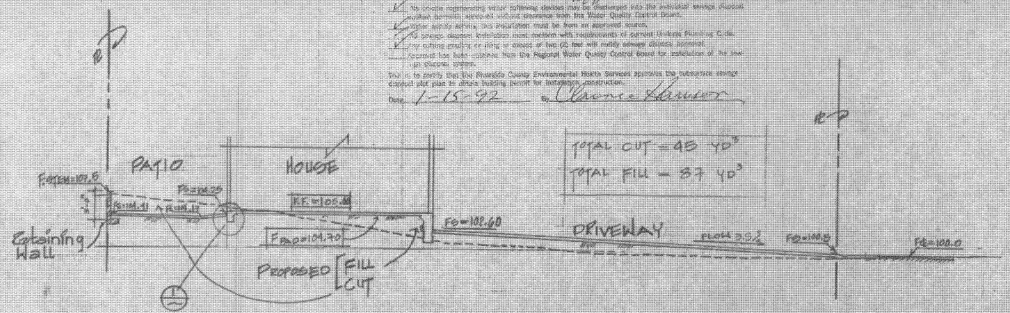
Food Establishment
Trailer Park
Motel, Apt., Hotel
Dwelling, 2 BDRM
Commercial Building
Swimming Pool

Sewage Disposal
Septic Tank
No. Ft. of Leach Line
Privy
Connection to Sewer

1. No private roof/swimming pool/softening devices may be discharged into the individual sewage disposal system (domestic) sewage without clearance from the Water Quality Control Board.
2. Water supply source, and quantities must be from an approved source.
3. All sewage disposal installation must maintain with requirements of current Uniform Plumbing Code.
4. Any cutting, grading or filling or closure of two (2) feet will notify sewage disposal personnel.
5. Approval has been obtained from the Regional Water Quality Control Board for installation of the on-site disposal system.

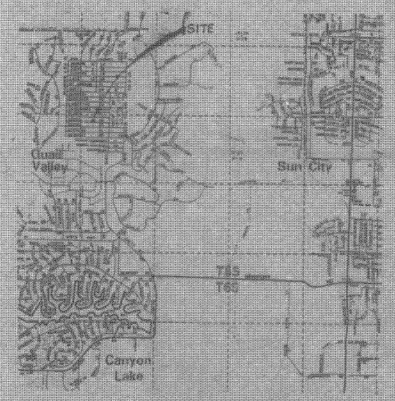
This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation construction.

Date 1-15-92 By Clarence Hanson



TOTAL CUT = 48 YD³
TOTAL FILL = 87 YD³

SECTION A-A SCALE 1/8"=1'-0"



VICINITY MAP
N.T.S.

REVISIONS	BY

OWNER
RON LERMAN
26852 CALLE MARIA
MISSION VIEJO, CA. 92691
714-583-9443

JOB ADDRESS
23060 CODE DRIVE
SUN CITY, CA. 92587
APN 350-230-003
BLOCK 17 LOT 60 MB 127/87

SYSTEM DESIGN
2 BEDROOM HOUSE
750 GAL SEPTIC TANK
30 SQ.FOOT GAL
563 SQ. LEACH BED 3 LINES 31' EA

DRAWN BY
PATRICK SCHEFFLER
714-677-4183
2/24/91

DRAWN: PS
CHECKED:
DATE: 2/24/91
SCALE: 1/8" = 1'-0"
JOB NO:
SHEET: 1
OF 1 SHEETS

PRINTED ON CLEARPRINT 1000H

SEPTIC SYSTEM LAYOUT

ENGINEER OF WORK:

PATRICK W. HARRISON OF RIVERSIDE, INC.
113 NORTH MAIN STREET
LAKE ELSINORE, CA. 92330

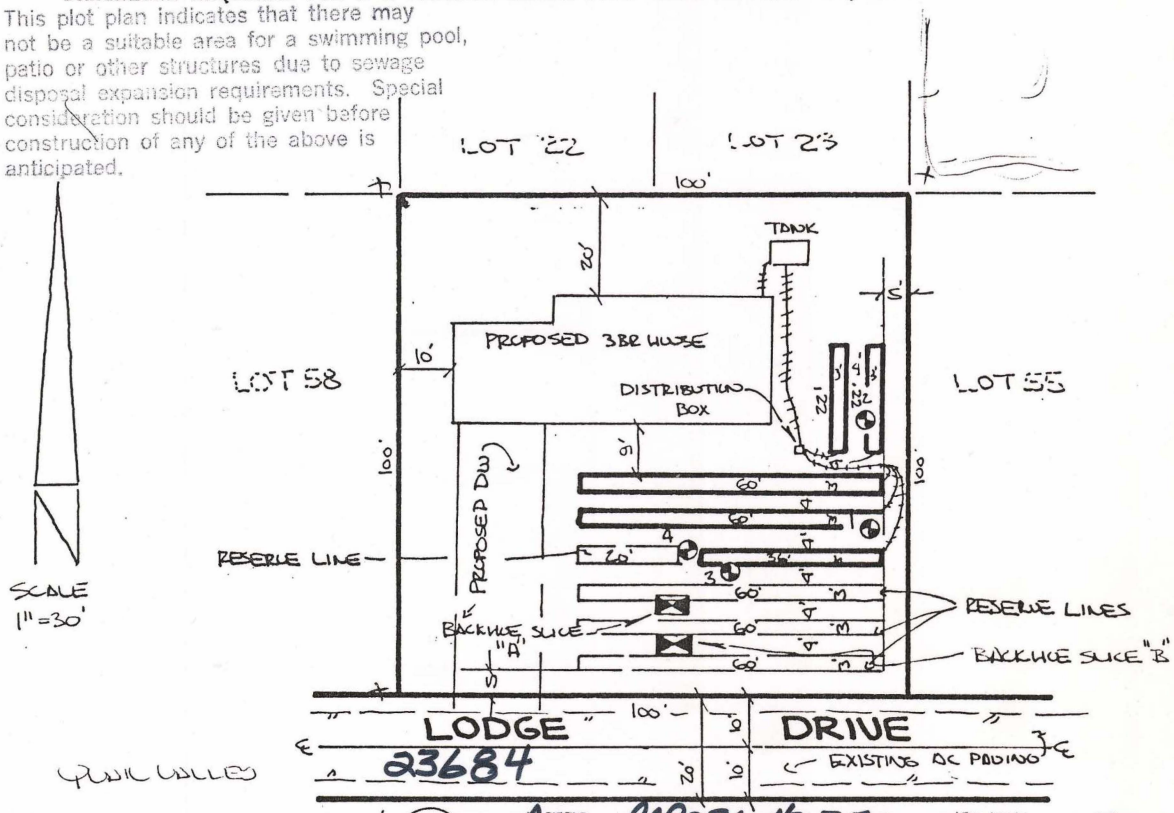
PAGE 6
W.O. QV-459A
DATE: 6-20-87
1 BACKHOE SLICE (8-25-87)

NOTE: A) NO ROCK OUTCROPPINGS ARE ON THIS PROPERTY
B) NO WELLS ARE LOCATED WITHIN 200' OF THIS PROPERTY
C) NO GRADING IS PROPOSED IN THE LEACH FIELD AREA

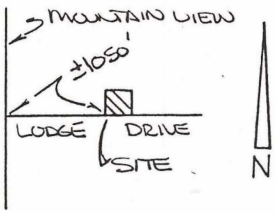
SYSTEM RECOMMENDATIONS:

INSTALL 1000 GALLON SEPTIC TANK WITH 200LF OF 3' WIDE TRENCH WITH 2' OF ROCK UNDER DRAINLINE REQUIRED FOR A 3-BEDROOM HOUSE PLUS 100% RESERVE REQUIRED

This plot plan indicates that there may not be a suitable area for a swimming pool, patio or other structures due to sewage disposal expansion requirements. Special consideration should be given before construction of any of the above is anticipated.



PUBLIC VALLEY



VICINITY MAP
NO SCALE

1	15	42"
2	19	48"
3	35	36"
4	32	36"

ASS PARCEL # 350-233-052

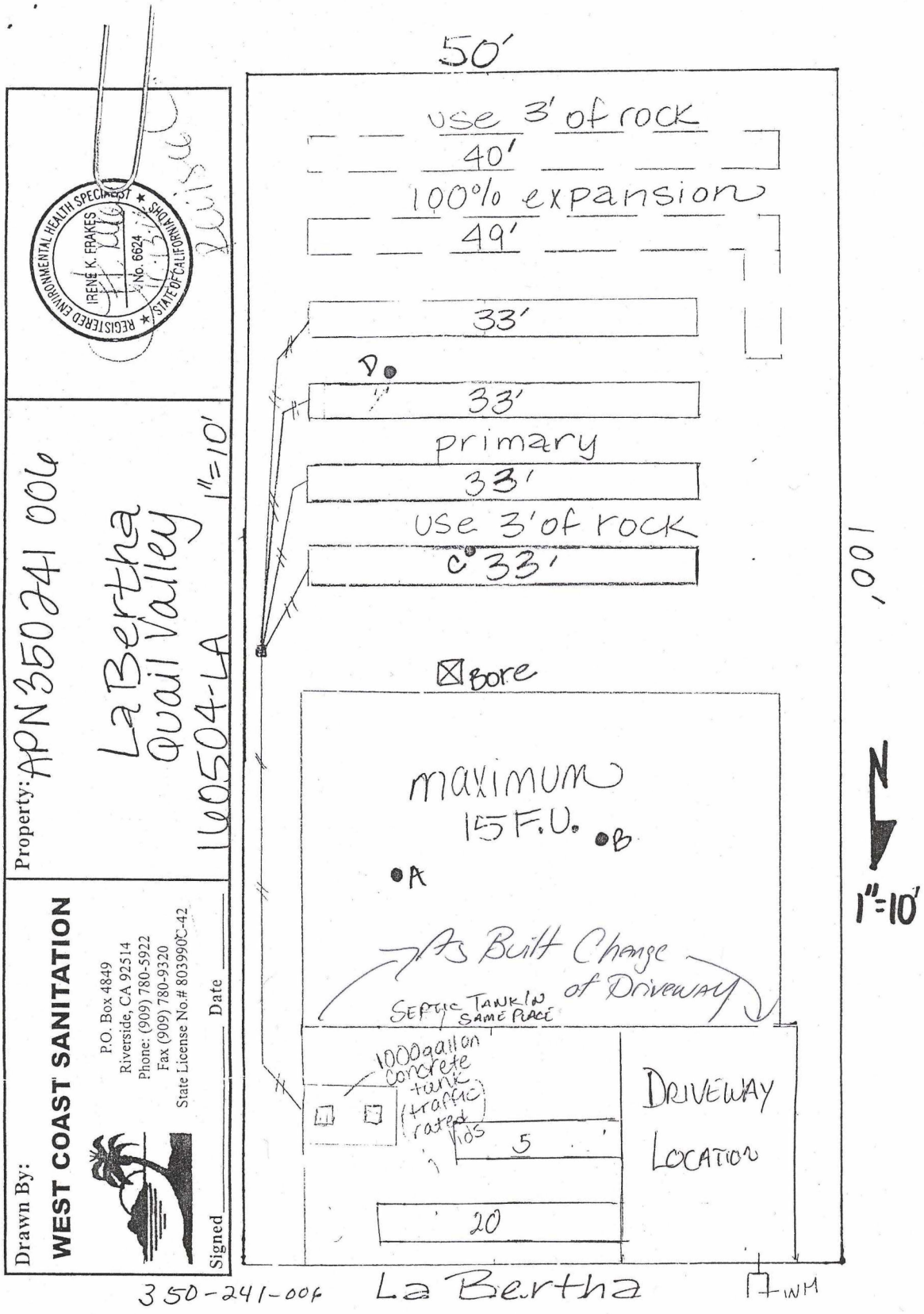
COUNTY OF RIVERSIDE
DEPARTMENT OF HEALTH

____ FOOD ESTABLISHMENT	____ SEWAGE DISPOSAL
____ TRAILER PARK	1000 GAL. SEPTIC TANK (SIDE WALL CALCULATIONS)
____ MOTEL, APT., HOTEL	800 SQ. FT. OF LEACH LINE
____ DWELLING 3 BDRM	____ X ____ SEEPAGE PIT
____ COMMERCIAL BUILDING	____ CONNECTION TO SEWER
____ WATER SOURCE	____ SEWER LINE LAYOUT
____ WATER LINE LAYOUT	____ SWIMMING POOL

This Is to Certify that the County of Riverside, Department of Health Approves for Occupancy, Construction or Installation the Item(s) Checked Above.

Date 9/18/87 By HR Fuches

NOTE:
1. Install primary system as shown above prior to pouring of footings (see attached note to Riv Co Bldg & Safety Dept.
2. Install 200 linear ft of line, 3 ft wide with 2 ft of rock below drain line.



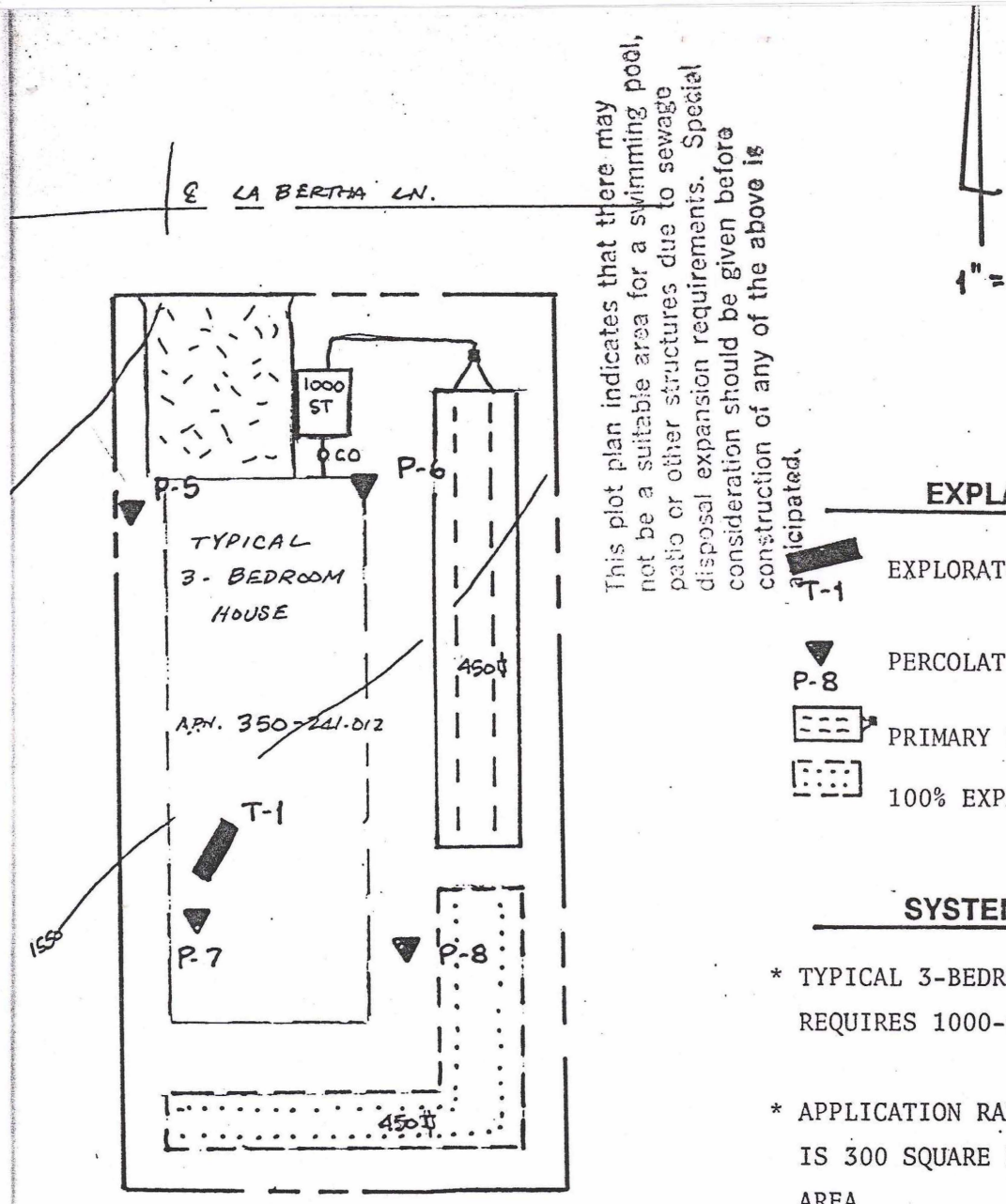
DEPARTMENT OF ENVIRONMENTAL HEALTH

Dwelling 16 FU

Commercial

Sewage Pits

4 lines 33' long
3 ft trench
Traffic Rated
Septic Tank



1" = 20'

This plot plan indicates that there may not be a suitable area for a swimming pool, patio or other structures due to sewage disposal expansion requirements. Special consideration should be given before construction of any of the above is anticipated.

EXPLANATION

T-1 EXPLORATORY TRENCH

P-8 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* TYPICAL 3-BEDROOM HOUSE/MOBILE REQUIRES 1000-GALLON SEPTIC TANK

* APPLICATION RATE OF 30 SQUARE FEET IS 300 SQUARE FEET OF ABSORPTION AREA

350 -

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

LEACH BED WITH 1 FOOT OF GRAVEL IS 450 SQUARE FEET OF BOTTOM AREA

____ Food
____ Trailer Park
____ Motel, Apt., Hotel
__/__ Dwelling 3bedroom
____ Commercial Building
____ Swimming Pool

__/__ Sewage Disposal
1000 Gal. Septic Tank
450 Sq. Ft. of Leaching BED
____ No. ___ Dia ____ BI ____ TD ____ MD Seepage Pit
____ Connection to Previous
____ Connect to Existing S.S.D.S.

NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, PORCHES, ETC

__/__ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
__/__ Water supply serving this installation must be from an approved source
__/__ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
__/__ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 8-12-97 BY _____

97170-01 **PLATE 1**

350-241-015

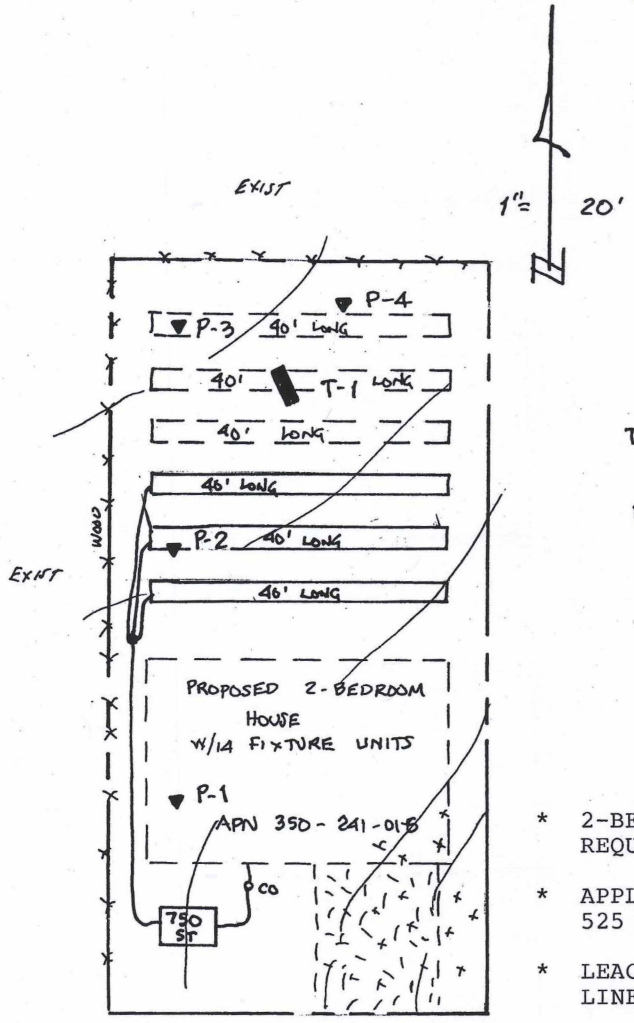
3 lines 40' long
3 ft of rock
below drainlines

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling 14 FU — 750 Gal. Septic Tank
___ Commercial — 525 Sq. Ft. of Leach Line
___ Seepage Pits — ___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer — ___ Connect to Existing System

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
✓ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 6/28/04 A. Layon



EXPLANATION

T-1 — EXPLORATORY TRENCH
P-4 — PERCOLATION TEST
PRIMARY LEACH LINES
100% EXPANSION LEACH LINES
HARD ROCK AREAS

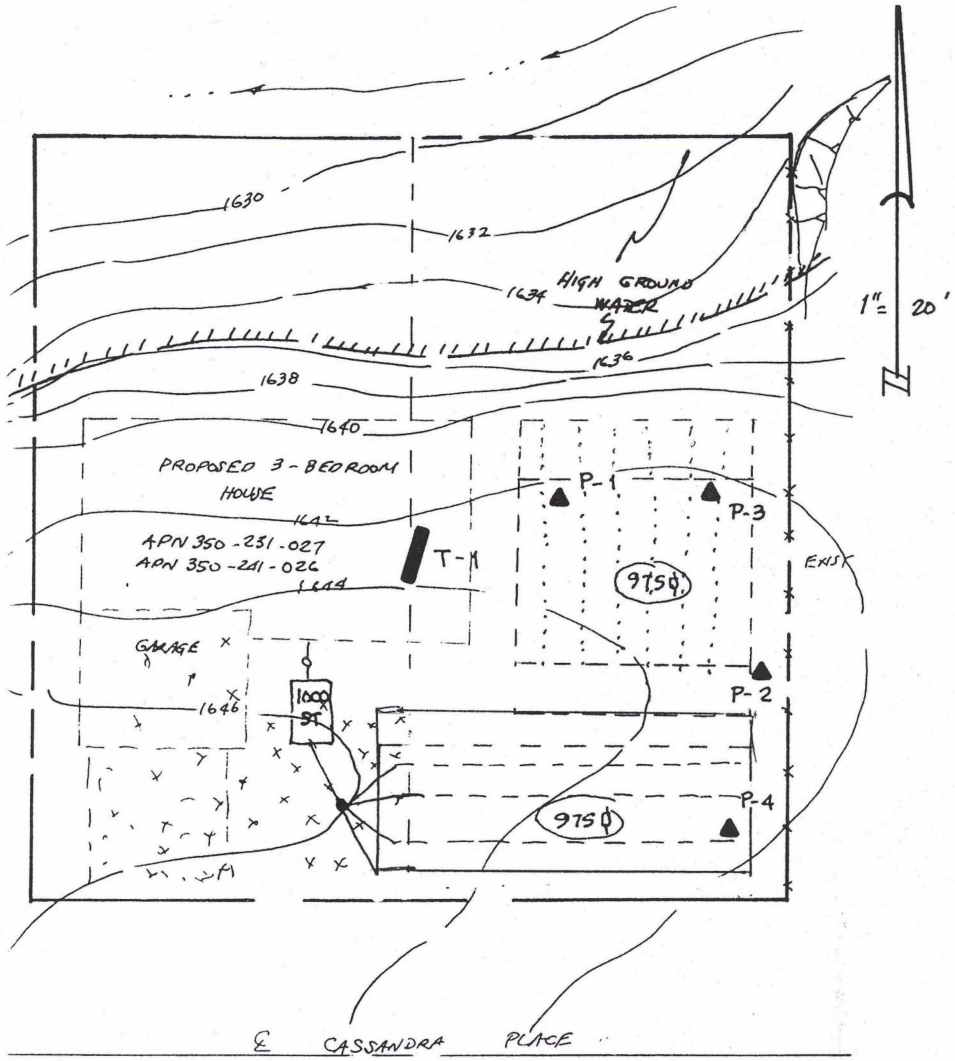
SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTURE UNITS REQUIRES 750- GALLON SEPTIC TANK.
* APPLICATION RATE OF 70 SQUARE FEET IS 525 SQUARE FEET OF ABSORPTION AREA.
* LEACH LINES WITH 3 FEET OF ROCK IS 105 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.
* 10% INCREASE FOR SLOPE/COVER FACTOR IS 120 LINEAR FEET.
* NO PORTION UNDER DRIVEWAYS, PORCHES, ET

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE 3-31-07
STATE of CALIFORNIA

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health Services Division and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leachline trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes.

23736-01 **PLATE 1**



EXPLANATION

1 — EXPLORATORY TRENCH

2 — PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED.

HARD ROCK AREA

SYSTEM DESIGN

* 3-BEDROOM HOUSE REQUIRES 1000-GALLON SEPTIC TANK.
* APPLICATION RATE OF 65 SQUARE FEET IS 650 SQUARE FEET OF ABSORPTION AREA.
* LEACH BEDS W/ 1.5 FEET OF ROCK IS 975 SQ. FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION AREA UNDER DRIVEWAYS, ETC.

2350 7/08-01 **PLATE 1**

350-241-026
350-231-027

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

X Dwelling 3Bed — 1000 Gal. Septic Tank
___ Commercial — 975 Sq. Ft. of Leach Line — Leachbed
___ Seepage Pits — ___No.___Dia___BI___TD___MD
___ Connect to Sewer — ___Connect to Existing System

X No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
X All sewage disposal installation shall conform to the current UPC
X Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

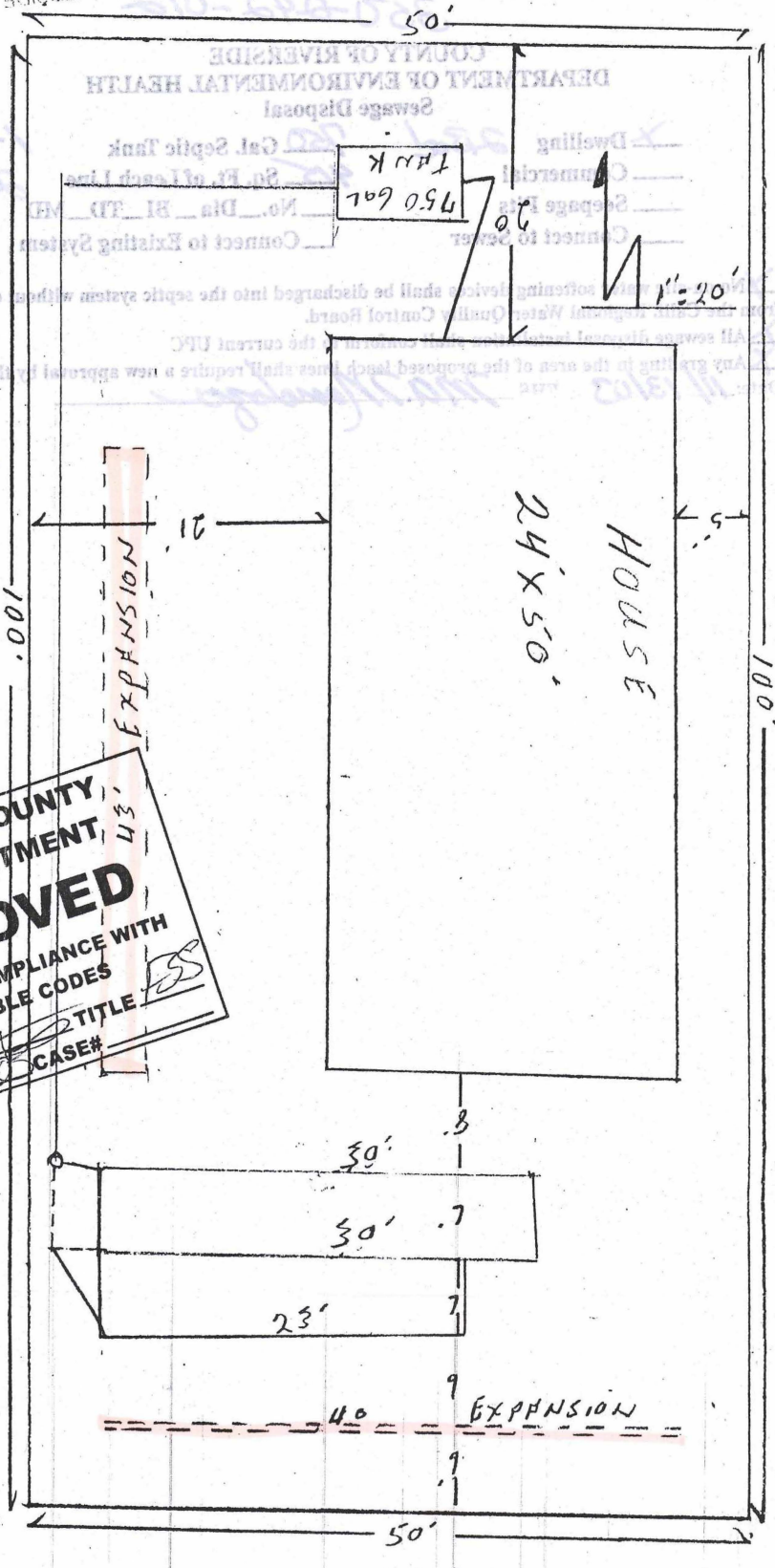
Date: 12/11/03 — M A Mendoza

DAVID BROOKS
23835
CASSANDRA DR.
QUAIL VALLEY
A.P.N. 350-242-012

PLANS ACCEPTABLE FOR
AP PLICATION PURPOSES ONLY

SEP 15 2003

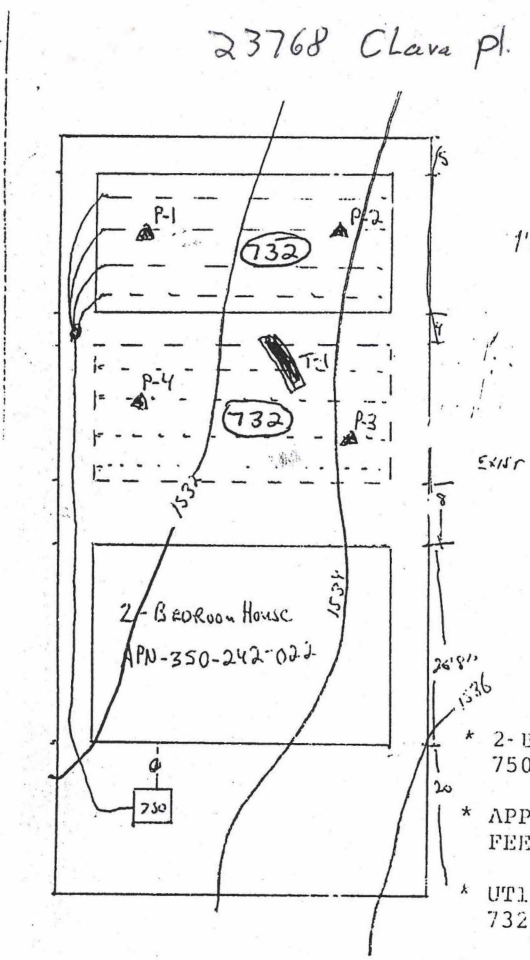
RIVERSIDE COUNTY
PLANNING DEPARTMENT
BY: Ismael Neal



RIVERSIDE COUNTY
FIRE DEPARTMENT
APPROVED
SUBJECT TO COMPLIANCE WITH
APPLICABLE CODES
BY
DATE
TITLE
CASE#

Note: Actual distance between the septic tank & D-box is 52' - not 69' as indicated on drawing. Redraw required!

23768 Clara Pl.



EXPLANATION

P-4 ▲ PERCOLATION TEST

T-1 ▬ EXPLORATORY TRENCH

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTURE UNITS REQUIRES 750 -GALLON SEPTIC TANK.

* APPLICATION RATE OF 65 SQUARE FEET IS 488 SQUAR FEET OF ABSORPTION ARE.

* UTILIZING LEACH BEDS WITH 1.5 FEET OF ROCK IS 732 SQUARE FEET OF BOTTOM AREA.

* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS ETC.

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

1 Dwelling 2/17	750 Gal. Septic Tank
___ Commercial	___ Sq. Ft. of Leach Line
___ Seepage Pits	___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer	___ Connect to Existing System

732 # Leach Bed

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.

___ All sewage disposal installation shall conform to the current UPC

✓ Any grading in the area of the proposed leach lines shall require a new approval by this Dept

Date: 7 Sep 04 EHS

1.5 FT ROCK REQ'D

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leachline trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes

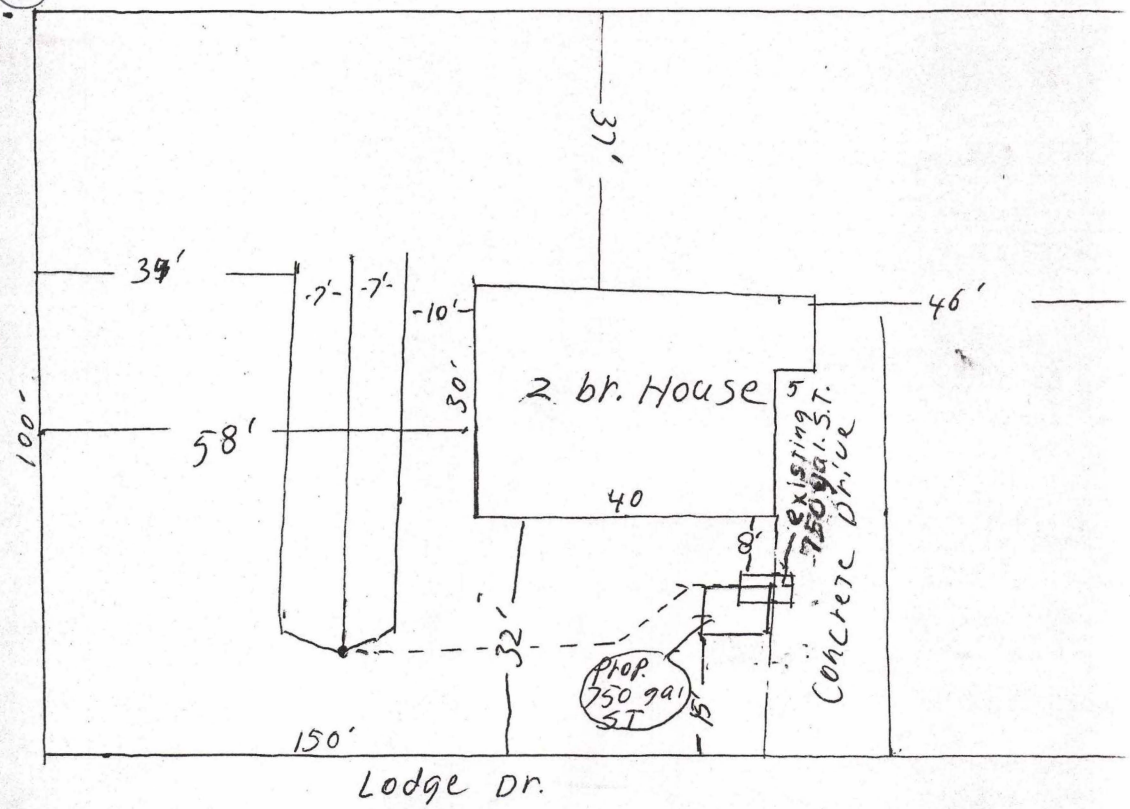
24208-01 PLATE 1

Wally Willette Backhoe
21551 Bundy Cyn Rd.
Lake Elsinore CA 92530
909 674 5476

State Lic. # 554199

log# 400495

scale 1" = 20'



PLANS ACCEPTABLE FOR APPLICATION PURPOSES ONLY

OCT 25 1995

RIVERSIDE COUNTY PLANNING DEPARTMENT
BY: vlb

Address: 23780 Lodge Dr.
Quail Valley
A.P.N.: 350-243-027
Owner: Transamerica

RIVERSIDE COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH

Replacing Septic Tank Only

- ___ Food Establishment
- ___ Trailer Park
- ___ Motel, Apt., Hotel
- ___ Dwelling
- ___ Commercial Building
- ___ Swimming Pool

- ✓ Sewage Disposal
- 250 Gal. Septic Tank PER
- ___ Sq. Ft. of Leach Line
- ___ Seepage Pit
- ___ Connection to Sewer

___ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
___ Water supply serving this installation must be from an approved source.
___ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation/construction.

Date 10/25/95 By _____

PLOT PLAN

NAME Wells Fargo Bank PHONE 766-4555

SITUS ADDRESS 23831 Clara Dr. Quail Valley

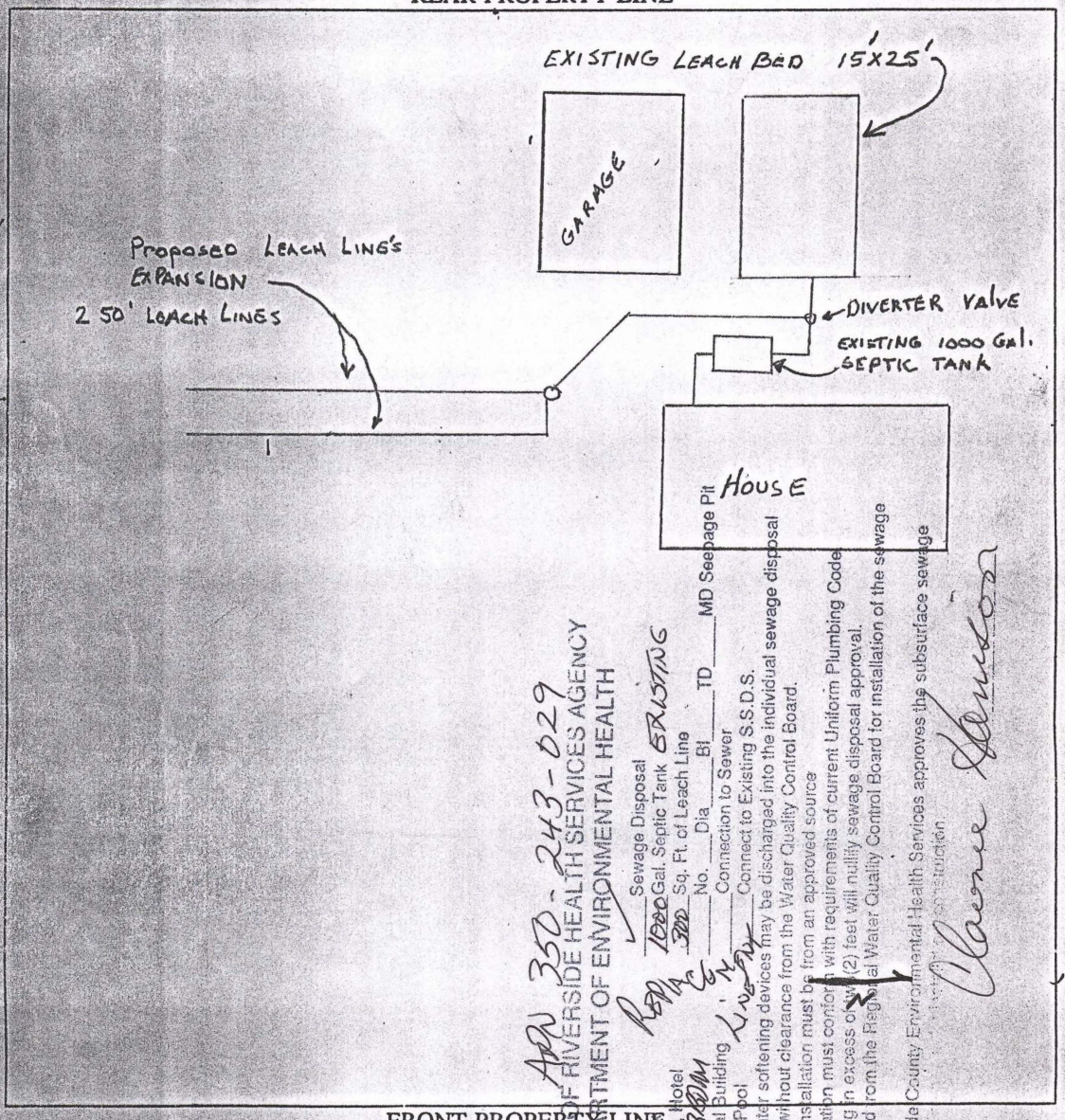
TRACT/PARCEL MAP _____ LOT _____

ASSESSOR'S PARCEL NO. 350-243-029

Provide North Arrow

Property Lines NOT TO SCALE

REAR PROPERTY LINE



FRONT PROPERTY LINE

Clara Dr STREET

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

APN 350-243-029

Food
Trailer Park
Motel, Apt., Hotel
Dwelling 3 BDRM
Commercial Building
Swimming Pool

✓ Sewage Disposal
1000 Gal. Septic Tank EXISTING
300 Sq. Ft. of Leach Line
___ No. ___ Dia. ___ BI ___ TD ___ MD Seepage Pit
___ Connection to Sewer
___ Connect to Existing S.S.D.S.

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code
✓ Any cutting, grading or filling in excess of (2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

I hereby certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal system for construction

Approved Clarence Johnson 1/9/97

284-263 REV 4/90

PLOT PLAN

NAME Rafael Pantoja PHONE 679-2875

SITUS ADDRESS 28636 Quail Pl. Quail Valley

TRACT/PARCEL MAP _____ LOT _____

ASSESSOR'S PARCEL NO. 350-244-002

Replacement of septic tank only

Provide North Arrow

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
1 Dwelling
___ Commercial Building
___ Swimming Pool

REAR PROPERTY LINE

1 Sewage Disposal
1200 Gal. Septic Tank
___ Lin. Ft. of Leach Line
1 Seepage Pit
___ Connection to Sewer

No on-site regenerative water softening devices may be discharged into the individual sewage disposal system. Water Quality Control Board.

Water supply serving this [illegible] an approved source.

All sewage disposal installations must conform to the requirements of current Uniform Plumbing Code.

Any cutting grading or filling in excess of [illegible] will nullify sewage disposal approval.

Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

Date 5/20/92 By Pioneer Dashwiler

SIDE PROPERTY LINE

SEWER LINE

SEPTIC

PORCH

LEACH LINE

SIDE PROPERTY LINE

FRONT PROPERTY LINE

STREET

LAND USE DIVISION
DEPT. OF BUILDING & SAFETY
HEMET OFFICE

284-263 REV 4/90

PLOT PLAN

Name CENTURY 21 Phone 734-6210

Situs Address 28720 QUAIL PLACE QUAIL VALLEY

Tract/Parcel Map _____ Lot _____

Assessor's Parcel No. 350-244-010

Provide North Arrow

RIVESIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

Replacement

_____ Food Establishment
_____ Trailer Park
_____ Motel, Apt., Hotel
_____ Dwelling
_____ Commercial Building
_____ Swimming Pool

leach lines & septic tank

_____ Sewage Disposal
750 Gal. Septic Tank
300 Sq. Ft. Seepage Pit
_____ Connection to Sewer

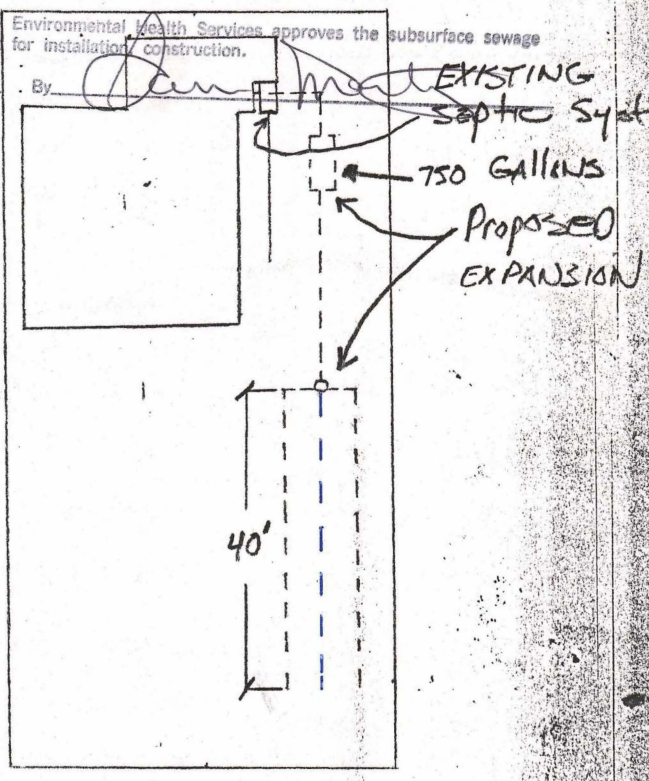
REAR PROPERTY LINE

SCALE 1" = 20'

_____ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
_____ Water supply serving this installation must be from an approved source.
_____ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
_____ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
_____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation construction.

Date 12-10-93 By _____



side property line

FRONT PROPERTY LINE

QUAIL PLACE

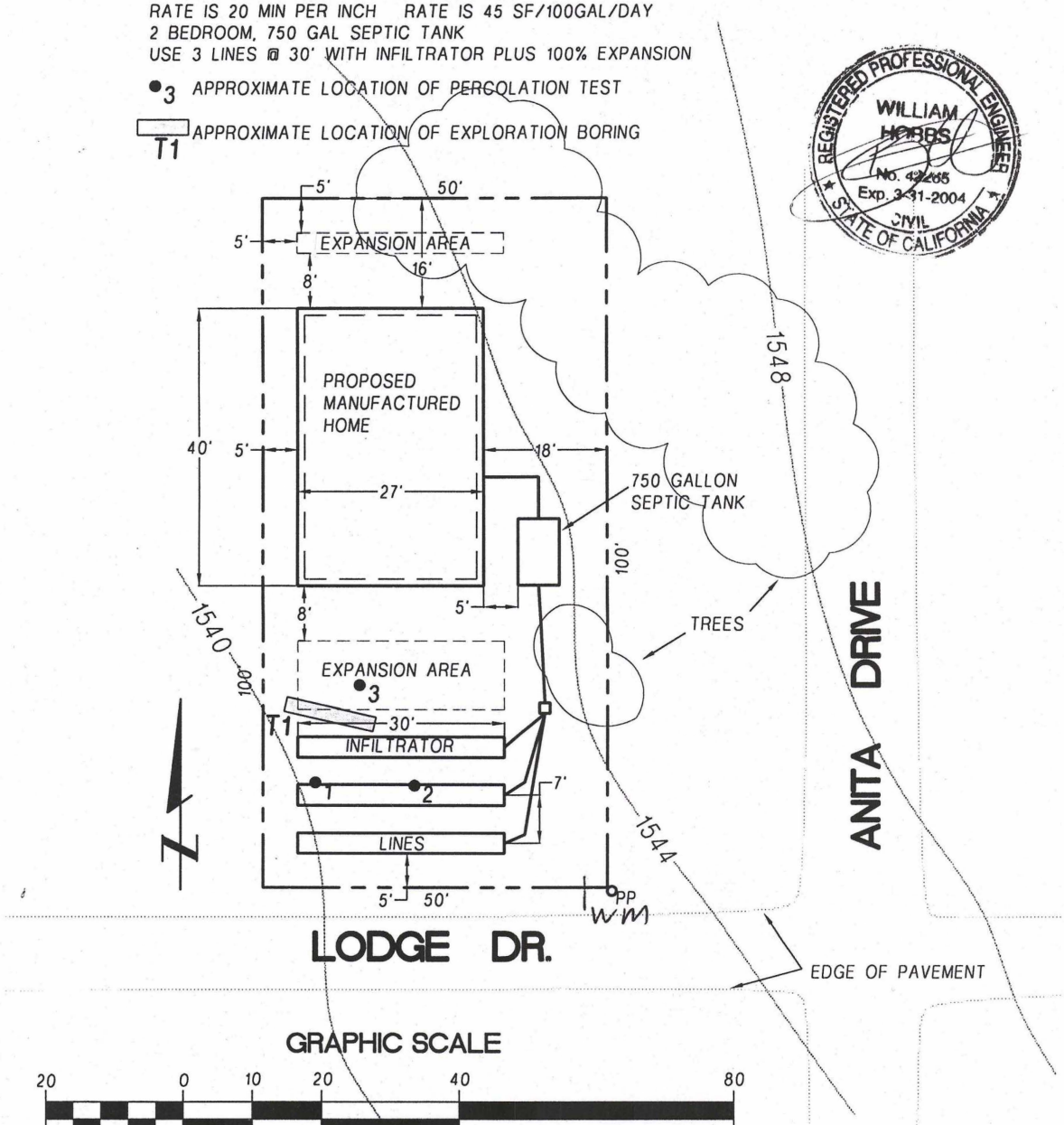
STREET

PLATE 1 TEST LOCATION MAP

APN 350-244-016 LOT 56 QUAIL VALLEY TRACT
RATE IS 20 MIN PER INCH RATE IS 45 SF/100GAL/DAY
2 BEDROOM, 750 GAL SEPTIC TANK
USE 3 LINES @ 30' WITH INFILTRATOR PLUS 100% EXPANSION

●3 APPROXIMATE LOCATION OF PERCOLATION TEST

T1 APPROXIMATE LOCATION OF EXPLORATION BORING



REGISTERED PROFESSIONAL ENGINEER
WILLIAM HOBBS
No. 42265
Exp. 3-31-2004
CIVIL
STATE OF CALIFORNIA

GRAPHIC SCALE

20 0 10 20 40 80

1 INCH = 20 FT

W. C. HOBBS, CONSULTING ENGINEER

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

X Dwelling 2Bed1470
___ Commercial
___ Seepage Pits
___ Connect to Sewer

750 Gal. Septic Tank
200 Sq. Ft. of Leach Line
___ No.__ Dia__ BI__ TD__ MD
___ Connect to Existing System

3 lines 30' long plastic chambers

X No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
X All sewage disposal installation shall conform to the current UPC
X Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date 11/3/03 M A Mendez

PLOT PLAN

NAME Greg Cabral PHONE

SITUS ADDRESS 23870 Lodge Dr.

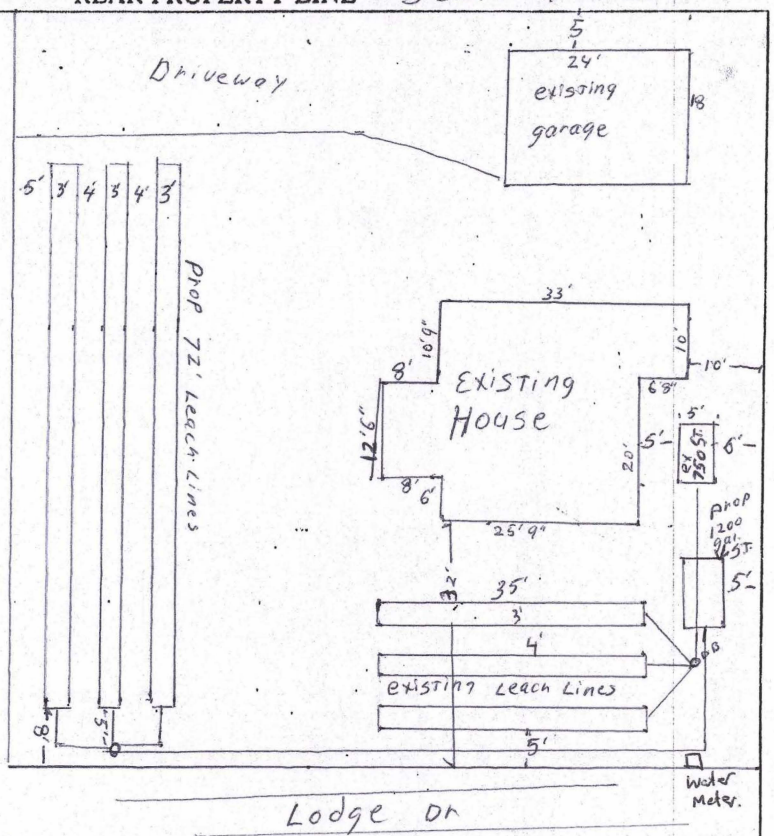
TRACT/PARCEL MAP LOTS 51252 Park Square ~~LOT~~

ASSESSOR'S PARCEL NO.

Provide North Arrow

N

REAR PROPERTY LINE Scale 1" = 20'



SIDE PROPERTY LINE

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH
SUBSURFACE SEWAGE DISPOSAL

These approved plans shall be VOIDED when:
1. Any part of the sewage disposal system is moved more than 10 feet from the original approved site.
2. Percolation rate changes more than 10 minutes /inch in the area of the sewage disposal system.
3. Any cutting, grading or filling in excess of 2 feet in the area of the subsurface sewage disposal area.

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

Replacement Leach Line and new tank

_____ Food Establishment
_____ Trailer Park
_____ ~~Hotel~~, Apt., Hotel
_____ Dwelling
_____ Commercial Building
_____ Swimming Pool

_____ Sewage Disposal
1200 Gal. Septic Tank NEW
504 Sq. Ft. of Leach Line NEW
_____ X _____ Seepage Pit
_____ Connection to Sewer

_____ No on-site recirculating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
_____ Water supply serving this installation must be from an approved source.
_____ All sewage disposal construction shall conform with requirements of current Uniform Plumbing Code.
_____ Any cutting grading or filling in excess of two (2) feet shall nullify sewage disposal approval.
_____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

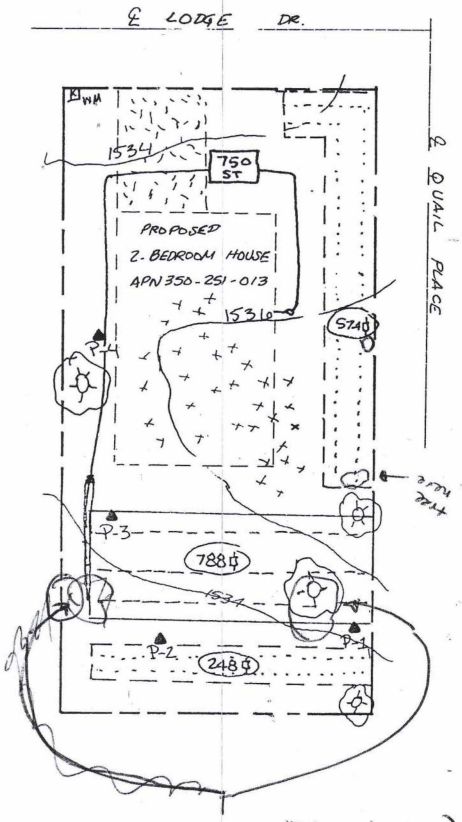
This is to certify that the Riverside County Department of Public Health approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

FRONT PROPERTY LINE

Date 11/25/94 By Wally Willett C42554199

STREET Clarence Hanson

PE REVIEWED 3-14-94



Large trees (eucalyptus) must be removed.

1"=20

EXPLANATION

- T-1 EXPLORATORY TRENCH
- P-4 PERCOLATION TESTS
- HARD ROCK AREAS
- PRIMARY LEACH BED
- 100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 70 SQUARE FEET IS 525 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 1.5 FEET OF ROCK IS 788 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, HORSE CORRALS, ETC.

22619-01 **PLATE 1**

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leachline trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes.

350 251 013

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

_____Food
_____Trailer Park
_____Motel, Apt., Hotel
2Bd Dwelling
_____Commercial Building
_____Swimming Pool

_____Sewage Disposal
750 Gal. Septic Tank
788 Sq. Ft. of Leach 1 Bed
_____No. ___Dia_____Bl_____TD _____MD Seepage Pit
_____Connection to Sewer
_____Connect to Existing S.S.D.S.

_____No on-site regenerating water softening devices may be discharged into the individu sewage disposal system herewith approved without clearance from the Water Quality Control Board.
_____Water supply serving this installation must be from an approved source
_____All sewage disposal installation must conform with requirements of current Uniform P bing Code.
_____Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal appr al.
_____Approval has been obtained from the Regional Water Quality Control Board for instal on of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the su rface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 1-31-03 BY Irene Fraites

USE 1.5' AL Rock

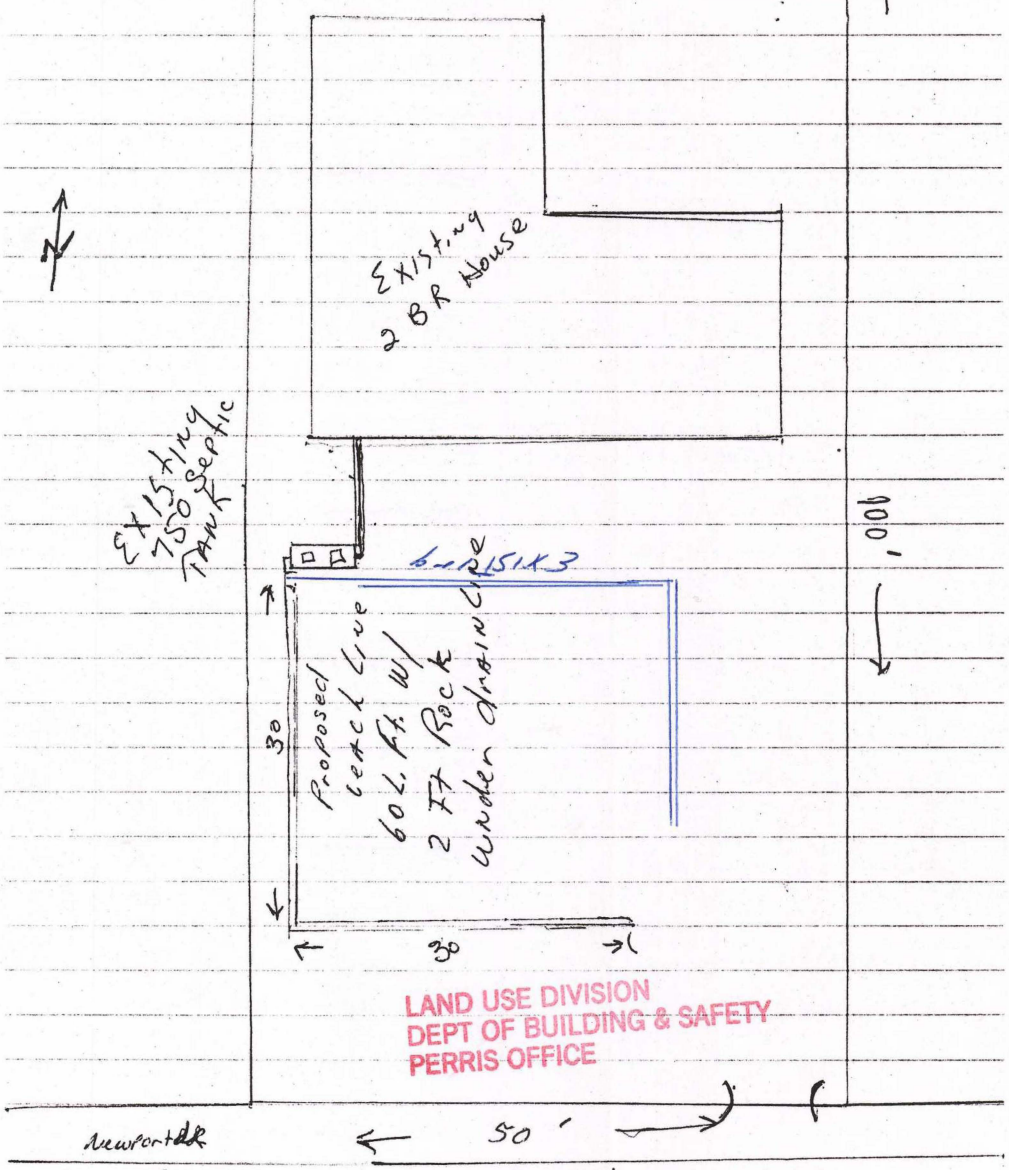
Owner

Rudy Sherrard

23940 Newportdr.

Quail Valley 29380

APN#
350-254-019-1



LAND USE DIVISION
DEPT OF BUILDING & SAFETY
PERRIS OFFICE

23940 Newport dr
Quail Valley Ca
~~29~~ 380
92

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

USE
2' OF ROCK
SIDE WALL
ALLOWANCE
NOT USED.

___ Food Establishment
___ Trailer Park
___ Mot., Apt., Hotel
✓ Dwelling 2BDRM
___ Commercial Building
___ Swimming Pool

ADDING
ADDITION
LEACH
LINES

✓ Sewage Disposal
750 Gal. Septic Tank EXISTING
180 Sq. Ft. of Leach Line
___ x ___ Seepage Pit
___ Connection to Sewer

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source.
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

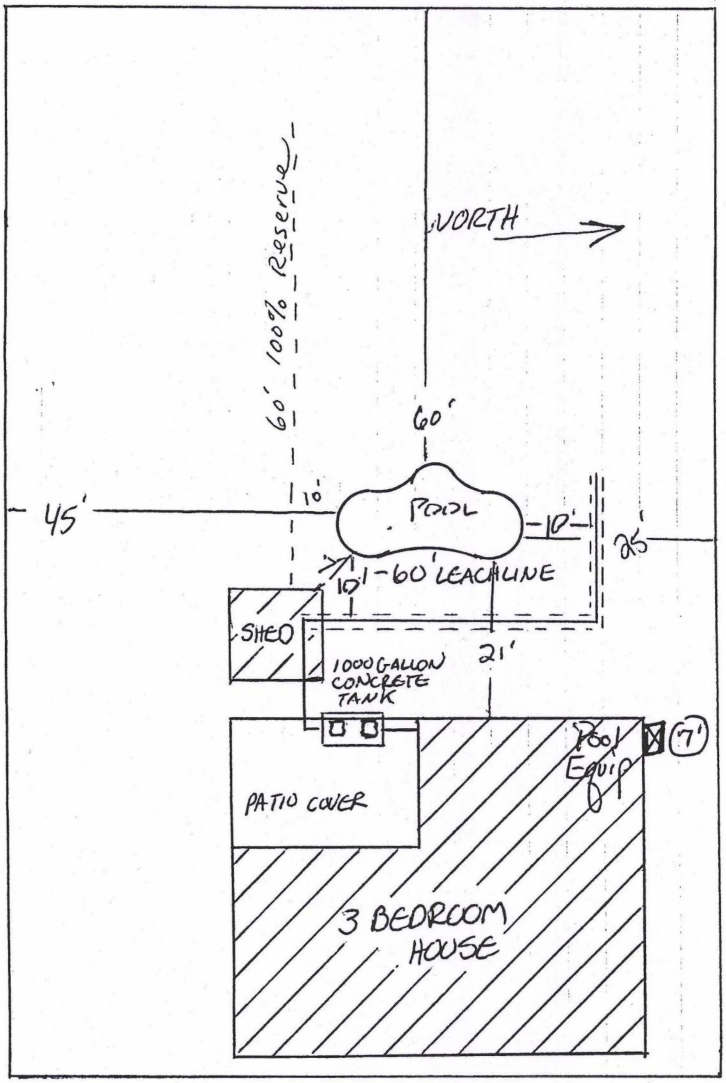
Date 1/22/91 By Clarence Hansen

SCALE 1"=20'

APN#

23916 NEWPORT DR
QUAIL VALLEY CA.

NEWPORT DR.



APN 350 254 021

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

_____Food
_____Trailer Park
_____Motel, Apt., Hotel
_____Dwelling
_____Commercial Building
✓ Swimming Pool

_____Sewage Disposal
_____Gal. Septic Tank
_____Sq. Ft. of Leach Line
_____No. ___Dia_____Bl_____TD_____MD Seepage Pit
_____Connection to Sewer
_____Connect to Existing S.S.D.S.

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
____Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 21 May 99 BY Mark Nardo

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH

RECEIVED
OCT 01 2015
County of Riverside • Environmental Health Department
ENVIRONMENTAL PROTECTION & OVERSIGHT DIVISION
LAND USE • WATER ENGINEERING PROGRAM

CERTIFICATION OF EXISTING SUBSURFACE DISPOSAL SYSTEM

☑ 3880 Lemon Street • Suite 200 • Riverside • CA • 92501 – (951) 955-8980
☐ 47-950 Arabia Street • Suite A • Indio • CA 92201 – (760) 863-7570

Property Information: APN: 350-254-033 Date of Inspection: 9-2-2015

1. Owner: Jessie Hernandez Address: 23980 Newport Drive City: Menifee/Quail Valley

FAILURE TO PROVIDE ALL REQUIRED INFORMATION SHALL PREVENT OWNER FROM OBTAINING ENVIRONMENTAL HEALTH APPROVAL

2. Show design and location on a scale of 1:20 or 1:40 of the sewage disposal system and 100% expansion area in relation to dwellings, structures, wells, rock outcroppings, drainage, watercourses, etc.

3. a. I examined existing subsurface sewage disposal system at the above location on 9-2-2015 and determined that the tank capacity is 1000 gallons and that there is 600 sq. ft. of leach line bottom area. There are _____ bedrooms in the dwelling and there are ____ fixture units.
   b. There are ____ leach line(s), each ____ ft. long Depth ____ ft. ☐ Rock ☐ Plastic Chamber
   c. There are ____ Seepage pit(s), each ____ ft. in diameter, and ____ ft. TD. ____ ft. BI.
   d. The leach bed is 10 ft. by 15 ft., total 450 ? sq. ft. of leached area. Depth is 7 ft.

4. a. Construction of septic tank (Please check one of the following):
   ☐ Concrete ☑ Fiberglass ☐ Steel ☐ Other: _____
   b. Internal dimensions of septic: Length 8 ft. Width 4 ft. Depth 5 ft.
   c. Condition of tank (please check yes or no for each question):
   Tank Structure deteriorated? ☐ Yes ☑ No
   Effluent Filter Present? ☐ Yes ☑ No
   Inlet Tee present? ☑ Yes ☐ No
   Outlet Tee present? ☑ Yes ☐ No
   Two compartments? ☑ Yes ☐ No
   d. Condition of D-Box: N/A Level? ☐ Yes ☐ No Replaced? ☐ Yes ☑ No

5. a. While pumping the tank, did effluent flow back into tank from absorption system? ☐ Yes ☑ No
   b. Prior to pumping, was the liquid level in the tank above the outlet tee? ☐ Yes ☑ No
   c. Was the area around the lids oxidized? ☐ Yes ☑ No
   d. Is design of system gravity feed? ☑ Yes ☐ No
   e. Were well(s) observed on this or adjacent property? ☐ Yes ☑ No
   If yes, indicate distance of well from: Septic tank ____ ft. Leach lines ____ Seepage Pits ____ ft.
   f. Distance from springs, lakes, and natural water courses (check all that apply):
   ☐ Septic Tank ____ ft. ☐ Leach lines ____ ft. ☐ Seepage Pits ____ ft.
   g. Is sewer within 200 ft. of structure and abuts property line? ☐ Yes ☐ No
   Additional Comments: _____
   h. How long has dwelling been vacant? (if applicable) _____ months _____ weeks ☐ N/A

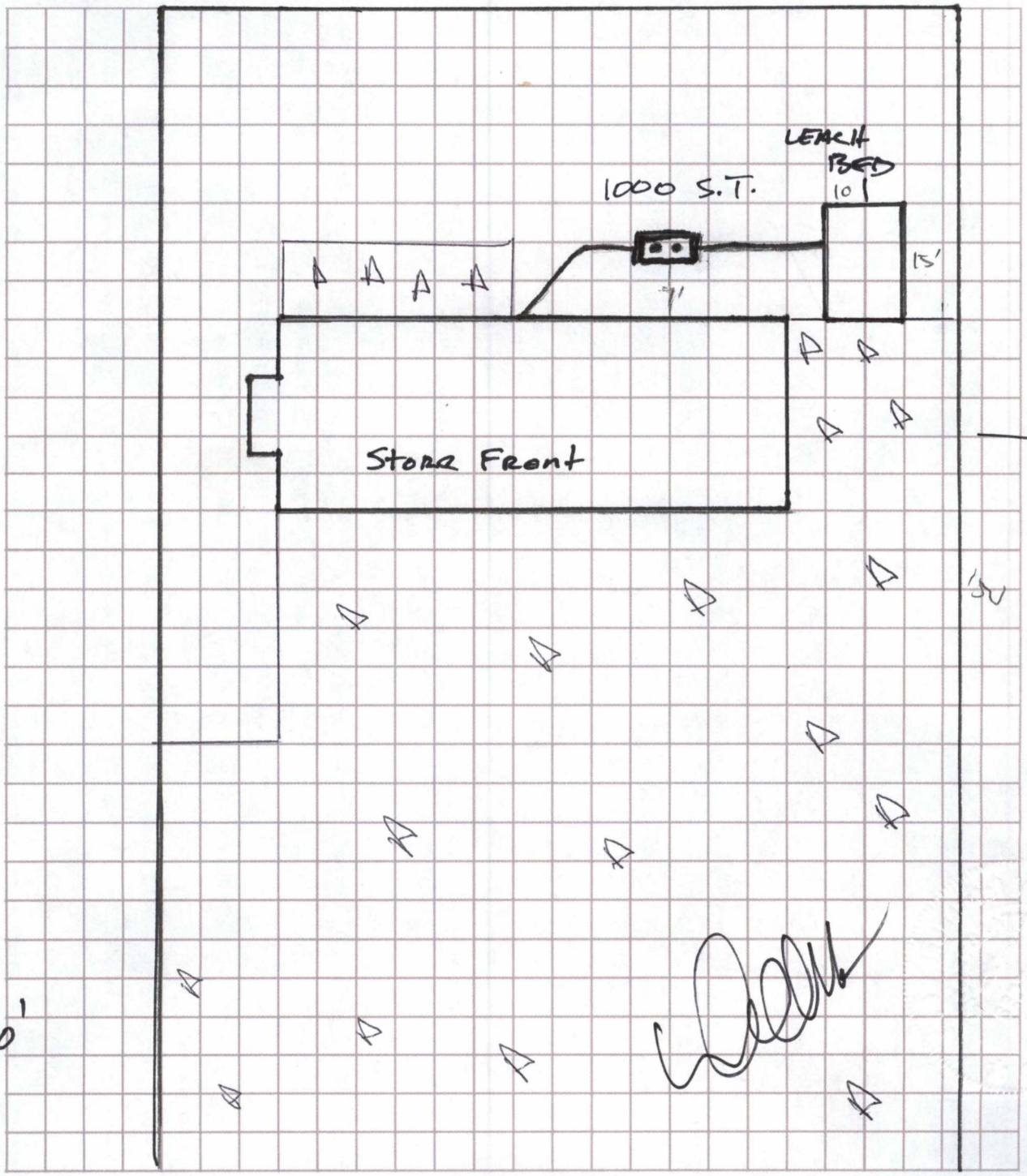
6. a. ☑ It is my opinion that the system appears to be in good working order and can be expected to function properly with proper maintenance. No repairs are necessary at this time.
   b. ☐ It is my opinion that the system is not in good working order and will not function properly without the following repairs: _____

I certify under penalty of perjury that the foregoing is true and correct.

Signature: _____ Print Name: Dan Murphy
Contractor License No.: 988020 Expiration Date: 10-15
Pumper Co.: Le Pew Industrial Inc Phone Number: 888-961-5971
Address: 41730 Elm Street #303 City: Murrieta Zip: 92562

Jessie Hernandez APN: 350-254-033 23980 Newport Drive Menifee Ca

Lic. #C42-988020



County of Riverside
DEPARTMENT OF ENVIRONMENTAL HEALTH
P.O. BOX 7909 • RIVERSIDE, CA 92513-7909
STEVE VAN STOCKUM, DIRECTOR

June 13, 2018

City of Menifee
Planning Department
Attn: Lisa Gordon
29714 Haun Road
Menifee, CA 92586

SUBJECT: CITY OF MENIFEE – PLANNING APPLICATION PP2018-103
Quail Valley Market Addition
APN: 350-254-033, -031, -014

Dear Ms. Gordon:

The project listed in the subject heading of this letter is a 684 square foot addition (unpermitted) for the sale of retail goods, an approximate 600 square foot patio seating area and 2 metal shipping containers for storage purposes. In accordance with the agreement between the County of Riverside, Department of Environmental Health (DEH) and the City of Menifee, DEH offers the following comments:

At this time, this Department cannot recommend the approval of the addition for this market located at 23980 Newport Drive.

This project lies within the boundaries of Riverside County Ordinance 856 and Resolution No. R8-2006-0024 by the Santa Ana Regional Water Quality Control Board. Both of these documents prohibit additional waste flows to the existing onsite wastewater treatment system (OWTS)/septic. Any seating proposed and additional uses at the site would constitute as additional flows to what was previously reviewed in 2015 as a pre-packaged market (PP2015-130). In addition, this additional development of the site does not allow for a suitable location for an expansion OWTS as required.

This site currently has a pre-packaged food facility permit with our District Environmental Services (DES) program. Any changes must be also addressed with DES. Metal shipping containers separate from the food facility do not meet the requirements of California Retail Food Code.

Should you have any further questions or require further assistance, please contact me by email at kakim@rivoco.org or by phone at (951) 955-8980.

Sincerely,
Kristine Kim, REHS
Environmental Protection and Oversight Division
Land Use and Water Resources Program

County of Riverside
DEPARTMENT OF ENVIRONMENTAL HEALTH
P.O. BOX 7909 • RIVERSIDE, CA 92513-7909
STEVE VAN STOCKUM, DIRECTOR

June 23, 2015

City of Menifee
Planning Department
Attn: Lisa Gordon
29714 Haun Road
Menifee, CA 92586

SUBJECT: CITY OF MENIFEE – PLANNING APPLICATION FOR PP2015-130 EL RANCHITO MARKET (APN 350-254-033, -031, -014)

Dear Ms. Gordon,

In accordance with the agreement between the County of Riverside, Department of Environmental Health (DEH) and the City of Menifee, DEH offers the following comments for the project referenced in the subject heading of this letter.

At this time, this department cannot recommend the approval of this proposal for a market which would include a deli located at 23980 Newport Drive in the city of Menifee. The project lies within the boundaries of prohibition of septic systems as outlined in Riverside County Ordinance 856. Based on floor plans provided, additional plumbing fixtures would be required to meet requirements of California Retail Food Code to become a market/deli and the prohibition does not allow additional water generating fixtures or any construction of a new system or alteration of the existing septic system.

Should you have any further questions or require further assistance, please contact me by email at kakim@rivcocha.org or by phone at (951) 955-8980.

Sincerely,

Kristine Kim, REHS
Environmental Protection and Oversight Division
Land Use and Water Resources Program
SR33796

CITY OF MENIFEE

Community Development Department

Cheryl Kitzerow – Community Development Director

DATE: **May 24, 2018**

RE: **Planning Application Plot Plan No. 2018-108 – Quail Valley Market Addition**

TO: City of Menifee Building Department – **Craig Carlson**
City of Menifee Engineering Department – **Chris Heron**
City of Menifee/County of Riverside Fire – **Paul Villalobos**
Department of Environmental Health – **Kristine Kim**

FROM: **Russell Brown – Assistant Planner**

Project Description:
Planning Application Plot Plan No. 2018-103 proposes a 684 square foot addition (unpermitted) for the sale of retail goods, an approximate 600 square foot patio seating area in the rear of the building and two (2) metal shipping containers for storage purposes. As shown, the Applicant is proposing three (3) parking spaces in the rear of the lot, over existing concrete.

The project site is located north of Newport Drive (not Newport Road), west of Palm Drive, off Goetz Road, near the Fire Station. The address is 23980 Newport Drive. The project site APNs are 350-254-033, -031 and -014.

The plot plan application was initiated with the City and this is our first routing of the project. Please provide me with your determination of completeness (review and comments) of the application by *June 14, 2018*.

Russell Brown
Assistant Planner

Kim, Kristine

From: Lisa Gordon <lgordon@cityofmenifee.us>
Sent: Thursday, June 07, 2018 1:03 PM
To: Kim, Kristine
Subject: Quail Valley Market Revision/Addition
Attachments: Transmittal1.docx; Quail_02-Site Plan.pdf

Good Afternoon:

I wanted to check and see if you received this transmittal. I know the first one was a lot of work and we could add anymore plumbing fixtures, so I wanted to make sure you saw this revision (includes seating for customers).

He says the storage containers are for storage only, but one has been outfitted with an AC unit and he previously told us he wanted to use as an office.

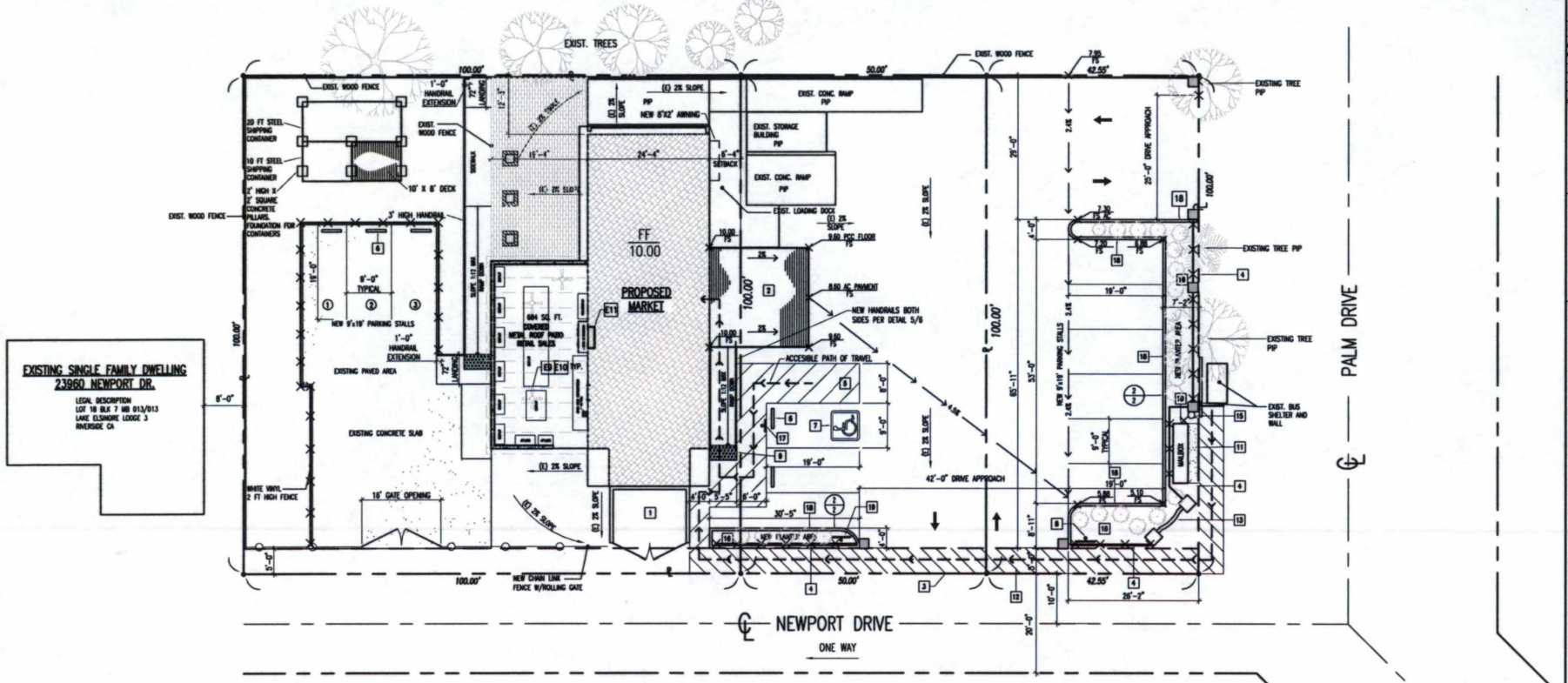
Thanks

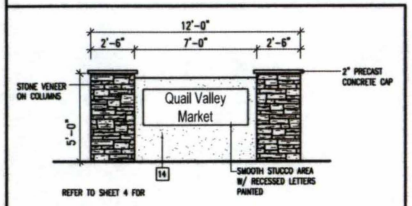
Lisa Gordon | Planning Manager
Community Development Department
City of Menifee | 29714 Haun Road | Menifee, CA 92586
Direct: (951) 723-3739 | City Hall: (951) 672-6777 | Fax: (951) 679-3843
lgordon@cityofmenifee.us | cityofmenifee.us

Connect with us on social media:

MENIFEE
New. Better. Best.

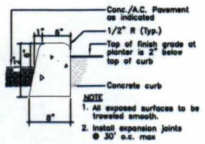
Please note that email correspondence with the City of Menifee, along with attachments, may be subject to the California Public Records Act, and therefore may be subject to disclosure unless otherwise exempt. The City of Menifee shall not be responsible for any claims, losses or damages resulting from the use of digital data that may be contained in this email.





MONUMENT SIGN DETAIL

SCALE: NONE — 3



TYP. CURB DETAIL

SCALE: NONE — 2

EXISTING BUILDING
23971 NEWPORT DR.
LEGAL DESCRIPTION
LOT 10 BLK 8 MB 013/013
LAKE ELSINORE LODGE 3
RIVERSIDE CA

PROJECT DATA:

DEVELOPER: / APPLICANT:	QUAIL VALLEY MARKET TRES MONOS LLC JESSE HERNANDEZ
PROJECT DESCRIPTION:	REMODEL OF EXISTING BUILDING FOR PRODUCE MARKET STORE ALONG W/ SITE IMPROVEMENTS
PROJECT ADDRESS:	23980 NEWPORT DRIVE CANYON LAKE,CA
APN:	350-254-014 350-254-031 350-254-033
SITE AREA	19,255 S.F. NET AREA
COVERAGE AREAS:	

AREA OF USE	SQ. FT.
BUILDINGS	1,655
PARKING/PAVED	16,829
LANDSCAPING	771

PIP = PROTECT IN PLACE

NOTES:

1. ALL NEW ACCESSIBLE PARKING, ACCESS AISLES, AND ACCESSIBLE WALKWAYS SHALL BE 5% MAXIMUM SLOPE IN DIRECTION OF TRAVEL AND 2% MAXIMUM CLOSS SLOPE.

KEY LEGEND

FF- FINISH FLOOR

FS- FINISH SURFACE

AC- ASPHALT

KEYNOTES

1. TRASH ENCLOSURE PER CITY OF MENIFEE STANDARDS 1310
2. NEW 20'X20' 400 SQ. FT. PATIO COVER AND CONCRETE DECK ABOVE FINISH GRADE, TO MATCH FINISH FLOOR LEVEL OF STORE
3. FUTURE 5'-0" RIGHT OF WAY DEDICATION
4. NEW 3 FEET HIGH VINYL FENCE (WHITE) WITH DOUBLE RAIL AND POST AT 10' O.C.
5. ACCESSIBLE AISLE
6. PARKING BUMPER
7. H.C. ACCESSIBLE PARKING PER DETAIL 1/6
8. UNAUTHORIZED PARKING SIGNAGE PER DETAIL 2/6
9. TRUNCATED DOMES PER DETAIL 1/6
10. NEW COMMUNITY MAILBOX KIOSK PROVIDED AND INSTALLED BY UNITED STATES POSTAL SERVICE
11. NEW CONCRETE PAVING
12. 5' STRIPED PUBLIC ACCESS
13. MONUMENT SIGN - SEE DETAIL 3 THIS SHEET
14. STUCCO FINISH
15. NEW LIGHT POLE (SOLAR POWERED) PROVIDED AND INSTALLED BY UNITED STATES POSTAL SERVICE
16. NEW DROUGHT TOLERANT LANDSCAPING
17. NEW ACCESSIBLE PARKING SIGNAGE PER DETAIL 7/6
18. NEW CONCRETE CURB PER DETAIL 2/2
19. NEW "RIGHT TURN ONLY - ONE WAY" SIGNAGE
- EB CEILING FAN
- E10 CEILING FAN ON DEDICATED 15 AMP BREAKER
- E11 200 AMP ELECTRICAL PANEL

NORTH

SITE PLAN

SCALE: 1" = 10'-0" — 1

REVISIONS

REV #	DESCRIPTION	DATE
1	2ND REVIEW	4/22/16
2	OWNER REVISIONS	4/23/16

Engineers Data:

Engineers Stamp:

PROJECT TITLE
PROPOSED QUAIL VALLEY MARKET PLANS

Agency Approval

PROPOSED OWNER:
JESSE HERNANDEZ

By: _____ Date: _____

Project Address
23980 NEWPORT DR.
CANYON LAKE, CA 92587

Project Description
PROPOSED MARKET AND DELI

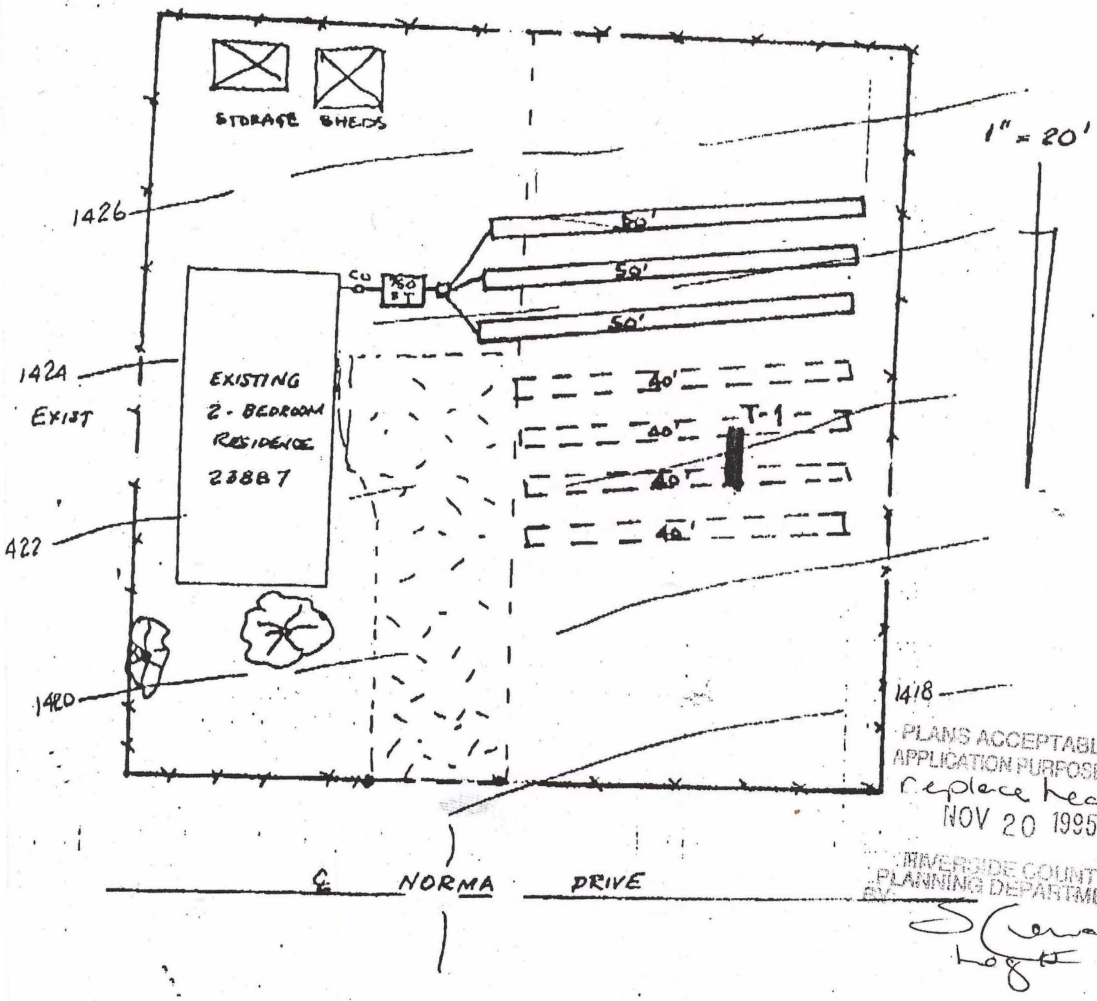
Date	AS NOTED	All approved	JAN. 2015
Drawn by	P.C.S.	All approved	MAY 2015
Job date	2016-02-03	All approved	
DISK File	QUAIL VALLEY 2015	Construction release	

Drawing Name: SITE PLAN, NOTES AND TYP. CURB DETAIL

Sheet No. 2 OF 6

A.P.N. 350-255-028

10977
401564



PLANS ACCEPTABLE FOR APPLICATION PURPOSES ONLY
Replace Head Lines
NOV 20 1995
RIVERSIDE COUNTY PLANNING DEPARTMENT
BY

EXPLANATION

T-1 EXPLORATORY TRENCH

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* RECOMMENDED APPLICATION RATE OF 60 SQUARE FEET IS 450 SQUARE FEET OF ABSORPTION AREA
* LEACH LINES WITH 1 FOOT OF GRAVEL IS 150 LINEAR FEET OF 3-FOOT WIDE LEACH LINE
* NO PORTION OF ABSORPTION AREA UNDER DRIVEWAYS, HORSE CORRALS, ETC

95178-01 PLATE 1

APN 350-255-028

RIVERSIDE COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH

REPLACEMENT LINES

___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
✓ Dwelling 2 BDRM
___ Commercial Building
___ Swimming Pool

✓ Sewage Disposal
750 Gal. Septic Tank — EXISTING
450 Sq. Ft. of Leach Line
___ x ___ Seepage Pit
___ Connection to Sewer

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source.
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

Date 11/20/95 By Clarence Hanson

PLOT PLAN

NAME CARLOS MARTINEZ PHONE _____

SITUS ADDRESS 23961 LODGE DR. Quail Valley, CA. 92587

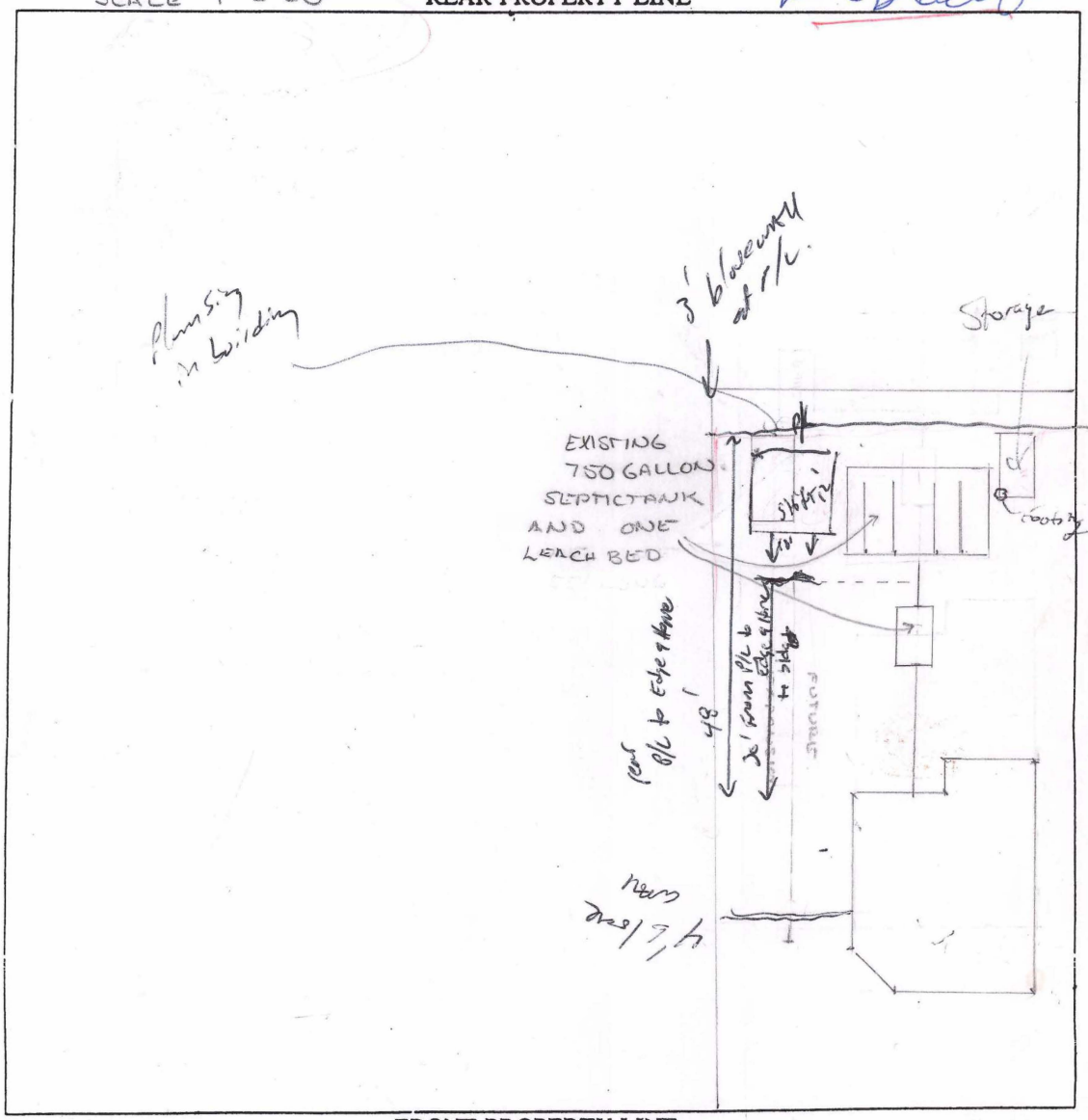
TRACT/PARCEL MAP _____ LOT _____

ASSESSOR'S PARCEL NO. _____

Provide North Arrow ↓

SCALE 1" = 20'

REAR PROPERTY LINE



FRONT PROPERTY LINE

LODGE DR.

STREET

350-261-022

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

X Dwelling 3 Bed — 750 Gal. Septic Tank — 1-line 75' long
___ Commercial — 375 Sq. Ft. of Leach Line — w/30' of rock
___ Seepage Pits — ___No. ___Dia ___BI ___TD ___MD
___ Connect to Sewer — ___Connect to Existing System

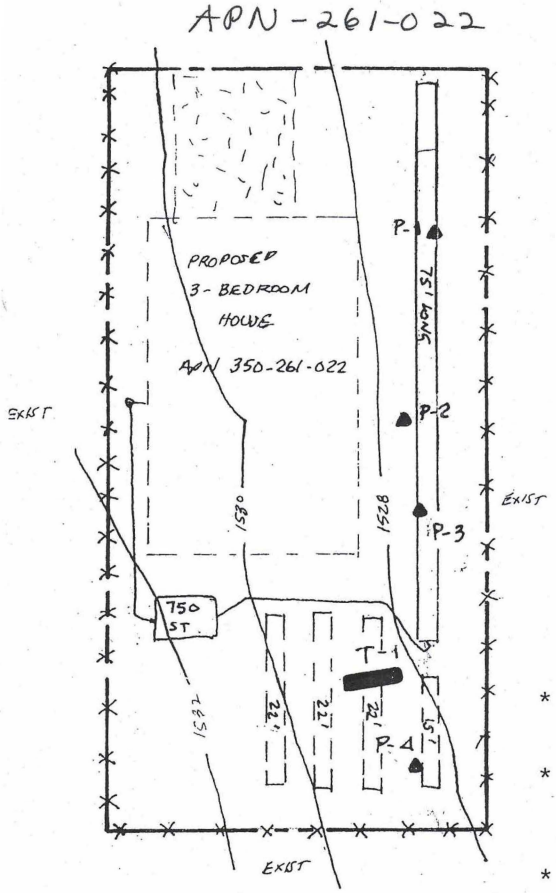
X No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
X All sewage disposal installation shall conform to the current UPC
X Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 9/25/03 EHS [signature]

23717 Lodge Dr.

E LODGE DRIVE

APN-261-022





EXPLANATION

T-1 — EXPLORATORY TRENCH

P-A — PERCOLATION TEST

PRIMARY LEACH LINES

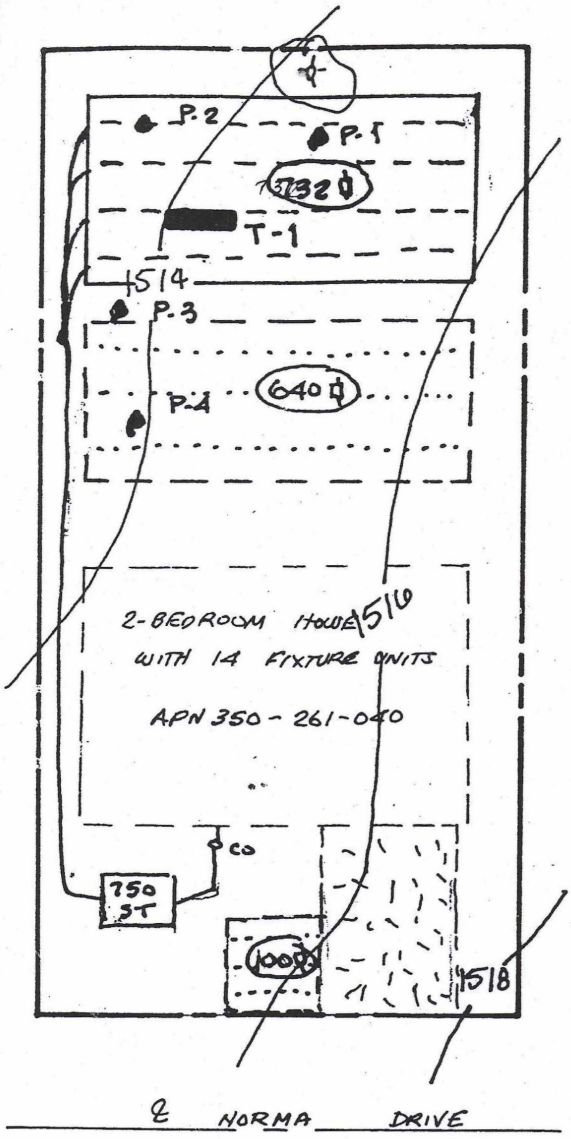
100% EXPANSION LEACH LINES

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750 GALLON SEPTIC TANK.
* APPLICATION RATE OF 50 SQUARE FEET IS 375 SQUARE FEET OF ABSORPTION AREA.
* LEACH LINES WITH 3-FEET OF ROCK IS 75 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

REGISTERED CIVIL ENGINEER
LARRY J. FASH
RCE No. 29150
EXPIRATION DATE 3-31-05
STATE of CALIFORNIA

23472-01 **PLATE 1**



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTURE UNITS I 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 65 SQUARE FEET IS 488 SQUARE FEET OF ABSORPTION AREA.
* LEACH BEDS WITH 1.5 FEET OF ROCK IS 732 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

350-261-040

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

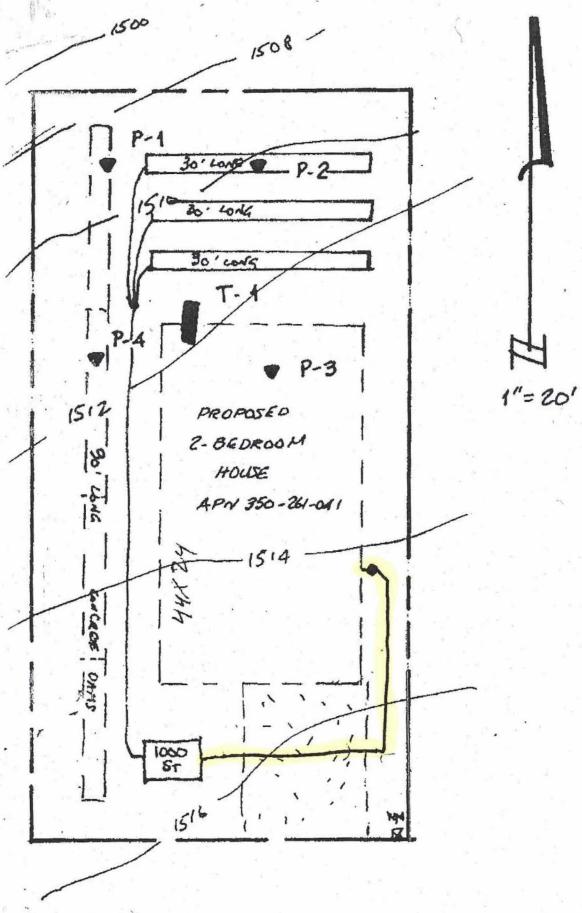
✓ Dwelling 14FU — 750 Gal. Septic Tank
___ Commercial — ___ Sq. Ft. of Leach Line
___ Seepage Pits — ___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer — ___ Connect to Existing System

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
✓ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 11/25/03 EHS G. Lyon

REGISTERED CIVIL ENGINEER
LARRY J. FA...
RCE No. 29150
EXPIRATION DATE
3-31-07
STATE of CALIFORNIA

APN 350-261-041
BMR 032575



EXPLANATION

T-1 ▬	EXPLORATORY TRENCH
P-4 ▲	PERCOLATION TEST
▭	PRIMARY LEACH LINES
▭	100% EXPANSION LEACH LINES

E NORMA DR.

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK. ACCESS COVERS REQUIRED.
* APPLICATION RATE OF 60 SQUARE FEET IS 450 SQUARE FEET OF ABSORPTION AREA.
* LEACH LINES WITH 3-FEET OF ROCK IS 90 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

Revision pipe to tank

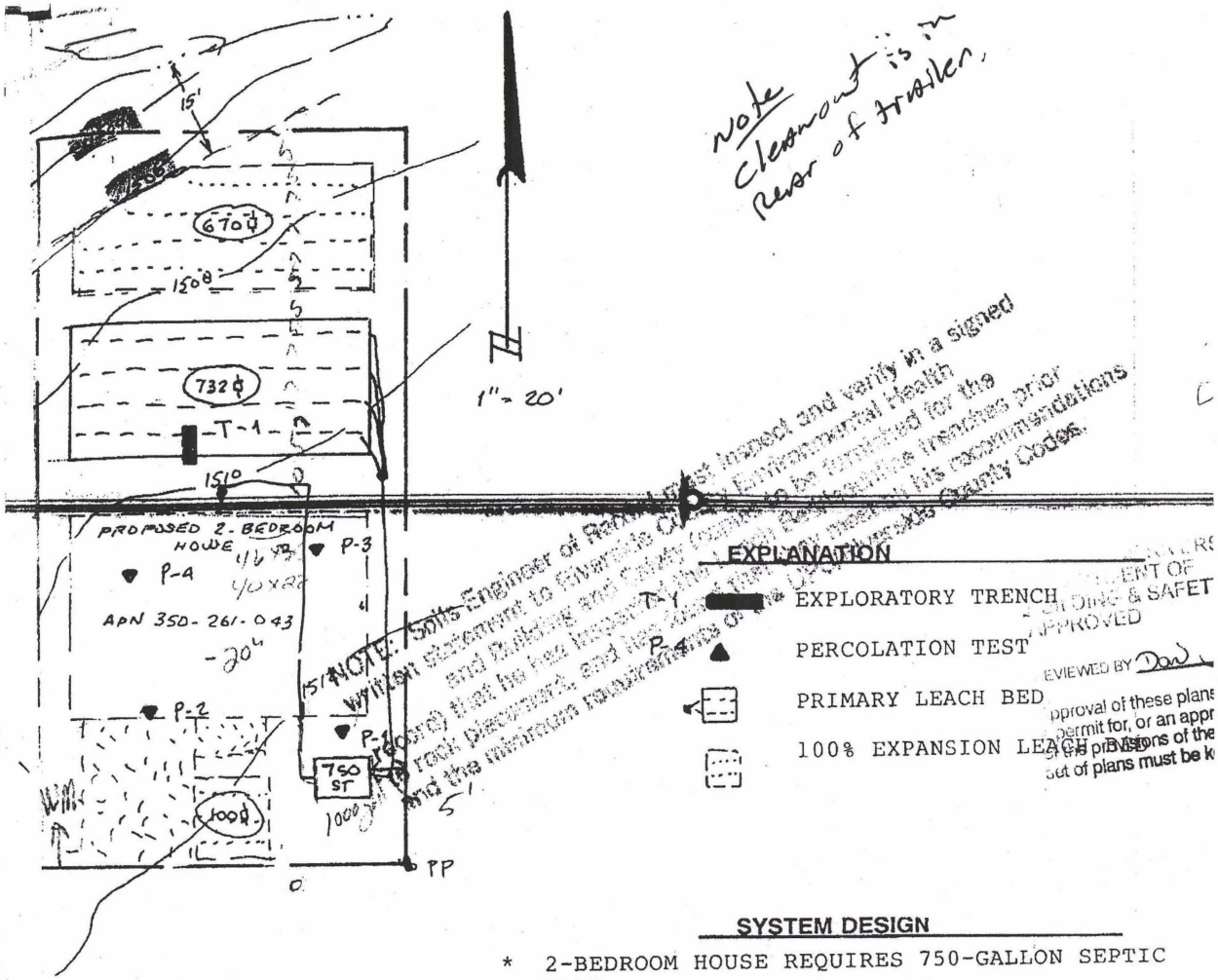
COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal (1000) 36" Rock Side Wall allowance

✓ Dwelling 2 Bed	750 Gal. Septic Tank
___ Commercial	450 Sq. Ft. of Leach Line
___ Seepage Pits	___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer	___ Connect to Existing System

23458-01 **PLATE 1**

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
✓ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 11/17/03 EHS A. Leyon



SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 65 SQUARE FEET IS 488 SQUARE FEET OF ABSORPTION AREA.
* LEACH BEDS WITH 1.5 FEET OF ROCK IS 732 SQ. FEET OF BOTTOM AREA.
* ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

350-261-043

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

2 BR MAX 20 F.V.

LEACH BED 732 Ft²/bottom Area

✓ Dwelling	750 Gal. Septic Tank
___ Commercial	732 Sq. Ft. of Leach ~~Line~~ Bed
___ Seepage Pits	___No.___Dia___BI___TD___MD
___ Connect to Sewer	___Connect to Existing System

REGISTERED CIVIL ENGINEER LARRY J. FAGUNDES RCE No. 29150 EXPIRATION DATE 3-31-05 STATE OF CALIFORNIA

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
✓ Any grading in the area of the proposed leach lines shall require a new approval by this Dept

Date: 9/3/03 EHS

23459-01 PLATE 1

Revision Location Tight Line TO

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

___ Dwelling	750 Gal. Septic Tank
___ Commercial	732 Sq. Ft. of Leach Line
___ Seepage Pits	___No.___Dia___BI___TD___MD
___ Connect to Sewer	___Connect to Existing System

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 11/10/03 EHS G. Layer

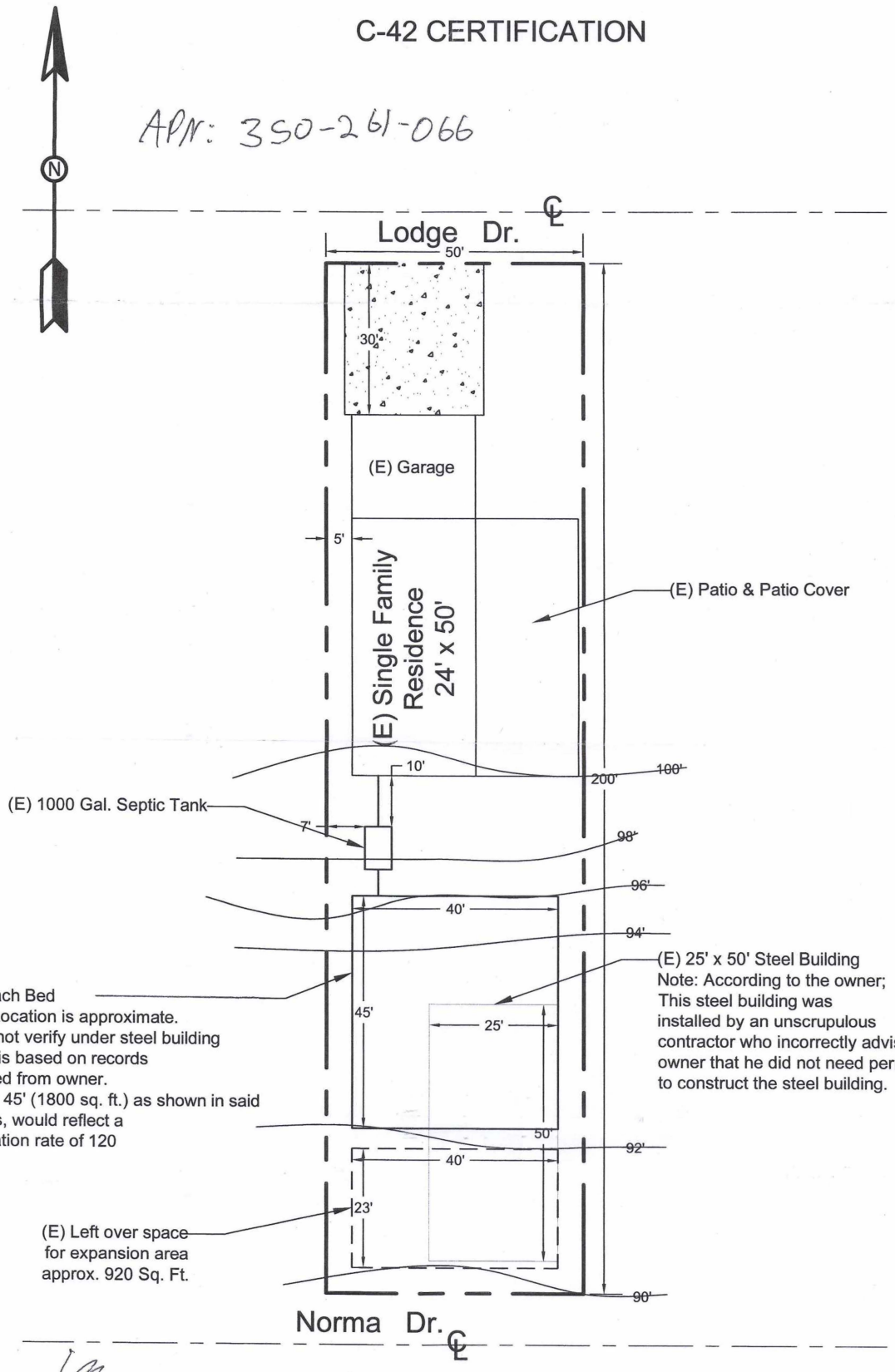
ALTRUISTIC CONSTRUCTION SERVICES

DATE: October 20, 2016

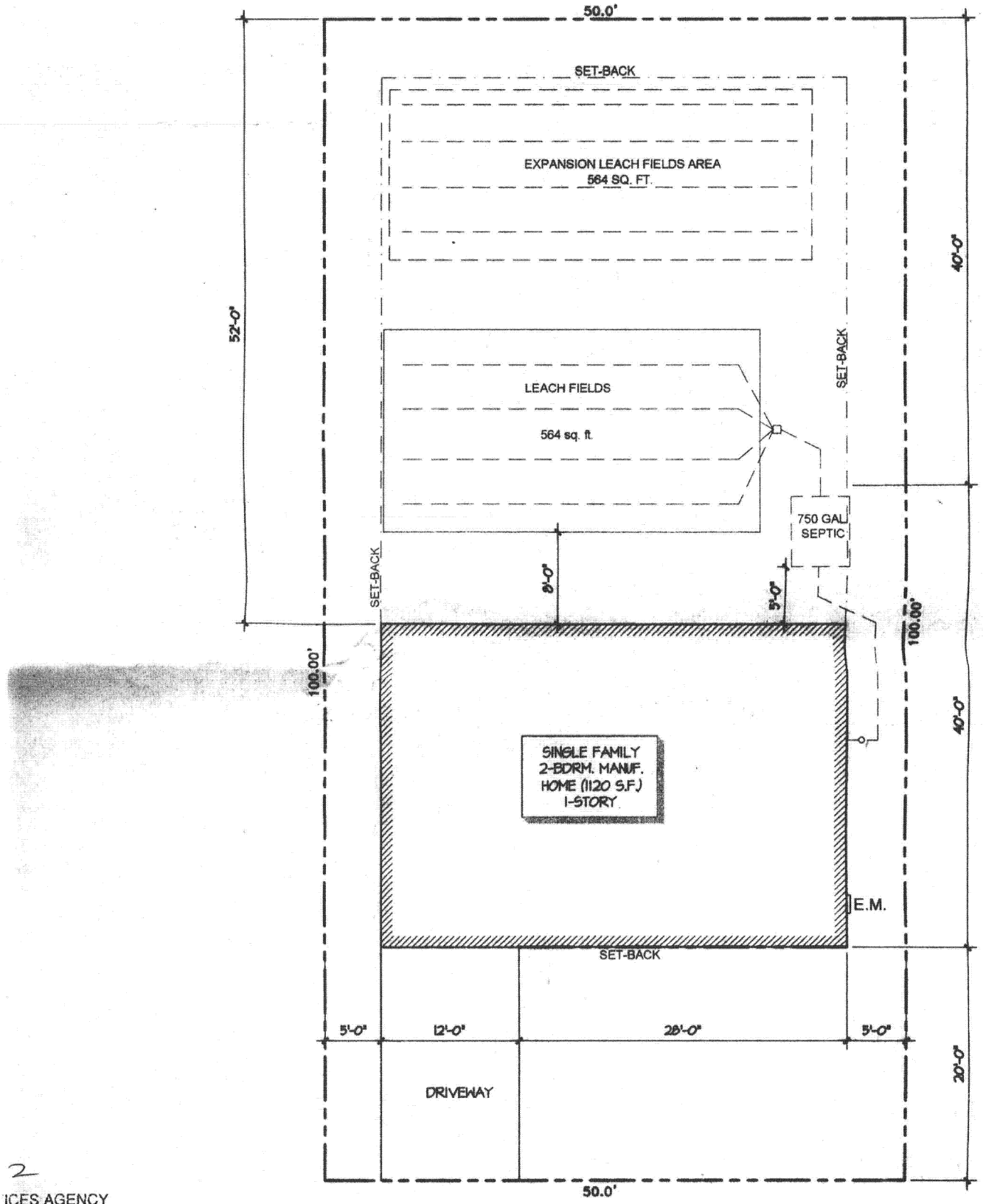
Scale: 1" = 20'

C-42 CERTIFICATION

APN: 350-261-066



ALTRUISTIC CONSTRUCTION SERVICES
LIC. # 968580



CYPRESS Pl.

350-262-032

2

ICES AGENCY
L HEALTH

sal
nk
ch Line
BI TD MD Seepage Pi
Sewer
isting S.S.D.S.
nto the individual sewage disposal
Control Board.
ce
rrent Uniform Plumbing Code.
e disposal approval.
Board for installation of the sewage

approves the subsurface sewage

Leached 564ft w/ 18" of rock

PERCOLATION TEST RESULTS
FOR
LEACH LINES

Test No.	Depth of Test	Soil Classification	Percolation Rate (Min/In)
P-1	Lot #59 * 60"	Brown, fine to coarse clayey silty sand.	24.0
P-2	* 60"	Brown, fine to coarse clayey silty sand.	15.5
P-3	* 60"	Brown, fine to coarse clayey silty sand.	160.0
P-4	* 50"	Brown, fine to coarse clayey silty sand.	120.0
P-5	* 50"	Brown, fine to coarse clayey silty sand.	16.0
P-6	* 60"	Brown, fine to coarse clayey silty sand.	24.0

Design Percolation Rate (Min/Inch): 24.0

Leach Line Area (Sq. Ft. Per 100 Gallons) of Septic Tank Capacity: 55 sq. ft.

PERCOLATION TEST RESULTS
FOR
LEACH LINES

Test No.	Depth of Test	Soil Classification	Percolation Rate (Min/In)
P-7	Lot #20 *	Brown, fine to coarse clayey silty sand.	34.3
P-8	*	Brown, fine to coarse clayey silty sand.	12.0
P-9	*	Brown, fine to coarse clayey silty sand.	18.5
P-10	*	Brown, fine to coarse clayey silty sand.	22.9
P-11	*	Brown, fine to coarse clayey silty sand.	18.5
P-12	*	Brown, fine to coarse clayey silty sand.	120.0

Design Percolation Rate (Min/inch): 24.0

No. of Bedrooms: 2

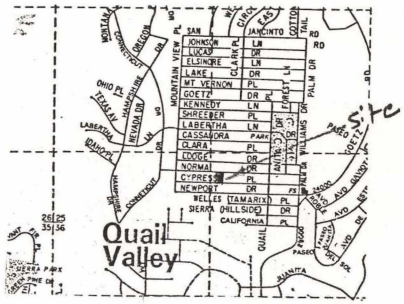
Leach Line Size: 1.5 x 412.50 = 618.75 sq. ft. with 12" rocks under bed.

Septic Tank Size: 750.0 gal.

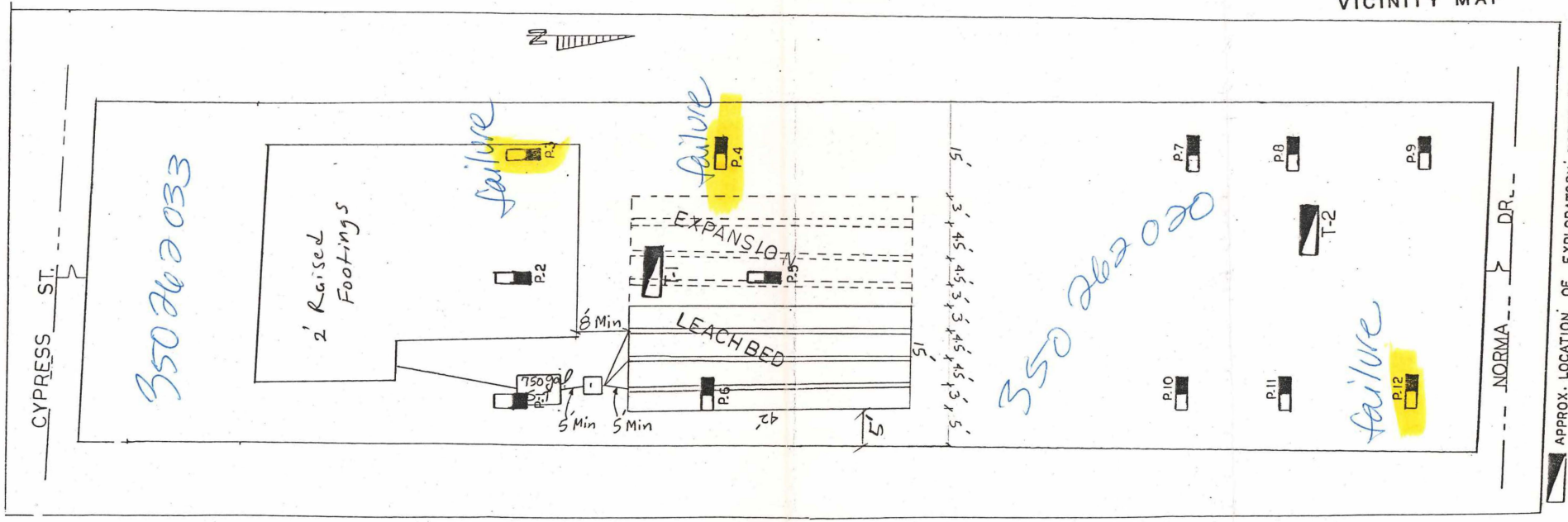
Leach Line Area (Sq. Ft. Per 100 Gallons) of Septic Tank Capacity: 55 sq. ft.

Required Leach Line Area: 412.50 sq. ft.

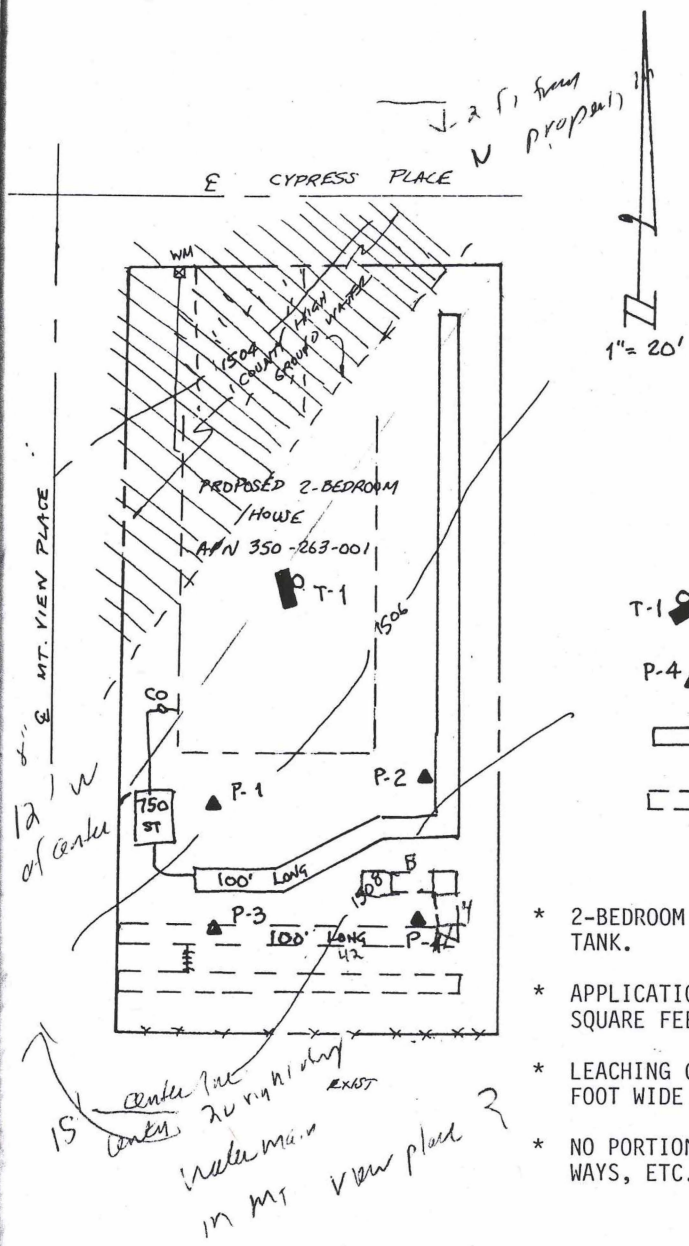
Design Leach Line Area: 15' x 42' = 63C sq. ft.



VICINITY MAP



Title: PLOT PLAN		AAKO GEOTECHNICAL ENGINEERING CONSULTANTS, INC.
Client: Dale Obermeyer	Site: North of Cypress Place, Quail Valley, County of Riverside, California	1465 Spruce St. Unit H Riverside, CA 92507 (714) 781-8585
Scale	Date: January 4, 1989	Job No.: 6627-P1-R8 / Dwg. No.: Plate-2



EXPLANATION

T-1 EXPLORATORY TRENCH W/MONITORING WELL

P-4 PERCOLATION TEST

PRIMARY LEACHING CHAMBERS

100% EXPANSION LEACHING CHAMBERS

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750 GALLON SEPTIC TANK.
* APPLICATION RATE OF 50 SQUARE FEET IS 375 SQUARE FEET OF ABSORPTION AREA.
* LEACHING CHAMBERS IS 100 LINEAR FEET OF 3-FOOT WIDE CHAMBER.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVE-WAYS, ETC.

350 263 001

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

_____Food
_____Trailer Park
_____Motel, Apt., Hotel
✓ Dwelling 2 Bed
_____Commercial Building
_____Swimming Pool

✓ Sewage Disposal
150 Gal. Septic Tank
375 Sq. Ft. of Leach Line
_____No. ___Dia_____Bl_____TD_____MD Seepage Pi
_____Connection to Sewer
_____Connect to Existing S.S.D.S.

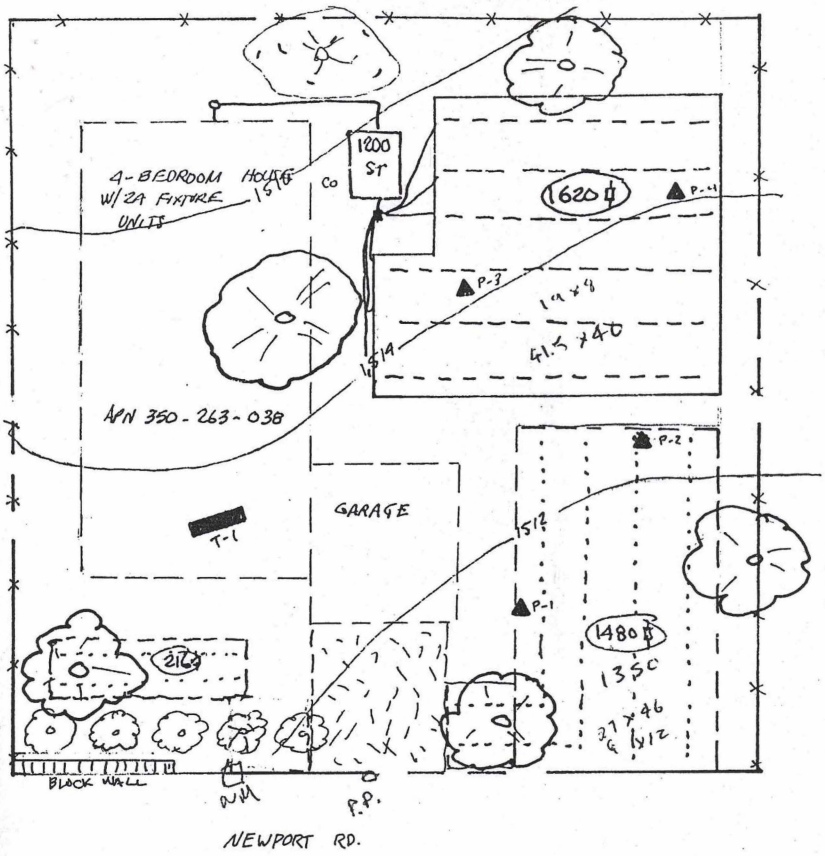
✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting, grading or filling in excess of [illegible] monthly sewage disposal approval.
___Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain a [illegible] for installation, construction.

DATE 9.18.02 BY Irene Frakes

USE PLASTIC CHAMBER

22939-01 **PLATE 1**



1" = 20'

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leachline trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes

EXPLANATION

P-4 PERCOLATION TEST

T-1 EXPLORATORY TRENCH

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 4-BEDROOM HOUSE WITH 24 FIXTURE UNITS REQUIRES 1200-GALLON SEPTIC TANK
* APPLICATION RATE OF 90 SQUARE FEET IS 1080 SQUARE FEET OF ABSORPTION AREA
* LEACH BED WITH 1.5 FEET OF ROCK IS 1620 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAY; ETC.

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE
7-31-05
STATE of CALIFORNIA

24547-01 **PLATE 1**

350 263038

Plans/Records

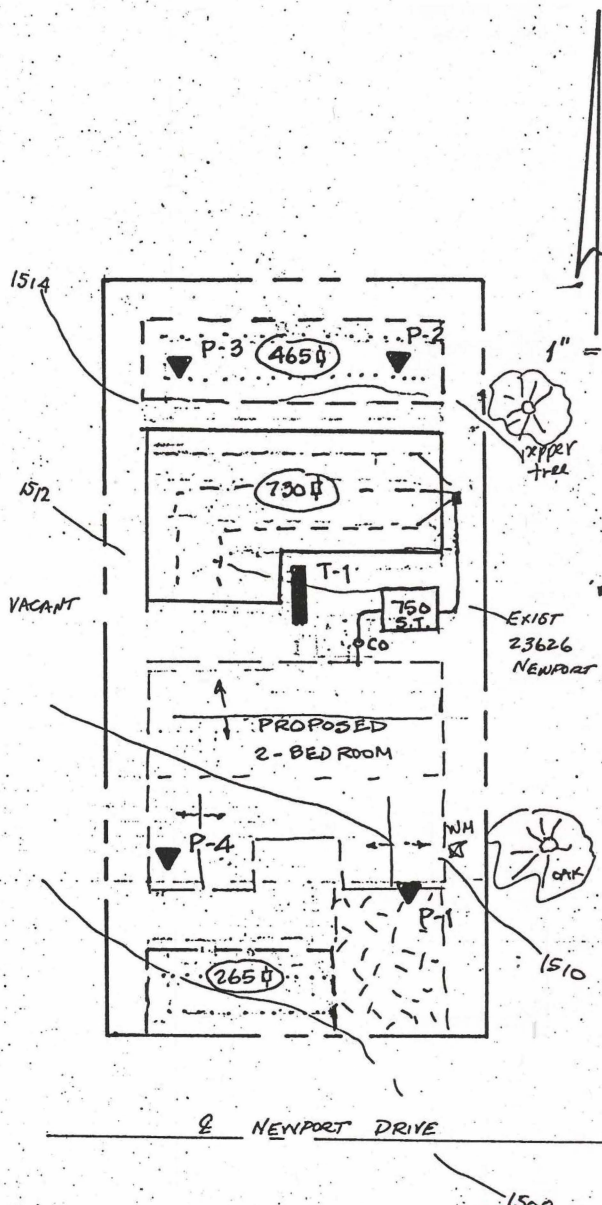
COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

- ✓ Dwelling 3/26
- ___ Commercial
- ___ Seepage Pits
- ___ Connect to Sewer

1200 Gal. Septic Tank - 1620 sq ft
___ Sq. Ft. of Leach Line Leach Bed
___ No. ___ Dia ___ BI ___ TD ___ MD 1.5 FT ROCK
___ Connect to Existing System

- ✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
- ✓ All sewage disposal installation shall conform to the current UPC
- ✓ Any grading in the area of the proposed leach lines shall require a new approval by this Dept

Date: 14Sep04 Marc Haran



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY AND

100% LEACH BEDS

SYSTEM DESIGN

*2-BEDROOM HOUSE REQUIRES 750 GALLON SEPTIC TANK.

*APPLICATION RATE OF 65 SQUARE FEET 487 SQUARE FEET OF ABSORPTION AREA.

*LEACH BED WITH 1 FOOT OF GRAVEL IS 730 SQUARE FEET OF BOTTOM AREA.

*NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

SUBSURFACE SEWAGE DISPOSAL

These approved plans shall be VOIDED when:
1. Any part of the sewage disposal system is moved more then 10 feet from the original approved site.
2. Percolation rate changes more than 10 minutes /inch in the area of the sewage disposal system.
3. Any cutting, grading or filling in excess of 2 feet in the area of the subsurface sewage disposal area.

93114-01 **PLATE 1**

APN 350-263-039

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
✓ Dwelling 2 BDRM
___ Commercial Building
___ Swimming Pool

✓ Sewage Disposal
750 Gal. Septic Tank
730 Sq. Ft. of Leach Line
___ x ___ Seepage Pit
___ Connection to Sewer

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source.
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting grading or filing in excess of two (2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation construction.

Date 2-9-93 By Clarence Hampton

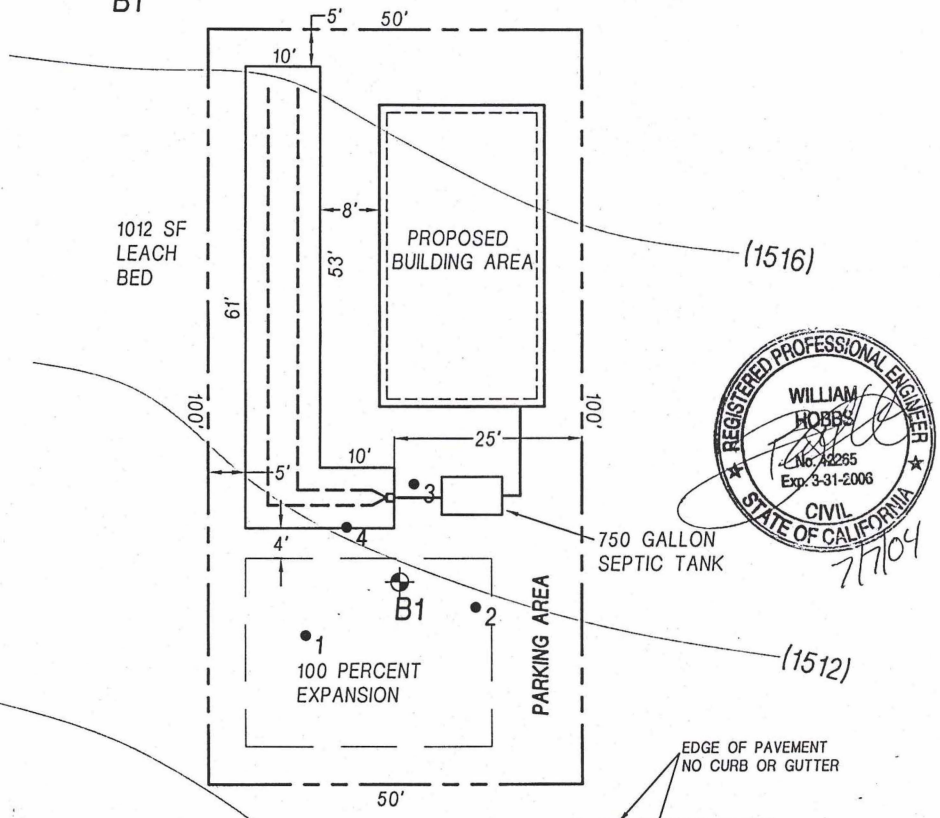
350-263-040

PLATE 1 TEST LOCATION MAP

APN 350-263-040 LOT 68 L. E. LODGE TRACT NO. 3, BLOCK 3
RATE IS 40 MIN PER INCH RATE IS 90 SF/100GAL/DAY
2 BEDROOM, 750 GAL SEPTIC TANK
CONSTRUCT LEACH BED 690 SQ. FT., 162 FT. PERIMETER WITH 3' ROCK
EQUIVALENT TO 1012 SF BED, PLUS 100% EXPANSION AREA

•2 APPROXIMATE LOCATION OF PERCOLATION TEST

B1 APPROXIMATE LOCATION OF EXPLORATION BORING



REGISTERED PROFESSIONAL ENGINEER
WILLIAM HOBBS
No. 42265
Exp. 3-31-2006
CIVIL
STATE OF CALIFORNIA
7/7/04

OTE: Soils Engineer of Record must inspect and verify in signed
ritten statement to Riverside Co... Environmental Health
and Building and Safety (copies to be furnished for the
cord) that he has inspected the Leach Bed/leachline trenches prior
rock placement, and has found that they ... recommendations
d the minimum requirements of the UPC/Riverside County Codes

GRAPHIC SCALE
20 0 10 20 40 80

1 INCH = 20 FT

W. C. HOBBS, CONSULTING ENGINEER

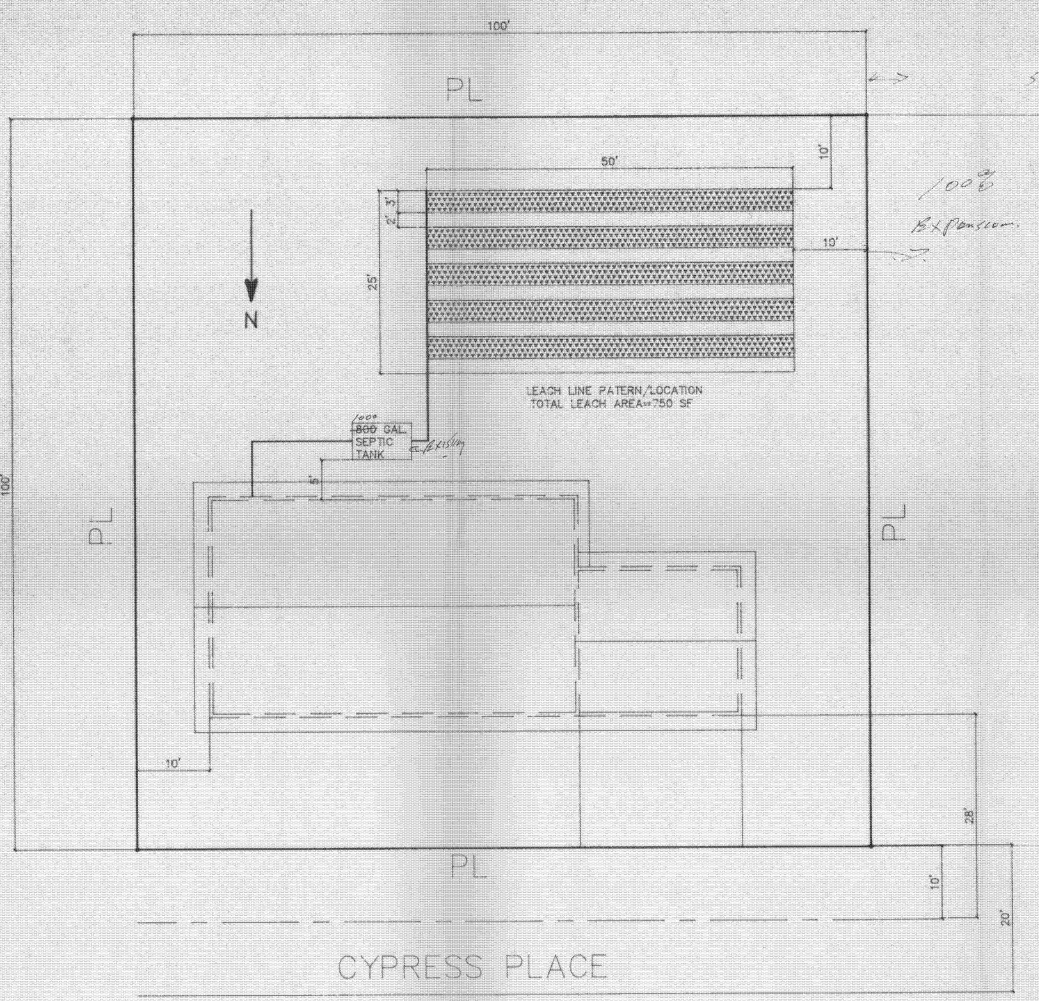
COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

- ✓ Dwelling
- ___ Commercial
- ___ Seepage Pits
- ___ Connect to Sewer

- 750 Gal. Septic Tank (only)
- 1012 Sq. Ft. of Leach ~~Line~~ Bed
- ___ No. ___ Dia ___ BI ___ TD ___ MD
- ___ Connect to Existing System

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 7-12-04 EHS



SITE PLAN

APN: 350-263-059

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

Food Establishment
Trailer Park
Motel, Apt., Hotel
Dwelling 2,000 sq.ft.
Commercial Building
Swimming Pool

Sewage Disposal
1000 Gal. Septic Tank existing
Sq. Ft. of Leach Line
Sewage Pit
Connection to Sewer

No on-site replenishing water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
Water supply serving this installation must be from an approved source.
All sewage disposal installation shall conform with requirements of current Uniform Plumbing Code.
Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation described.

Date 9/15/95

By Margaret Kobing

PROPERTY INFORMATION

ADDRESS: 23705 CYPRESS PLACE
QUIL VALLEY, CA.

APN # 350-263-059

OWNER: J.W. MORGAN
9395E HOBSON WY
BLYTH, CA

CONTRACTOR: THE SESSA CORP.
3773 TIBBETS
RIVERSIDE, CA

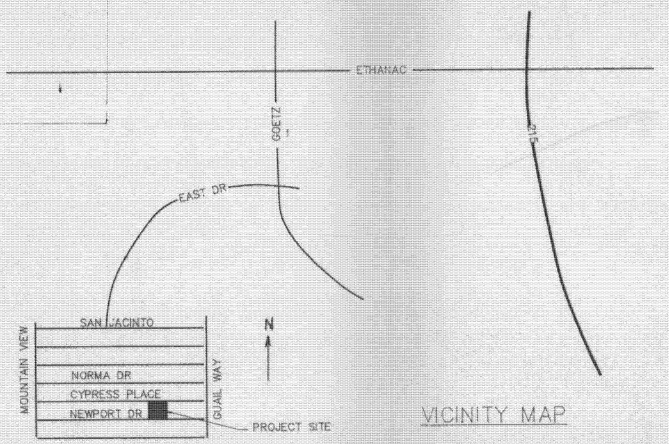
SHEET INDEX

1. SITE PLAN , EXISTING FLOOR PLAN, LEGAL, VICINITY MAP
2. GENERAL NOTES
3. FLOOR PLAN,ENERGY(T24)
4. ELE. PLAN,ROOF PLAN,FOUNDATION & FRAMING PLANS SECTIONS
5. ELEVATIONS,DETAILS

TOTAL LIVING AREA: 1500 SF
GARAGE AREA: 420 SF

NOTES

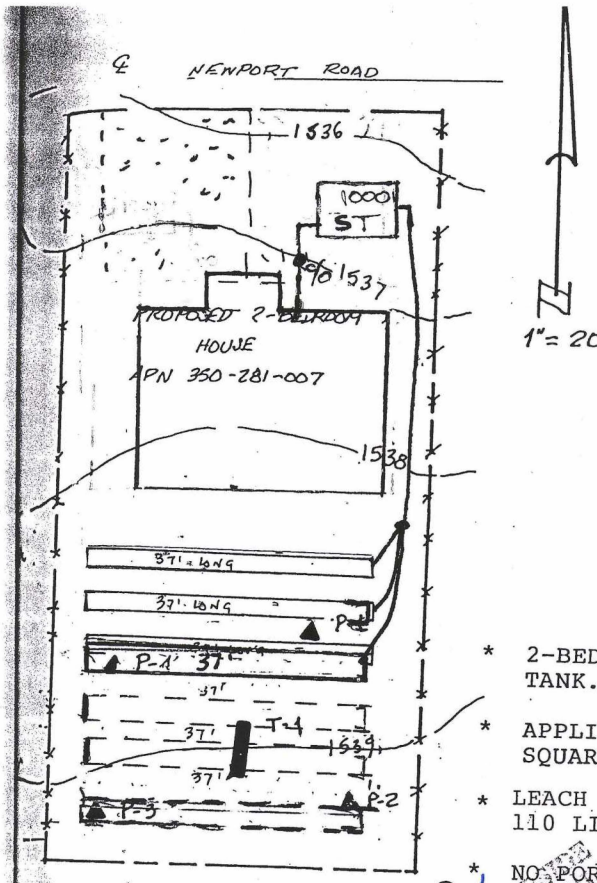
1. THE BUILDING DESIGN MEETS THE REQUIREMENT OF CALIFORNIA CODE OF REGULATIONS, TITLE24, PART6.
2. INSULATION INSTALLER SHALL POST A CONSPICUOUS LOCATION IN THE BUILDING A CERTIFICATE SIGNED BY THE INSTALLER AND THE BUILDER STATING THAT THE INSTALLATION CONFORMS WITH THE REQUIREMENT OF TITLE 24, PART6 AND THAT THE MATERIALS INSTALLED CONFORM WITH THE REQUIREMENT OF TITLE20, CHAPTER 2, SUBCHAPTER 4, ARTICLE 3.
3. THE BUILDER SHALL PROVIDE THE ORIGINAL OCCUPANT A LIST OF THE HEATING AND COOLING, WATER HEATING AND LIGHTING SYSTEMS INSTALLED IN THE BUILDING AND INSTRUCTION ON HOW TO USE THEM EFFICIENTLY.
4. ALL PARTS OF THE DUCT SYSTEM SHALL BE TIGHTLY SEALED WITH MASTIC OR TAPE.
5. STUCCO, LATH AND DRYWALL SHALL BE NAILED TO ALL STUDS AND TO TOP AND BOTTOM PLATES.
6. ALL WORKS TO COMPLY WITH THE 1990 N.E.C.
7. ALL EQUIPMENT TO BE U.L. LISTED



VICINITY MAP

PACIFIC ENGINEERING GROUP
1271 COLUMBIA AV. SUIT F5
RIVERSIDE CA, 92507
PHONE (714) 684-1850
FAX (714) 788-5987

RIVISIONS
DRAWN BY
MIKE M. AFIFI
DATE
07/24/95
SCALE
1/8"=1'
PAGE NUMBER
A95104-1



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PERCOLATION LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 1000 GALLON SEPTIC TANK.
* APPLICATION RATE OF 55 SQUARE FEET IS 550 SQUARE FEET OF ABSORPTION AREA.
* LEACH LINES WITH 3 FEET OF ROCK REQUIRES 110 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

350-281-007

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling — 1000 Gal. Septic Tank
___ Commercial — 550 Sq. Ft. of Leach Line
___ Seepage Pits — ___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer — ___ Connect to Existing System

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.
Date: 3/24 EHS D. Vidal

3 LINES 37 LONG
ROCK

REGISTERED CIVIL ENGINEER
LARRY J. FAS
RCE No. 29150
EXPIRATION DATE 3-31-05
STATE OF CALIFORNIA

Revised 12/03

22235-01 **PLATE 1**

350-281-007
Revision Tank Relocation as above

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling — 1000 Gal. Septic Tank
___ Commercial — 550 Sq. Ft. of Leach Line
___ Seepage Pits — ___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer — ___ Connect to Existing System

3 lines 37' long
3 ft of rock

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.
Date: 5/6/04 EHS A. Lyon

LAND USE APPROVAL

DATE: 3-20-90

BY: J. Horton

new layout - leach lines
Re - R 1776-90

RIVESIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
___ Dwelling 2bed.
___ Commercial Building
___ Swimming Pool

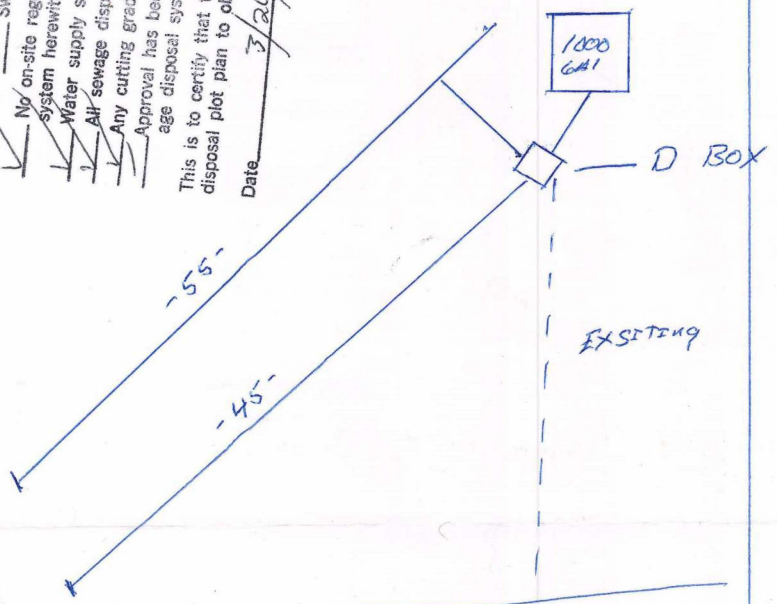
✓ Sewage Disposal
1000 Gal. Septic Tank Existing
320 Sq. Ft. of Leach Line
___ x ___ Seepage Pit
___ Connection to Sewer

Replacement Leach Line

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source.
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
✓ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

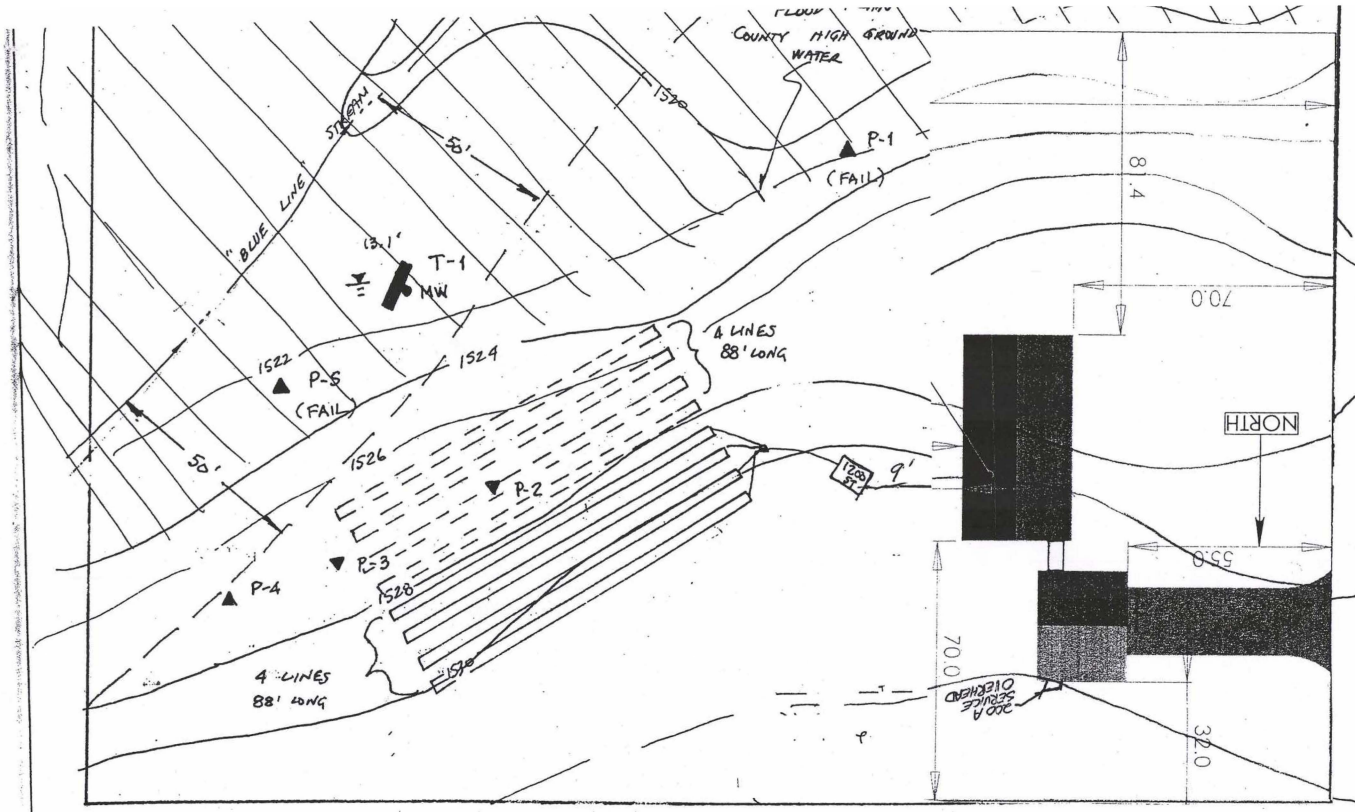
This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

Date 3/20/90 By [signature]



23818 SIRRA

APN # 350-282-023



1" = 30'

EXPLANATION

- P-5 ▲ PERCOLATION TEST
- T-1 EXPLORATORY TRENCH
- PRIMARY LEACHING CHAMBER
- 100% EXPANSION LEACHING CHAMBERS
- HARD ROCK AREAS

SYSTEM DESIGN

* 3-BEDROOM HOUSE WITH 24 FIXTURE UNITS REQUIRES 1200- GALLON SEPTIC TANK.
* APPLICATION RATE OF 110 SQUARE FEET IS 1320 SQUARE FEET OF ABSORPTION AREA.
* UTILIZING LEACHING CHAMBERS IS 352 LINEAR FEET OF 3-FOOT WIDE CHAMBER.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

Re-draw of orientation change of Manufactured Home

E SIERRA DRIVE

350-283-004

BXX050731
BMR041881

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

- ✓ Dwelling
- ___ Commercial
- ___ Seepage Pits
- ___ Connect to Sewer

1200 Gal. Septic Tank
P.C. 104 Sq. Ft. of Leach Line
___ No.__Dia__BI__TD__MD
___ Connect to Existing System

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health Services Division and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/Trenches trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes.

RIVERSIDE COUNTY PLANNING DEPARTMENT
BY: Ronnie Nagel
MAY 16 2006
PLANS ACCEPTABLE FOR APPLICATION PURPOSES ONLY

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 8/25/04 EHS

De-Review
(To include Garage Location)

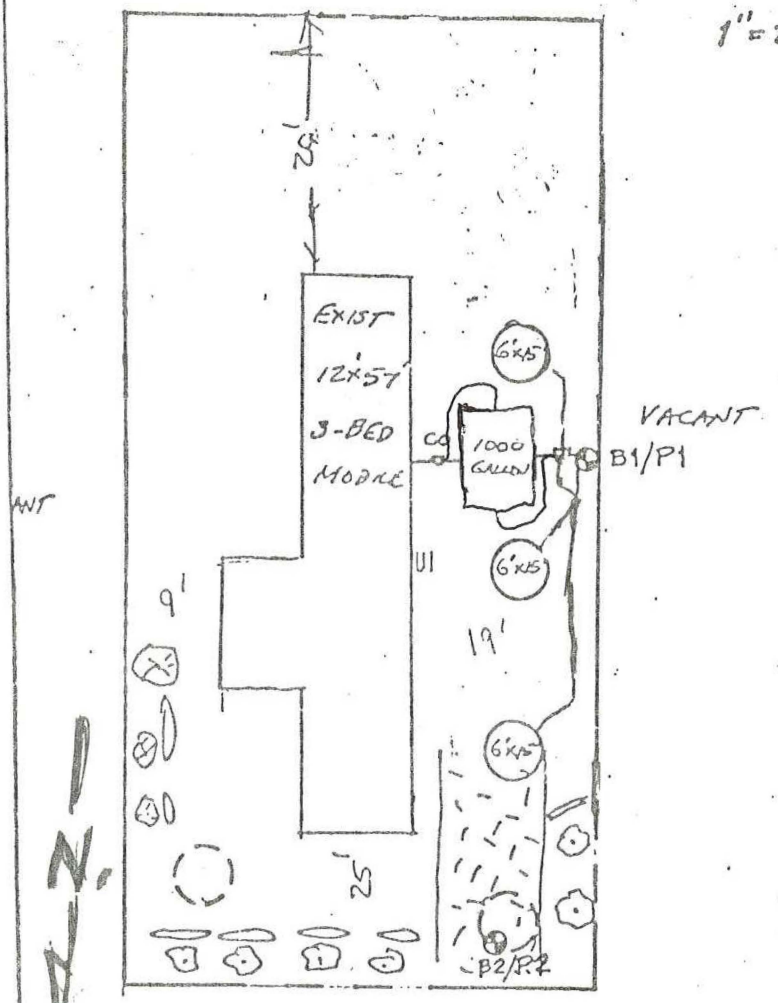
23892-01 PLATE 1

350-284-004

Log 39870.

FALLER, JAMES
23893 WELLS PL.
Quail Valley CA
92587.

1"=20'



EXPLANATION

B1/P1 BORING AND SEEPAGE PIT TEST

PRIMARY and

100% EXPANSION SEEPAGE PITS

T
Date: 10/10/23
Initial: SG

SYSTEM DESIGN

* 3-BEDROOM HOUSE REQUIRES 1000-GALLON SEPTIC TANK
* APPLICATION RATE OF 1.34 GAL/SQ. FT./DAY IS 45 FEET OF SIDEWALL BELOW INLET

23893 WELLS PLACE

RIVERSIDE COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH

Quail Valley Establishment

___ Trailer Park
___ Motel, Hotel, Motel
___ Dwelling
___ Commercial Building
___ Swimming Pool

___ Sewage Disposal
1000 Gal. Septic Tank
___ Sq. Ft. of Leach Line
3-6 x 15 Seepage Pit BF. 19' T.D.
___ Connection to Sewer

Required Before Finalizing

Paved parking, driveway

___ No onsite regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without ~~Paved~~ DG ~~grade from the Water Quality Control Board.~~

___ Water supply serving this installation must be from a ~~approved~~ source.

Ordinance 348, Section 18.12

___ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.

___ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.

___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for location, construction

Date 9/18/95 By

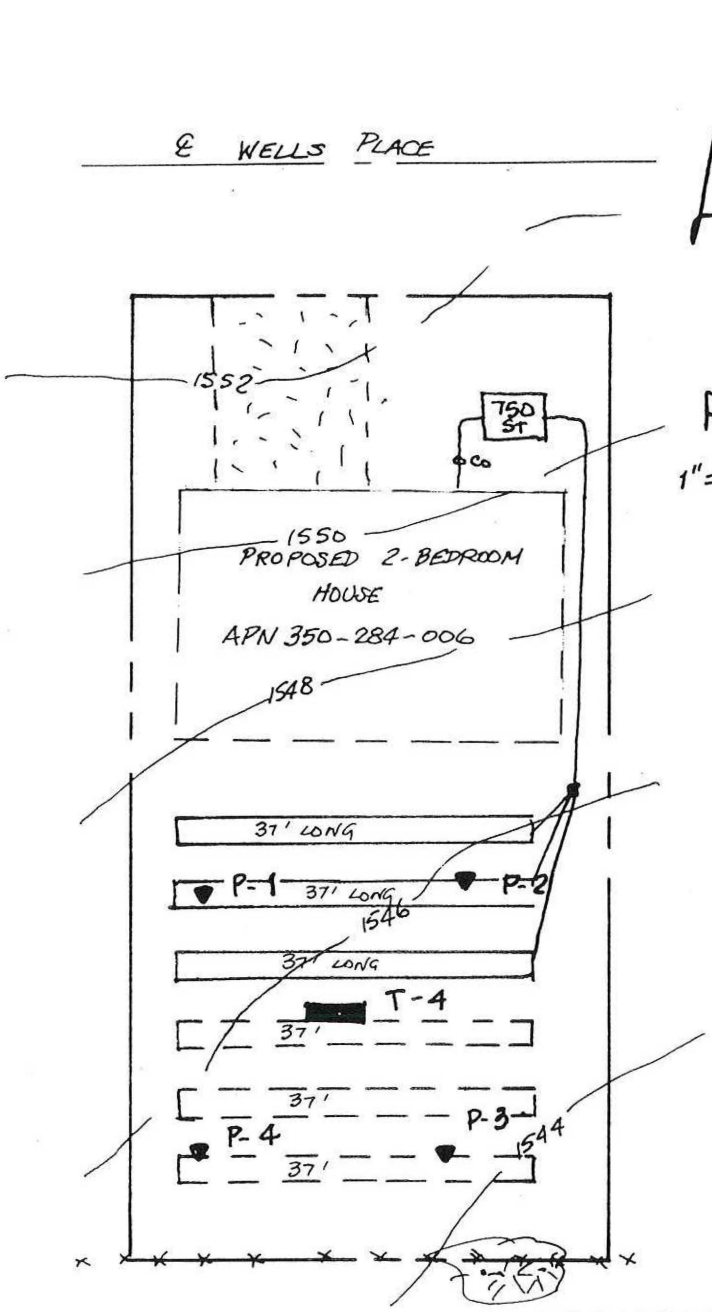
HIGH FIRE AREA
ORD. 546

9/18/95

9/4/96 REVIEWED Clarence Hamson

E WELLS PLACE

T
Date: 10/20/23
Initial: JG



1"= 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACHING CHAMBERS

100% EXPANSION LEACH CHAMBERS

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 55 SQUARE FEET IS 412 SQUARE FEET OF ABSORPTION AREA
* UTILIZING LEACHING CHAMBERS IS 110 LINEAR FEET OF 3-FOOT WIDE
* NO PORTION OF ABSORPTION SYSTE UNDER DRIVEWAYS, ETC

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

EXISTING

_____Food
_____Trailer Park
_____Motel, Apt., Hotel
__✓__Dwelling 2bdrm
_____Commercial Building
_____Swimming Pool

__✓__Sewage Disposal
750 Gal. Septic Tank
330 Sq. Ft. of Leach Line 6 chambers per line
_____No. ___Dia_____BI_____TD_____MD Seepage Pit
_____Connection to Sewer
_____Connect to Existing S.S.D.S.

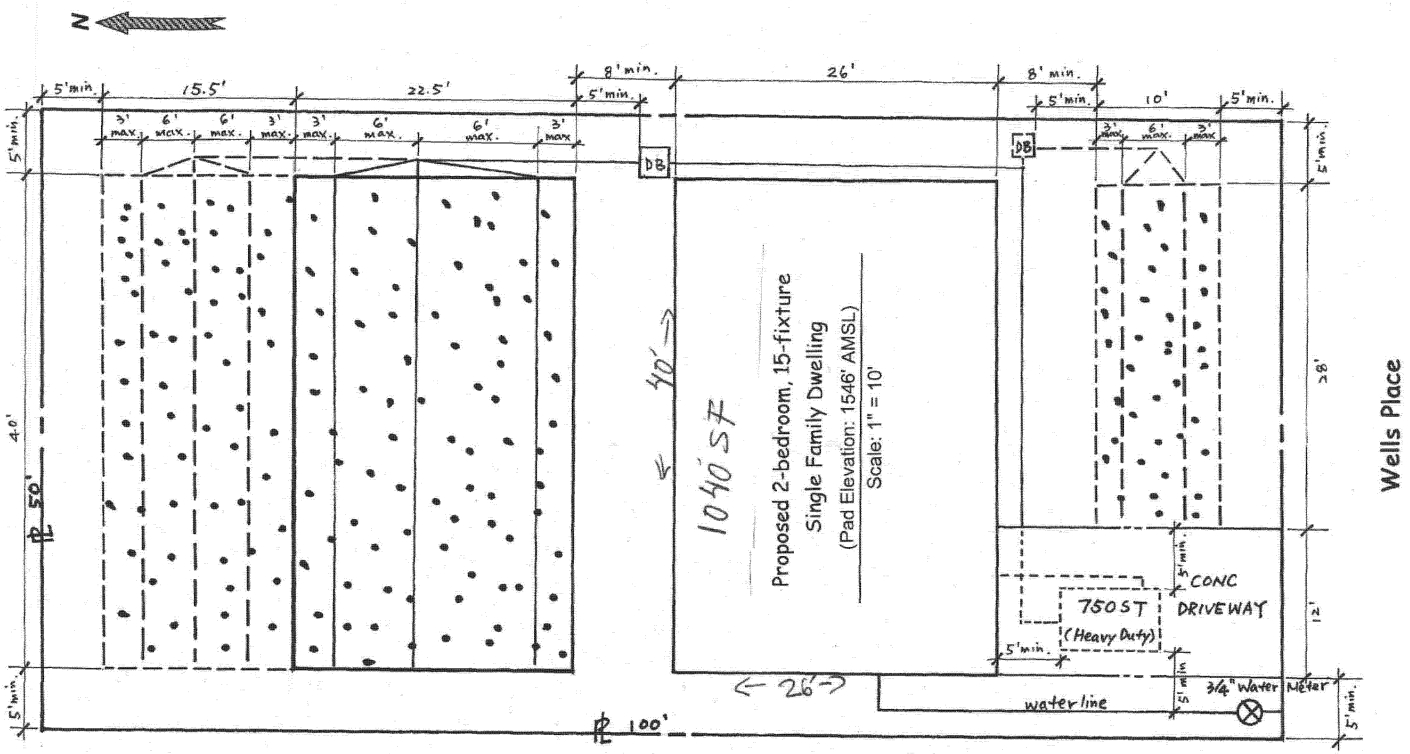
__✓__No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
__✓__Water supply serving this installation must be from an approved source
__✓__All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
_____Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
_____Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 6DEC02 BY Marc Hans

350-284-006

22542-01 **PLATE 1**



SYSTEM DESIGN

* 2-bedroom modular home w/ 15 fixtures
* <3% gradient throughout Site from E to W
* 750 gallon septic tank *(Table 5.2 of County Guidelines)*
* 34.29 mpi design percolation rate => 80 ft^2 of leach line bottom per 100 gallon of septic tank capacity *(Table 3.1 of County Guidelines)*, i.e. 600 ft^2 of leach line bottom area is required!
* ***Design:*** use leach bed => 600 ft^2 x 1.5 (multiplier) = 900 ft^2 is needed!
* ***Provision:*** (primary) 22.5' x 40' = 900 ft^2 of leach bed area + (15.5' x 40' + 10' x 28') = 900 ft^2 for 100% expansion

LEGEND

Refer to the original plot plan for designations and locations of test pit and percolation test holes

Primary Leach Bed

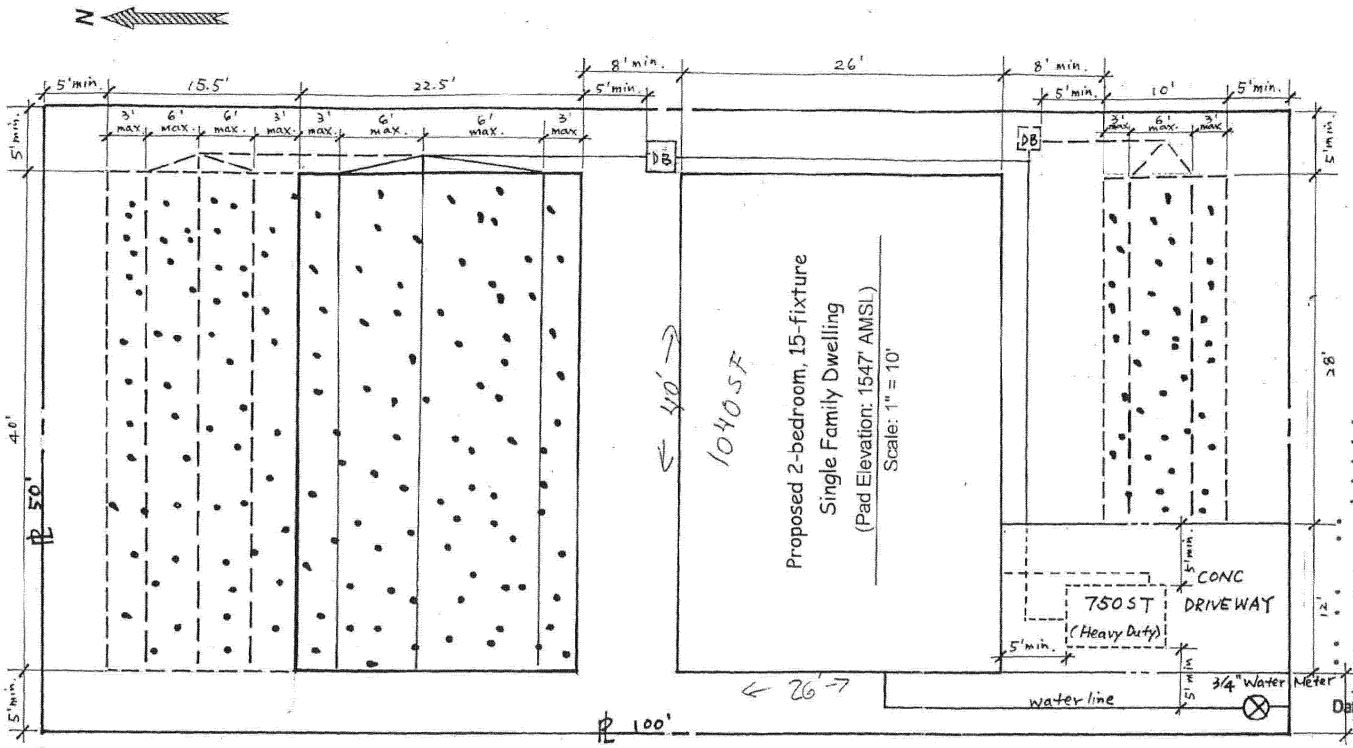
100% Expansion Leach Lines

REGISTERED GEOLOGIST
BRIAN VALUKONIS
No. 2287
CERTIFIED ENGINEERING GEOLOGIST
Exp. 11-30-05
STATE OF CALIFORNIA

Testing Engineers - U S Labs
41146 Elm Street, Suite A
Murrieta, CA 92562
Tel:(951) 677-0366 Fax:(951) 677-5761

Project:	*Lot 15, Wells Place, Quail Valley*		
Figure 1	Revised Plot Plan		
Proj. No.:	78026	Date:	December, 2004

350-285-016



T
Date: 10/20/23
Initial: JG

WEST COAST SANITATION, INC.
General Engineering Contractors
State License No. 973707 • State DHS Reg No. 6624
P.O. Box 4849 • Riverside, CA • 92514
Office: (951) 780-5922 • Fax: (951) 780-9320

"AS-BUILT"

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
ONSITE WASTEWATER TREATMENT SYSTEM

Lot 16 Wells Place

- Dwelling 2 BD
- Commercial
- Seepage Pits
- Connect to Sewer
- Connect to Existing

750 Gal. Septic Tank
___ Sq. Ft. of Leach Line
___ No. Dia ___ BI ___ TD ___ MD ___
___ Concrete Pump Chamber

- Installation of leach lines are not to exceed _____ ft. in depth
- Install risers to grade, leaving lids accessible for cleaning. Note: Larger tanks (2000 gallons or greater) require 2 risers to access primary chamber.
- Approved cleanable effluent filters must be installed to facilitate servicing.
- No on-site water softening devices shall be discharged into the septic system without clearance from the California Regional Water Quality Control Board.
- Installation shall conform to the current UPC.
- Any grading in the area of proposed drip lines shall require new approval by this Department.

Date: 11/15/18 EHS:

REGISTERED GEOLOGIST BRIAN VALUKONIS No. 2267 CERTIFIED ENGINEERING GEOLOGIST Exp. 11-30-19 STATE OF CALIFORNIA

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH

It is the responsibility of the City of Menifee to verify that project scope is consistent with plans approved by this Department. It is the responsibility of the applicant to obtain any and all required permits for projects within City boundaries.

SYSTEM DESIGN

- 2-bedroom modular home w/ 15 fixtures
- <3% gradient throughout Site from E to W
- 750 gallon septic tank *(Table 5.2 of County Guidelines)*
- 34.29 mpi design percolation rate => 80 ft^2 of leach line bottom per 100 gallon of septic tank capacity *(Table 3.1 of County Guidelines)*, i.e. 600 ft^2 of leach line bottom area is required!
- ***Design:*** use leach bed => 600 ft^2 x 1.5 (multiplier) = 900 ft^2 is needed!
- ***Provision:*** (primary) 22.5' x 40' = 900 ft^2 of leach bed area + (15.5' x 40' + 10' x 28') = 900 ft^2 for 100% expansion

LEGEND

Refer to the original plot plan for designations and locations of test pit and percolation test holes

Primary Leach Bed

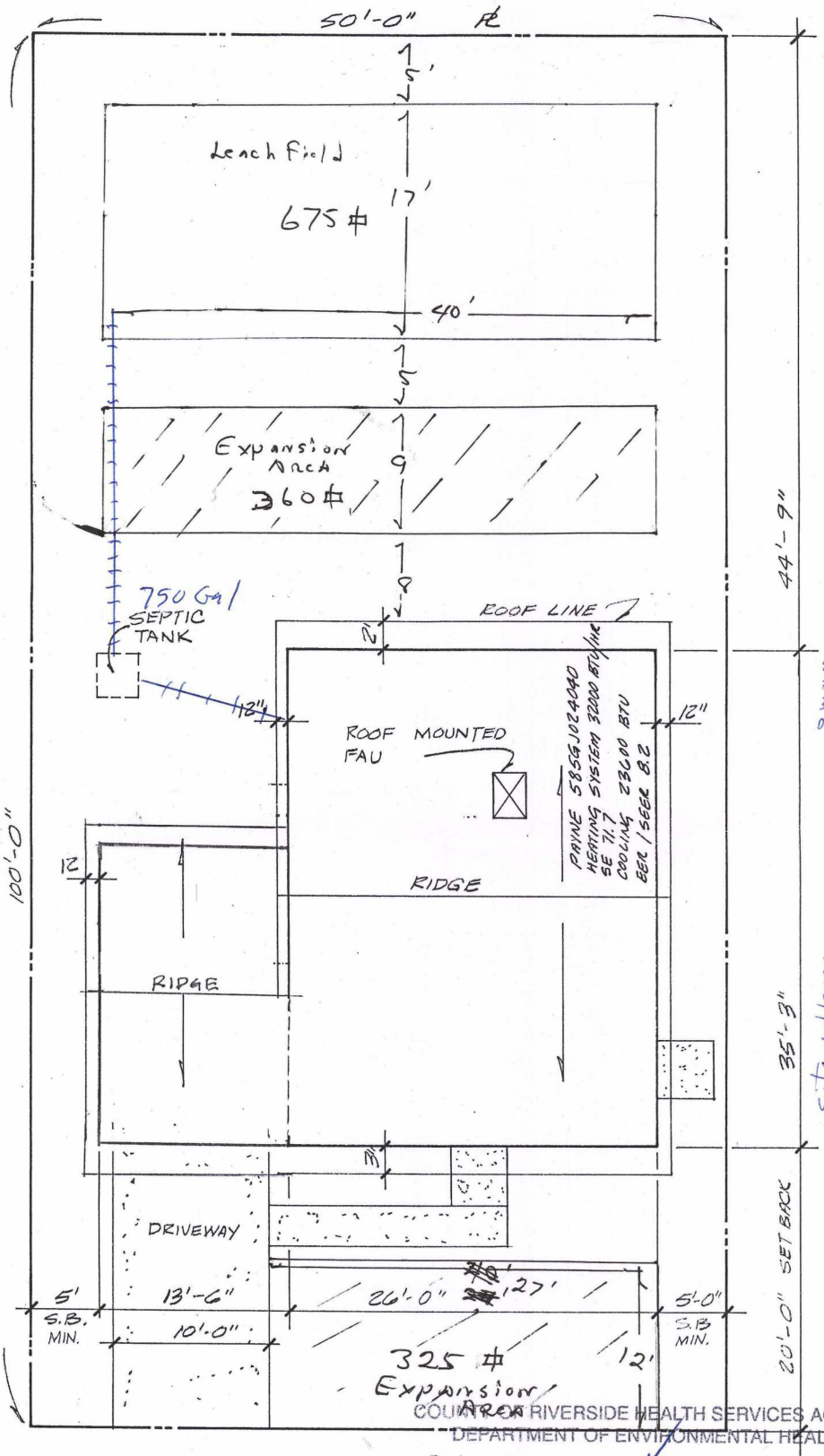
100% Expansion Leach Lines

Testing Engineers - U S Labs
41146 Elm Street, Suite A
Murrieta, CA 92562
Tel:(951) 677-0366 Fax:(951) 677-5761

Project:	*Lot 16, Wells Place, Quail Valley*		
Figure 1	Revised Plot Plan		
Proj. No.:	78026	Date:	December, 2004

SHT 1

PLOT & ROOF PLAN SCALE 1/8" = 1'-0"



Owner
Neil Hughes
143 Brisas St.
Oceanside, CA 92057
760-721-0961

Site address
23966 Welles Pl.
Quail Valley, CA

Permit No. BRS 031657

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

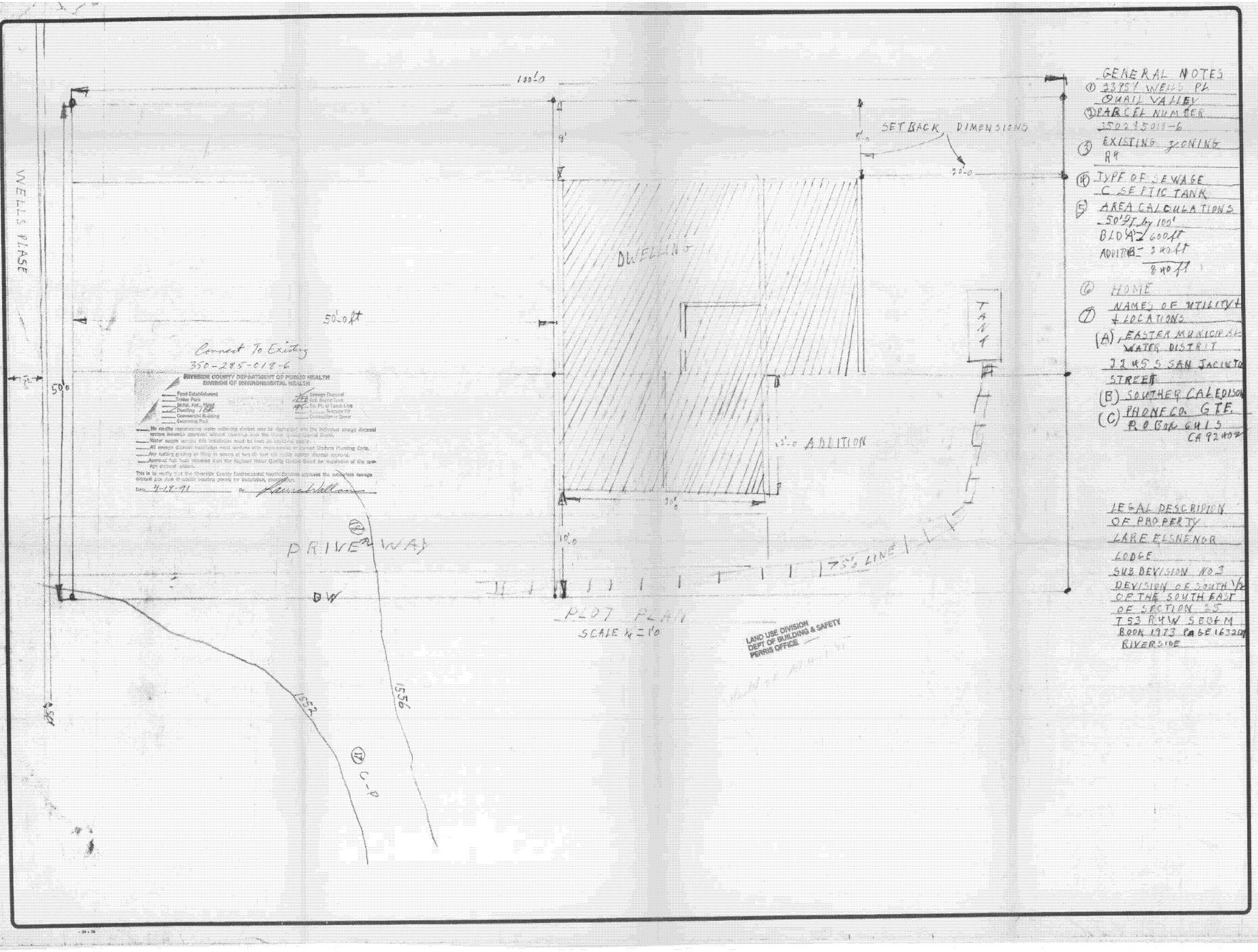
____ Food	✓ Sewage Disposal
____ Trailer Park	750 Gal. Septic Tank
____ Motel, Apt., Hotel	675 Sq. Ft. of Leach ~~Line~~ BED
✓ Dwelling 2 BDRM	____ No. ___ Dia ____ BI ____ TD ____ MD Seepage Pi
____ Commercial Building	____ Connection to Sewer
____ Swimming Pool	____ Connect to Existing S.S.D.S.

Welles Place

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 2/3/03 BY


WELLS PLASE
100'-0
4'
SET BACK DIMENSIONS
4'-0
20'-0
DWELLING
50'-0 ft
Connect To Existing
350-285-018-6
50'-0
RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
Pond Establishment
Trailer Park
Motel, Apt., Hotel
Dwelling 1 DW
Commercial Building
Swimming Pool
Sewage Disposal
Soil Percolation
Sq. Ft. of Land Use
Distribution to Sewer
No on-site replacement water softening devices may be discharged into the individual sewage disposal system towards approval without clearance from the Water Quality Control Board.
Water supply service this installation must be from an approved source.
All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
Any cutting, grading or filling in excess of two (2) feet will nullify septic disposal approval.
Approval has been received from the Regional Water Quality Control Board for expansion of the sewage disposal system.
This is to verify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan in septic tracting permit for subdivision, exemption.
Date 4-18-91 By Kenneth Wilson
ADDITION
10'-0
75'6 LINE
PLOT PLAN
SCALE 1/4"=1'0
LAND USE DIVISION
DEPT OF BUILDING & SAFETY
PERRIS OFFICE
PRIVE WAY
DW
1552
1556
C-P
GENERAL NOTES
① 2375' WELLS PL
QUAIL VALLEY
② PARCEL NUMBER
350-285-018-6
③ EXISTING ZONING
R4
④ TYPE OF SEWAGE
C SEPTIC TANK
⑤ AREA CALCULATIONS
50'6" by 100'
BLDG 1 600 ft
ADDITION 3 400 ft
4 400 ft
⑥ HOME
⑦ NAMES OF UTILITY
& LOCATIONS
(A) EASTER MUNICIPAL WATER DISTRICT
22 W S SAN JACINTO STREET
(B) SOUTHER CAL EDISON
(C) PHONE CO. GTE.
P.O Box 6415
CA 92402
LEGAL DESCRIPTION
OF PROPERTY
LAKE ELSINOR
LODGE
SUB DEVISION NO 3
DEVISION OF SOUTH 1/2
OF THE SOUTH EAST
OF SECTION 25
T 5 S R 4 W S B & M
BOOK 1973 PAGE 163201
RIVERSIDE
350-28
PARCEL
350285018-6
REVISIONS
BY
STANLEY
BURGET
9224 RUBIN
FIMONTE
91733
(949) 859-8770
DRAWN
STANLEY & BURGET
CHECKED
DATE
4/15/91
SCALE
1/4" = 1'0
JOB NO.
SHEET
PLOT PLAN
OF 4 SHEETS

PLOT PLAN

NAME George Abilez PHONE 244-5984

SITUS ADDRESS 23926

TRACT/PARCEL MAP ____ LOT ____

ASSESSOR'S PARCEL NO. ____

Provide North Arrow

350-285-028

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH

REAR PROPERTY LINE

Scale 1" = 20'

____ Food Establishment
____ Trailer Park
____ Motel, Apt., Hotel
____ Dwelling 3bed
____ Commercial Building
____ Swimming Pool

____ Sewage Disposal
2000 Gal. Septic Tank EXISTING
____ Sq. Ft. of Leach Line
____ x ____ Seepage Pit
✓ Connection to ~~Sewer~~ EXISTING

____ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source.
✓ All sewage disposal work must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting grading or fill in excess of two (2) feet will modify sewage disposal approval.
____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Service approves the subsurface sewage disposal plot plan to obtain building permit for installation, subject to ____

Date 12/19/94 By ____

SIDE PROPERTY LINE

SIDE PROPERTY LINE

100'

3'x85' Leach Lines

3' 3' 3' 3'

5'

2000 gal. S.T.

48'

14'6"

mobile Home 3 bedroom

20'

18'6"

97'

5'

14'

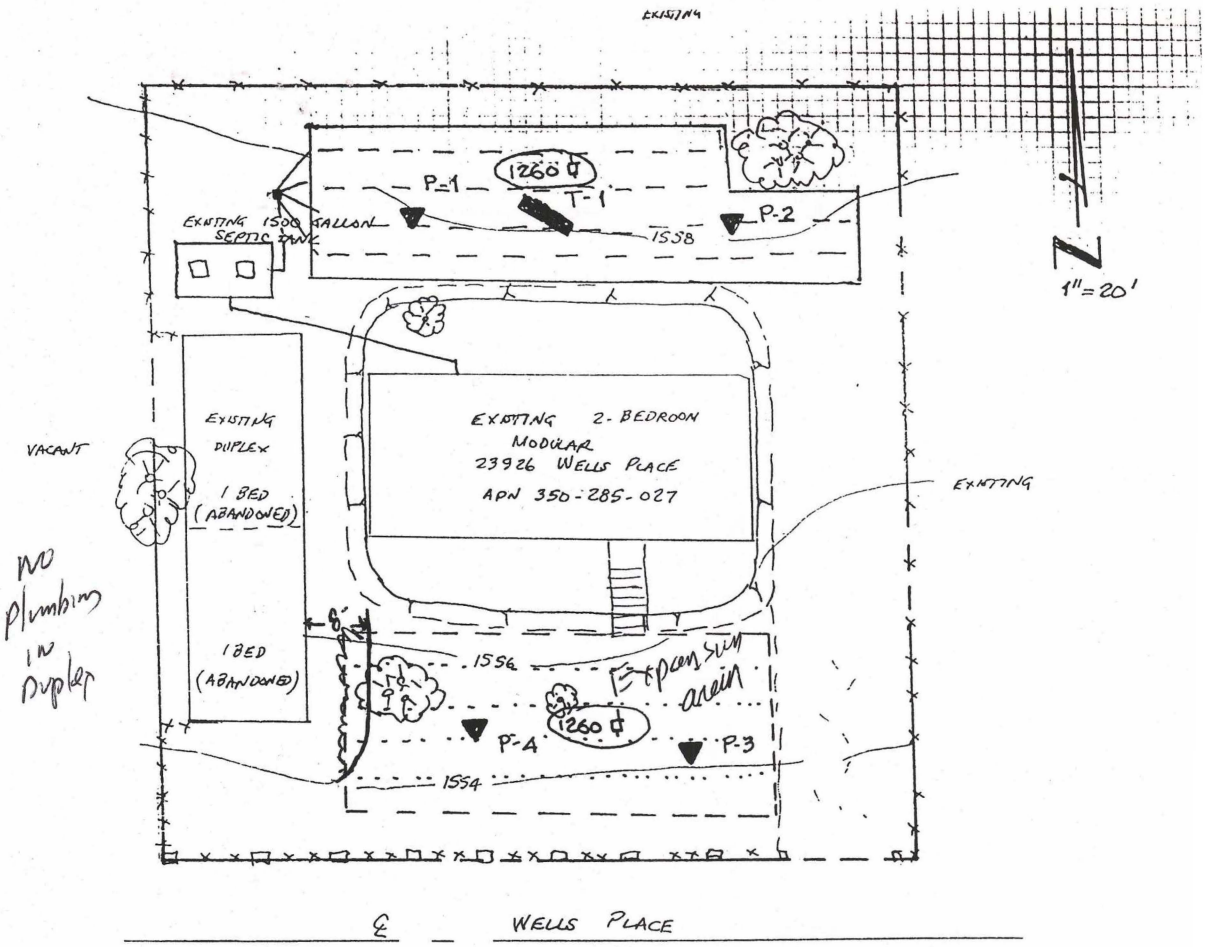
45'

Driveway

FRONT PROPERTY LINE

Wally Willis C42554199

STREET



no plumbing in duplex

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-Bedroom modular house requires 750 Gall septic tank existing 1500 Gallon tank acceptable.
* Application rate of 110 square feet requi 826 square feet of absorption area for 2-Bedroom flows
* Leach bed with 1.5 feet of gravel is 1240 square feet of bottom area.
* No portion of absorption system under driveways, etc.

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

Use Existing 1500 gallon tank

20230-01 **PLATE**

____ Food	✓ Sewage Disposal
____ Trailer Park	750 Gal. Septic Tank
____ Motel, Apt., Hotel	1260 Sq. Ft. of Leach Line ~~BED~~
✓ Dwelling	____ No. ____ Dia. ____ Ft. ____ TD.
____ Commercial Building	____ Connection to Sewer
____ Swimming Pool	____ Connect to Existing S.S.D.S.

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.

✓ Water supply serving this installation must be from an approved source

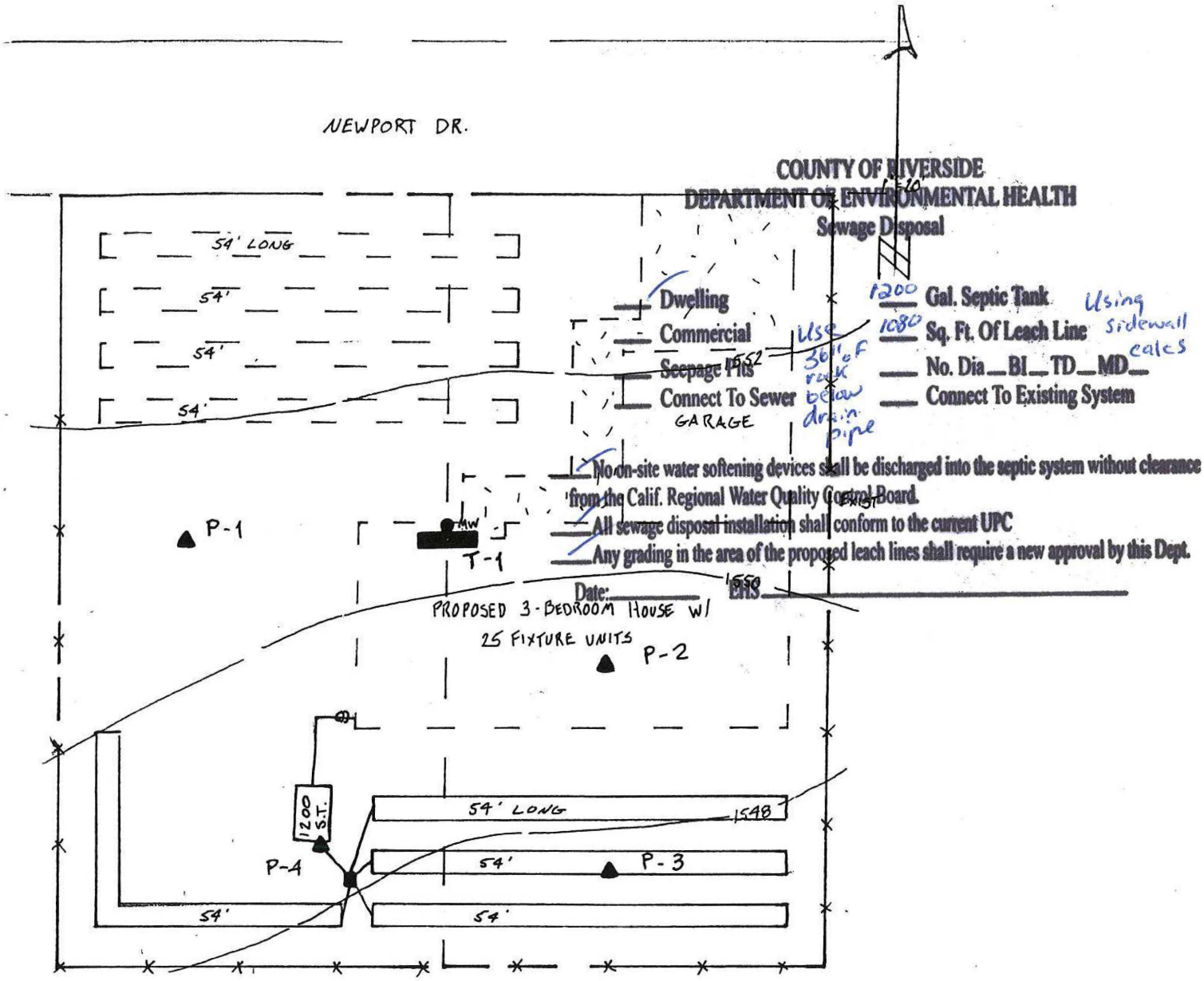
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code

✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.

____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 7/7/20 BY



EXPLANATION

- T-1 MW — EXPLORATORY TRENCH W/ MONITORING WELL
- P-4 — PERCOLATION TEST
- PRIMARY LEACH LINES
- 100% EXPANSION LEACH LINES

SYSTEM DESIGN

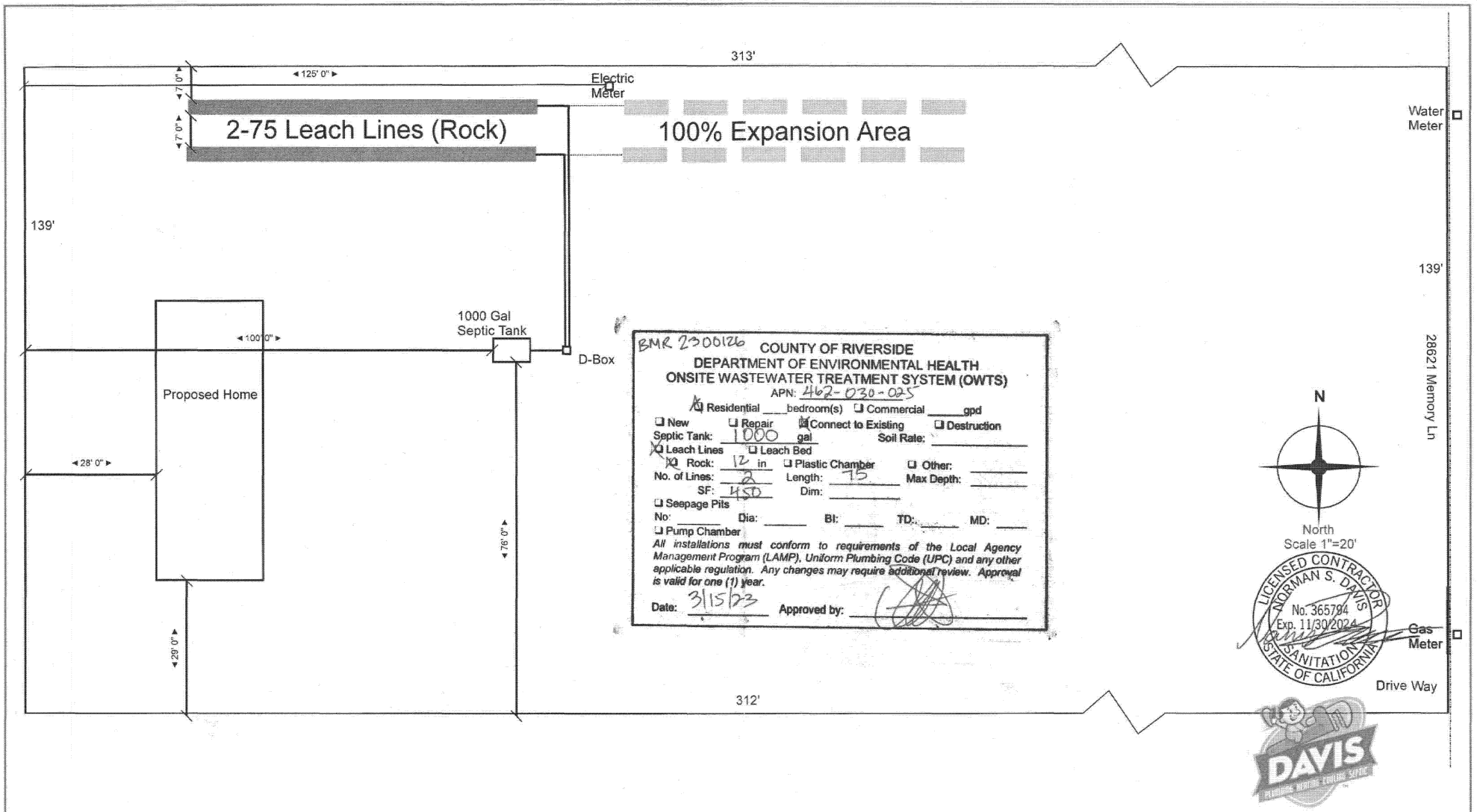
* 3-BEDROOM HOUSE WITH 24 FIXTURE UNITS REQUIRI 1200-GALLON SEPTIC TANK.
* APPLICATION RATE OF 90 SQ. FT. IS 1080 SQ.FT. OF ABSORPTION AREA.
* LEACH LINES UTILIZING 3 FEET OF ROCK IS 216 LINEAR FEET OF 3-FOOT WIDE TRENCH
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVE-WAYS, ETC.

GREG

Installation of leach lines not to exceed 5.25 feet
Effluent filter and risers to grade are required.

JERRY J. FAY
RCE No. 28150
EXPIRATION DATE 3-11-09

PLATE 1
24823-01



BMR 2300126

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
ONSITE WASTEWATER TREATMENT SYSTEM (OWTS)

APN: 462-030-025

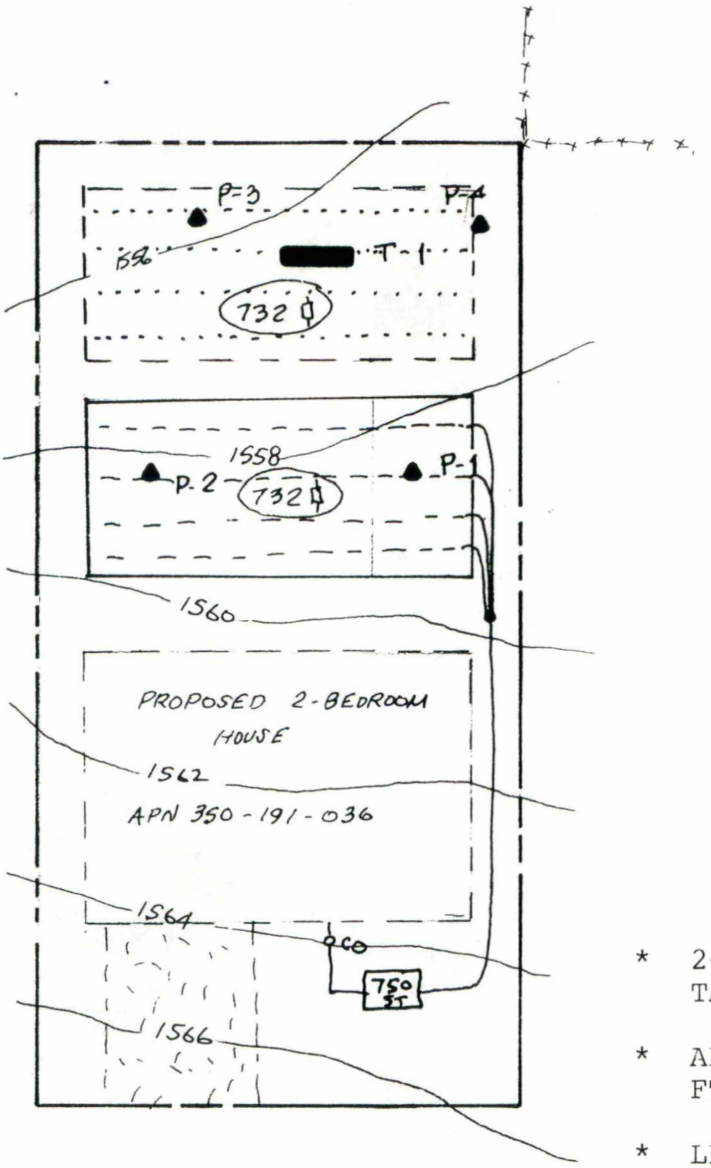
☒ Residential ___bedroom(s) ☐ Commercial _____gpd
☐ New ☐ Repair ☒ Connect to Existing ☐ Destruction
Septic Tank: 1000 gal Soil Rate: _____
☒ Leach Lines ☐ Leach Bed
☒ Rock: 12 in ☐ Plastic Chamber ☐ Other: _____
No. of Lines: 2 Length: 75 Max Depth: _____
SF: 450 Dim: _____
☐ Seepage Pits
No: _____ Dia: _____ Bl: _____ TD: _____ MD: _____
☐ Pump Chamber

All installations must conform to requirements of the Local Agency Management Program (LAMP), Uniform Plumbing Code (UPC) and any other applicable regulation. Any changes may require additional review. Approval is valid for one (1) year.

Date: 3/15/23 Approved by: _____

LICENSED CONTRACTOR NORMAN S. DAVIS No. 365794 Exp. 11/30/2024 SANITATION STATE OF CALIFORNIA

Site:	28621 Memory Ln, Winchester, CA 92596	Owner: Raul Moreno	Project: APN:462-030-025	Drawn: ND	Notes: 1000 GALLON SEPTIC TANK (CONCRETE) 450 SQ' BOTTOM AREA 150 LINEAR FT. OF 3' TRENCH + 100% EXPANSION AREA	Davis Plumbing & Heating Inc. PO Box 871 Perris, CA 92572 Ph:951-657-0393 Lic# 365794 Exp.Nov. 30,2024
Title:	Subsurface Septic System 1000 Gallon Septic Tank 2-75' leach line	Scale: 1"=20'	Date: 02/27/2023	Rev: N/A		



EXPLANATION

T-1 ▬ EXPLORATORY TRENCH

P-4 ▲ PERCOLATION TEST LOCATION

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 65 SQ. FT. IS 488 SQ. FT. OF ABSORPTION AREA.
* LEACH BED WITH 1.5 FEET OF ROCK IS 732 SQ. FT. OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAY, ETC.

350-191-036

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

1½' Rock under pipe Req'd

2BR 16 F.U. MAX

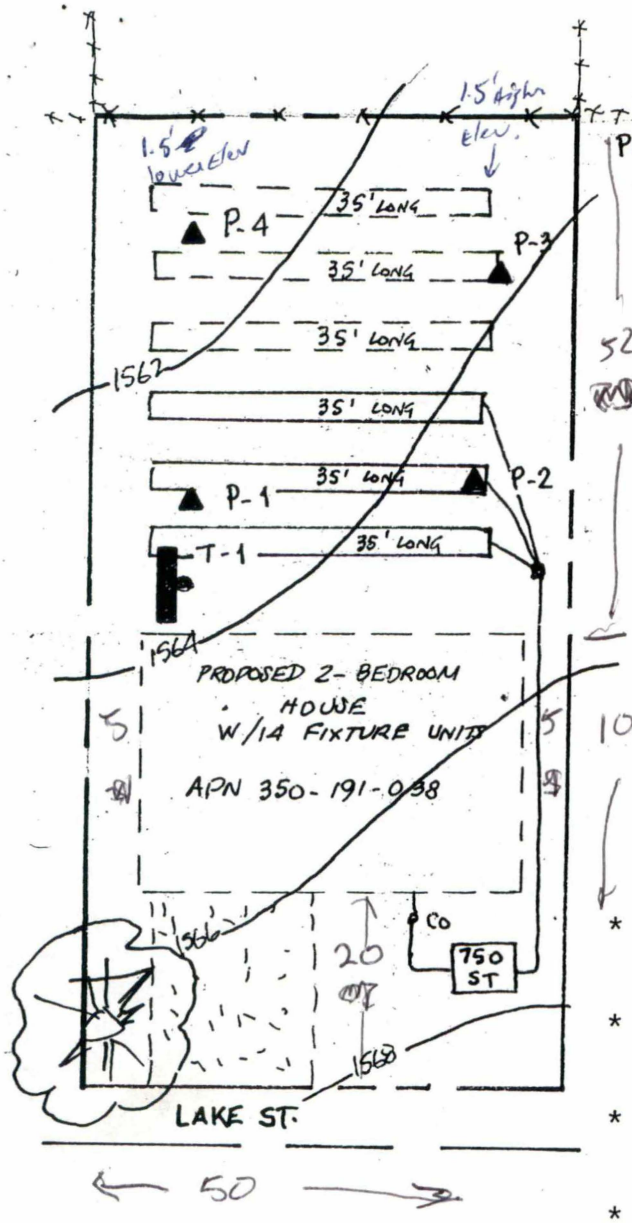
✓ **Dwelling** — 750 **Gal. Septic Tank** BED
Commercial — 732 **Sq. Ft. of Leach ~~Line~~**
Seepage Pits — **No.** **Dia** **BI** **TD** **MD**
Connect to Sewer — **Connect to Existing System**

✓ **No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.**
✓ **All sewage disposal installation shall conform to the current UPC**
Any grading in the area of the proposed leach lines shall require a new approval by this Dept

Date: 1/23/09 **EHS**

REGISTERED CIVIL ENGINEER — LARRY J. FAGUNDES — RCE No. 29150 — EXPIRATION DATE 3-31-09 — STATE OF CALIFORNIA

23284-01 **PLATE 1**



EXPLANATION

P-4 ▲ PERCOLATION TEST

T-1 EXPLORATORY TRENCH W/ MONITORING WELL INSTALLED

1" = 20'

52 PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

SYSTEM DESIGN

* 2-BEDROOM HOUSE W/14 FIXTURE UNITS REQUIRES 750 GALLON SEPTIC TANK.
* APPLICATION RATE OF 65 SQ. FT. IS 488 SQ. FT. OF ABSORPTION AREA.
* LEACH LINES WITH 3 FEET OF ROCK IS 98 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, PORCHES, ETC.

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

___ Dwelling
___ Commercial
___ Seepage Pits
___ Connect to Sewer

3 FT DEEP ROCK

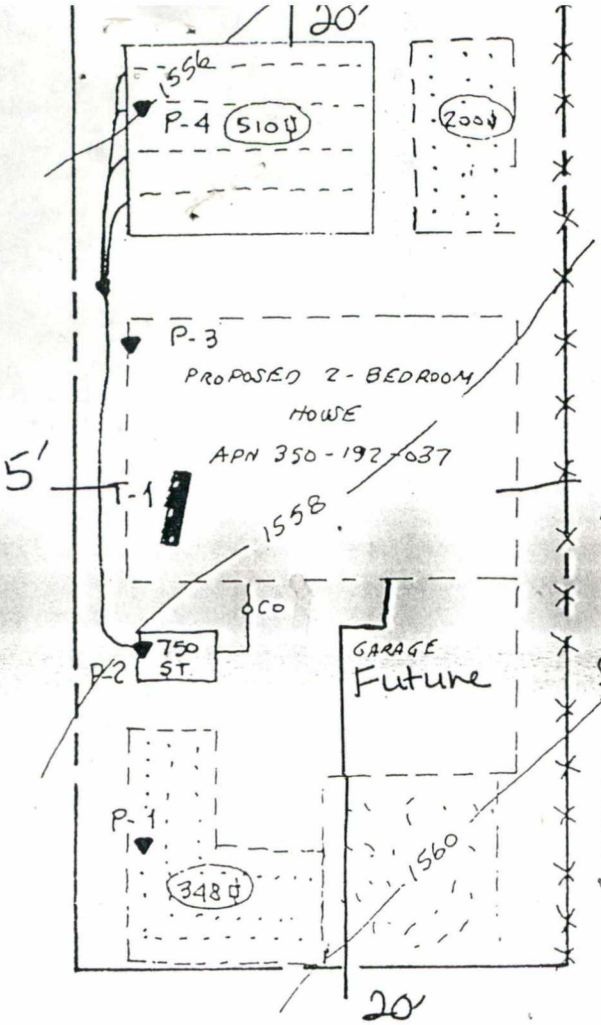
750 Gal. Septic Tank
525 Sq. Ft. of Leach Line
___ No.__Dia__BI__TD__MD
___ Connect to Existing System

REGISTERED CIVIL ENGINEER
LARRY J. FAHL
RCE No. 29150
EXPIRATION DATE 9-30-22
STATE of CALIFORNIA

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date 7/18/14 EHS D. Vieatte

24413-01 **PLATE 1**



1" = 20'

THIS APPROVAL GRANTED BY THE RIVERSIDE CO
DEPARTMENT OF ENVIRONMENTAL HEALTH IS VA
FOR ONE (1) YEAR FROM DATE OF APPROVAL.
DATE 26 Jan 04 SIGNATURE Marc Hacc

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 45 SQUARE FEET IS 338 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 1.5 FEET OF ROCK IS 508 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION AREA UNDER DRIVEWAYS, ETC.

PLANS ACCEPTABLE FOR
PURPOSES ONLY
JAN 26 2004
RIVERSIDE COUNTY
PLANNING DEPARTMENT
BY CM

PLANS ACCEPTABLE FOR
APPLICATION PURPOSES ONLY
JUL 17 2005
BY Raylenne Guttenberg

SP
(D)

350-192-037

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE
3-31-07
STATE OF CALIFORNIA

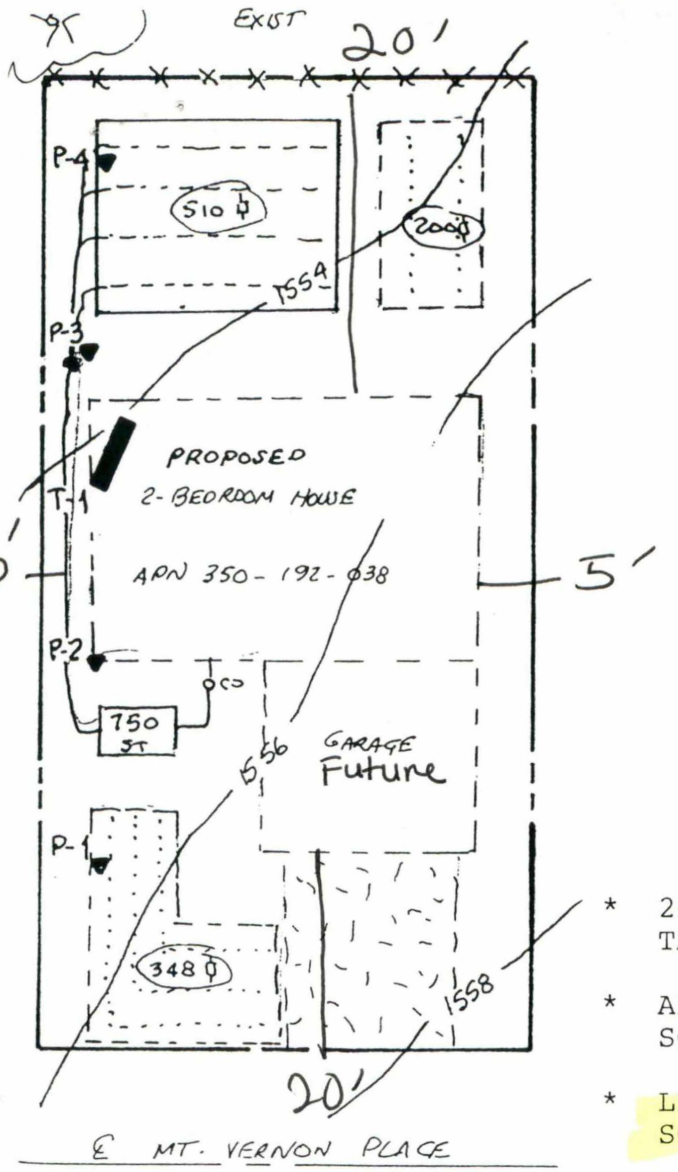
COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

___ Dwelling — 750 Gal. Septic Tank
___ Commercial — 508 Sq. Ft. of Leach ~~Line~~ BED
___ Seepage Pits — ___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer — ___ Connect to Existing System

23452-01 PLATE 1

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ ~~All sewage disposal installation shall conform to the current UPC~~
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 10/15/03 EHS



350-192-038



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 45 SQUARE FEET IS 338 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 1.5 FEET OF ROCK IS 508 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION AREA UNDER DRIVE-WAYS, ETC.

350-192-038

PLANS ACCEPTABLE FOR APPLICATION PURPOSES ONLY

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

OCT 17 2003
RIVERSIDE COUNTY
PLANNING DEPARTMENT
BY Ravienne Guttenberg

750 Gal. Septic Tank
508 Sq. Ft. of Leach Line

___ Dwelling
___ Commercial
___ Seepage Pits
___ Connect to Sewer

___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Existing System

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 10/15/03 By: [signature]

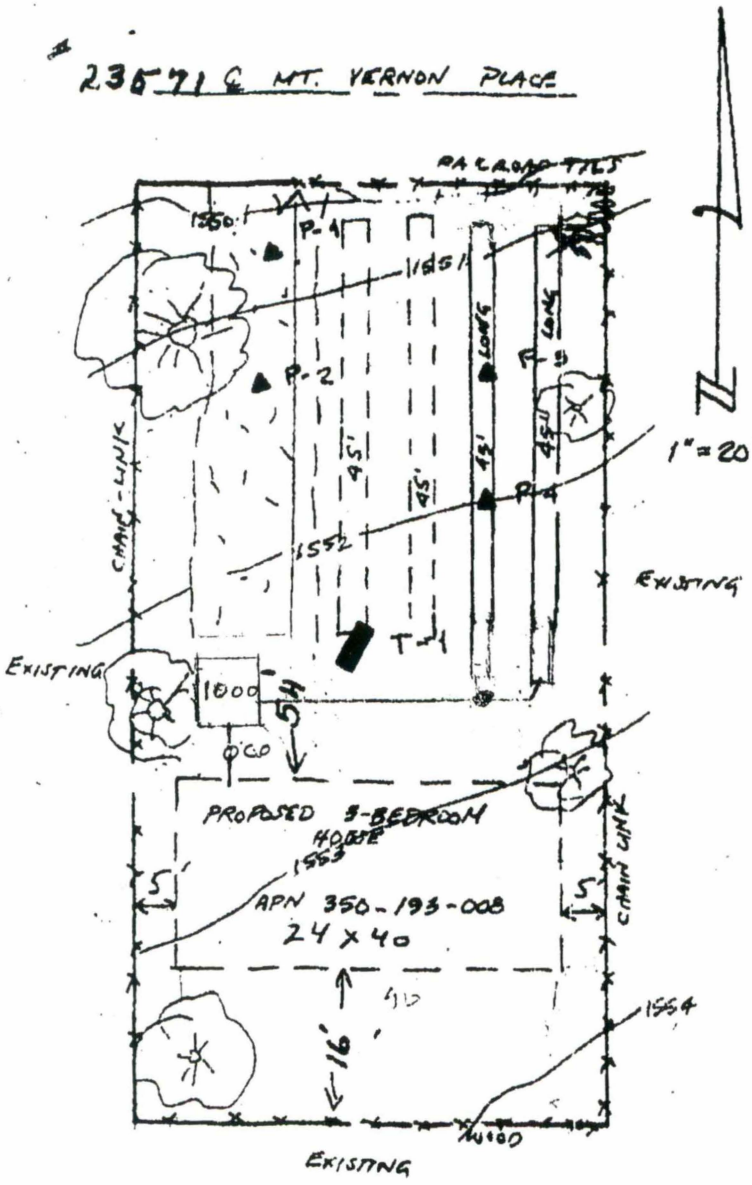
REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE 3-31-05
STATE of CALIFORNIA

[signature]

23453-01 PLATE 1

350-193-008

23571 E MT. VERNON PLACE



BR5026888

NOTE - This set of plans a
MUST Be kept on
it is unlawful

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

001

SYSTEM DESIGN

* 3-BEDROOM HOUSE REQUIRES 1000-GALLO SEPTIC TANK
* APPLICATION RATE OF 45 SQUARE FEET 450 SQUARE FEET OF ABSORPTION AREA
* LEACH LINES WITH 3 FEET OF ROCK IS 90 LINEAR FEET OF 3 FOOT WIDE LEACH LINE
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

APPROVED
RIVERSIDE COUNTY FIRE DEPT
BY
TITLE FS
DATE 10-31-02

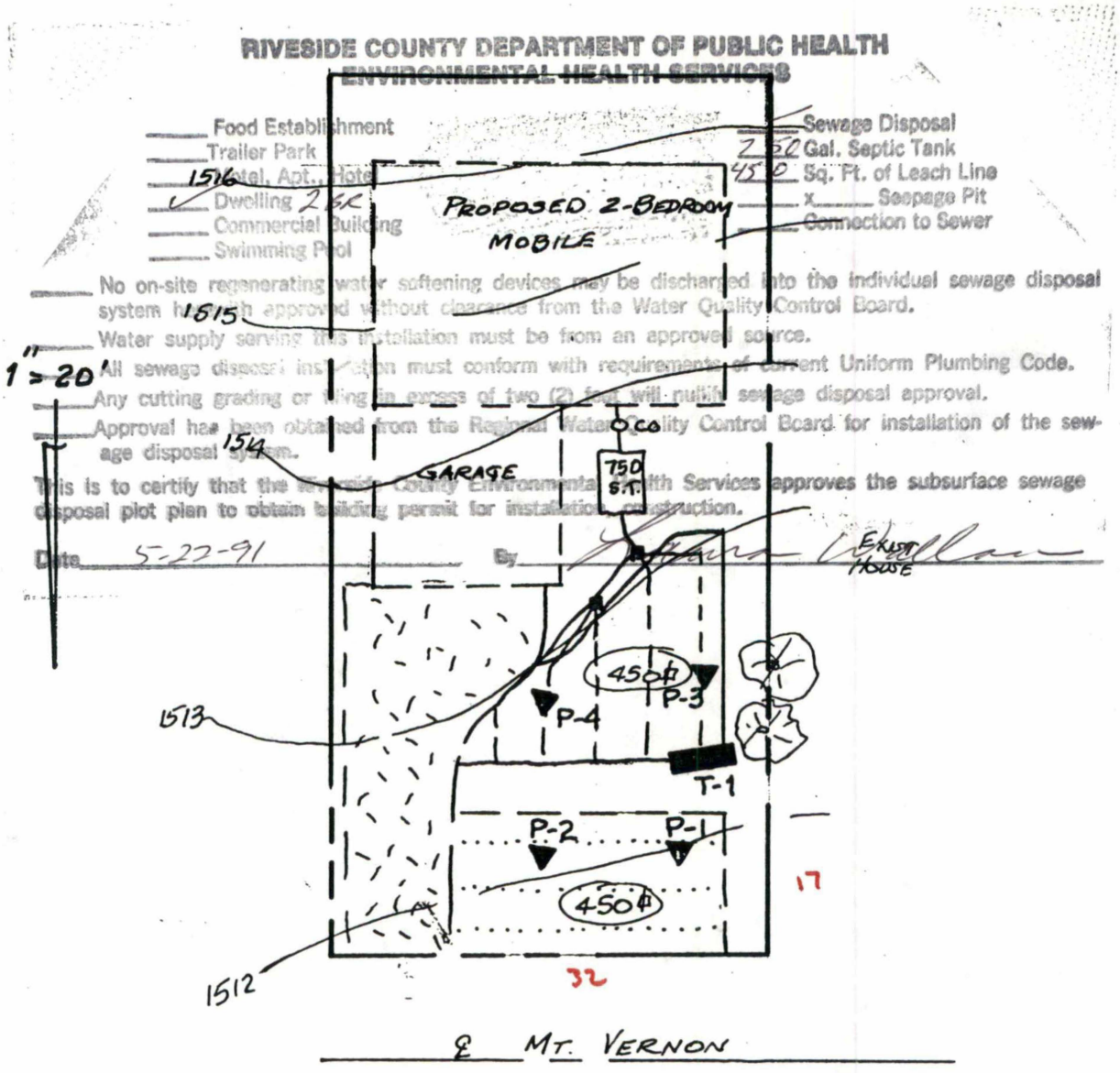
COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

Sidewall calcs appl-
36" possible below leach Lines
Bottom of trench to
66" building

____ Food
____ Trailer Park
____ Motel, Apt., Hotel
____ Dwelling
____ Commercial Building

✓ Sewage Disposal
1000 Gal. Septic Tank
450 Sq. Ft. of Leach Line
No. ____ Dia. ____ Bl. ____ TD ____ MD Seepage Pi
____ Connection to Sewer

APN 350-193-009



EXPLANATION

T-1 — EXPLORATORY TRENCH

P-4 — PERCOLATION TEST

PRIMARY AND 100%

EXPANSION LEACH BEDS

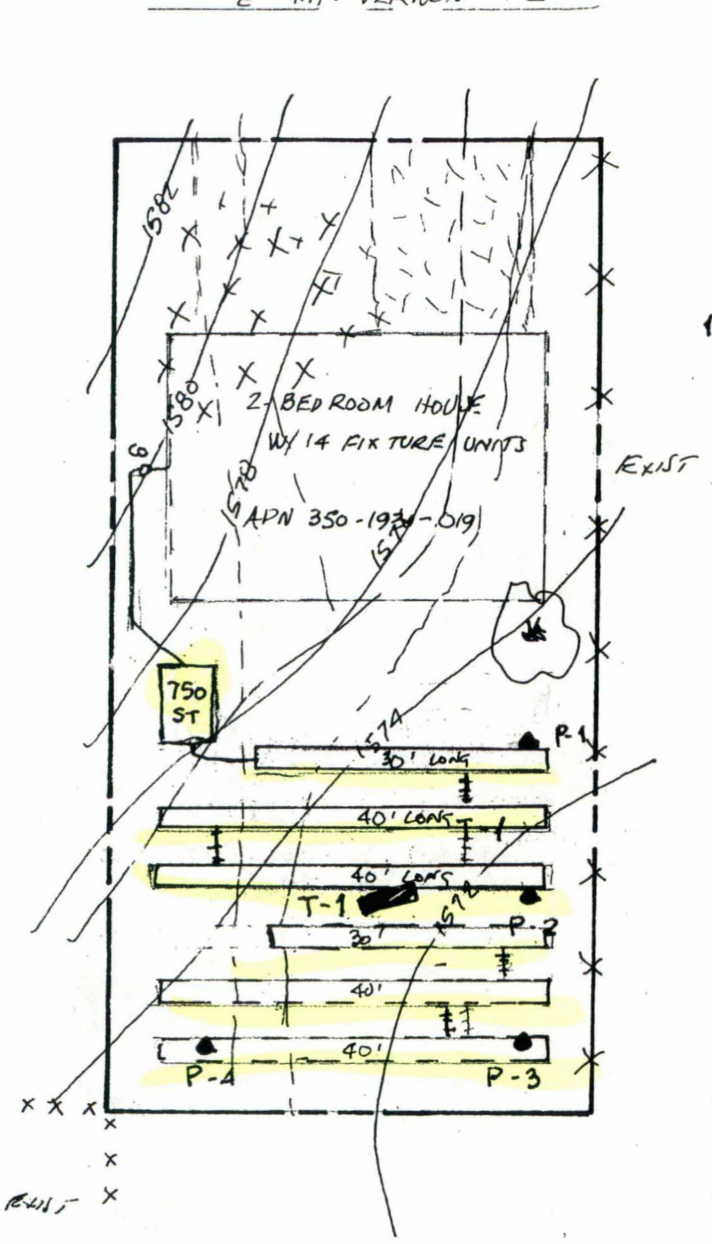
SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750 GALLON SEPTIC TANK
* APPLICATION RATE OF 40 SQUARE FEET IS 300 SQUARE FEET OF ABSORPTION AREA.
* LEACH BEDS REQUIRE 50% INCREASE OR 450 SQUARE FEET OF ABSORPTION AREA. (18 INCHES OF GRAVEL RECOMMENDED).
* NO PORTION OF SYSTEM UNDER DRIVEWAY, ETC.

PLATE 1

91055-01

E MT. VERNON RD



1" = 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

HARD ROCK AREAS

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTURE UNITS REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 65 SQUARE FEET IS 488 SQUARE FEET OF ABSORPTION AREA
* LEACH LINES WITH 3-FEET OF ROCK REQUIRES 98-LINEAR FEET OF 3-FOOT WIDE TRENCH
* 10% INCREASE FOR SLOP COVER IS 108 LINEAR FEET
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health Services Division and Building and Safety (copies to be furnished for the "Record") that he has inspected the Leach Bed/leachline trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes.

350-193-019

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling	750 Gal. Septic Tank
___ Commercial (14 F.U.)	488 Sq. Ft. of Leach Line (3FT ROCK)
___ Seepage Pits	___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer	___ Connect to Existing System

REGISTERED CIVIL ENGINEER LARRY J. FAST RCE No. 29150 EXPIRATION DATE 3-31-02 STATE OF CALIFORNIA

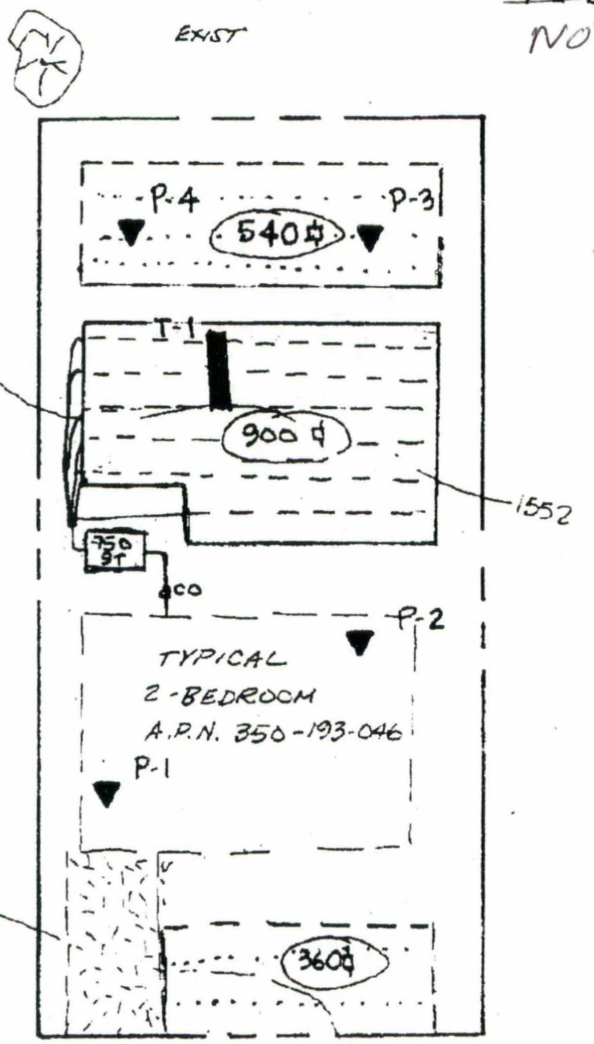
✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
✓ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 6/16/94 EHS _____

24143-01 **PLATE 1**

350-193-016

1" = 20' NOT TO SCALE



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* TYPICAL 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 80 SQUARE FEE IS 600 SQUARE FEET OF ABSORPTION AREA
* LEACH BED WITH 1.5 FEET OF GRAVEL IS 900 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.
* ACCESS COVER REQUIRED FOR SEPTIC TANK UNDER DRIVEWAY

E GOETZ DR.

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

___ Food
___ Trailer Park
___ Motel, Apt., Hotel
✓ Dwelling
___ Commercial Building
___ Swimming Pool

✓ Sewage Disposal
750 Gal. Septic Tank
900 Sq. Ft. of Leach ~~Line~~ BED
___ No. ___ Dia. ___ Bl. ___ TD ___ MP Seepage Pi
___ Connection to Sewer
___ Connect to Existing S.S.D.S.

___ ✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
___ ✓ Water supply serving this installation must be from an approved source
___ ✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___ ✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

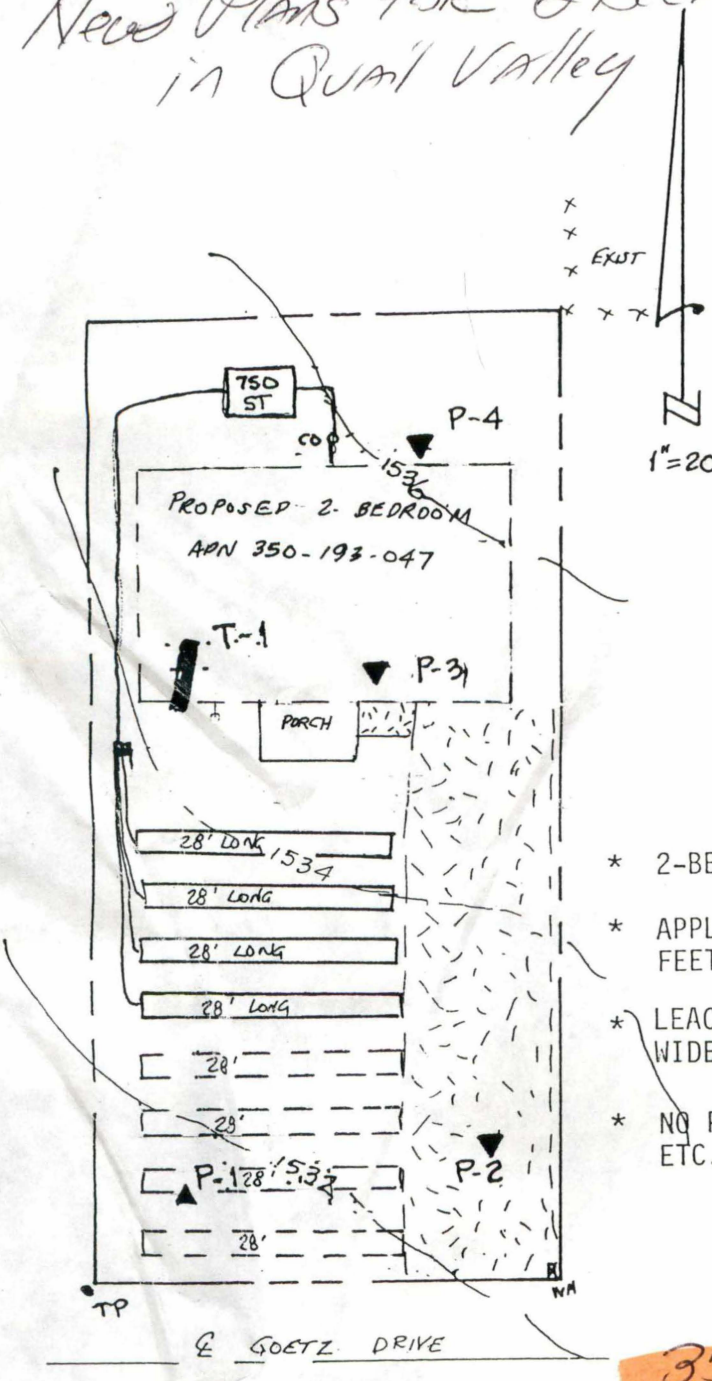
Revised 12/9/02
96169-99 PLATE 1

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 12/11/02 BY _____

REVISED

New Plans for 2 Bedroom Home in Quail Valley



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH CHAMBER

100% EXPANSION LEACH CHAMBER

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TA
* APPLICATION RATE OF 55 SQUARE FEET IS 412 SQ. FEET OF ABSORPTION AREA.
* LEACHING CHAMBERS IS 110 LINEAR FEET OF 3-FOOT WIDE CHAMBER.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWA ETC.

350-193-047

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

____ Food	X Sewage Disposal
____ Trailer Park	750 Gal. Septic Tank
____ Motel, Apt., Hotel	412 Sq. Ft. of Leach Line
X Dwelling 2 Bedroom	____ No. ___ Dia ____ Bl ____ TD ____ MD Seepage Pi
____ Commercial Building	____ Connection to Sewer
____ Swimming Pool	____ Connect to Existing S.S.D.S.

4 lines 28' long plastic Chambers

X No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.

X Water supply serving this installation must be from an approved source

X All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.

X Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.

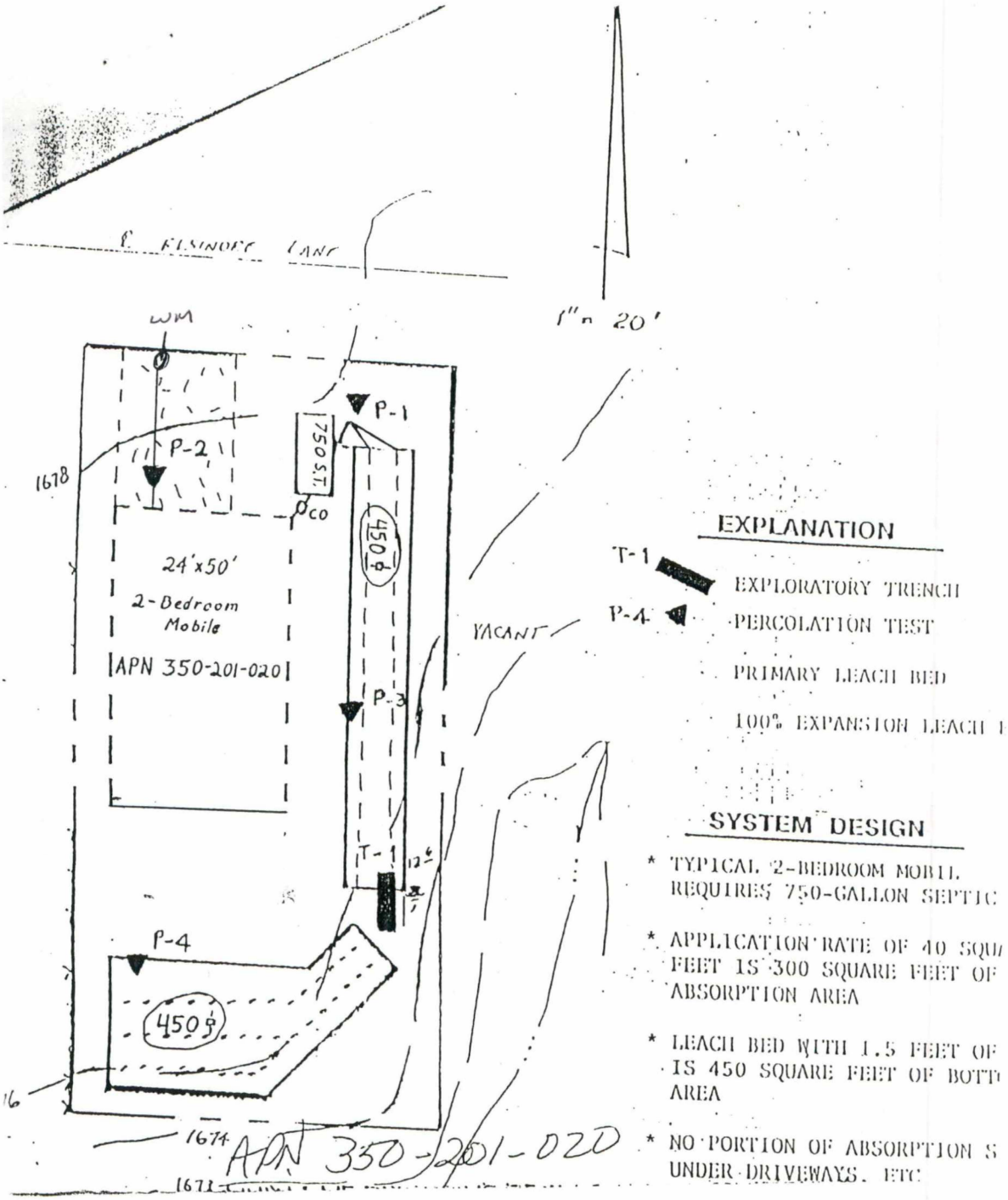
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage [illegible] to obtain building permit for installation, construction.

Revised 10/02

DATE 10/18/02 M.A. Morales

21300-01 PLATE 1



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH F

SYSTEM DESIGN

* TYPICAL 2-BEDROOM MOBIL REQUIRES 750-GALLON SEPTIC

* APPLICATION RATE OF 40 SQU FEET IS 300 SQUARE FEET OF ABSORPTION AREA

* LEACH BED WITH 1.5 FEET OF IS 450 SQUARE FEET OF BOTT AREA

* NO PORTION OF ABSORPTION S UNDER DRIVEWAYS, ETC

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leachline trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes.

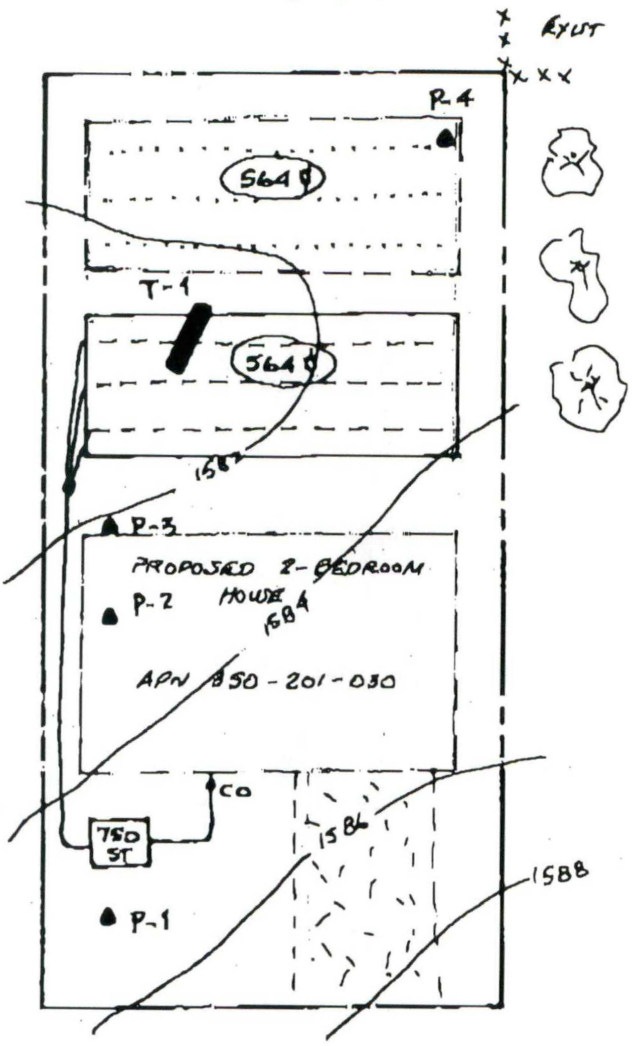
350 201 020

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

_____Food	✓ Sewage Disposal
_____Trailer Park	750 Gal. Septic Tank 450 ft Leach bed
_____Motel, Apt., Hotel	_____Sq. Ft. of Leach Line
✓ Dwelling 2 bdrm	_____No. ___Dia_____Bl_____TD_____MD Seepage Pit
_____Commercial Building	_____Connection to Sewer
_____Swimming Pool	_____Connect to Existing S.S.D.S.

_____ water softening devices may be discharged into the individual sewage disposal

350-201-030



1" = 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 50 SQUARE FEET OF ABSORPTIO AREA
* LEACH BED WITH 1.5 FEET OF ROCK IS 584 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS ETC.

E LAKE DRIVE

Must use 1.5ft of Rock

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

_____ Food
_____ Trailer Park
_____ Motel, Apt., Hotel
X Dwelling 2 bed
_____ Commercial Building
_____ Swimming Pool

X Sewage Disposal
750 Gal. Septic Tank
584 Sq. Ft. of Leach Line
_____ No. ___ Dia ____ Bl ____ TD ____ MD Seepage Pi
_____ Connection to Sewer
_____ Connect to Existing S.S.D.S.

leachbed with 1½' of rock

X No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
X Water supply serving this installation must be from an approved source
X All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
X Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
_____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

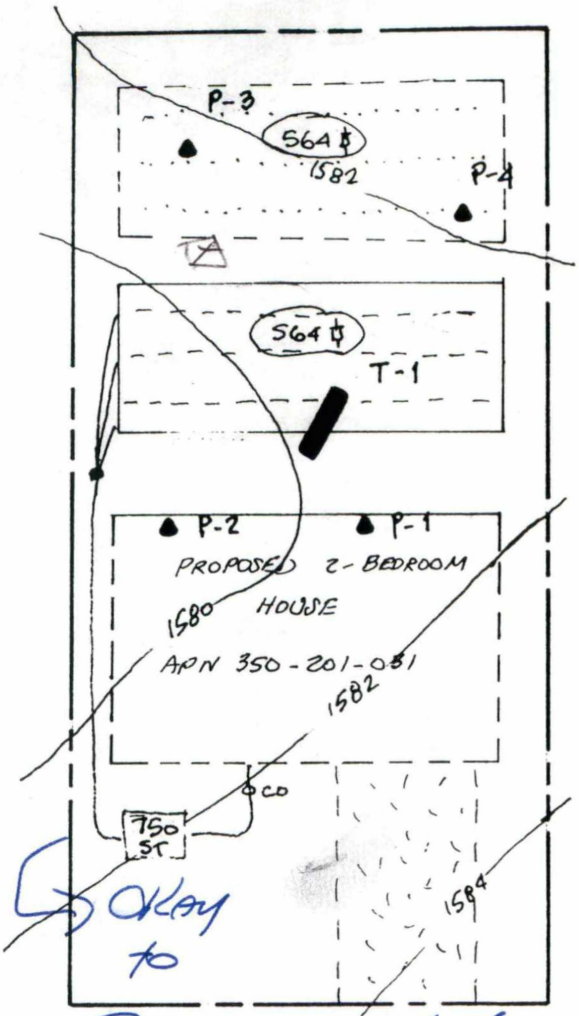
DATE 5/23/03 BY M A Mendoza

23240-01

PLATE 1

Maintain sheet flow over leachbed

350-201-032





EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED.

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750 GALLON SEPTIC TANK.
* APPLICATION RATE OF 50 SQUARE FEET I 375 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 1.5 FEET OF ROCK IS 564 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDI DRIVEWAYS, ETC.

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

X Dwelling 2 Bed	750 Gal. Septic Tank
___ Commercial	___ Sq. Ft. of Leach Line
___ Seepage Pits	___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer	___ Connect to Existing System

564 Sq ft. leach bed
14.5' X 39'
Approximate

X All on-site water softening devices shall be discharged into the septic system without clearance from the Santa Ana Regional Water Quality Control Board.
X All sewage disposal installation shall conform to the current UPC
X Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

D 8/25/03 EHS M.M. Mendoza

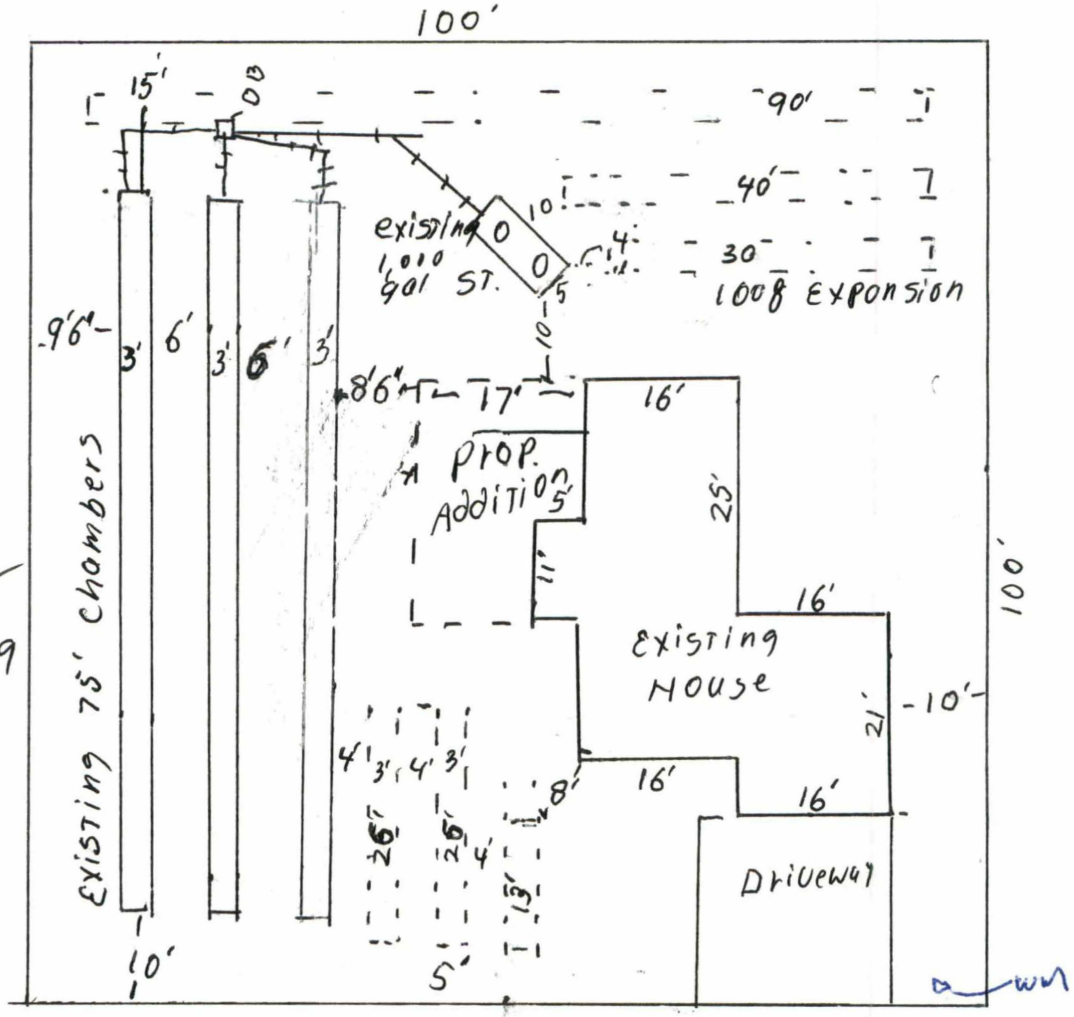
REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE 3-31-05
STATE of CALIFORNIA

23240-02 **PLATE 1**

350-201-058

Existing septic system
1,000 gal Tank with
3 75' Long plastic chambers

Expansion
90
40
30
26
26
13
225



Wally Wood
C42 554199

Lake Dr.

	address:	Owner:	APN:	Scale
	23834 Lake Dr Menifee	Gabrial Hernandez	350-201-085	1" = 20' N

PERMIT NO._____

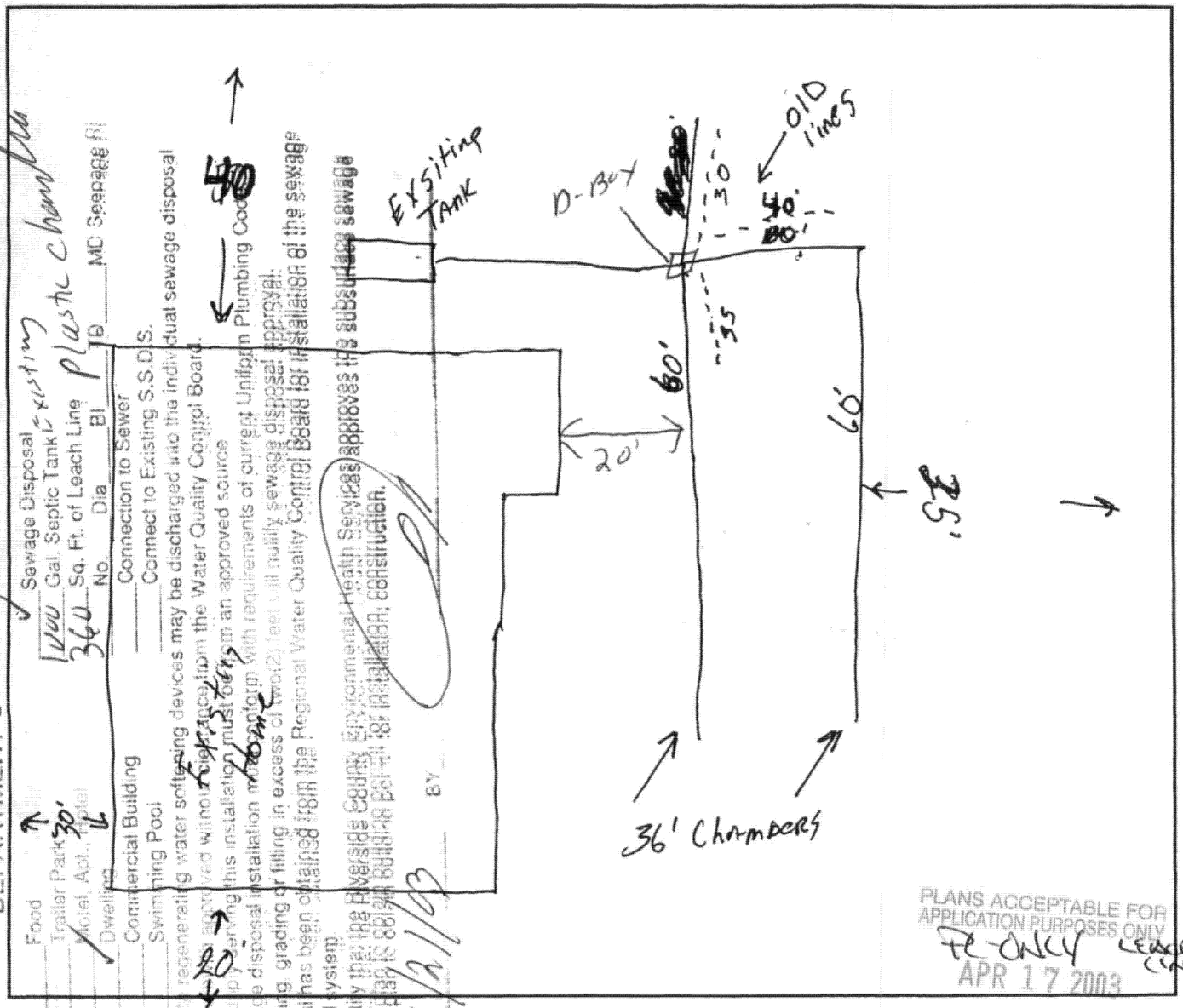
SITE PLAN

NAME Marsha Gray PHONE ( ) 764-5616

SITE ADDRESS 23821 Elsinore lane

ASSESSORS PARCEL NUMBER 350 201 059

Provide North Arrow **REAR PROPERTY LINE**



COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

No on-site regenerating water softening devices may be discharged into the individual sewage disposal system approved without prior approval from the Water Quality Control Board.
Water supplying this installation must be from an approved source
All sewage disposal installation must conform with requirements of current Uniform Plumbing Code
Any cutting, grading or filling in excess of four (4) feet will nullify sewage disposal approval.
Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.
This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plan as shown on this plot plan for installation, construction.

FRONT PROPERTY LINE

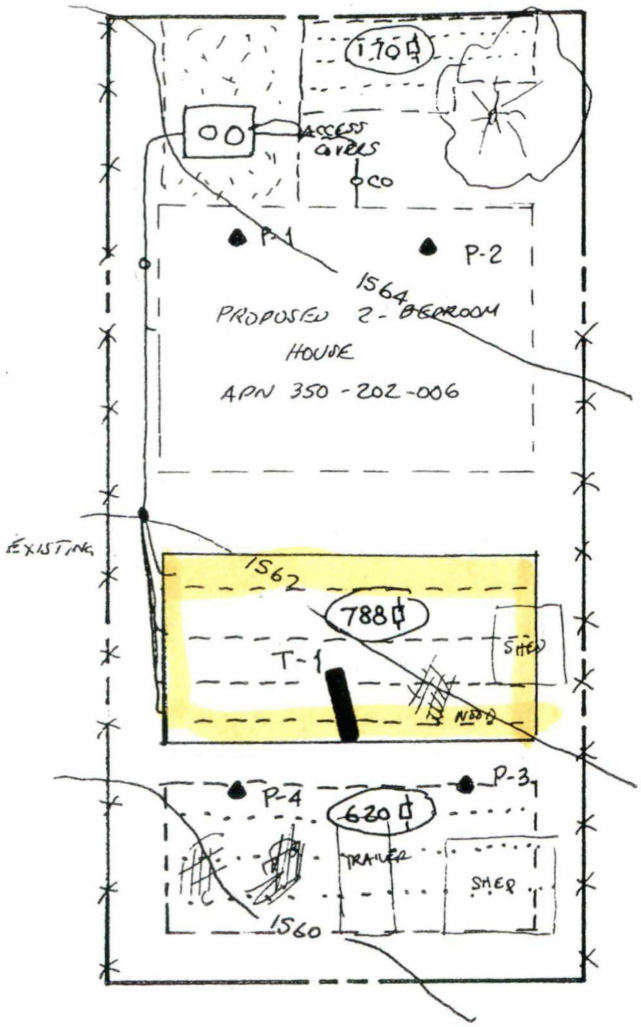
Street

SIDE PROPERTY LINE

PLANS ACCEPTABLE FOR APPLICATION PURPOSES ONLY
FE ONLY
APR 17 2003

RIVERSIDE COUNTY PLANNING DEPARTMENT

E LAKE DRIVE



1" = 20'

EXPLANATION

T-1 ▬	EXPLORATORY TRENCHES
P-4 ▲	PERCOLATION TESTS
	PRIMARY LEACH BEDS
	100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 70 SQUARE FEET IS 525 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 1.5 FEET OF ROCK IS 788 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

350-202-006

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

Leach Bed 788sqft

✓ Dwelling
___ Commercial
___ Seepage Pits
___ Connect to Sewer

750 Gal. Septic Tank
___ Sq. Ft. of Leach Line
___ No.__Dia__BI__TD__MD
___ Connect to Existing System

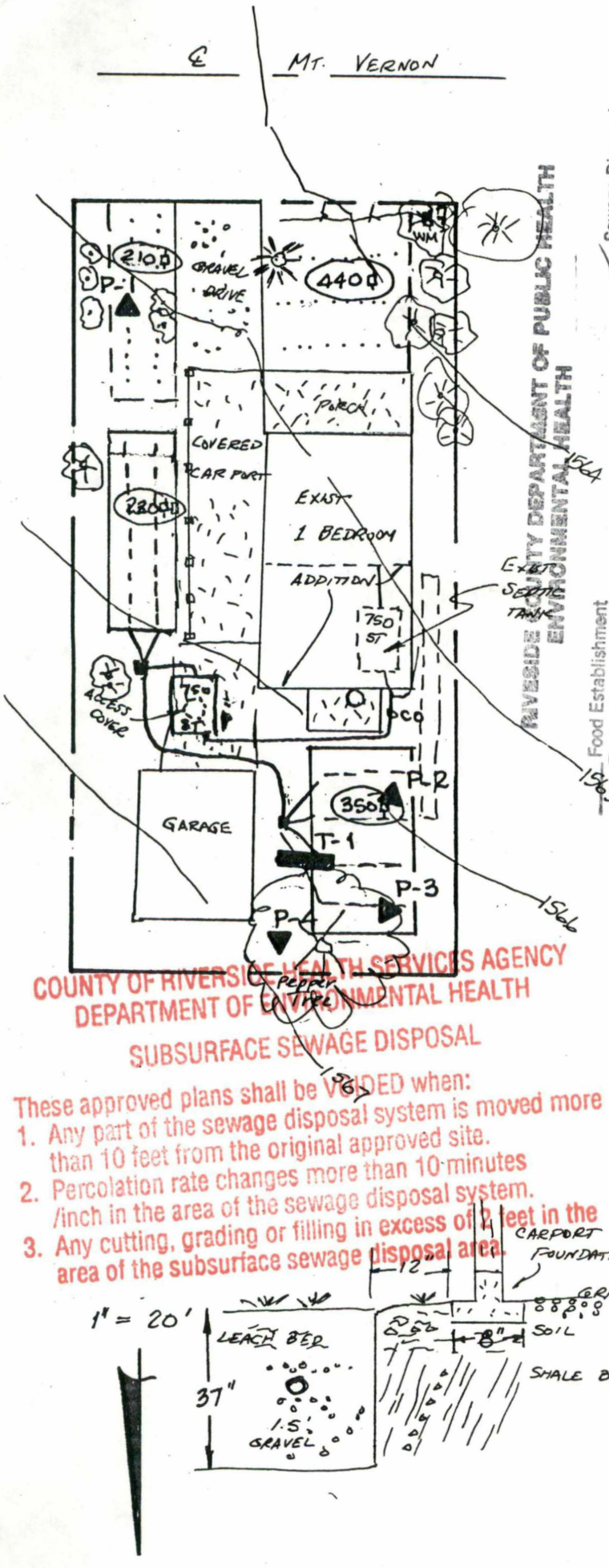
REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE 3-31-07
STATE of CALIFORNIA

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
✓ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 2/29/04 EH A. Lyon

Traffic rated tank required if installed in driveways

23501-01 **PLATE 1**



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 1-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK - Existing tank should be abandoned

* APPLICATION RATE OF 50 SQUARE FEET IS 375 SQUARE FEET OF ABSORPTION AREA

* LEACH BED WITH 1.5 FEET OF GRAVEL REQUIRES 565 SQUARE FEET OF BOTTOM AREA

* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC. ACCESS COVER REQUIRED FOR SEPTIC TANK UNDER DRIVEWAYS, ETC

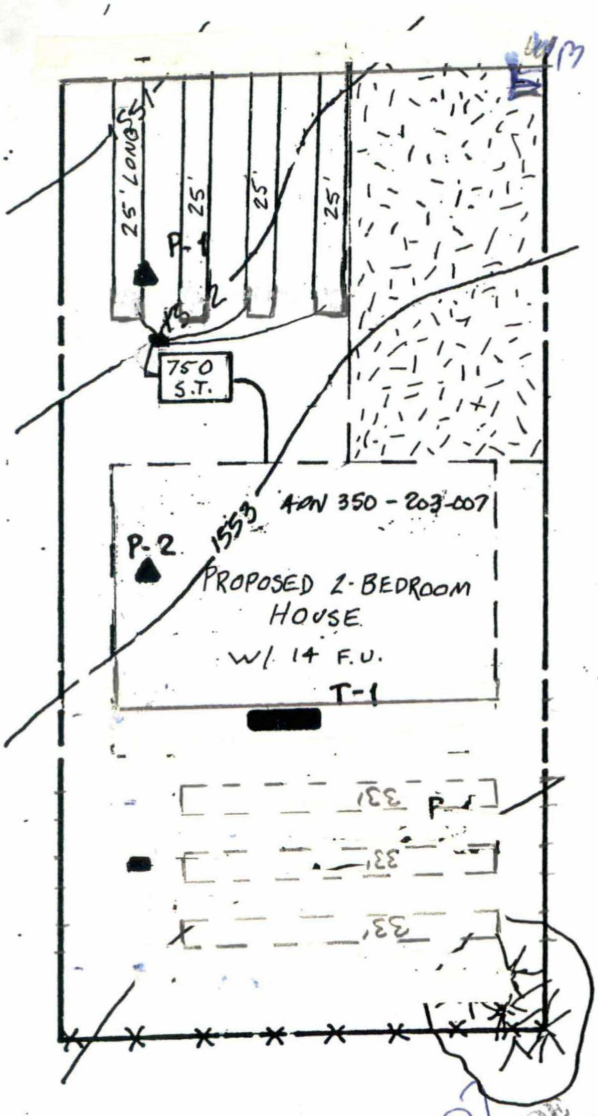
* LEACH BED EXCAVATION SHOULD BE 1 FOOT FROM CARPORT FOUNDATION

350 202 045

Revised 6/30/94

94155-01 **PLATE 1**

K MT. VERNON PLACE



1" = 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTU UNITS REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 65 SQUARE FEET IS 488 SQUARE FEET OF ABSORPTION AREA
* UTILIZING 3-FEET OF ROCK REQUIRES 98 LINEAR FEET OF 3-FOOT WIDE LEACH LINE
* NO PORTION OF ABSORPTION SYSTI BENEATH DRIVEWAYS, ETC.

850-203-007

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH

Sewage Disposal

__Dwelling 3 PT BACK
__Commercial
__Seepage Pits
__Connect to Sewer

__ Gal. Septic Tank 750
__ Sq. Ft. of Leach Line
__No.__Dia__FT__TD__MD
__Connect to Existing System

__No on-site water softening devices shall be discharged into the septic system without approval by this Dept from the Calif. Regional Water Quality Control Board.
__All sewage disposal installation shall conform to the current requirements of the Uniform Plumbing Code.
__Any grading in the area of the proposed leach lines shall be approved by this Dept

Date 10/31/06

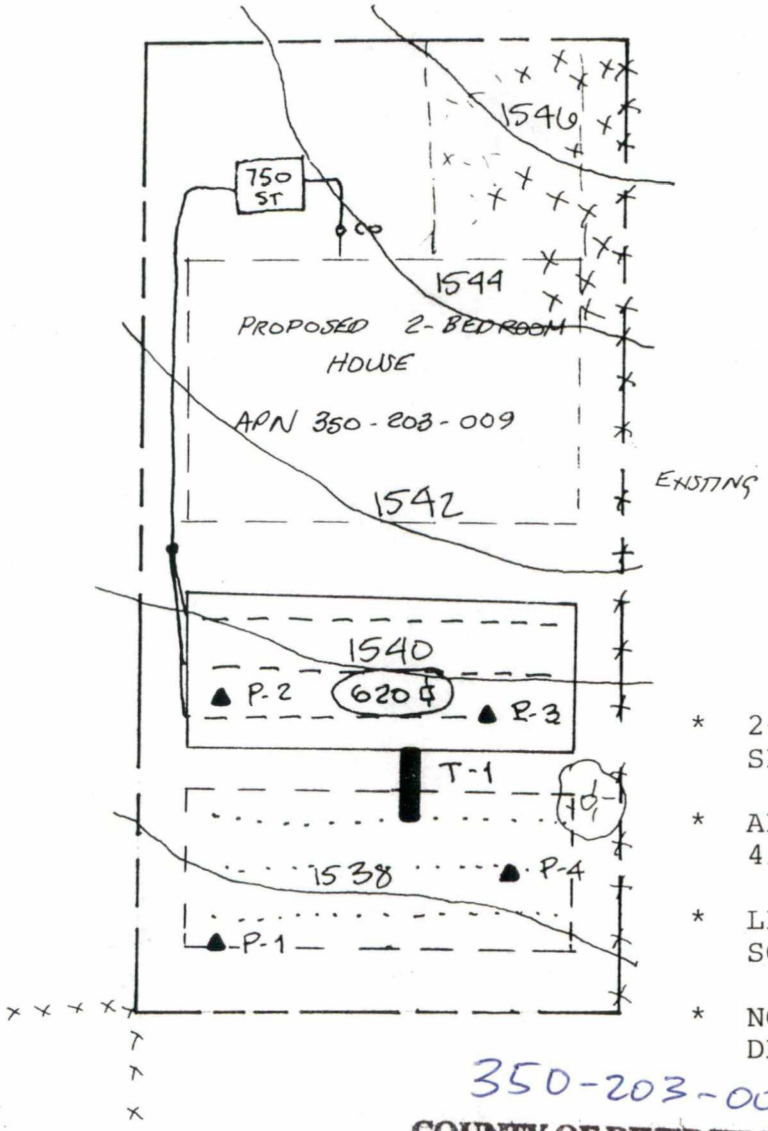
REGISTERED CIVIL ENGINEER
LARRY J. PAUL
RCE No. 29150
EXPIRATION DATE
3-31-07
STATE of CALIFORNIA

SHOW SPACE NOTATIONS ON BACK PLOT

2 PEOPLE PER BEDROOM MAX OCCUPANCY IS 4 PERSONS

23566-01 PLATE 1

& MT. VERNON PLACE



1"=20'

EXPLANATION

T-1 — EXPLORATORY TRENCH

P-4 — PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

HARD ROCK AREA

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750 GALLON SEPTIC TANK.
* APPLICATION RATE OF 55 SQUARE FEET IS 412 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 1 FOOT OF ROCK IS 620 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

350-203-009

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling
___ Commercial 2BR, 1F.U.
___ Seepage Pits
___ Connect to Sewer

750 Gal. Septic Tank
620 Sq. Ft. of Leach Line BED
___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Existing System

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
✓ Any grading in the area of the proposed leach lines shall require a new approval by this D...

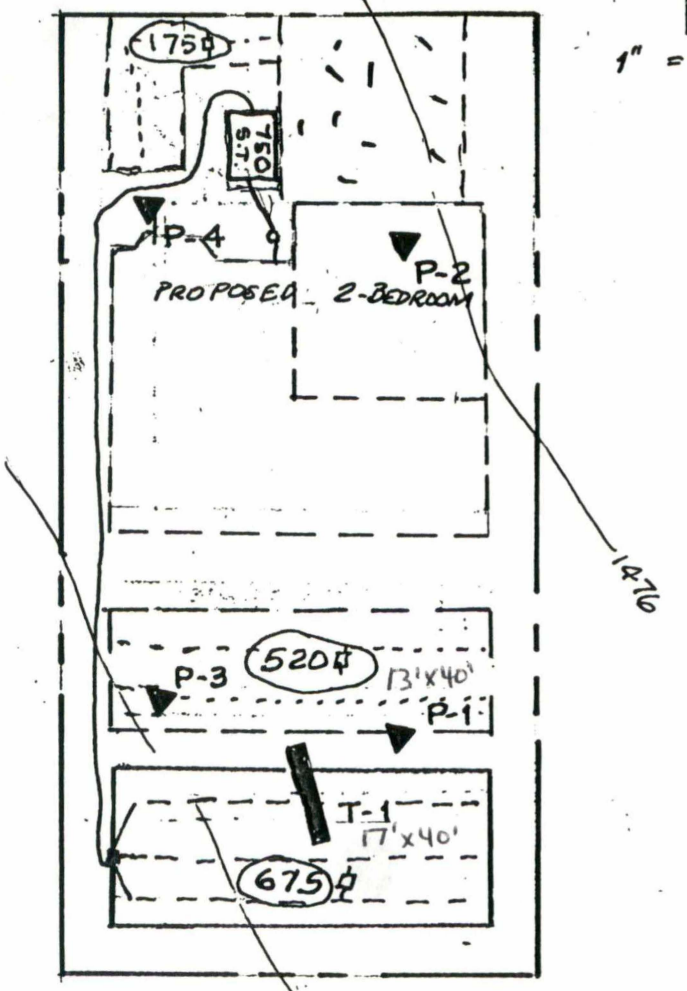
Date: 4/21/04 EHS

REGISTERED CIVIL ENGINEER
LARRY J. FA...
RCE No. 29150
EXPIRATION DATE 3-31-05
STATE of CALIFORNIA

PLATE 1

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health Services Division and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/~~trenches~~ prior to rock placement, and has found that they meet all his recommendations, and the minimum requirements of the UPC/Riverside County Codes.

℄ MT. VERNON AVENUE



1" = 20'

This plot plan indicates that there may not be a suitable area for a swimming pool, patio or other structures due to sewage disposal expansion requirements. Special consideration should be given before construction of any of the above is anticipated.

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST LOCATION

PRIMARY AND 100%

EXPANSION LEACH BEDS

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750 GALLON SEPTIC TANK.
* APPLICATION RATE OF 60 SQUARE FEET IS 450 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 2 FEET OF GRAVEL IS 675 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF SYSTEM UNDER DRIVEWAYS, POOLS, ETC.

350-203-017

COUNTY OF RIVERSIDE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES

Use two(2) feet of gravel beneath the drainpipe

____ Food Establishment	✓ Sewage Disposal
____ Trailer Park	750 Gal. Septic Tank
____ Motel, Apt., Hotel	675 Sq. Ft. of Leach ~~Line~~ bed
✓ Dwelling 2bed (House)	____ x____ Seepage Pit
____ Commercial Building	____ Connection to Sewer
____ Swimming Pool	

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.

✓ Water supply serving this installation must be from an approved source.

✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.

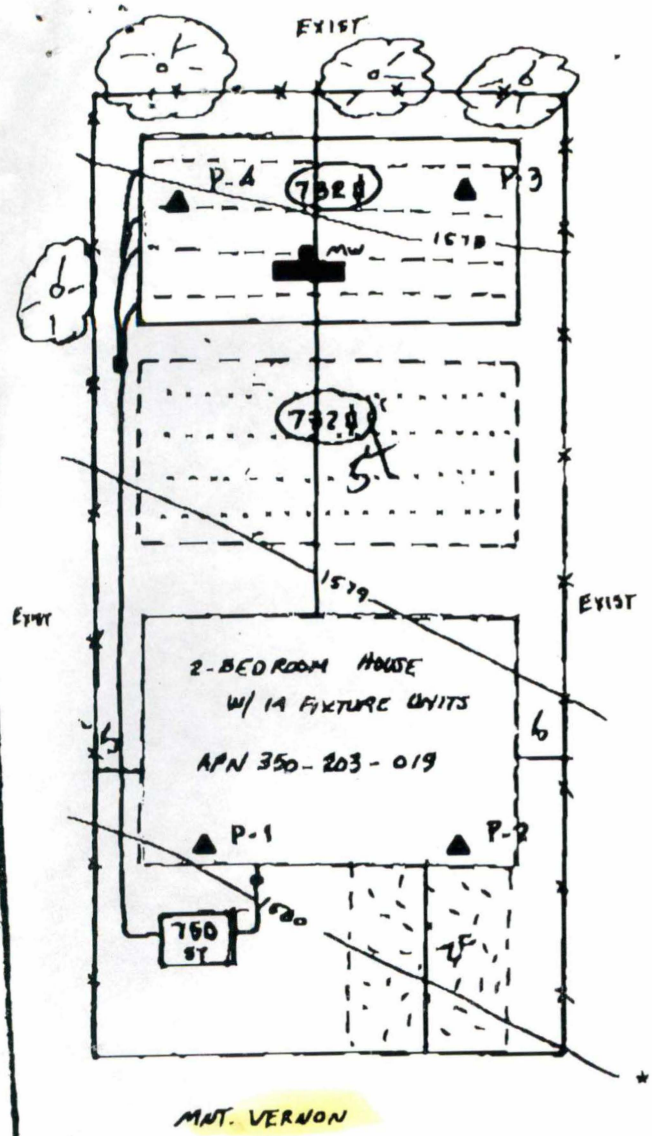
✓ Any cutting grading or filing in excess of two (2) feet will nullify sewage disposal approval.

____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

Date 90050-01a 10-30-91 By [signature] REHS IV

PLATE 1



EXPLANATION

P-4 ▲ PERCOLATION TEST

T-1 EXPLORATORY TRENCH WITH MONITORING WELL

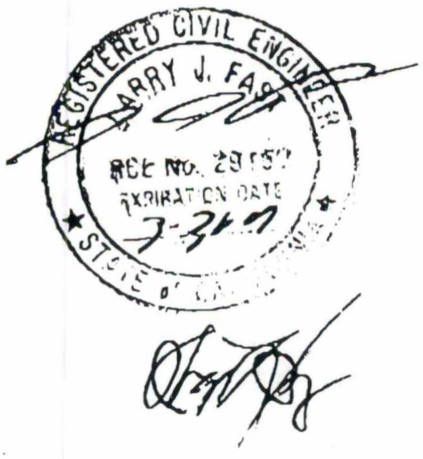
PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTURE UNITS REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 65 SQUARE FEET IS 488 SQUARE FEET OF ABSORPTION AREA
* LEACH BEDS WITH 1.5 FEET OF ROCK IS 732 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.





24594-01 **PLATE 1**

1
2
3
4
5
6

DOROTHY TOLBERT YOUNG
23977 GOETZ RD
QUAIL VALLEY, CA
APN # 350-203-027

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

LAND USE APPROVAL

DATE: 3-28-90

BY: C. Neighbours

___ Food Establishment
___ Meat Market
___ Motel, Apt., Hotel
___ Dwelling 2 bed
___ Commercial Building
___ Swimming Pool

___ Sewage Disposal
___ Gal. Septic Tank
___ Sq. Ft. of Leach Line
___ x ___ Seepage Pit
___ Connection to ~~Sewer~~ EXISTING SYSTEM

___ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
___ Water supply serving this installation must be from an approved source.
___ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

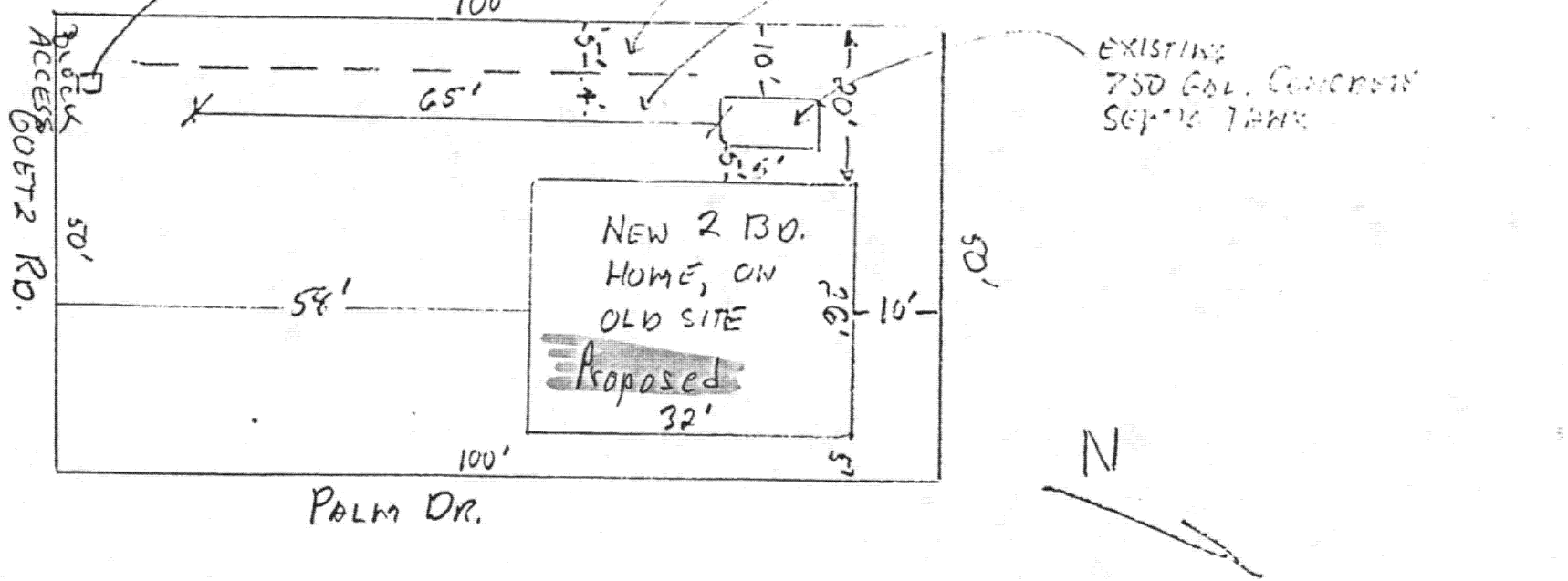
This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

Date 3-30-90 By [signature] REHS III

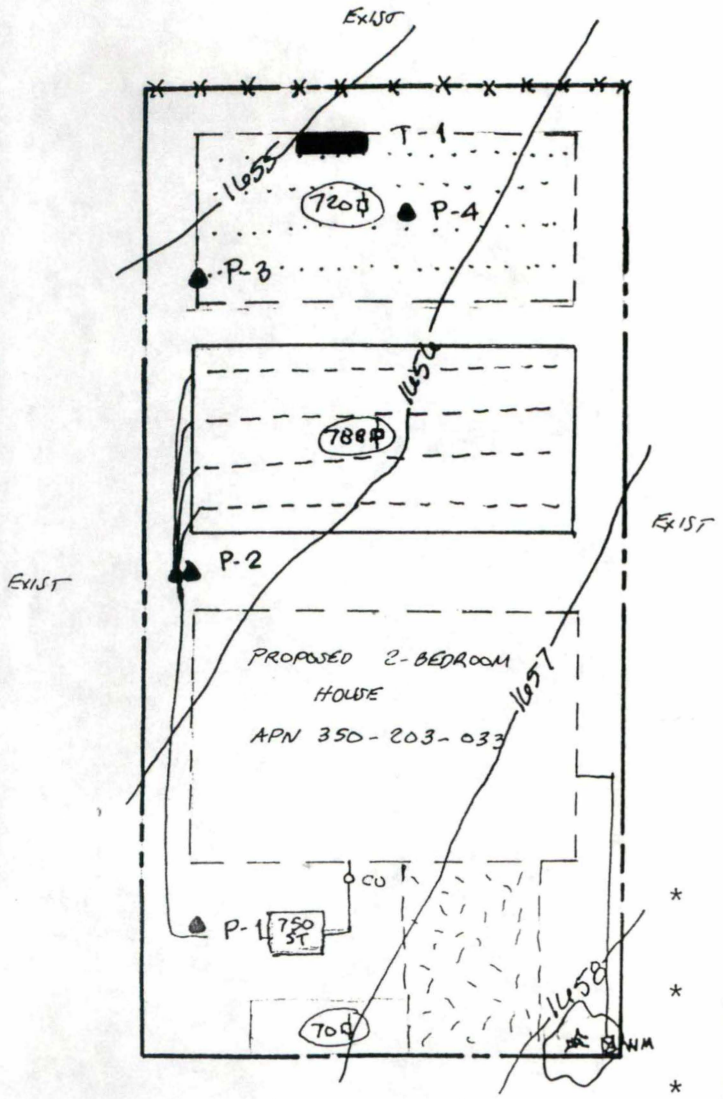
100% EXPANSION LEACH LINE

EXISTING WATER METER BOX

EXISTING GAS LINE TO LEACH LINE



SCALE: 1" = 20'



1" = 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750 = GALLON SEPTIC TANK.
* APPLICATION RATE OF 70 SQUARE FEET IS 525 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 1.5 FEET OF ROCK IS 788 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAY, ETC.

350 203 033

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH

18 Fixt. **Sewage Disposal**

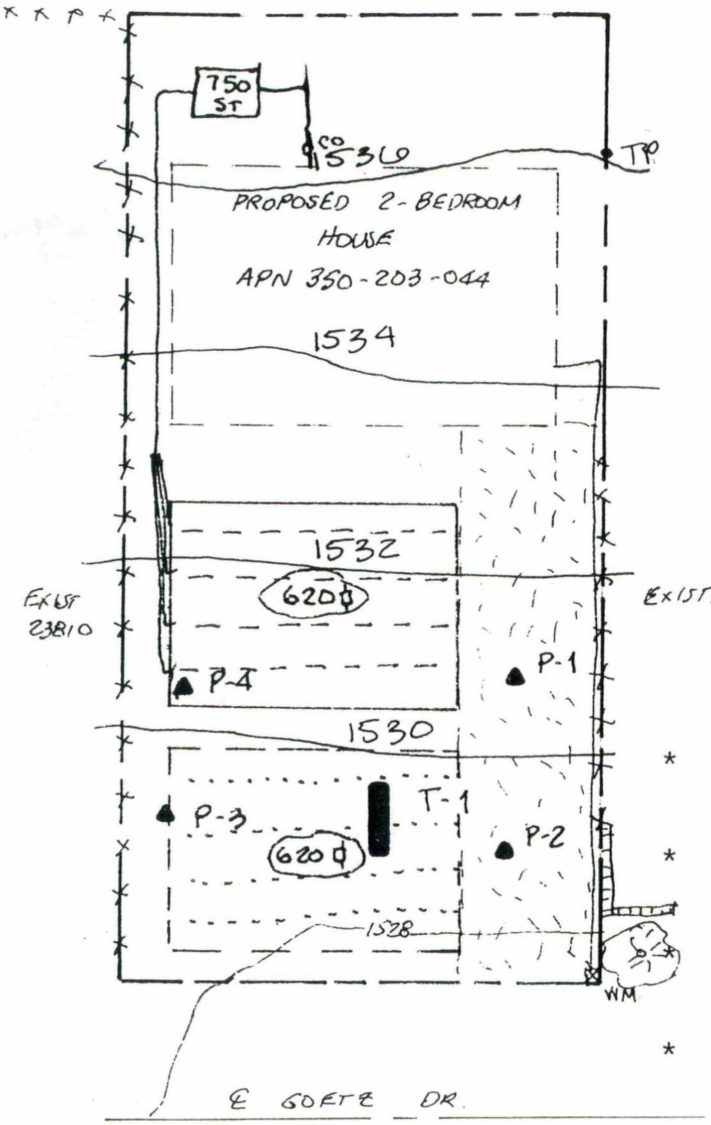
1 **Dwelling** 2bdrm
____ **Commercial**
____ **Seepage Pits**
____ **Connect to Sewer**

1000 **Gal. Septic Tank** 750
____ **Sq. Ft. of Leach Line** Leach
___ **No.** __ **Dia** __ **BI** __ **TD** __ **MD** Bed
___ **Connect to Existing System**

___ **No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.**
___ **All sewage disposal installation shall conform to the current UPC**
___ **Any grading in the area of the proposed leach lines shall require a new approval by this Dept.**

Date 13 Jun 03 **EHS** Marc Hanab

23211-01 **PLATE 1**



N

1" = 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.

* APPLICATION RATE OF 55 SQUARE FEET IS 412 SQUARE FEET OF ABSORPTION AREA.

LEACH BED WITH 1 FOOT OF ROCK IS 620 SQUARE FEET OF BOTTOM AREA.

* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

350-203-044

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ 2 BR MAX Dwelling
___ Commercial
___ Seepage Pits
___ Connect to Sewer

750 Gal. Septic Tank
LEACH BED 620 Sq. Ft. of [redacted]
___ No. ___ Dia ___ [redacted] MIN
___ Connect to Existing System

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE
3-31-07
STATE OF CALIFORNIA

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.

✓ All sewage disposal installation shall conform to the current UPC

✓ Any grading in the area of the proposed leach lines shall require approval of this Dept.

Date: 9/13/03 By: [redacted]

22636-01

PLATE 1

SWR 60 ES.DK

50

31

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

___ Food	X Sewage Disposal Leach bed 7324
___ Trailer Park	1000 Gal. Septic Tank w/ 12" of rock
___ Motel, Apt., Hotel	___ Sq. Ft. of Leach Line
X Dwelling 3 Bedroom	___ No. ___ Dia ___ Bl ___ TD ___ MD Seepage Pit
___ Commercial Building	___ Connection to Sewer
___ Swimming Pool	___ Connect to Existing S.S.D.S.

X No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.

X Water supply serving this installation must be from an approved source

X All sewage disposal installation must conform with requirements of current Uniform Plumbing Code

X Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.

___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 9/10/02 BY M.A. Mendoza

56

EST 100

24

15

7324 Leach bed

MIN 12" rock

7"

1000

10

AH 90

West 100

RIVERSIDE DR

58

350-211-030

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

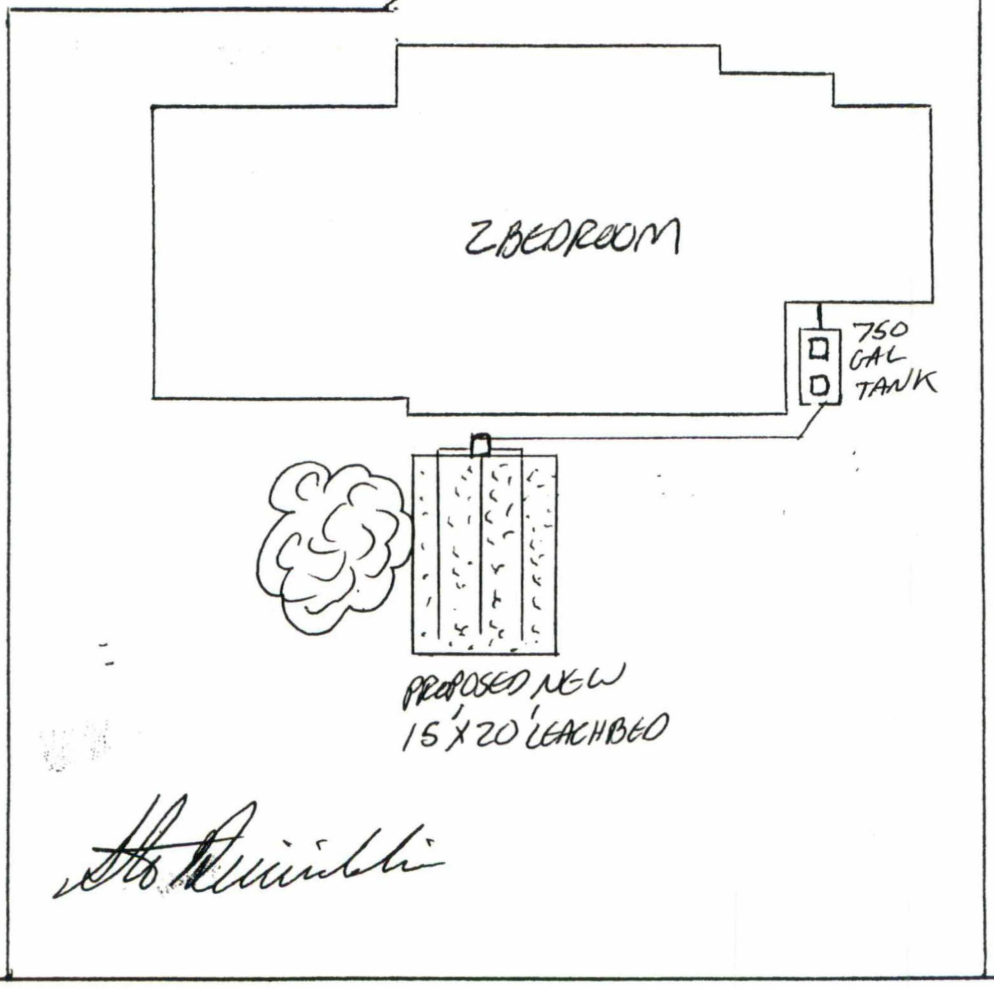
_____ Food
_____ Trailer Park
_____ Motel, Apt., Hotel
OR ✓ Dwelling 2 BED
_____ Commercial Building
_____ Swimming Pool

✓ Sewage Disposal
750 Gal. Septic Tank
300 Sq. Ft. of Leach Line
_____ No. ___ Dia ____ BI ____ TD ____ MD Seepage Pit
_____ Connection to Sewer
_____ Connect to Existing S.S.D.S.

23775 GOETZ
QUAIL VALLEY CA
APN# 350-211-030
SCALE 1"=20'

No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
Water supply serving this installation must be from an approved source.
All sewage disposal installation must conform with the Uniform Plumbing Code.
Any cutting, grading or filling in excess of two(2) feet will void sewage disposal approval.
Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.
This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

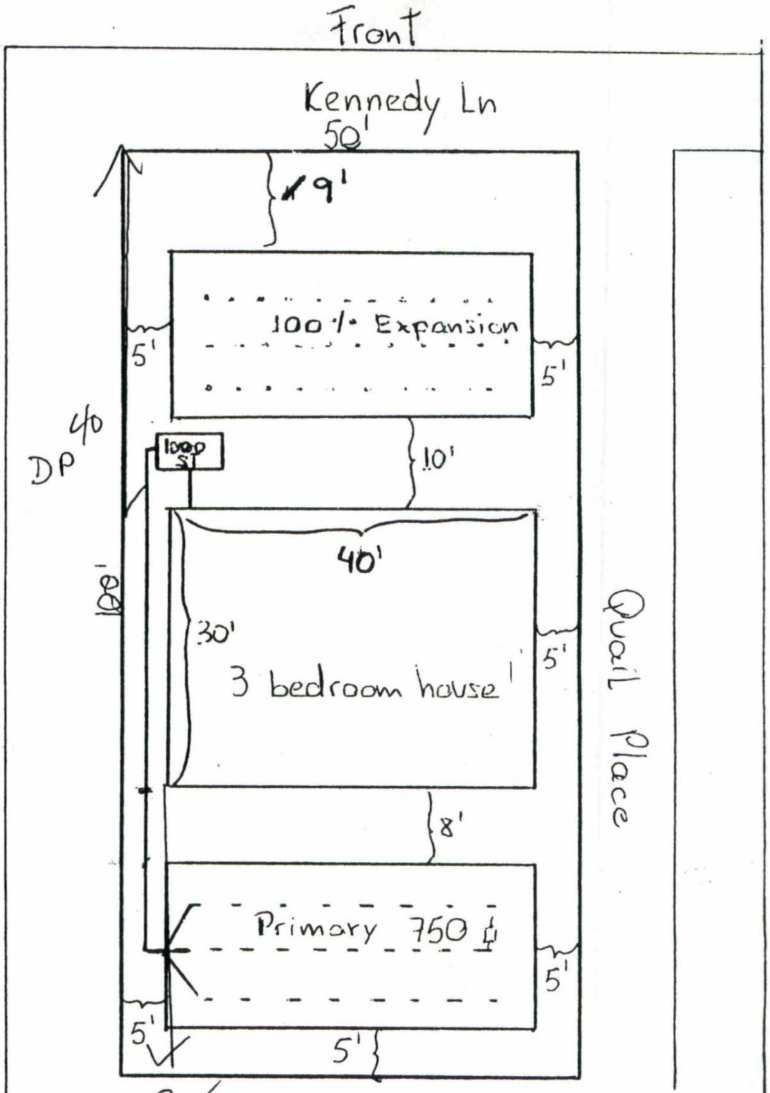
DATE 5/31/00 BY _____



GOETZ OR

Jay Sommer
APN #: 350-212-013
Address: Kennedy Ln
Phone: 909 301 6636

Permit #:



1" = 20'
1000 Gallon Seo. Tank
3 bedroom house

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal Rear

- ✓ Dwelling
- ____ Commercial
- ____ Seepage Pits
- ____ Connect to Sewer

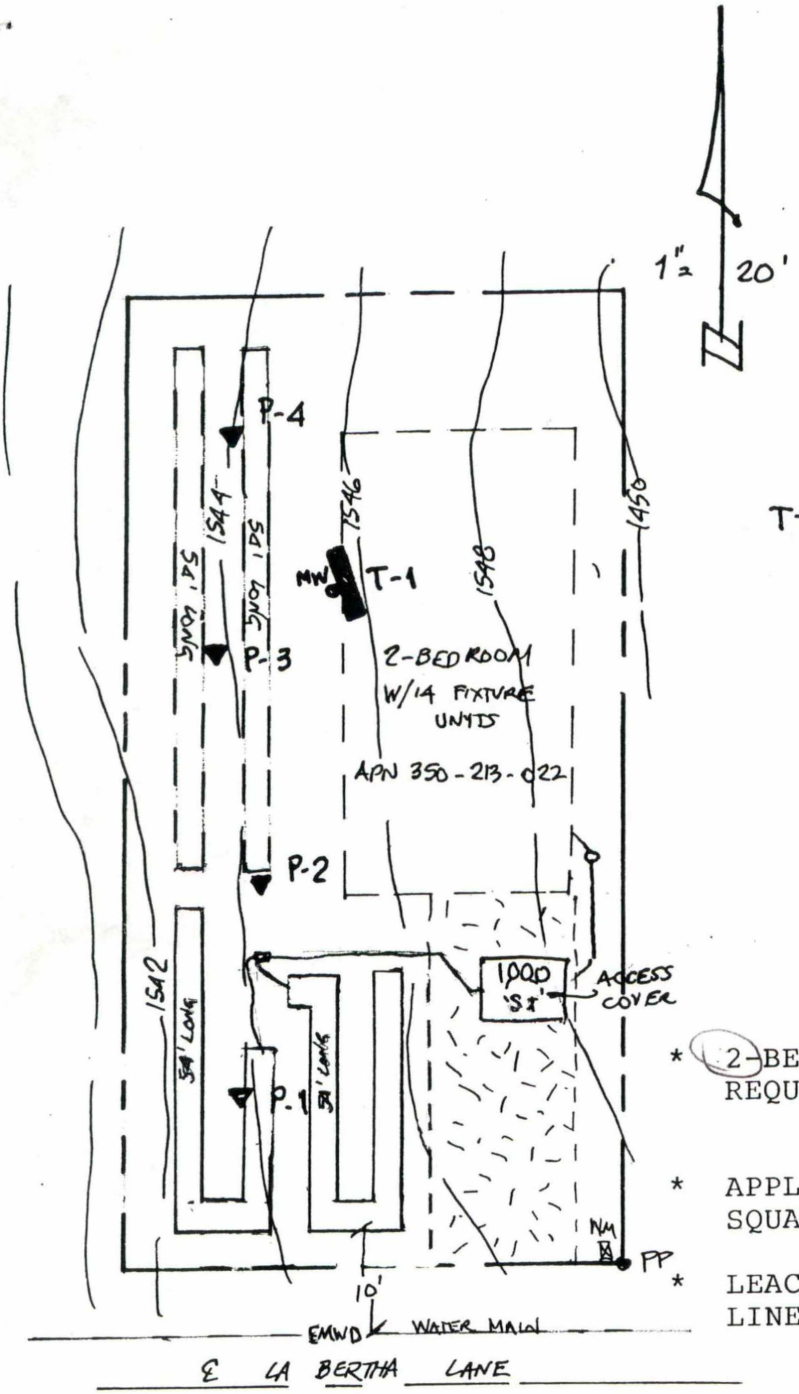
1000 ____ Gal. Septic Tank
750 ____ Sq. Ft. of Leach ~~Line~~ BED
____ No. ____ Dia ____ BI ____ TD ____ MD
____ Connect to Existing System

1½ feet Rock Below Line

____ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
____ All sewage disposal installation shall conform to the current UPC
____ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 8/10/21 EHS _____

PLANS ACCEPTABLE FOR



T-1 MW EXPLORATORY TRENCH WITH MONITORING WELL

PERCOLATION TEST

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

APPL. WAS FOR 750 G. CHANGED TO 1000 GAL PER COUNTY

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Solid Disposal

EXPLANATION

1000 Gal. Septic Tank
Sq. Ft. Of Leach Line
No. Dia__ Bl__ TD__ MD__
Connect To Existing System

Dwelling
Commercial
Sewage Pipe
Connect To Sewer

No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
All sewage disposal installation shall conform to the current UPC
All proposed leach lines shall require a new approval by this Dept.
Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

350-213-022

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTURE UNITS REQUIRES ~~750~~ 1000 GALLON SEPTIC TANK.
* APPLICATION RATE OF 65 SQ. FT. IS 488 SQUARE FEET OF ABSORPTION AREA.
* LEACH LINES WITH 3 FEET OF ROCK IS 98 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.
* 10% INCREASE FOR SLOPE/COVER FACTOR IS 108 LINEAR FEET OF LEACH LINE.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE 3-31-07
STATE of CALIFORNIA

Revised 8/24/05
24815-01 PLATE 1

BAKER - sized septic installed

PERMIT NO. _____

SITE PLAN

NAME DENNIS JAVERT PHONE (909) 674-6565

SITUS ADDRESS 23877 GOETZ DRIVE, QUAIL VALLEY

ASSESSORS PARCEL NO. 350-214-002-1

Provide North Arrow →

APN 350-214-002

REAR PROPERTY LINE

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

SCALE X1 = 20

_____ Food
_____ Trailer Park
_____ Motel, Apt., Hotel
X Dwelling 1 Bedroom
_____ Commercial Building
_____ Swimming Pool

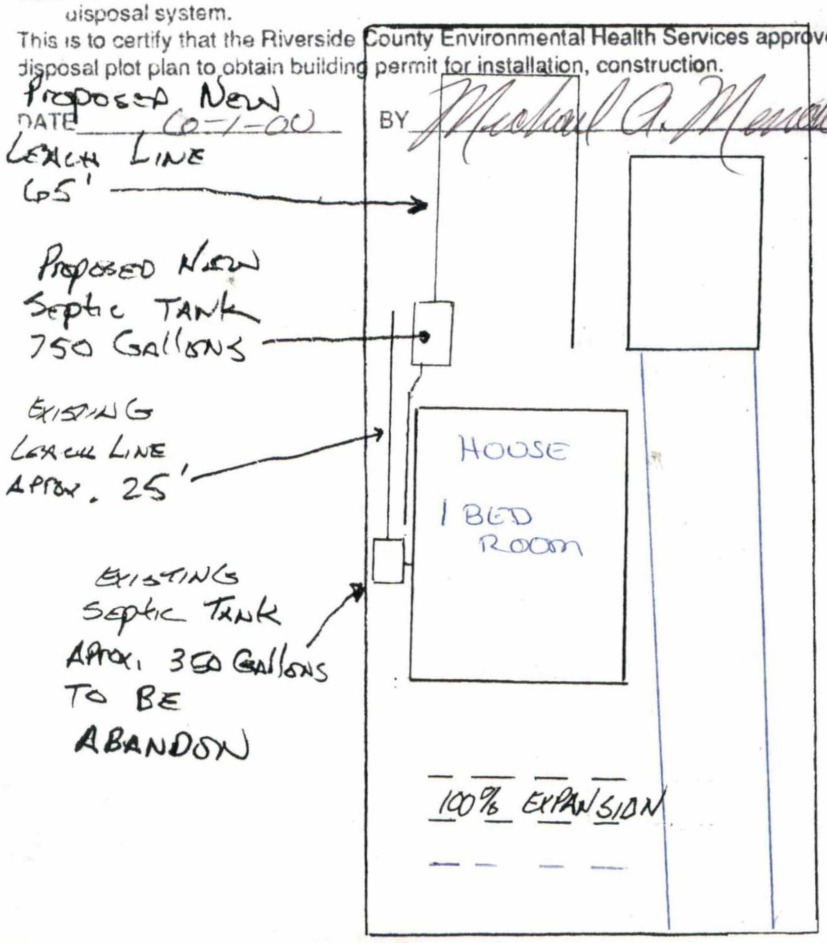
X 1 Sewage Disposal
Replacement 750 Gal. Septic Tank
1165 Sq. Ft. of Leach Line 1 line 55 66' Aggs Chamber
_____ No. ___ Dia _____ Bl _____ TD _____ MD Seepage Pit
_____ Connection to Sewer
_____ Connect to Existing S.S.D.S.

X No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
X Water supply serving this installation must be from an approved source
X All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
X Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
_ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 10-1-00 BY Michael A. Mendoza REHS/MS

SIDE PROPERTY LINE



SIDE PROPERTY LINE

Terri Bloodworth

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

350-214-003

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ ___ Dwelling
___ Commercial
___ Seepage Pits 2BR
___ Connect to Sewer

750 ___ Gal. Septic Tank
182 ___ Sq. Ft. of Leach Line / 24" Rock
___ No.__Dia__BI__TD__MD
___ Connect to Existing System

NO SIDEWALL CALC)

✓ ___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ ___ All sewage disposal installation shall conform to the current UPC
✓ ___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 11/18/20 EHS _____

PERMIT NO. BPL040695

SITE PLAN

NAME Maira Franco PHONE (951) 375-1532
SITE ADDRESS 23889 Goetz Dr Quail Valley
ASSESSORS PARCEL NUMBER 350-214-003

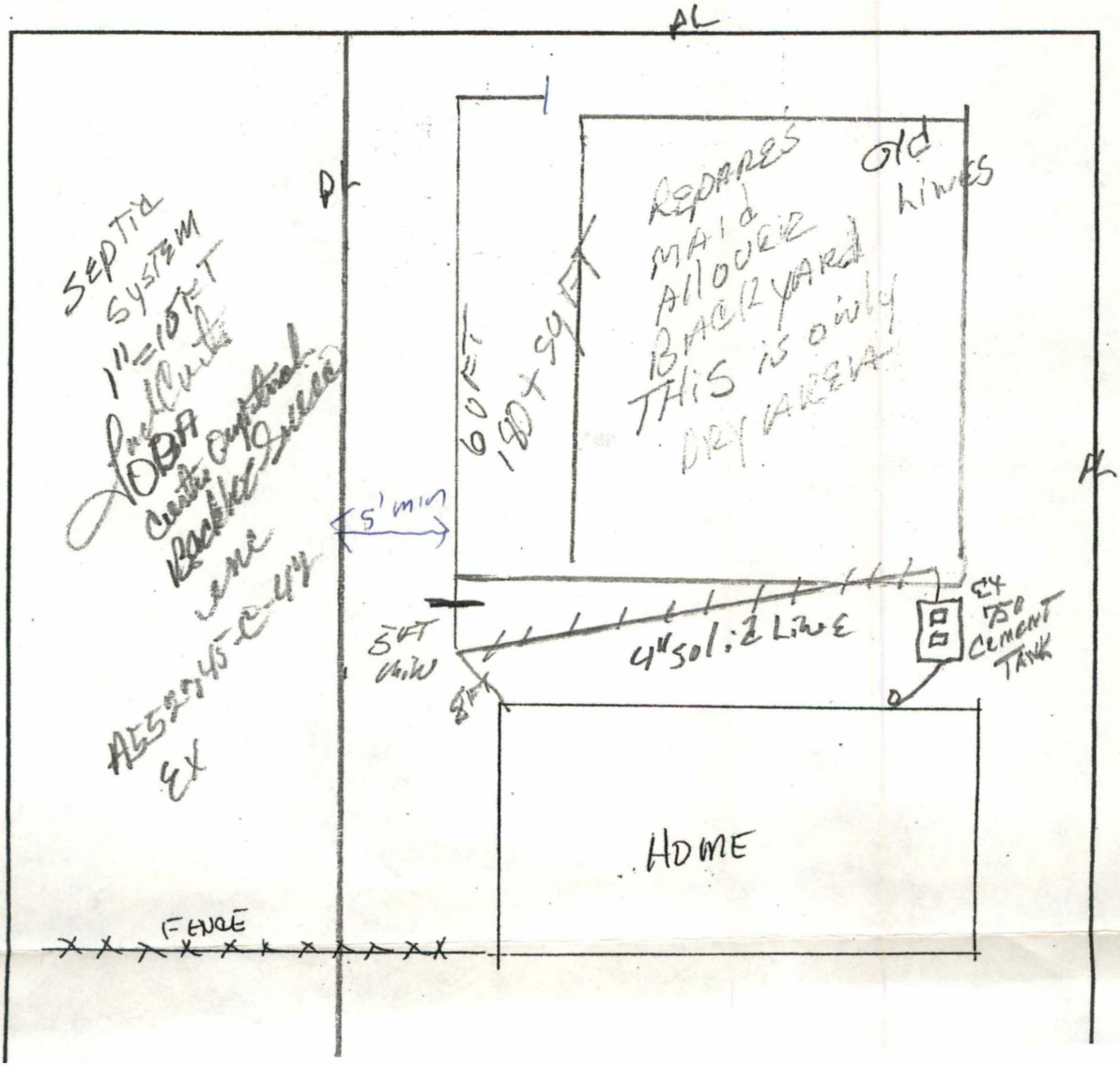
Provide North Arrow

REAR PROPERTY LINE

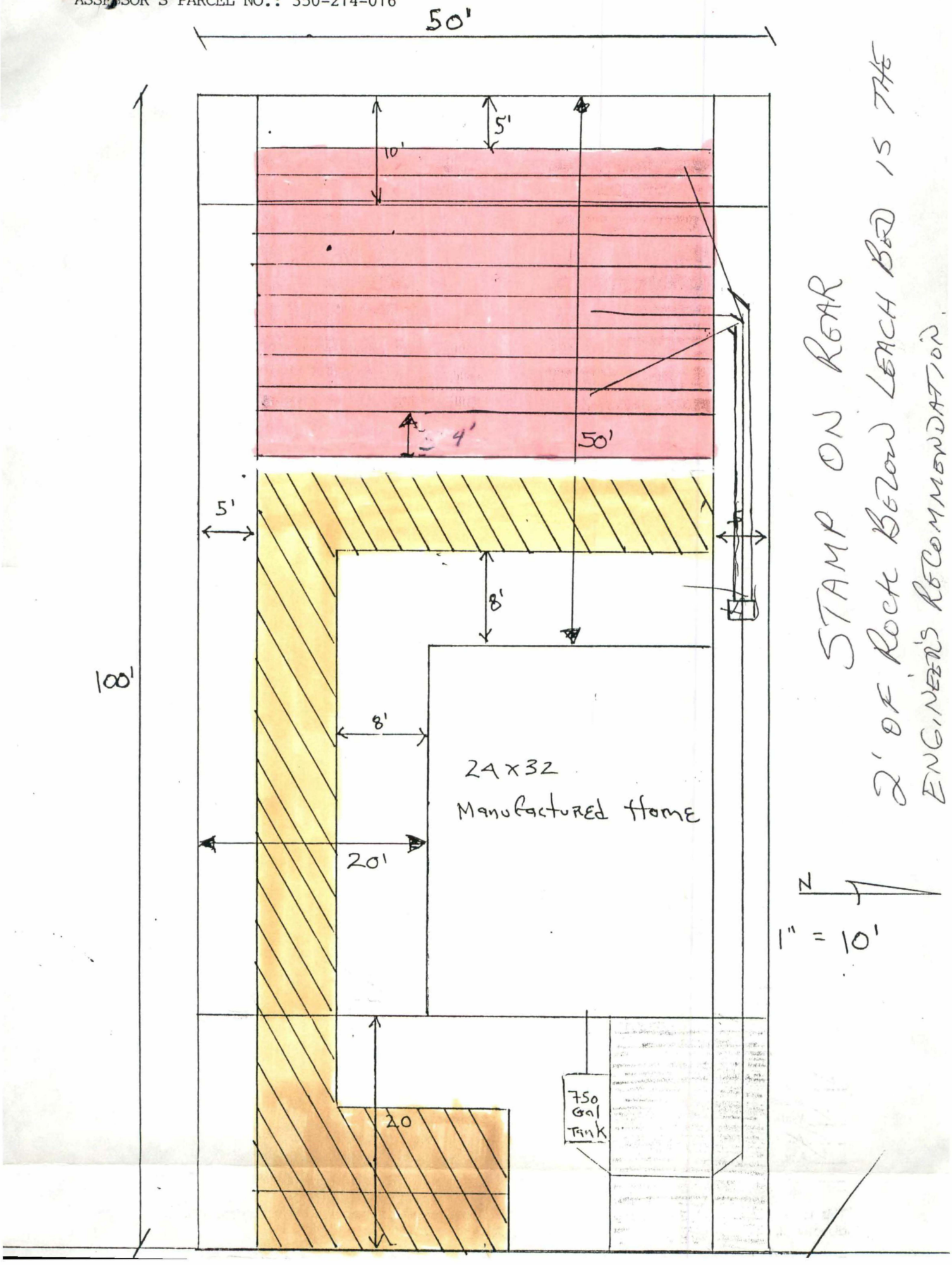
PL

SIDE PROPERTY LINE

SIDE PROPERTY LINE



NAME: Donald Moreau PHONE: (714) 940-4275 SITUS ADDRESS: 28541 Williams Dr.
TRACT/PARCEL MAP: Park Square Addendum LOT: 16 Quail Valley, CA 92380
ASSESSOR'S PARCEL NO.: 350-214-016



APN 350-214-016

RIVERSIDE COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

____ Food Establishment	✓ Sewage Disposal
____ Trailer Park	750 Gal. Septic Tank
____ ~~Motel~~, Apt., Hotel	900 Sq. Ft. of Leach ~~Line~~ Bed
✓ Dwelling 2BDRMM H	____ x____ Seepage Pit
____ Commercial Building	____ Connection to Sewer
____ Swimming Pool	

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.

✓ Water supply serving this installation must be from an approved source.

✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.

✓ Any cutting grading or filling in excess of two (2) feet will nullify sewage disposal approval.

____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

6-14-91

Herrera

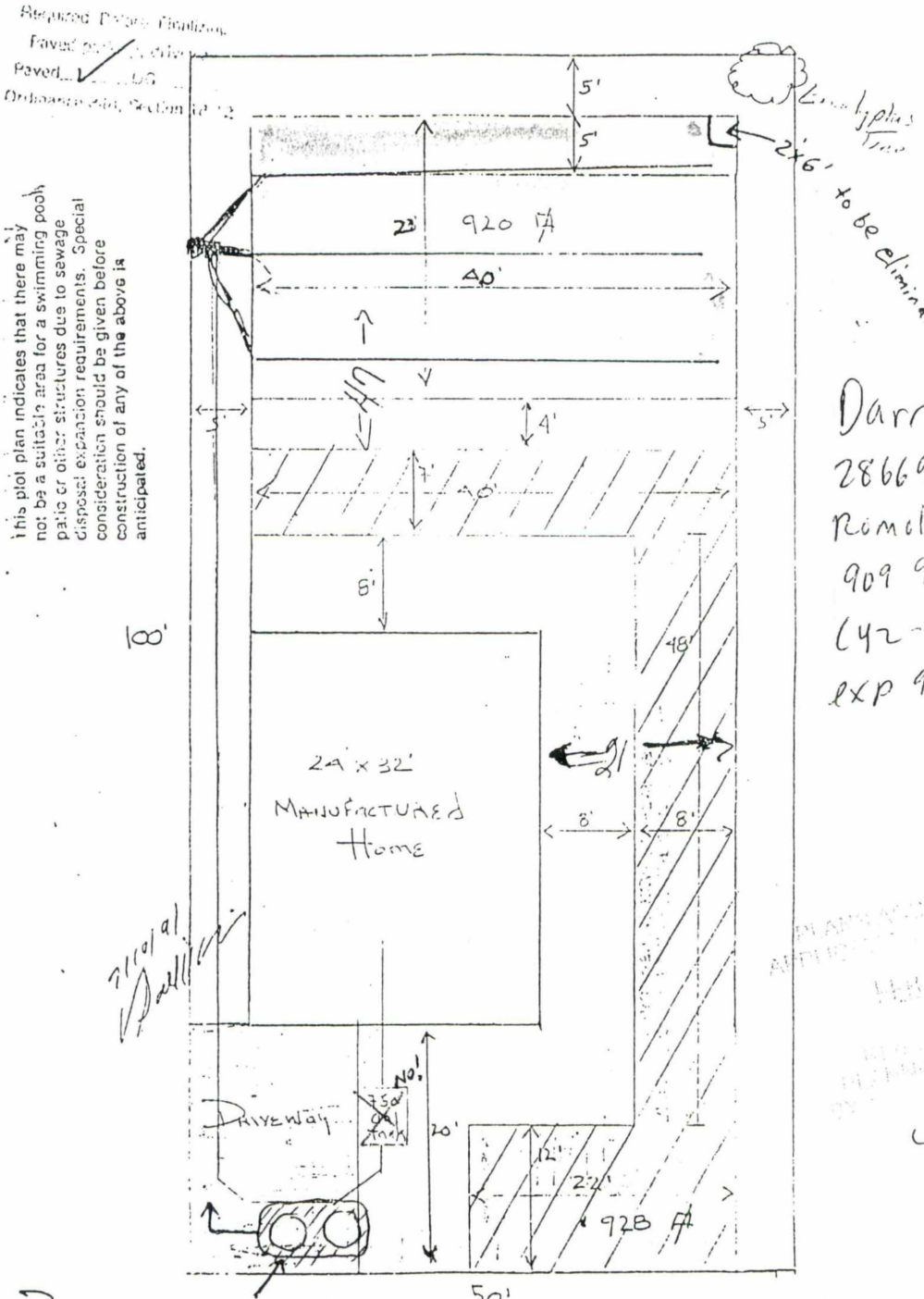
NAME: ~~Donald Moreau~~ PHONE: ~~(714) 940-4275~~

SITUS ADDRESS: 28567 Williams Drive
Quail Valley, CA 92380

TRACT/PARCEL MAP: Park Square Addendum LOT: 17

ASSESSOR'S PARCEL NO.: 350-214-017

Scale = 1" = 10'



Darrells Pumping
28669 Villa It
Romoland 92585
909 928-9029
C42-696 145
exp 9-30-02

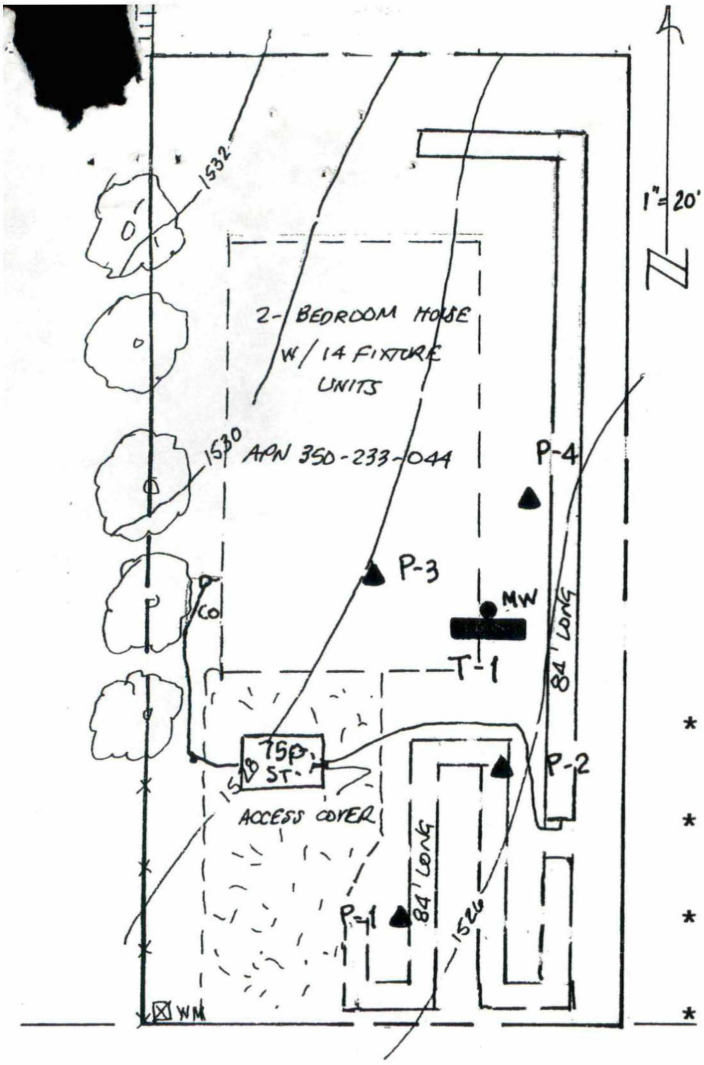
Primary 1,000 gal ~~fiberglass~~ PLASTIC

Secondary

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

_____ Food
_____ Trailer Park
_____ Motel, Apt., Hotel
✓ Dwelling 2 Bdt

✓ Sewage Disposal
1000/900 Gal. Septic Tank
_____ Sq. Ft. of Leach ~~Line~~ Bed
_____ No. ___ Dia ___ BI ___ TD ___ MD Seepage Pit
_____ Connection to Sewer



EXPLANATION

T-1 MW — EXPLORATORY TRENCH WITH MONITORING WELL

P-4 — PERCOLATION TEST

PRIMARY LEACH LINES

100% EXPANSION LEACHLINES

SYSTEM DESIGN

* 2-BEDROOM HOUSE W/14 FIXTURE UNITS REQUIRES 750 GALLON SEPTIC TANK.
* APPLICATION RATE OF 55 SQUARE FEET IS 415 SQUARE FEET OF ABSORPTION AREA.
* LEACH LINES WITH 3 FEET OF ROCK IS 84 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

NOTE: ~~Soils Engineer~~ of Record must inspect and verify in a signed written statement to Riverside County Environmental Health and Building and Safety (copies to be furnished for the record) that he has inspected the ~~Leach Bed~~/leachline trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes

~~LODGE DR.~~

NOTE: DEH staff & RCE of Record MUST be present AT Time of trench Dig FOR Inspection – MUST be RCE and DEH staff Call to schedule 8/hr in Advance

350-233-044

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling 14 F.U TOTAL MAX	750 Gal. Septic Tank 1 Line
___ Commercial	413 Sq. Ft. of Leach Line -83'
___ Seepage Pits 36" Rock	___ No. ___ Dia ___ BI ___ TD ___ MD 36" Rock under PIPE
___ Connect to Sewer	___ Connect to Existing System

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE 3-31-07
STATE of CALIFORNIA

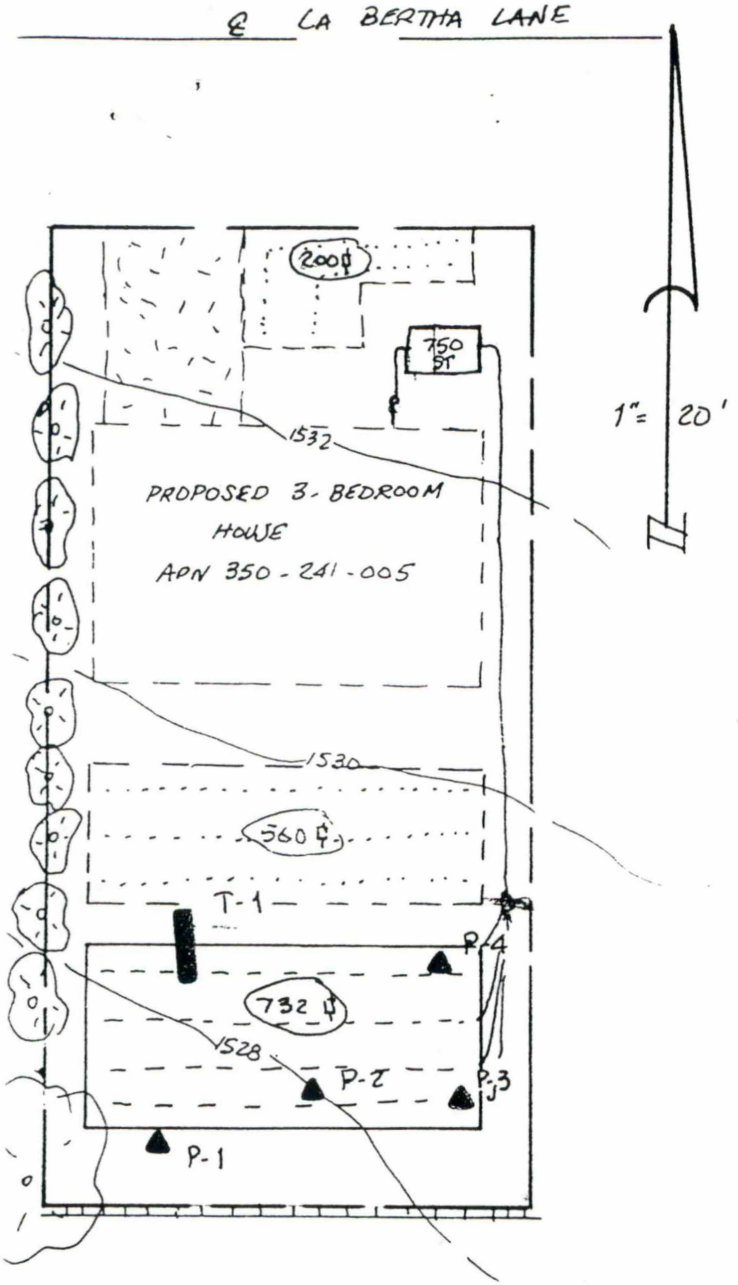
___ No on-site water softening devices shall be discharged into the septic system without clearanc from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept

Date: 4/19/05 EHS _____

Revised 4/13/05

PLATE 1

24701-01



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 65 SQUARE FEET IS 488 SQUARE FEET OF ABSORPTION AREA
* LEACH BED WITH 1.5 FEET OF ROCK AREA I 732 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION AREA UNDER DRIVEWAYS, ETC.

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

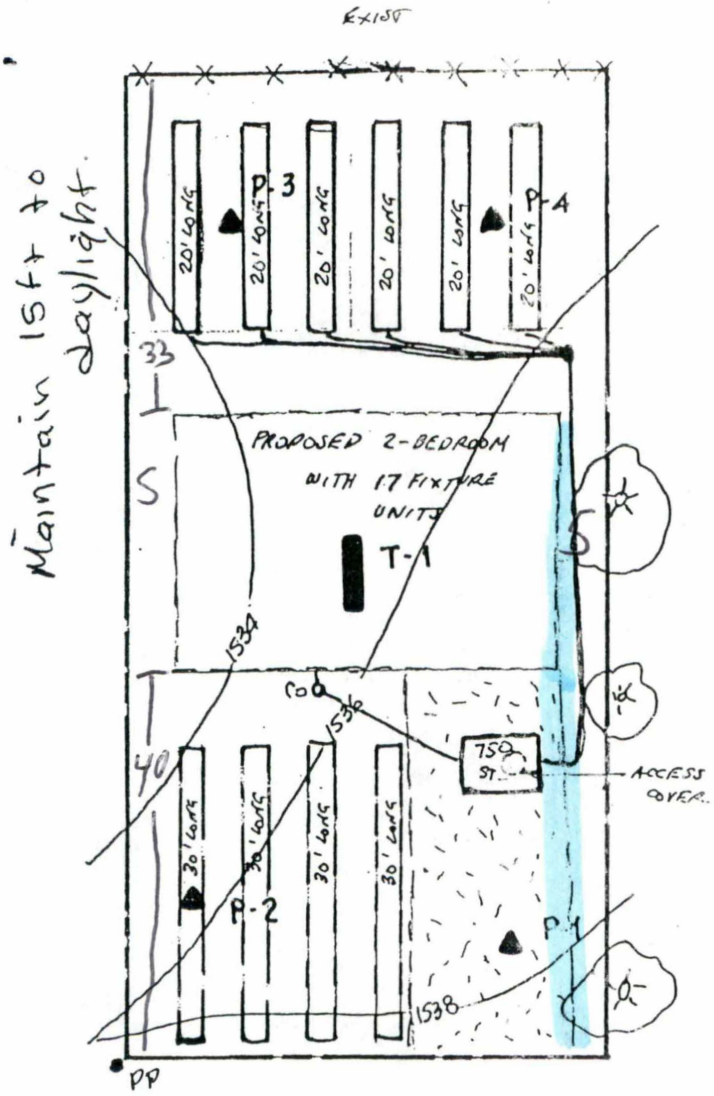
- ✓ Dwelling
- ___ Commercial
- ___ Seepage Pits
- ___ Connect to Sewer

750 Gal. Septic Tank
732 Sq. Ft. of Leach ~~Line~~ BED
___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Existing System

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 10/9/03 EHS _____

23586-01 **PLATE 1**



1" = 20'

EXPLANATION

T-1 ▬ EXPLORATORY TRENCH

P-4 ▲ PERCOLATION TEST

▭ PRIMARY LEACH LINES

▭ 100% EXPANSION LEACH LINES

SYSTEM DESIGN

* 2-BEDROOM HOUSE W/17 FIXTURE UNITS REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 80 SQ. FT. IS 600 SQ. FT. OF ABSORPTION AREA.
* LEACH LINES WITH 3-FEET OF ROCK IS 120 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.
* NO PORTION OF LEACH LINES UNDER DRIVEWAYS, ETC.

℄ CASSANDRA DRIVE

350 241 017

PLANS ACCEPTABLE FOR APPLICATION PURPOSES ONLY

MAY 11 2004

RIVERSIDE COUNTY PLANNING DEPARTMENT

BY BLB

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling 2bdrms	750 Gal. Septic Tank
___ Commercial 17 Fixtures	600 Sq. Ft. of Leach Line
___ Seepage Pits May.	___No.___Dia___BI___TD___MD
___ Connect to Sewer	___Connect to Existing System

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
✓ Any grading in the area of the proposed leach lines shall require a new approval by this Dept

Date: 18NOV03 EHS: Marc Kovar

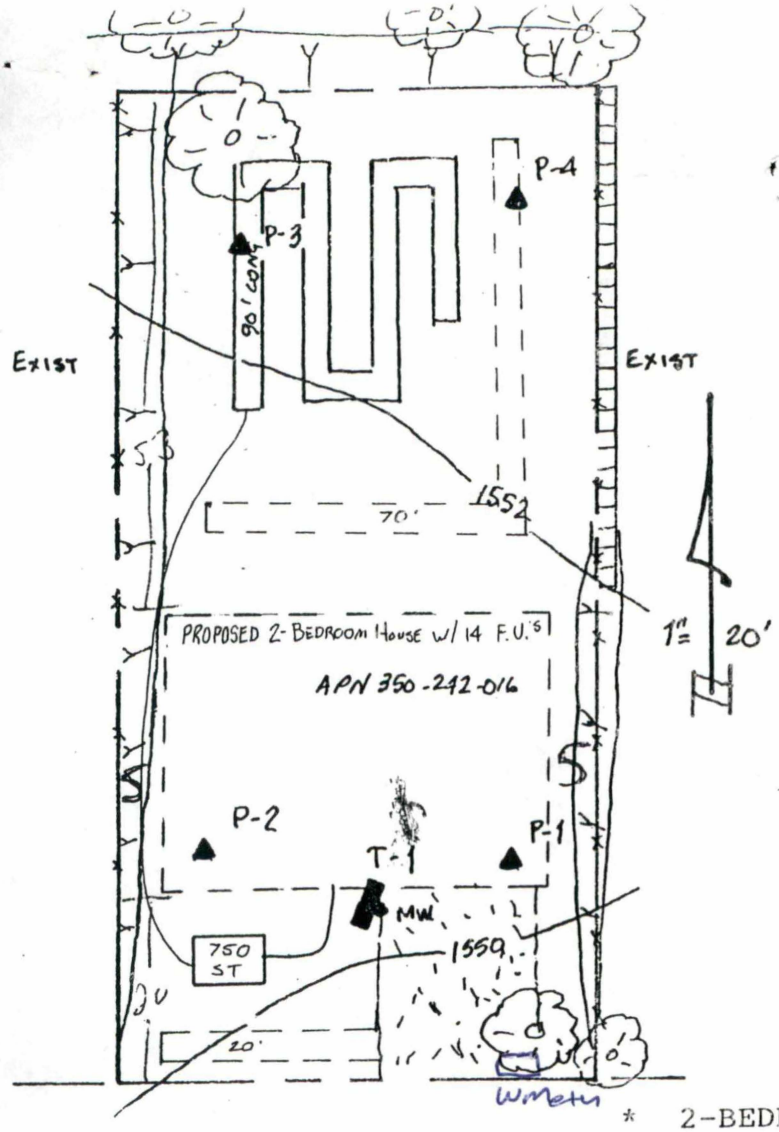
REGISTERED CIVIL ENGINEER LARRY J. FAST RCE No. 29150 EXPIRATION DATE 3-31-05 STATE OF CALIFORNIA

DATE 5/11/04 SIGNATURE

THIS APPROVAL GRANTED BY THE RIVERSIDE COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH IS VALID FOR ONE (1) YEAR FROM DATE OF APPROVAL.

Build must be

23570:01 PLATE 1



EXPLANATION

P-4 ▲ PERCOLATION TEST

T-1 EXPLORATORY TRENCH W/MONITORING WELL

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTURE UNITS REQUIRES 750 GALLON SEPTIC TANK.
* APPLICATION RATE OF 60 SQ. FT. IS 450 SQ. FT. OF ABSORPTION AREA.
* UTILIZING LEACHING LINES WITH 3 FEET OF ROCK IS 90 LINEAR FEET OF 3-FOOT WIDE LEACH LINE.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAY: ETC.

350-242-016

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

PLANS ACCEPTABLE FOR APPLICATION PURPOSES ONLY
NOV 08 2004
RIVERSIDE COUNTY PLANNING DEPARTMENT
BY: CM

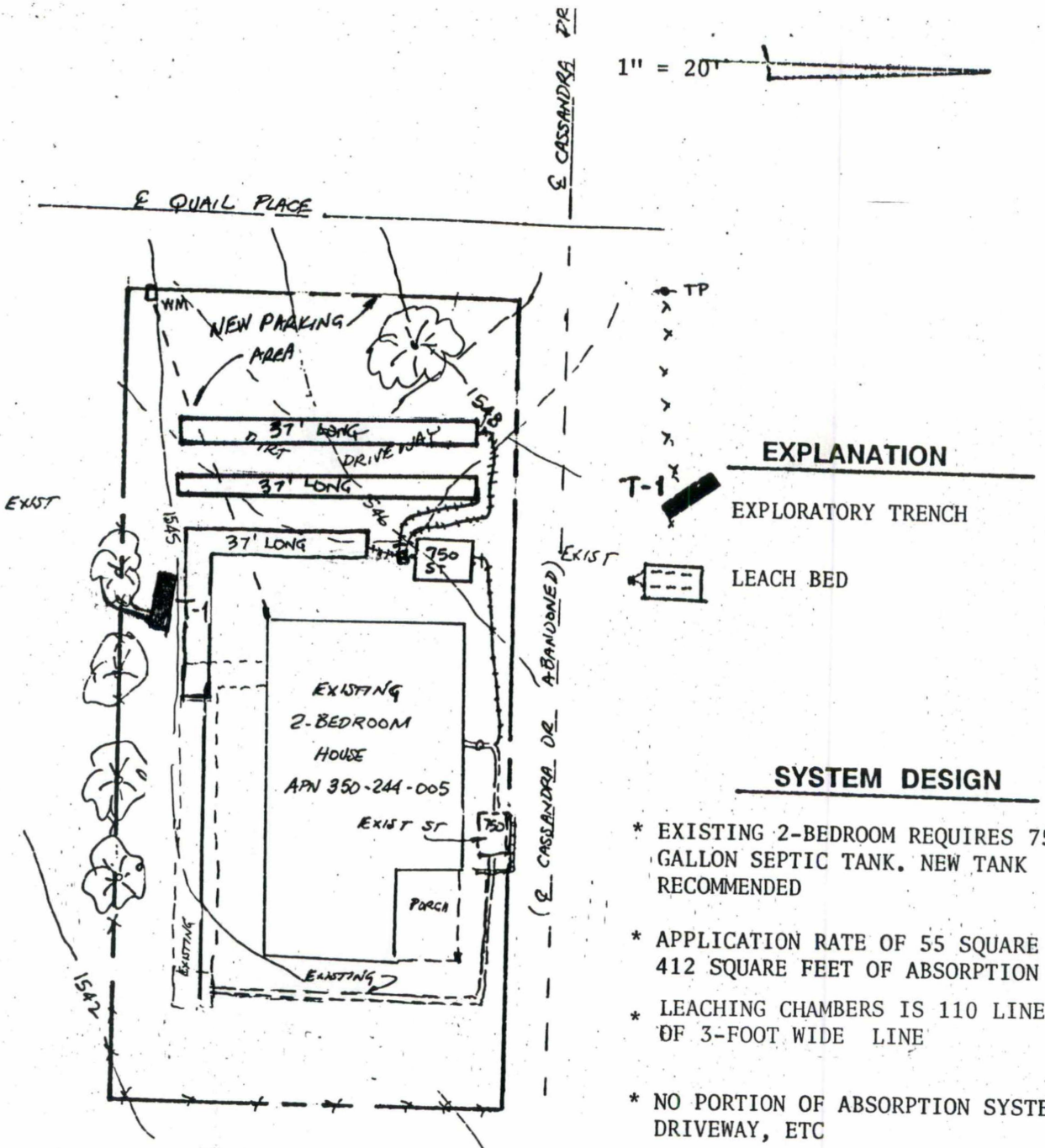
___ Dwelling 14 F.U. MAX	750 Gal. Septic Tank
___ Commercial 36" Rock	___ Sq. Ft. of Leach Line 36" Rock under pipe
___ Seepage Pits	___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer	___ Connect to Existing System

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept
Date: 11/18/04 EHS

MAX cover over leach lines = 3.75'

Revised 9/16/04

PLATE 1 24609-01



SYSTEM DESIGN

* EXISTING 2-BEDROOM REQUIRES 750-GALLON SEPTIC TANK. NEW TANK RECOMMENDED
* APPLICATION RATE OF 55 SQUARE FEET IS 412 SQUARE FEET OF ABSORPTION AREA
* LEACHING CHAMBERS IS 110 LINEAR FEET OF 3-FOOT WIDE LINE
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAY, ETC

APN - 350-244-005

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

____ Food	✓ Sewage Disposal
____ Trailer Park	750 Gal. Septic Tank → USE PLASTIC CHAMBERS
____ Motel, Apt., Hotel	330 Sq. Ft. of Leach Line
✓ Dwelling 2BDM	____ No. ___ Dia ____ BI ____ TD ____ MD Seepage Pit
____ Commercial Building	____ Connection to Sewer
____ Swimming Pool	____ Connect to Existing S.S.D.S.

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 9/10/99 Cleonee Hamilton Revised 9/1/99

99258-01 **PLATE 1**

COUNTY OF [illegible] HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

____Trailer Park	____Gal. Septic Tank
____Motel, Apt., Hotel	____Sq. Ft. of Leach Line
____Dwelling	____No. ____ BR ____ TD ____ MD Seepage Pit
____Commercial Building	____Commercial Sewage
____Swimming Pool	____Septic Tank(s)

No on-site regenerating water softening devices may be discharged into the individual sewage disposal system unless approved by the Water Quality Control Board.

Water supply serving this installation must be from an approved source

All sewage disposal installation must conform with requirements of current Uniform Plumbing Code

Any cutting, grading or filling in excess of [illegible] from any public sewage disposal approved.

Approval has been obtained from the [illegible] Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the [illegible] Health Services Agency has approved the subsurface sewage disposal [illegible]

Date _____

Drawn by: AD
04/30/2018

NORTH
1:20

Owner:
Frank Marron
28640 Williams Drive
Canyon Lake, CA 92587
APN:350-245-003

System:
1000 gallon concrete septic tank
17'x38' leach bed w/3' of rock
100% expansion area

Davis Plumbing & Heating
PO Box 871 Perris, CA 92572
P:951.657.0393 F:951.657.1323
Lic# 365794 Exp. Nov 30, _____
Norman Davis Jr.

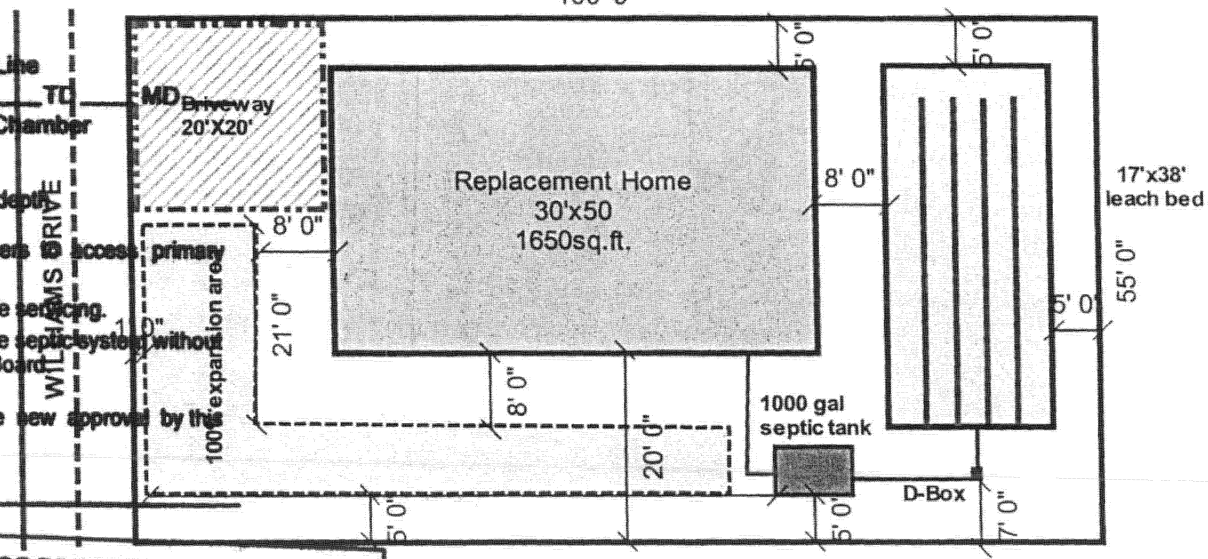
COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
ONSITE WASTEWATER TREATMENT SYSTEM

- ✓ Dwelling
- ___ Commercial
- ___ Seepage Pits
- ___ Connect to Sewer
- ✓ Connect to Existing

- ___ Gal. Septic Tank
- ___ Sq. Ft. of Leach Line
- ___ No. Dia ____ Bl ____ TC
- ___ Concrete Pump Chamber

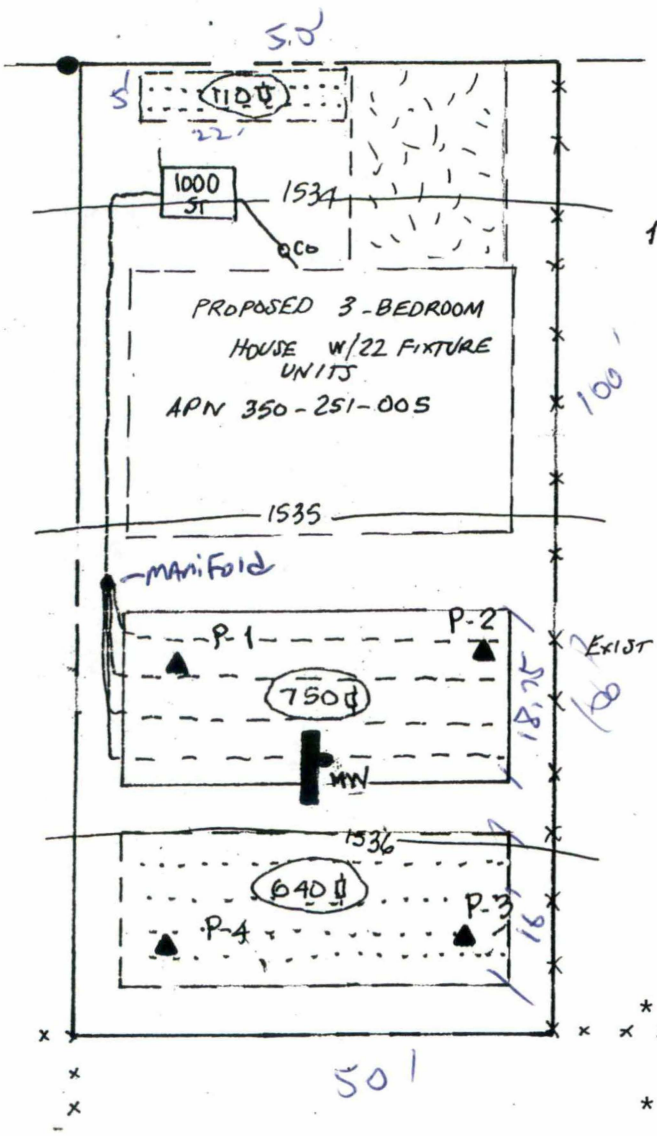
- Installation of leach lines are not to exceed _____ ft. in depth.
- Install risers to grade, leaving lids accessible for cleaning. Note: Larger tanks (2000 gallons or greater) require 2 risers to access each chamber.
- Approved cleanable effluent filters must be installed to facilitate servicing.
- No on-site water softening devices shall be discharged into the septic system without clearance from the California Regional Water Quality Control Board.
- Installation shall conform to the current UPC.
- Any grading in the area of proposed drip lines shall require new approval by this Department.

Date: 5/29/18 EHS: _____



COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH

It is the responsibility of the City of Menifee to verify that project scope is consistent with plans approved by this Department. It is the responsibility of the applicant to obtain any and all required permits for projects within City boundaries.



EXPLANATION

P-4 ▲ PERCOLATION TEST

T-1 MW EXPLORATORY TRENCH WITH MONITORING WELL

PRIMARY LEACH BED

100% EXPANSION LEACH BED

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leachline trenches prior to rock placement and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Code.

SYSTEM DESIGN

* 3-BEDROOM HOUSE WITH 22 FIXTURE UNITS REQUIRES 1000-GALLON SEPTIC TANK.
* APPLICATION RATE OF 50 SQUARE FEET IS 500 SQUAR FEET OF ABSORPTION AREA.
* UTILIZING LEACH BEDS WITH 1.5 FEET OF ROCK IS 750 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS ETC.

350-251-005

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling 21 F.U MAX — 1000 Gal. Septic Tank BED
___ Commercial LEACH — 750 Sq. Ft. of Leach Line
___ Seepage Pits BED — ___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer 750 ft — ___ Connect to Existing System

REGISTERED CIVIL ENGINEER LARRY J. FAB RCE No. 29150 EXPIRATION DATE 3-31-05 STATE of CALIFORNIA

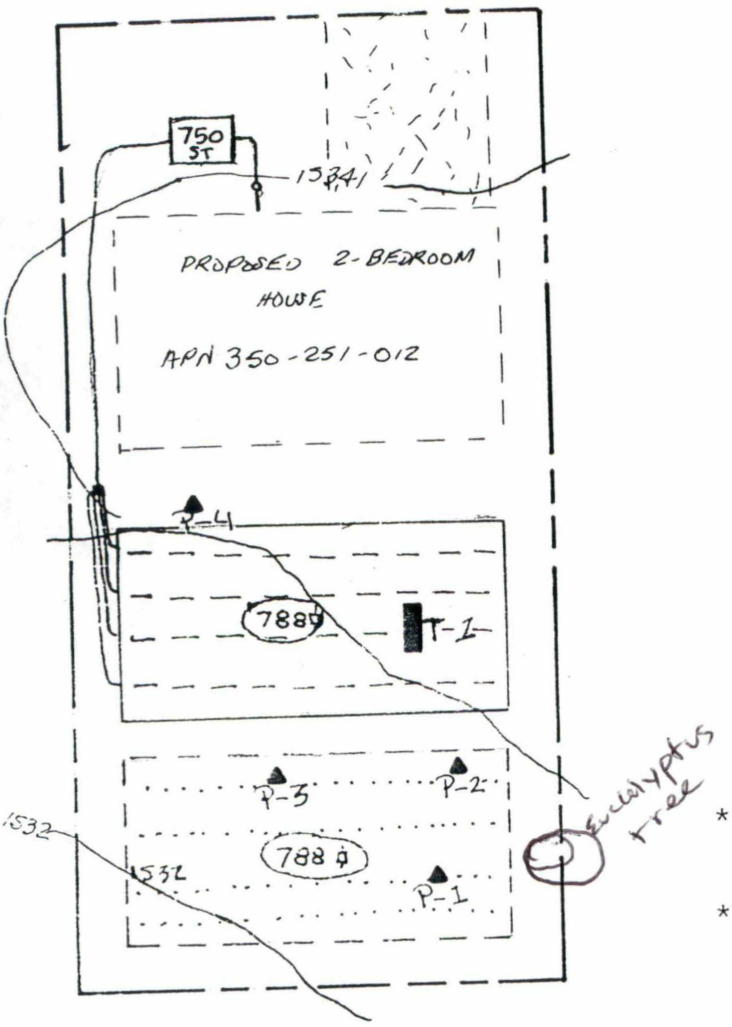
✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
✓ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept

Date: 9/15/04 EHS

1) NO TUB in MASTER BATH.
2) MAINTAIN STREET F/DAN

PLATE 1 24464-01

E LODGE DR.



1"= 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TESTS

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 70 SQUARE FEET IS 525 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 1.5 FEET OF ROCK IS 788 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, HORSE CORRALS, ETC.

350251012

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

_____Food	Sewage Disposal
_____Trailer Park	750 Gal. Septic Tank
_____Motel, Apt., Hotel	788 Sq. Ft. of Leach Line Bed
2 Bd Dwelling	_____No. ___Dia____Bl____TD____MD Seepage Pit
_____Commercial Building	_____Connection to Sewer
_____Swimming Pool	_____Connect to Existing S.S.D.S.

USE 1.5' of ROCK

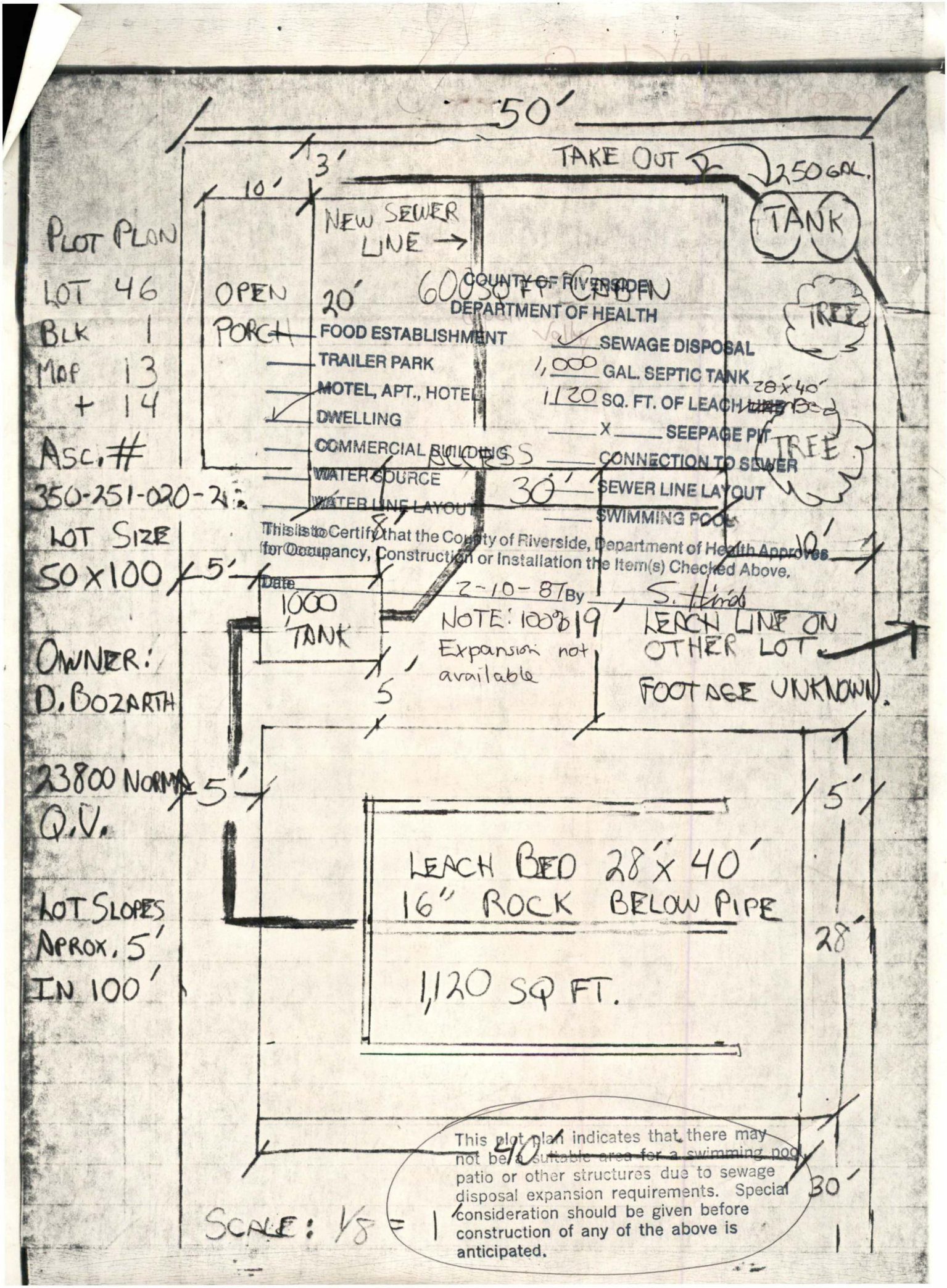
___No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
___Water supply serving this installation must be from an approved source
___All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
___Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

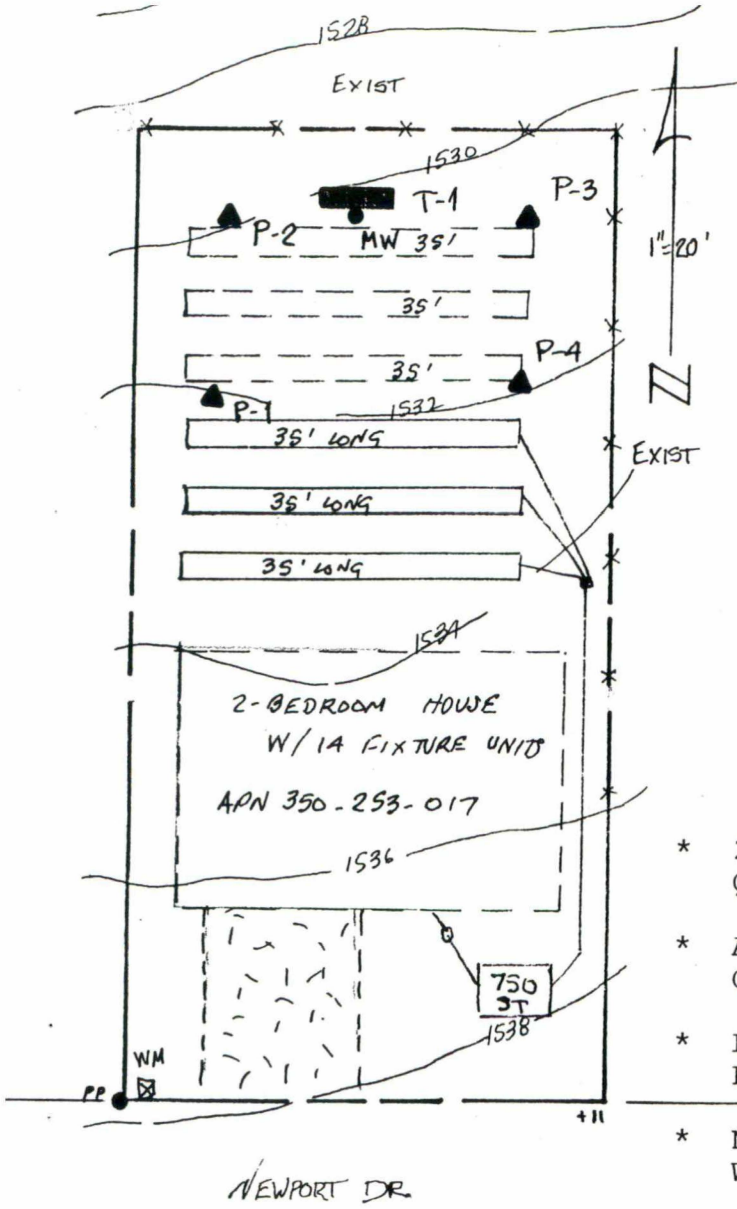
This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

22618-01 **PLATE 1**

DATE 1·31·03 BY Irene Frakes

LEACH BED


50'
TAKE OUT
250 GAL.
TANK
3'
10'
NEW SEWER LINE →
PLOT PLAN
LOT 46
BLK 1
MAP 13 + 14
ASC. #
350-251-020-2
LOT SIZE
50 X 100
OPEN PORCH
20'
60 SQ FT CABIN
COUNTY OF RIVERSIDE
DEPARTMENT OF HEALTH
FOOD ESTABLISHMENT
TRAILER PARK
MOTEL, APT., HOTEL
DWELLING
COMMERCIAL BUILDING
WATER SOURCE
WATER LINE LAYOUT
SEWAGE DISPOSAL
1,000 GAL. SEPTIC TANK
1120 SQ. FT. OF LEACH LINE
X SEEPAGE PIT
CONNECTION TO SEWER
SEWER LINE LAYOUT
SWIMMING POOL
28 x 40'
TREE
TREE
ACCESS
30'
8'
10'
This is to Certify that the County of Riverside, Department of Health Approves for Occupancy, Construction or Installation the Item(s) Checked Above.
Date 2-10-87 By S. Hinds
5'
1000 TANK
NOTE: 1000 & 19 Expansion not available
LEACH LINE ON OTHER LOT
FOOTAGE UNKNOWN.
OWNER:
D. BOZARTH
23800 NORMA
Q.V.
5'
5'
LEACH BED 28' X 40'
16" ROCK BELOW PIPE
1,120 SQ FT.
28'
LOT SLOPES
APROX. 5'
IN 100'
40'
30'
This plot plan indicates that there may not be a suitable area for a swimming pool, patio or other structures due to sewage disposal expansion requirements. Special consideration should be given before construction of any of the above is anticipated.
SCALE: 1/8 = 1'



EXPLANATION

MW
T-1 — EXPLORATORY TRENCH W/MONITORING WELL

P-4 — PERCOLATION TEST LOCATION

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

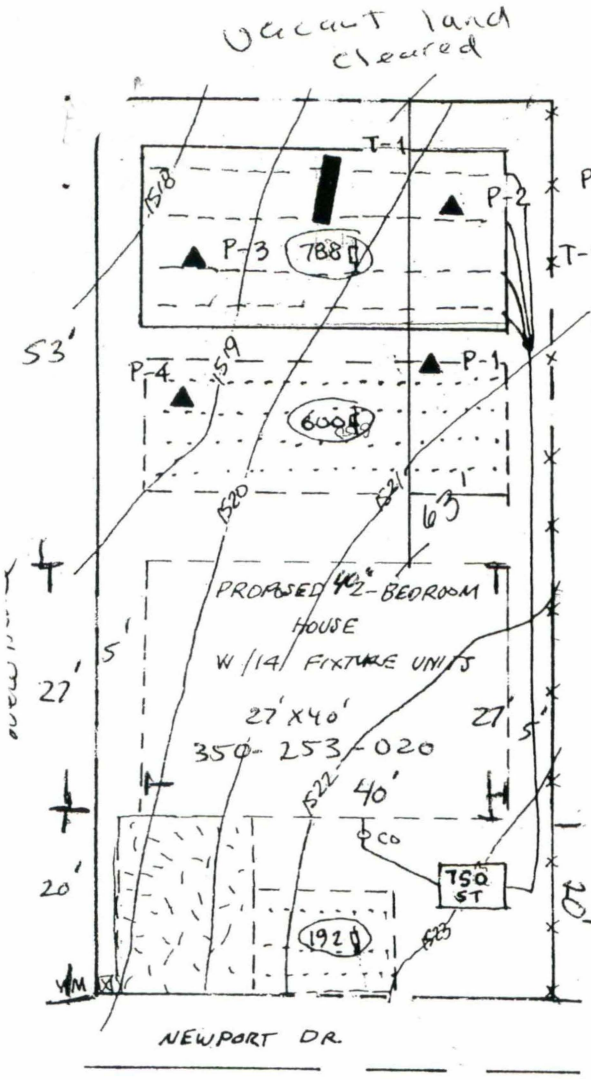
SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTURE UNITS REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 70 SQ. FT. IS 525 SQ. FT. OF ABSORPTION AREA.
* LEACH LINES WITH 3 FEET OF ROCK IS 105 LINEAR FEET OF 3-FOOT WIDE TRENCH.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE
3-31-07
STATE of CALIFORNIA

PLATE 1

24730-01



EXPLANATION

P-4 ▲ PERCOLATION TEST

T-1 ▬ EXPLORATORY TRENCH

PRIMARY LEACH BED

100% EXPANSION LEACH BED

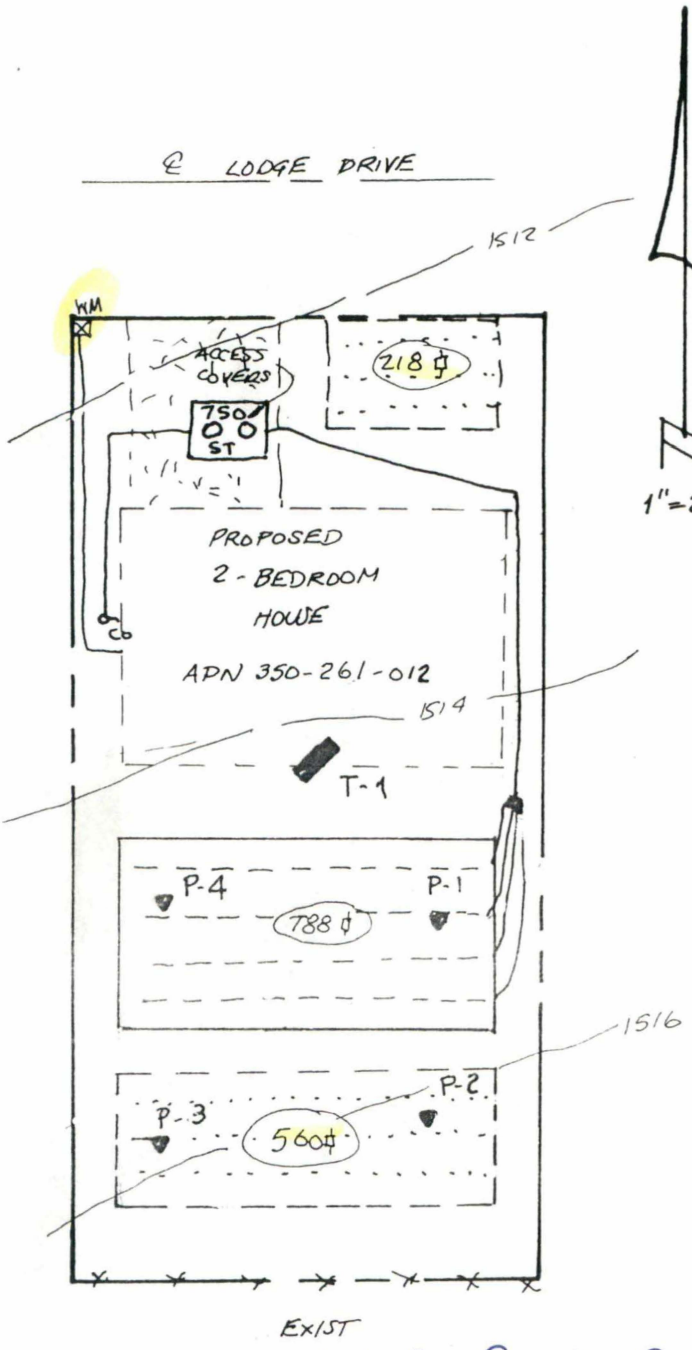
1" = 20'

SYSTEM DESIGN

* 2-BEDROOM HOUSE WITH 14 FIXTURE UNITS REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 70 SQ. FT. IS 525 SQ. FT. OF ABSORPTION AREA.
* UTILIZING LEACH BEDS WITH 1.5 FEET OF ROCK IS 788 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAY, ETC.

PLANS ACCEPTABLE FOR APPLICATION PURPOSES ONLY
APR 28 2004
RIVERSIDE COUNTY PLANNING DEPARTMENT
BY:

24318-01 **PLATE 1**



Traffic Rated Lids Req'd for septic tank.

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 70 SQUARE FEET IS 525 SQUARE FEET OF ABSORPTION AREA
* LEACH BED WITH 1.5 FEET OF ROCK IS 788 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS ETC.

1.5 ft Rock Req'd

350 261 012

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling 2/16
___ Commercial
___ Seepage Pits
___ Connect to Sewer

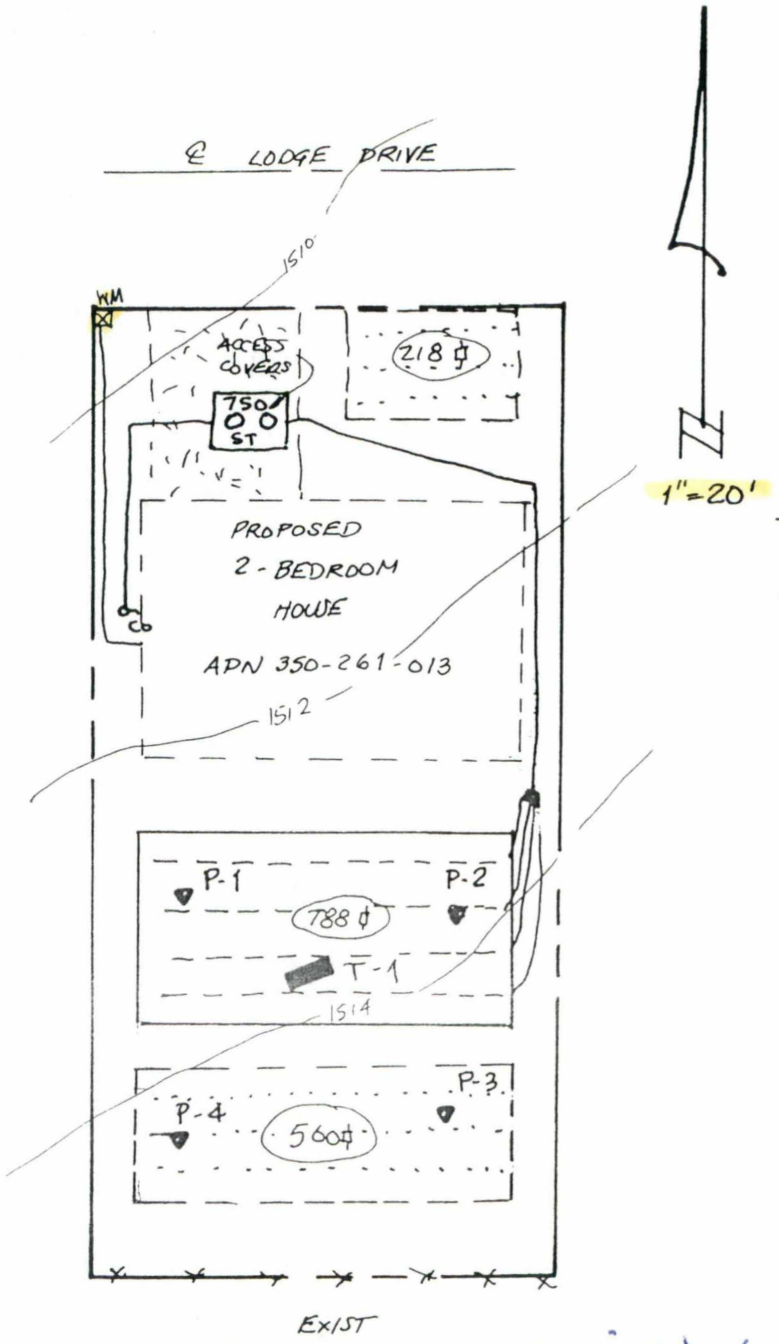
750 Gal. Septic Tank
788 Sq. Ft. of Leach ~~Line~~ Bed
___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Existing System

REGISTERED CIVIL ENGINEER
LARRY J. FAGG
RCE No. 29150
EXPIRATION DATE 3-31-07
STATE of CALIFORNIA

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 14 Jan 02 EHS Mark Hare

PLATE 1



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BE

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 75(GALLON SEPTIC TANK
* APPLICATION RATE OF 70 SQUA FEET IS 525 SQUARE FEET OF ABSORPTION AREA
* LEACH BED WITH 1.5 FEET OF ROCK IS 788 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS ETC.

Traffic Rated Lids required for septic tank.
1.5 ft Rock Req'd

350 261013

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

✓ Dwelling 2/16 — 750 Gal. Septic Tank
___ Commercial — ___ Sq. Ft. of ~~Leach Line~~ Leach Bed
___ Seepage Pits — ___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer — ___ Connect to Existing System

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE
7-31-10
STATE of CALIFORNIA

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept

Date: 14 Jan 04 EHS Mark H

23199-01

PLATE 1

350-261-032

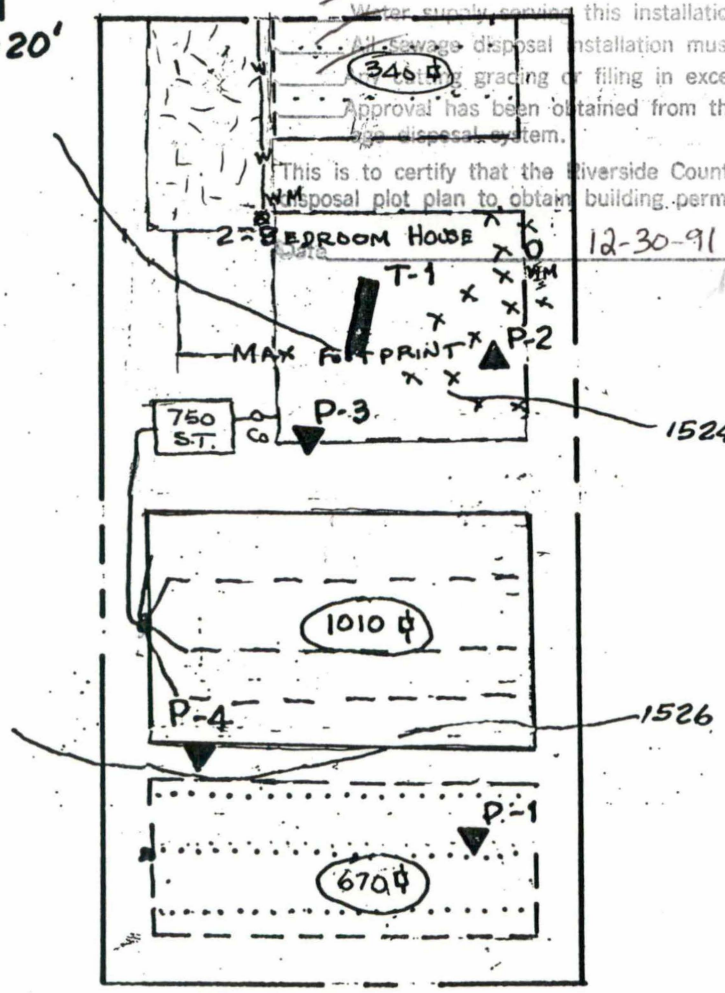
COUNTY OF RIVERSIDE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES

____ Food Establishment
____ Trailer Park
____ Motel, Apt., Hotel
____ Dwelling 2bed (House)
____ Commercial Building
____ Swimming Pool

✓ Sewage Disposal
750 Gal. Septic Tank
1010 Sq. Ft. of Leach ~~Line~~ BED
____ x ____ Seepage Pit
____ Connection to Sewer

℄ NORMA DRIVE

1" = 20'



This plot plan indicates that there may not be a suitable area for a swimming pool, patio or other structures due to sewage disposal expansion requirements. Special consideration should be given before construction of any of the above is anticipated.

- ✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
- ✓ Water supply service this installation must be from an approved source.
- ✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
- ✓ Any cutting, grading or filing in excess of two (2) feet will nullify sewage disposal approval.
- ✓ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation.

Date 12-30-91 T-1 [signature] for [signature] REHS

EXPLANATION

- EXPLORATORY TRENCH
- P-4 PERCOLATION TEST LOCATION
- PRIMARY AND 100%
- EXPANSION LEACH BEDS
- HARD ROCK AREAS

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750 GALLON SEPTIC TANK.
* APPLICATION RATE OF 90 SQUARE FEET IS 675 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED WITH 1.5 FEET OF GRAVEL IS 1010 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF SYSTEM UNDER DRIVEWAYS, PORCHES, ETC.

REVISED 12/25/91

APPROVED AS SHOWN, CONFORMS TO RECOMMENDATIONS OF JULY 24, 1991 REPORT

CERTIFIED ENGINEERING GEOLOGIST WARREN L. SHERLING C.E.G. 1182 STATE OF CALIFORNIA

[signature]

WARREN L. SHERLING C.E.G. 1182

91093-01

PLATE 1

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH

Sewage Disposal

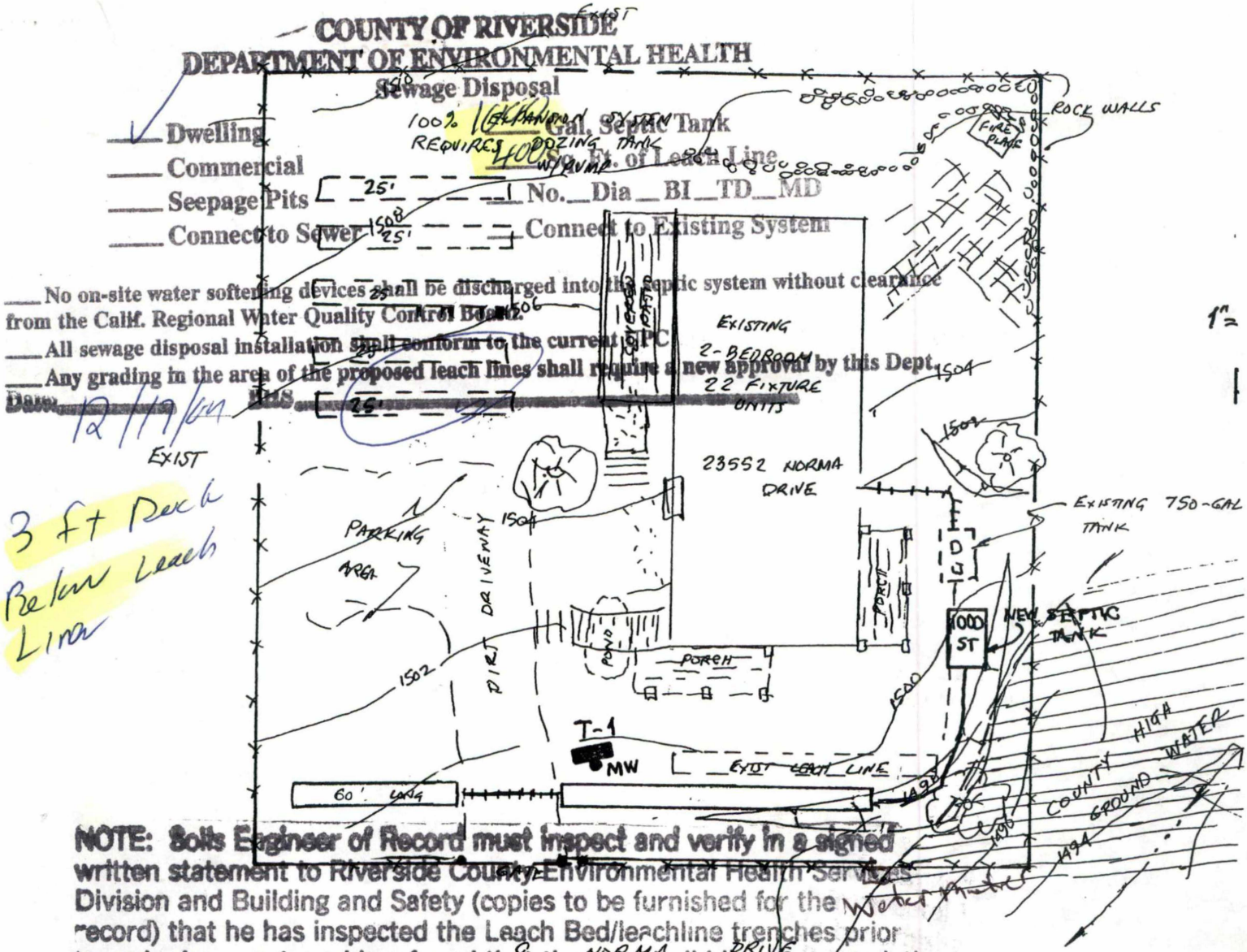
- ✓ Dwelling — 100% EXPANSION SYSTEM REQUIRED — 1000 Gal. Septic Tank
- ___ Commercial — 400 Sq. Ft. of Leach Line
- ___ Seepage Pits — No.__ Dia__ BI__ TD__ MD
- ___ Connect to Sewer — Connect to Existing System

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.

___ All sewage disposal installation shall conform to the current U.P.C.

___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date 12/19/04 Init



3 ft Rock Below Leach Line

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health Services Division and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leachline trenches prior to rock placement, and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes.

EXPLANATION

MW T-1 — EXPLORATORY TRENCH W/ MONITORING WELL

PRIMARY LEACH LINES

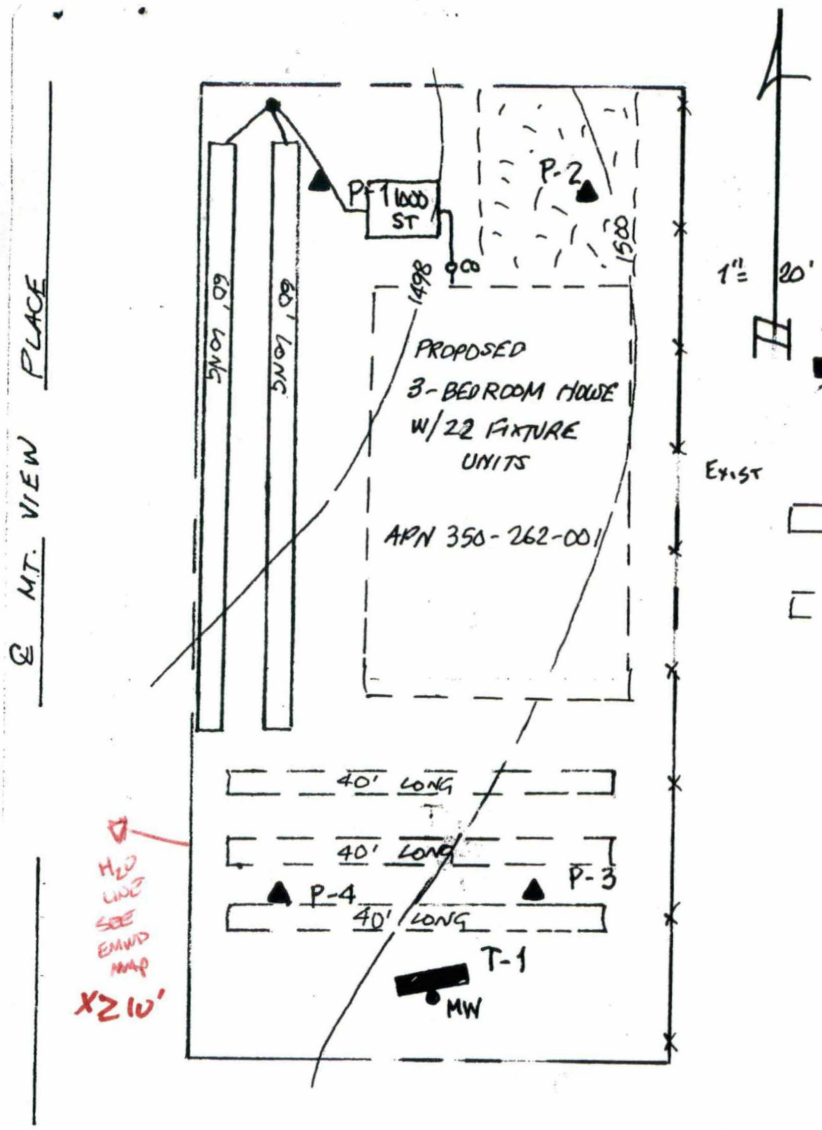
100% EXPANSION LEACH-LINES

SYSTEM DESIGN

* 2-BEDROOM HOUSE W/22 FIXTURE UNIT REQUIRES 1000-GAL. SEPTIC TANK.
* APPLICATION RATE OF 40 SQ. FT. IS 400 SQ. FT. OF ABSORPTION AREA.
* UTILIZING LEACH LINES W/3 FEET OF ROCK IS 60 LINEAR FEET OF 3 FOOT WIDE LEACH LINE.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, PORCHES, ETC.

REGISTERED CIVIL ENGINEER — LARRY J. FAB — RCE No. 29150 — EXPIRATION DATE 3-31-05 — STATE OF CALIFORNIA

PLATE 1 24810-01



EXPLANATION

P-4 PERCOLATION TEST

T-1 MW EXPLORATORY TRENCH W/MONITORING WELL

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health Services Division and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leaching trenches prior to rock placement, and has found that they meet all his recommendations **and the minimum requirements of the UPC/Riverside County Codes.**

SYSTEM DESIGN

* 3-BEDROOM HOUSE W/22 FIXTURE UNITS REQUIRES 1000-GALLON SEPTIC TANK.
* APPLICATION RATE OF 60 SQUARE FEET IS 600 SQ. FT. OF ABSORPTION AREA.
* UTILIZING LEACH LINES WITH 3 FEET OF ROCK IS 120 LINEAR FEET OF 3 FOOT WIDE LEACH LINE.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

350-262-001

COUNTY OF RIVERSIDE

DEPARTMENT OF ENVIRONMENTAL HEALTH

Sewage Disposal

✓ Dwelling	1000 Gal. Septic Tank
___ Commercial	22 F.U. 600 Sq. Ft. of Leach Line 36" Rock
___ Seepage Pits	___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Sewer	___ Connect to Existing System

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE 3-31-09
STATE of CALIFORNIA

✓ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.

✓ All sewage disposal installation shall conform to the current UPC

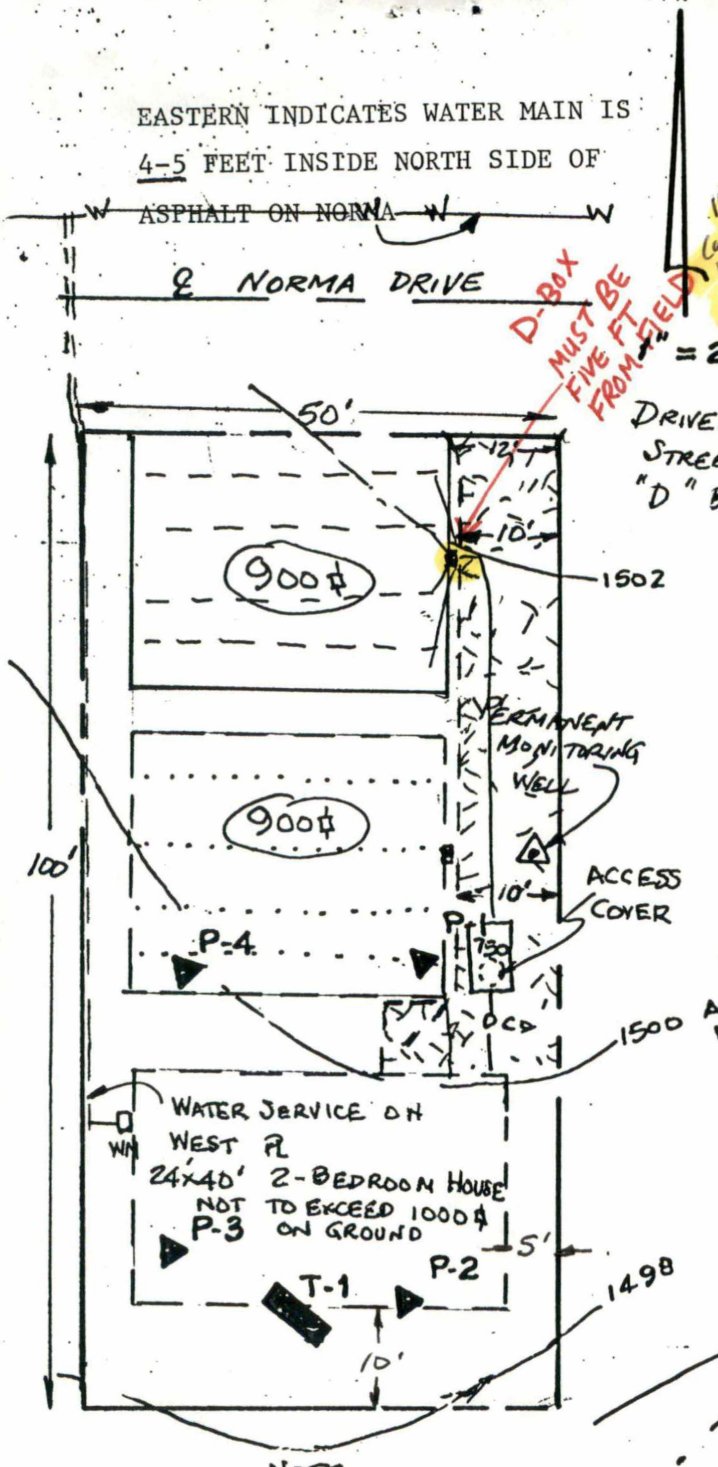
✓ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date 10/15/04 EHS _____

PLATE 1 24610-01

REVISED PLOT PLAN

A.P.N. 350-262-002



EXPLANATION

T-1 — EXPLORATORY TRENCH

P-4 — PERCOLATION TEST LOCATION

PRIMARY AND 100%

EXPANSION LEACH BEDS

A — A' GEOLOGIC CROSS SECTION (see Plate3)

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750 GALLON SEPTIC TANK.

* APPLICATION RATE OF 80 SQUARE FEET IS 600 SQUARE FEET OF ABSORPTION AREA.

* LEACH BED WITH 1½ FEET OF GRAVEL IS 900 SQUARE FEET OF BOTTOM AREA.

* NO PORTION OF SYSTEM UNDER DRIVEWAYS, PATIOS,

* Pools, patios, additional structures etc., shall not be installed due to size of the primary and expansion of leach field systems unless clearance granted by Riverside County Environmental Health Services.

PLOT PLAN APPROVED AS SHOWN

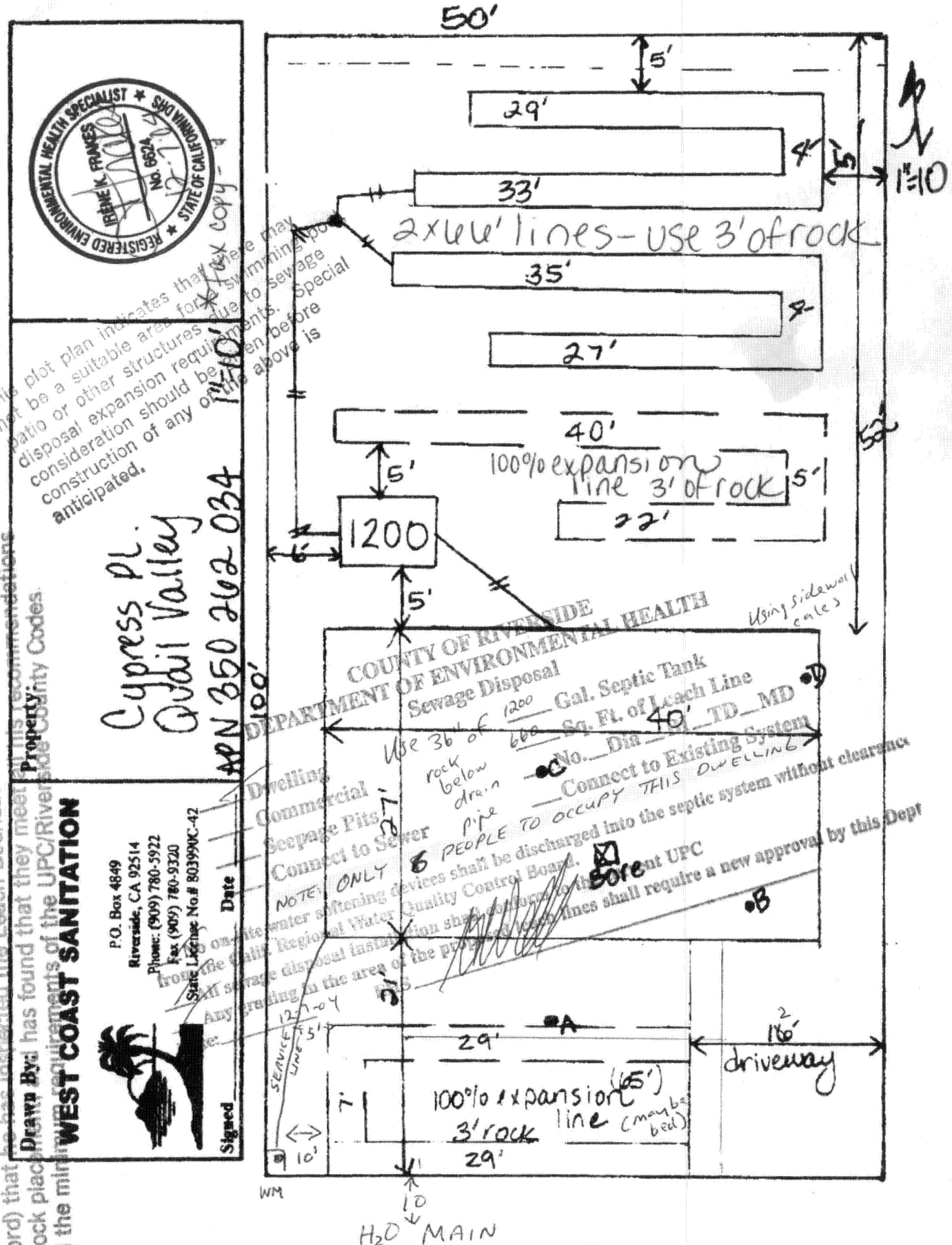
WARREN L. SHERLING, C.E.G. 1182

CERTIFIED ENGINEERING GEOLOGIST * STATE OF CALIFORNIA *

EARTH TECHNICS,
29645 VALLE OLVERA
TEMECULA, CALIFORNIA 92591 (714) 699-5451

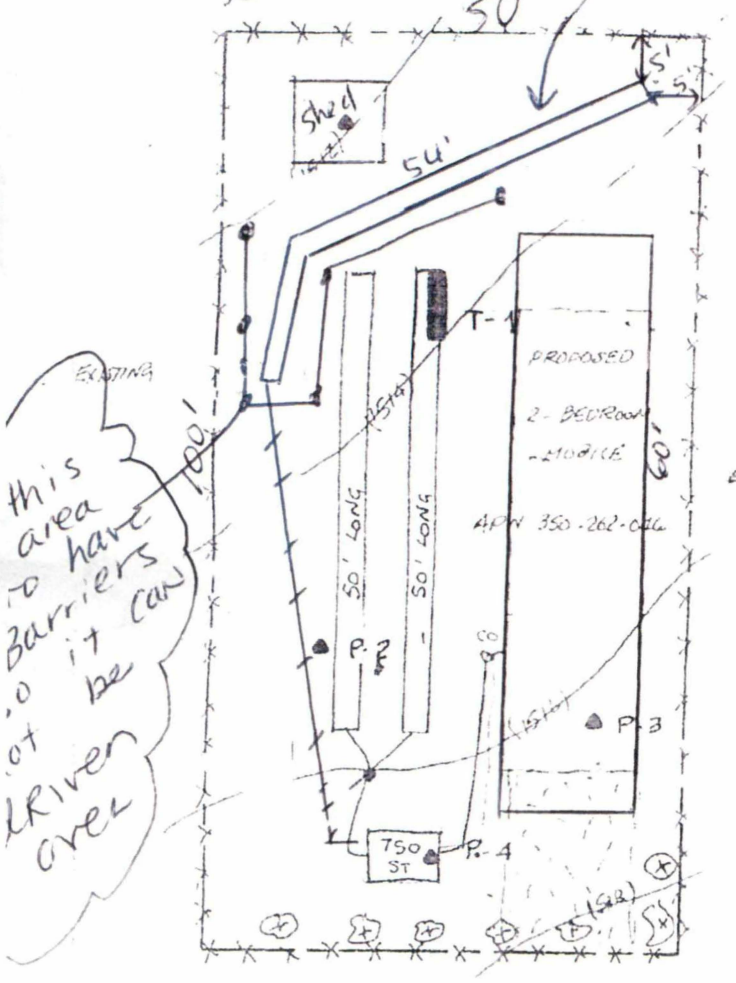
PLATE 1

PROJECT 91080-01



NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health and Building and Safety (copies to be furnished for the (record) that he has inspected the Leach Bed/leachline trenches prior to rock placement and has found that they meet all the recommendations and the minimum requirements of the UPC/Riverside County Codes.

P-42 #458467
Glinda Land



Owner: Renee Perez
Address: 23566 Cypress Pl.

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACHING CHAMBERS

100% EXPANSION LEACHING CHAMBERS

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 50 SQUARE FEET OF ABSORPTION AREA.
* LEACHING CHAMBERS IS 100 LINEAR FEET OF 3-FOOT WIDE CHAMBERS.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

APN #

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
ONSITE WASTEWATER TREATMENT SYSTEM (OWTS)

APN: 350-262-046

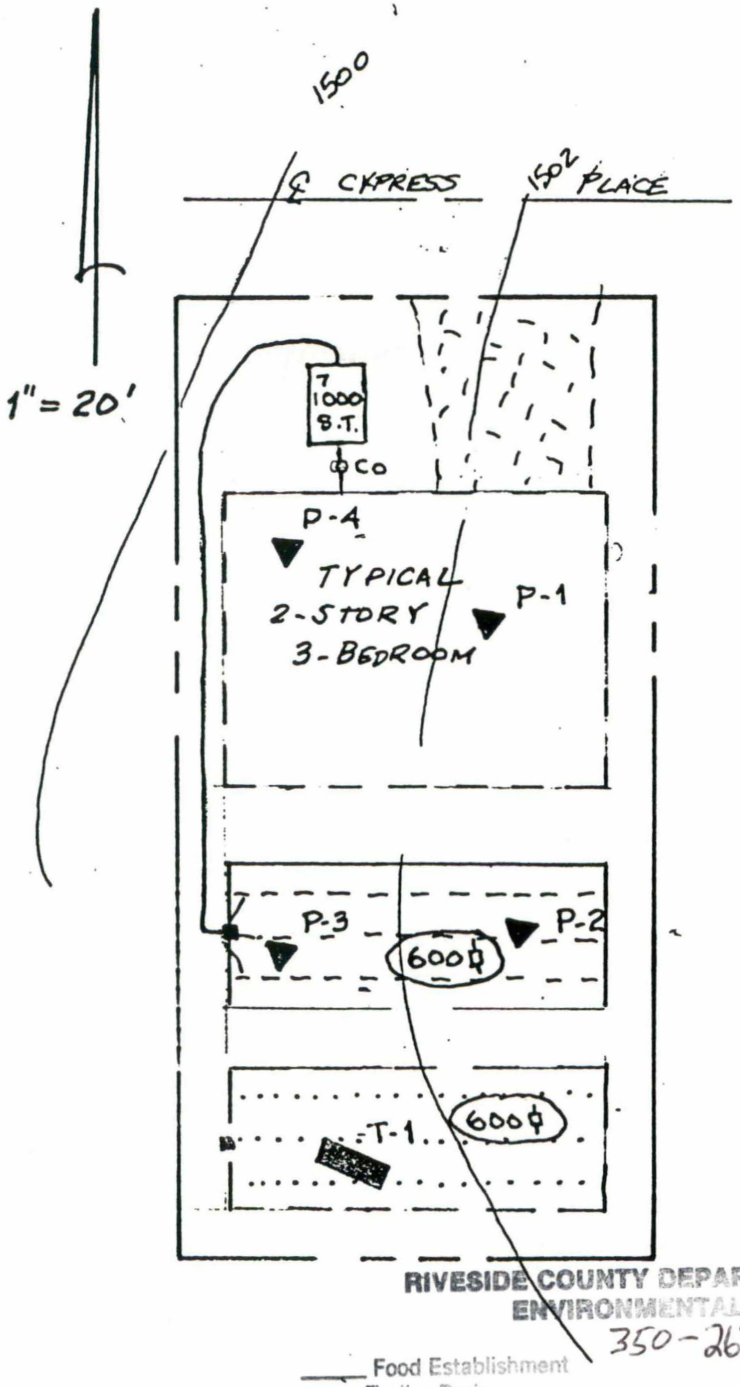
☒ Residential 3 Bedroom(s). ☐ Commercial ____ GPD
☐ New ☒ Repair ☐ Connect to Existing ☐ Destruction
Septic Tank: 750 gal. Soil Rate: 50 sq ft /100gal
☐ Leach Lines ☐ Leach Bed
☒ Rock: 36 in. ☐ Plastic Chamber(s) ☐ Other: ____
No. of Lines: 1 Length: 54 ft Max Depth: ____
SF: 378 Dim: ____
☐ Seepage Pits
No: ____ Dia: ____ Bl: ____ TD: ____ MD: ____
☐ Pump Chamber

All installations must conform to the requirements of the Local Agency Management Program (LAMP), Uniform Plumbing Code (UPC) and any other applicable regulation. Any changes may require additional review. Approval is valid for ONE year.

Date: 05/14/2020 **Approved by:** Matthew Reka

3/28/23

23142-01 **PLATE 1**



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST LOCATION

PRIMARY AND 100%

EXPANSION LEACH BEDS

SYSTEM DESIGN

* 3-BEDROOM HOUSE REQUIRES 1000 GALLON SEPTIC TANK.

* APPLICATION RATE OF 40 SQUARE FEET IS 400 SQUARE FEET OF ABSORPTION AREA.

* LEACH BED WITH 1½ FEET OF GRAVEL IS 600 SQUARE FEET OF BOTTOM AREA.

* NO PORTION OF SYSTEM UNDER DRIVEWAYS, PATIOS, ETC.

RIVERSIDE COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH SERVICES

350-263-005

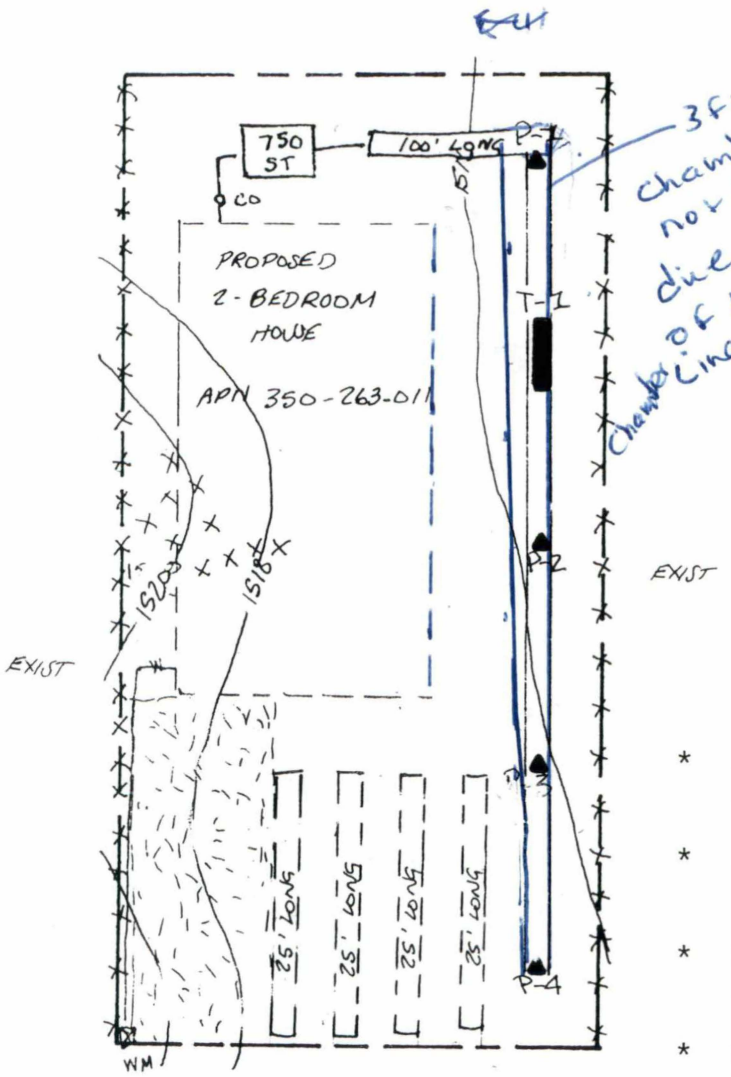
___ Food Establishment
___ Trailer Park
___ Motel, Apt., Hotel
✓ Dwelling 3 Bdrm
___ Commercial
___ Swimming

___ No on-site
system here
___ Water supply
___ All sewage disposal
___ Any cutting grading
___ Approval has been obtained
age disposal system.

This is to certify that the Riverside County
disposal plot plan to obtain building permit for

Date 9-5-91 By Renee Darwiter

PLATE 1



3ft trench
Chamber Line
not to be straight
due to South end
of Line. 4ft setback
Chamber Line within marked area.

from expansion Lines

N

1" = 20'

EXPLANATION

T-1 — EXPLORATORY TRENCH

P-4 — PERCOLATION TEST

HARD ROCK AREAS

PRIMARY LEACHING CHAMBERS

100% EXPANSION LEACHING CHAMBERS

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 50 SQUARE FEET IS 375 SQUARE FEET OF ABSORPTION AREA.
* LEACHING CHAMBERS IS 100 LINEAR FEET OI 3-FOOT WIDE CHAMBER.
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.

350263011

& CYPRESS DEACE

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

16 chambers Total

- ____ Food
- ____ Trailer Park
- ____ Motel, Apt., Hotel
- ✓ Dwelling 2 bdrm
- ____ Commercial Building
- ____ Swimming Pool

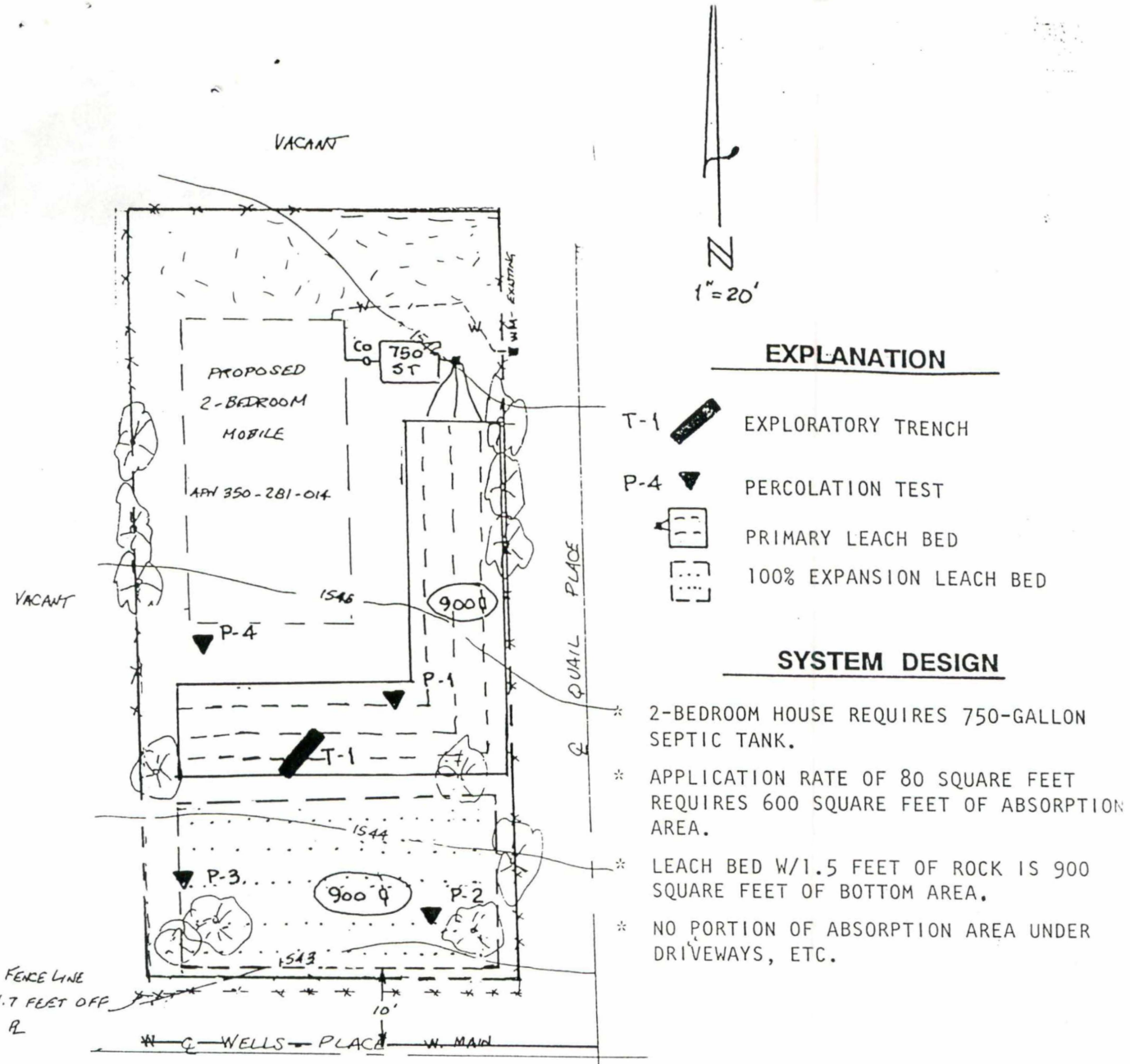
- ✓ Sewage Disposal
- 750 Gal. Septic Tank
- 300 Sq. Ft. of Leach Line
- ____ No. ___ Dia ____ BI ____ TD ____ MD Seepage P t
- ____ Connection to Sewer
- ____ Connect to Existing S.S.D.S.

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
✓ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 31 Jan 03 BY _____

23115-01 **PLATE 1**



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK.
* APPLICATION RATE OF 80 SQUARE FEET REQUIRES 600 SQUARE FEET OF ABSORPTION AREA.
* LEACH BED W/1.5 FEET OF ROCK IS 900 SQUARE FEET OF BOTTOM AREA.
* NO PORTION OF ABSORPTION AREA UNDER DRIVEWAYS, ETC.

APN 350 281 014

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

____Food	✓ Sewage Disposal
____Trailer Park	750 Gal. Septic Tank
____Motel, Apt., Hotel	____Sq. Ft. of Leach Line 900 sq ft leach bed with 1.5ft Rock
✓ Dwelling	____No. ___Dia____BI____TD____MD Seepage Pit
____Commercial Building	____Connection to Sewer
____Swimming Pool	____Connect to Existing S.S.D.S.

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
___ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

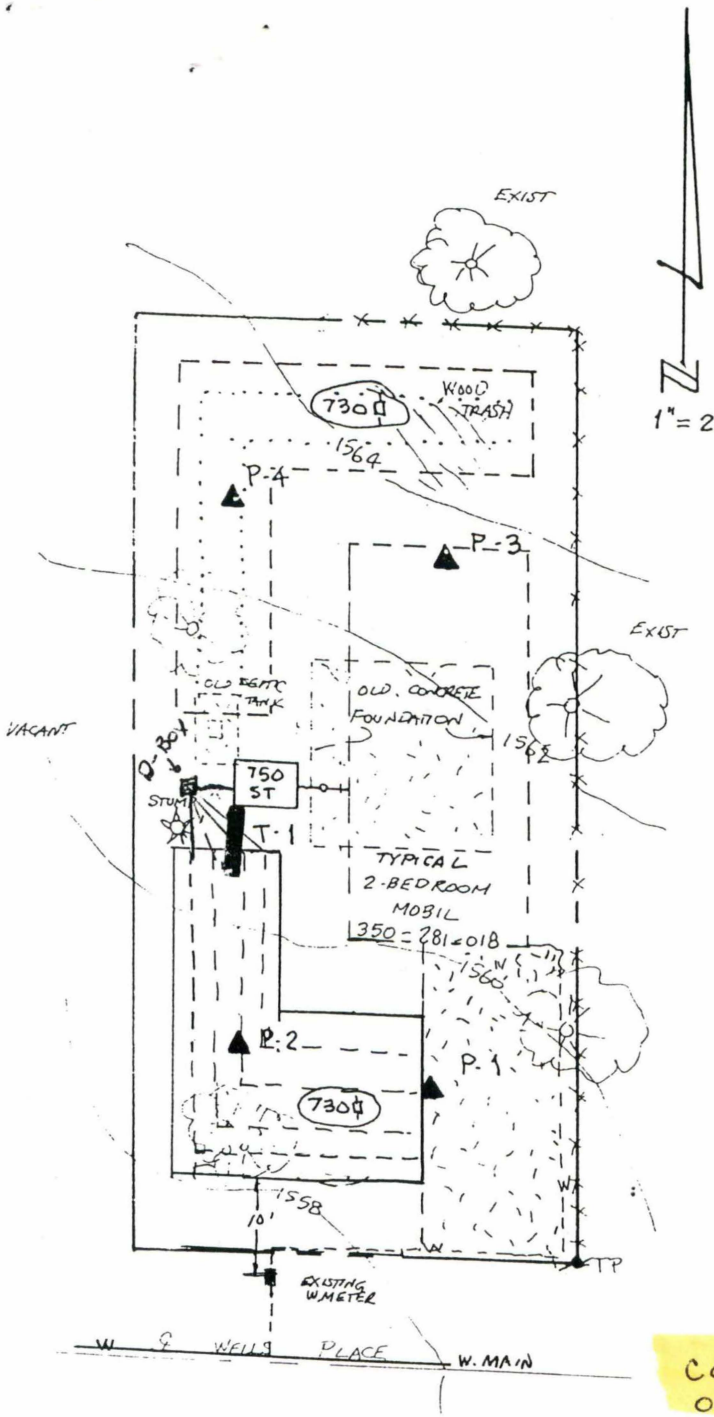
This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 21NOV00 BY Marc Hanabar

20311-01

REVISED 11/18/00

PLATE 1



EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* TYPICAL 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 65 SQUARE FEET IS 487 SQUARE FEET OF ABSORPTION AREA
* LEACH BEDS WITH 1.5 FEET OF ROCK IS 730 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC

contact this department if old septic field is found.

APN 350 281 018

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

____Food
____Trailer Park
____Motel, Apt., Hotel
✓ Dwelling 2 bdrm
____Commercial Building
____Swimming Pool

✓ Sewage Disposal
750 Gal. Septic Tank
✓ Sq. Ft. of Leach Line 732 square feet leach bed with
____No. ___Dia____BI____TD____MD Seepage Pit 1.5 ft rock.
____Connection to Sewer
____Connect to Existing S.S.D.S.

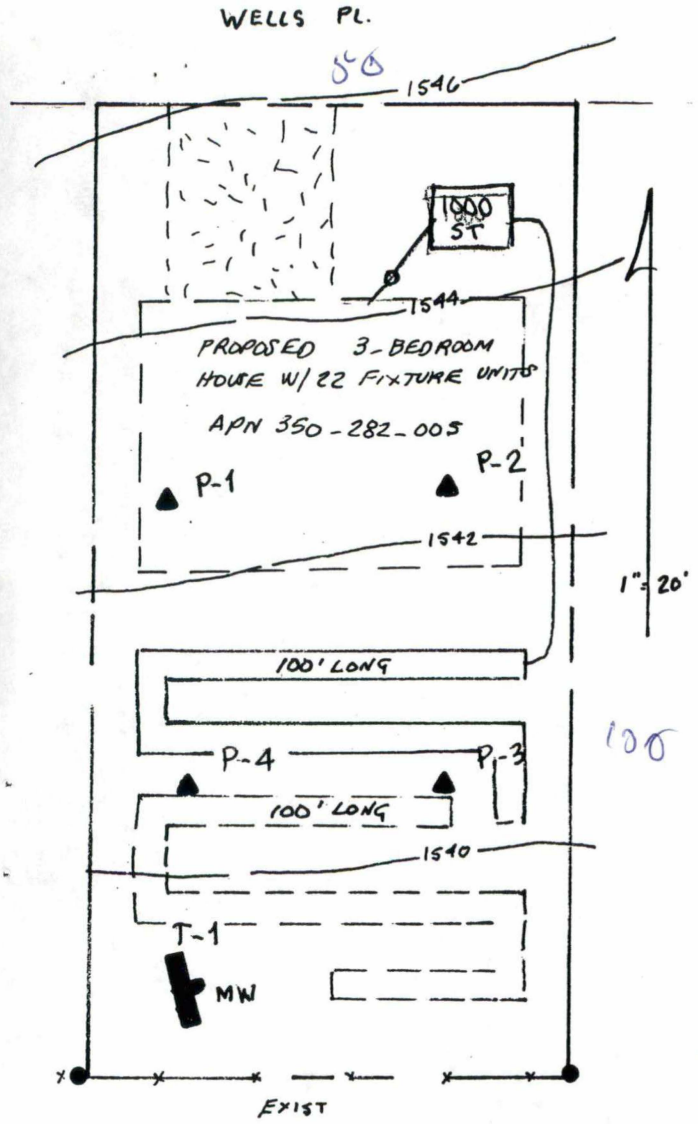
✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
✓ Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
____ Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit. Final approval is subject to satisfactory construction.

DATE 21NOV00 BY Marc Heralde

REVISED 11/18/00

20280-01 PLATE 1



EXPLANATION

P-4 ▲ PERCOLATION TEST

T-1 MW EXPLORATORY TRENCH WITH MONITORING WELL

PRIMARY LEACH LINES

100% EXPANSION LEACH LINES

SYSTEM DESIGN

* 3-BEDROOM HOUSE WITH 22 FIXTURE UNITS REQUIRES 1000 GALLON SEPTIC TANK.
* APPLICATION RATE OF 50 SQ. FT. IS 500 SQ. FT. OF ABSORPTION AREA.
* LEACH LINES WITH 3 FEET OF ROCK IS 100 LINEAR FEET OF 3-FOOT WIDE TRENCH.
* NO PORTION OF ABSORPTION AREA BENEATH DRIVEWAYS, ETC.

NOTE: Soils Engineer of Record must inspect and verify in a signed written statement to Riverside County Environmental Health and Building and Safety (copies to be furnished for the record) that he has inspected the Leach Bed/leachline trenches prior to rock placement and has found that they meet all his recommendations and the minimum requirements of the UPC/Riverside County Codes.

350-282-005

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

21 F.U MAX

- ___ Dwelling
- ___ Commercial
- ___ Seepage Pits
- ___ Connect to Sewer

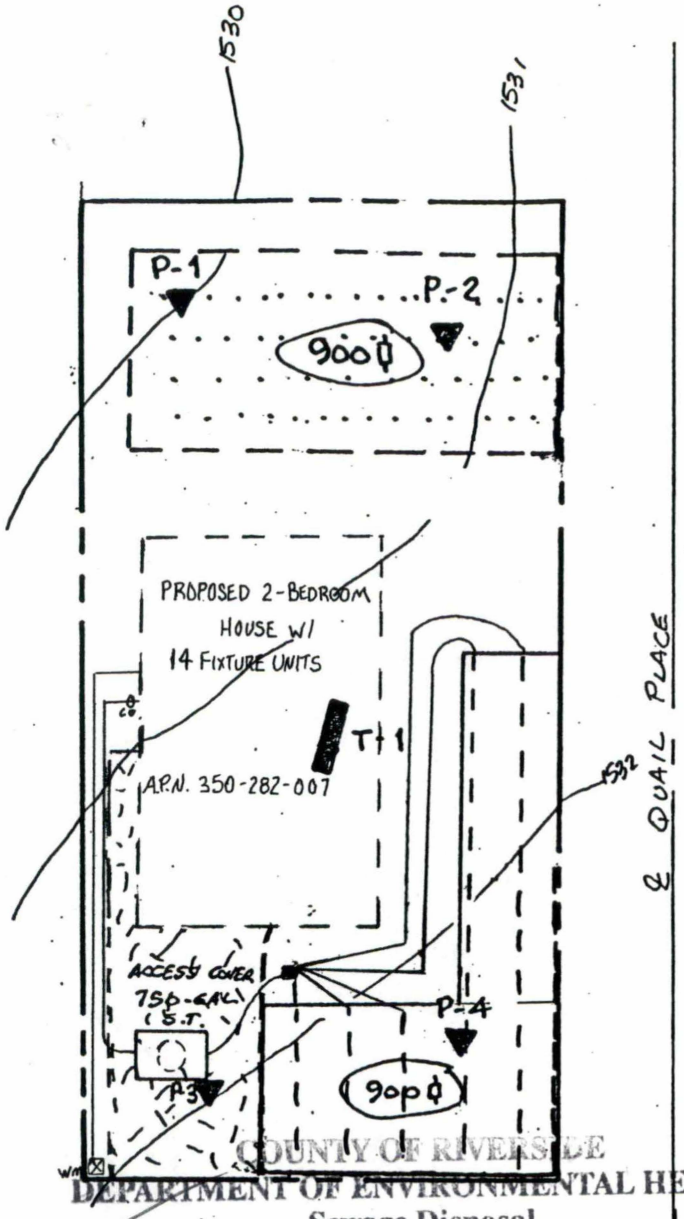
1000 Gal. Septic Tank
36" Rock 500 Sq. Ft. of Leach Line
___ No. ___ Dia ___ BI ___ TD ___ MD
___ Connect to Existing System

REGISTERED CIVIL ENGINEER
LARRY J. FAST
RCE No. 29150
EXPIRATION DATE 3-31-05
STATE OF CALIFORNIA

___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept

Date: 9/15/04 EHS

PLATE 1 24470-01





1" = 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* TYPICAL 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 80 SQUARE FEET IS 600 SQUARE FEET OF ABSORPTION AREA
* LEACH BED WITH 1.5 FEET OF GRAVEL IS 900 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, ETC.
* ACCESS COVER REQUIRED FOR SEPTIC TANK PLACED BENEATH DRIVEWAY

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

___ Dwelling & SIERRA DR 750 Gal. Septic Tank
___ Commercial 900 Sq. Ft. of Leach Line Bed
___ Seepage Pits ___ No. ___ Dia ___ BI ___ TI ___ MH
___ Connect to Sewer ___ Connect to Existing System

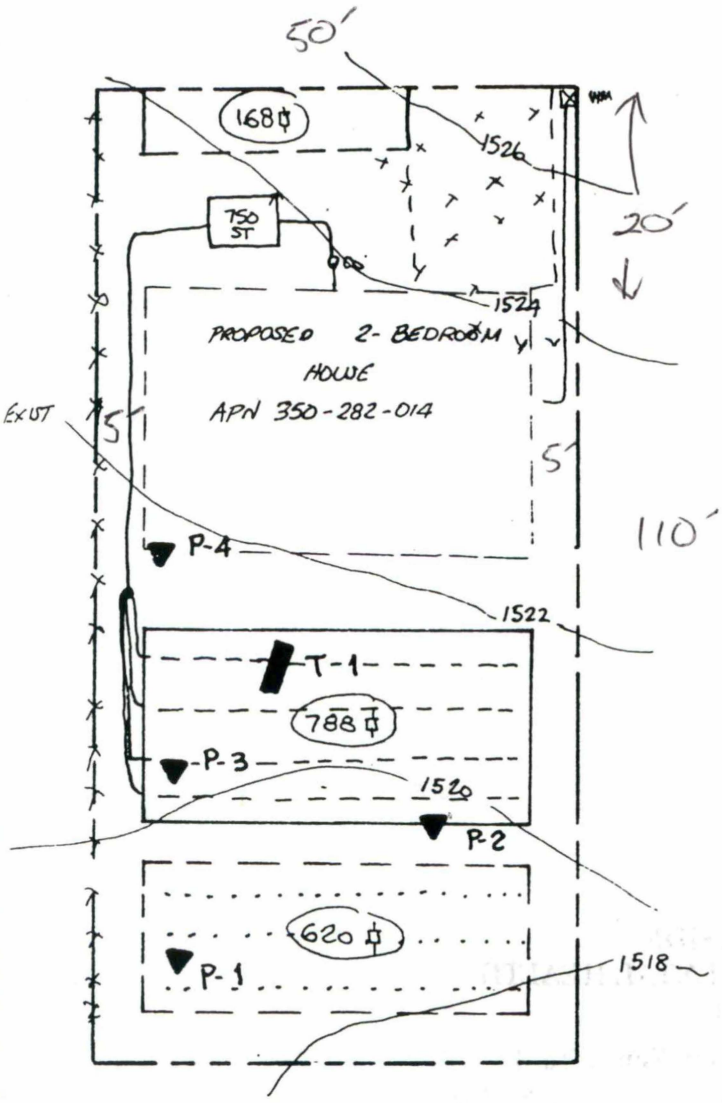
___ No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.
___ All sewage disposal installation shall conform to the current UPC
___ Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 7-13-04

REGISTERED CIVIL ENGINEER
LARRY J. FAR
RCE No. 29150
EXPIRATION DATE 3-31-07
STATE of CALIFORNIA

98123-01 **PLATE 1**
REVISED 7/10/04

23837
℄ SIERRA DRIVE



N

1"=20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

HARD ROCK AREA

PRIMARY LEACH BEDS

100% EXPANSION LEAC

SYSTEM DESIGN BED

* 2-BEDROOM HOUSE REQUIR 750- GALLON SEPTIC TAN

* APPLICATION RATE OF 70 SQUARE FEET IS 525 SQU FEET OF ABSORPTION ARE

* LEACH BED WITH 1.5 FEE OF ROCK IS 788 SQUARE FEET OF BOTTOM AREA

* NO PORTION OF ABSORPTIO SYSTEM UNDER DRIVEWAYS, ETC.

REGISTERED CIVIL ENGINEER
LARRY J. [illegible]
RCE No. 29150
EXPIRATION DATE
3-31-04
STATE of CALIFORNIA

RIVERSIDE COUNTY
PLANNING DEPARTMENT
BY: Pamela Neal
JUL 8 2003
PLANS ACCEPTABLE FOR
APPLICATION PURPOSES ONLY

23156-01 PLATE 1

350-282-014

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

X Dwelling 3 Bed	1000 Gals Septic Tank
____ Commercial	788 Sq. Ft. of Leach Line Leachbed
____ Seepage Pits	___ No. ___ Dia ___ BI ___ TD ___ MD
____ Connect to Sewer	___ Connect to Existing System

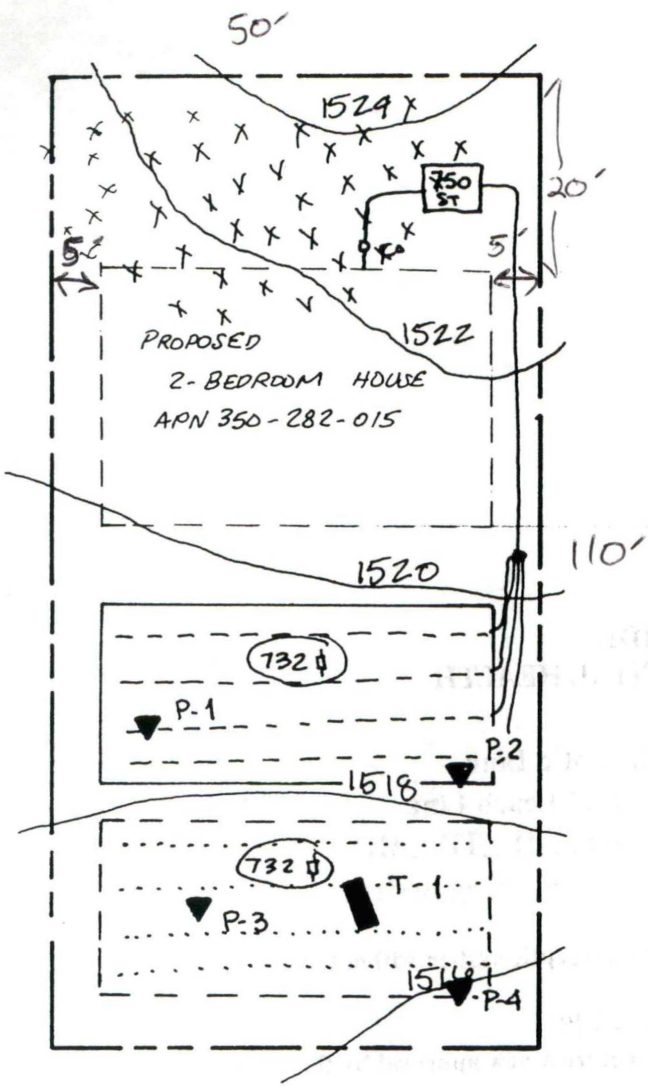
X No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.

X All sewage disposal installation shall conform to the current UPC

X Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 7/15/03 EHS M A Mendez

23843 SIERRA DRIVE



1"=20'

EXPLANATION

T-1

P-4

SYSTEM DESIGN

REGISTERED CIVIL ENGINEER
LARRY J. FA
RCE No. 29150
EXPIRATION DATE
3-31-05
STATE of CALIFORNIA

RIVERSIDE COUNTY
PLANNING DEPARTMENT
BY: Pamela Neal
JUL 8 2003
PLANS ACCEPTABLE FOR
APPLICATION PURPOSES ONLY

23157-01 **PLATE 1**

350-282-015

COUNTY OF RIVERSIDE
DEPARTMENT OF ENVIRONMENTAL HEALTH
Sewage Disposal

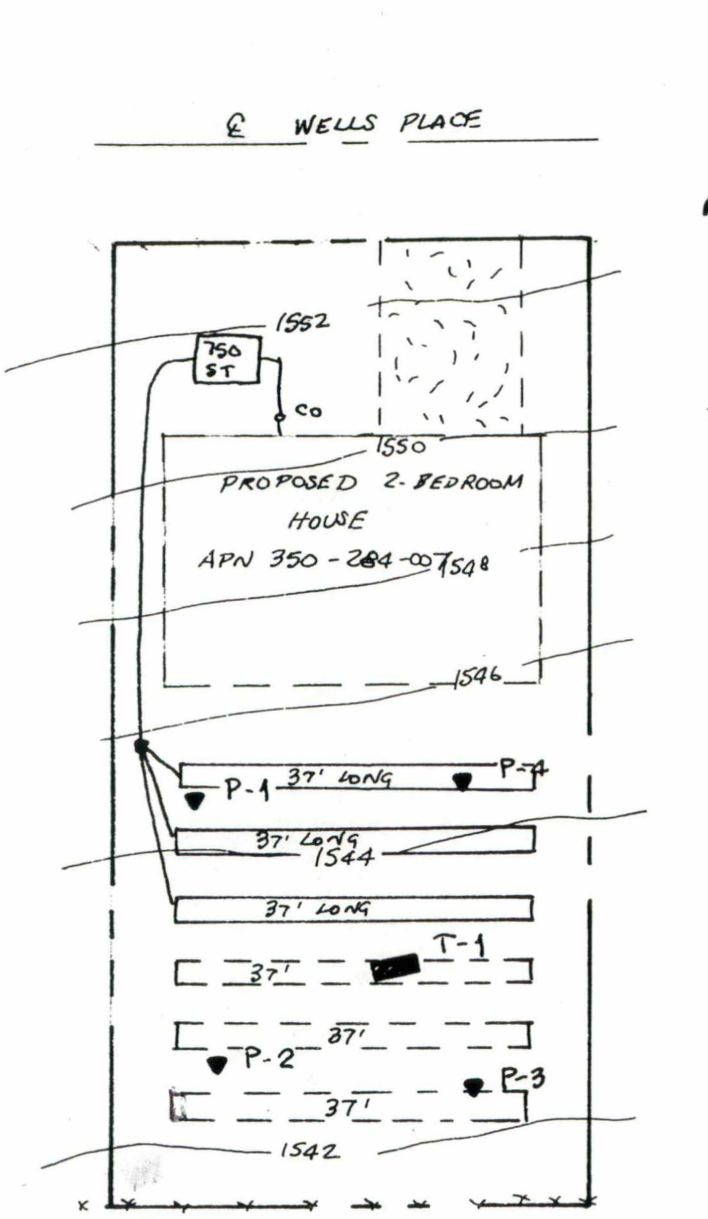
X Dwelling 2Bed	1000 Gal. Septic Tank Apps. Choice
____ Commercial	732 Sq. Ft. of Leach Line leach bed
____ Seepage Pits	___ No. __ Dia __ BI __ TD __ MD
____ Connect to Sewer	___ Connect to Existing System

X No on-site water softening devices shall be discharged into the septic system without clearance from the Calif. Regional Water Quality Control Board.

X All sewage disposal installation shall conform to the current UPC

X Any grading in the area of the proposed leach lines shall require a new approval by this Dept.

Date: 7/15/03 EHS [signature]



1"= 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACHING CHAMBER

100% EXPANSION LEACHING CHAMBER

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 55 SQUARE FEET IS 412 SQUARE FEET OF ABSORPTION AREA
* LEACHING CHAMBERS IS 110 LINEAR FEET OF 3-FOOT WIDE CHAMBER
* NO PORTION OF ABSORPTION SYSTEM UNDER DRIVEWAYS, PORCHES, ETC

OTP Maintain sheet flow over leach lines.

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

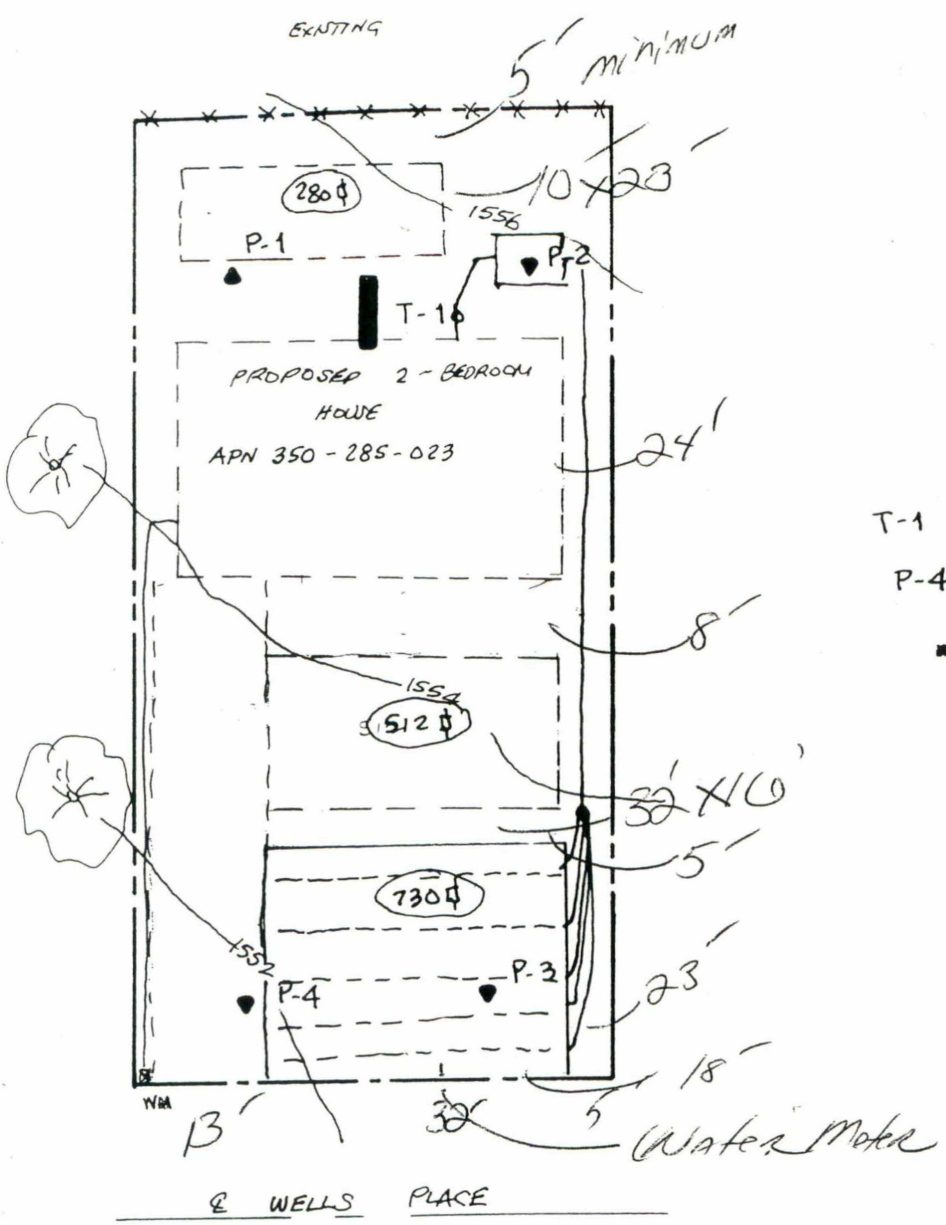
____Food	✓ Sewage Disposal
____Trailer Park	750 Gal. Septic Tank
____Motel, Apt., Hotel	330 Sq. Ft. of Leach Line 6 chambers per line
✓ Dwelling 2 bdrm	____No. ___Dia____Bl____TD____MD Seepage Pit
____Commercial Building	____Connection to Sewer
____Swimming Pool	____Connect to Existing S.S.D.S.

✓ No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
✓ Water supply serving this installation must be from an approved source
✓ All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
____Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
____Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 6 Dec 02 BY Marotta

PLATE 1



1" = 20'

EXPLANATION

T-1 EXPLORATORY TRENCH

P-4 PERCOLATION TEST

PRIMARY LEACH BED

100% EXPANSION LEACH BED

SYSTEM DESIGN

* 2-BEDROOM HOUSE REQUIRES 750-GALLON SEPTIC TANK
* APPLICATION RATE OF 65 SQUARE FEET IS 512 SQUARE FEET OF ABSORPTION AREA
* LEACH BED WITH 1.5 FEET OF ROCK IS 730 SQUARE FEET OF BOTTOM AREA
* NO PORTION OF ABSORPTION SYSYEM UNDER DRIVEWAYS ETC.

350 - 285 - 023

COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

_____Food
_____Trailer Park
_____Motel, Apt., Hotel
X Dwelling 2 Bedroom
_____Commercial Building
_____Swimming Pool

X Sewage Disposal
750 Gal. Septic Tank
4875 Sq. Ft. of Leach Line
_____No. ___Dia____Bl____TD____MD Seepage Pi
_____Connection to Sewer
_____Connect to Existing S.S.D.S.

1730 ft of leachbed

X No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
X Water supply serving this installation must be from an approved source
X All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
X Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

Date 5-1-03 M. A. Mendez

23245-01

PLATE 1

OWNER: ANTONIO TORRES

28860 WELLS Pl.
Quail Valley.

AP# 350-285-026

Each field not adequately sized

~~COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY~~
DEPARTMENT OF ENVIRONMENTAL HEALTH

___Food	___Sewage Disposal
___Trailer Park	___Gal. Septic Tank
___Motel, Apt., Hotel	___Sq. Ft. of Leach Line
___Dwelling	___No. ___Dia ___B ___To ___MD Seepage Pit
___Commercial Building	___Connection to Sewer
___Swimming Pool	___Connect to Existing S.S.D.S.

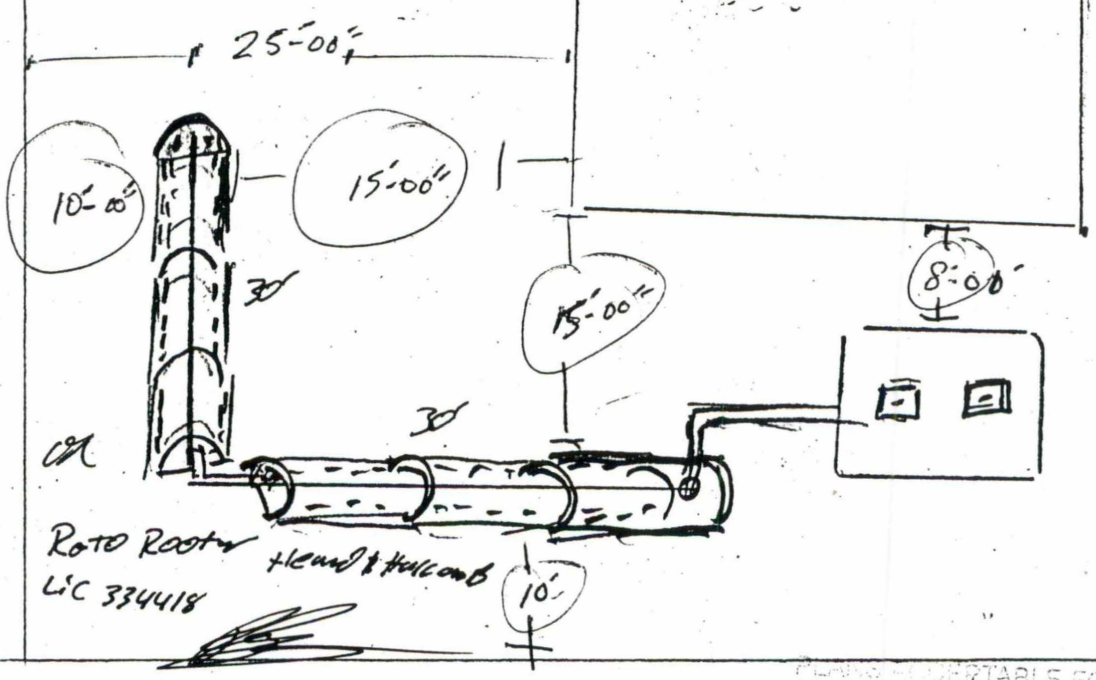
Rise Way 25

___No on-site regenerating water softening devices may be discharged into the individual sewage disposal system herewith approved without clearance from the Water Quality Control Board.
___Water supply serving this installation must be from an approved source
___All sewage disposal installation must conform with requirements of current Uniform Plumbing Code.
___Any cutting, grading or filling in excess of two(2) feet will nullify sewage disposal approval.
___Approval has been obtained from the Regional Water Quality Control Board for installation of the sewage disposal system.

This is to certify that the Riverside County Environmental Health Services approves the subsurface sewage disposal plot plan to obtain building permit for installation, construction.

DATE 09-04-01 Sidewell K

2B. TBath



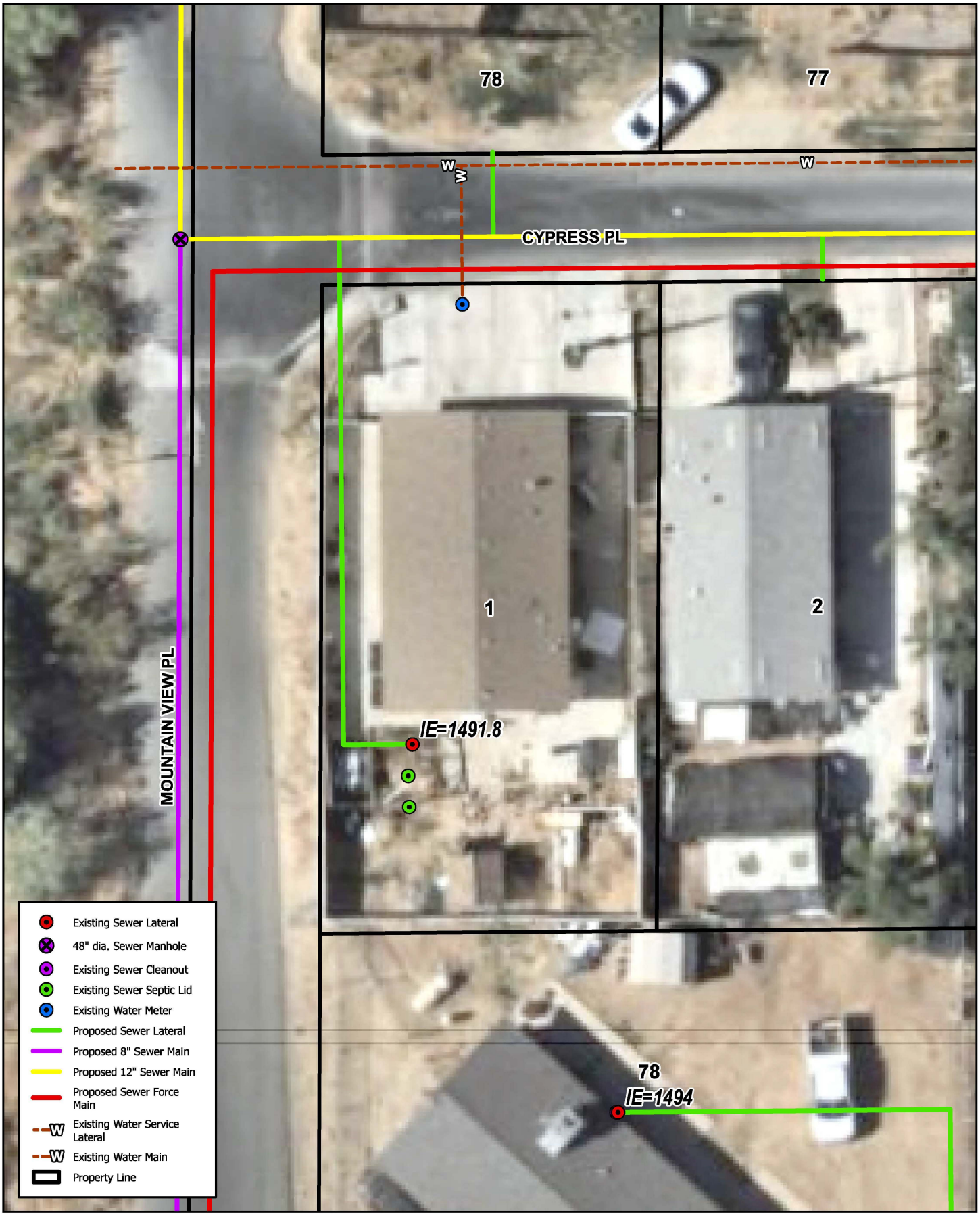
Quail Pl.

Wells Pl.

PLOTTING SUITABLE FOR APPLICATION PURPOSES ONLY
AUG 21 2001
RIVERSIDE COUNTY PLANNING DEPARTMENT

JOMCA

APPENDIX H – INDIVIDUAL SERVICE EXHIBITS

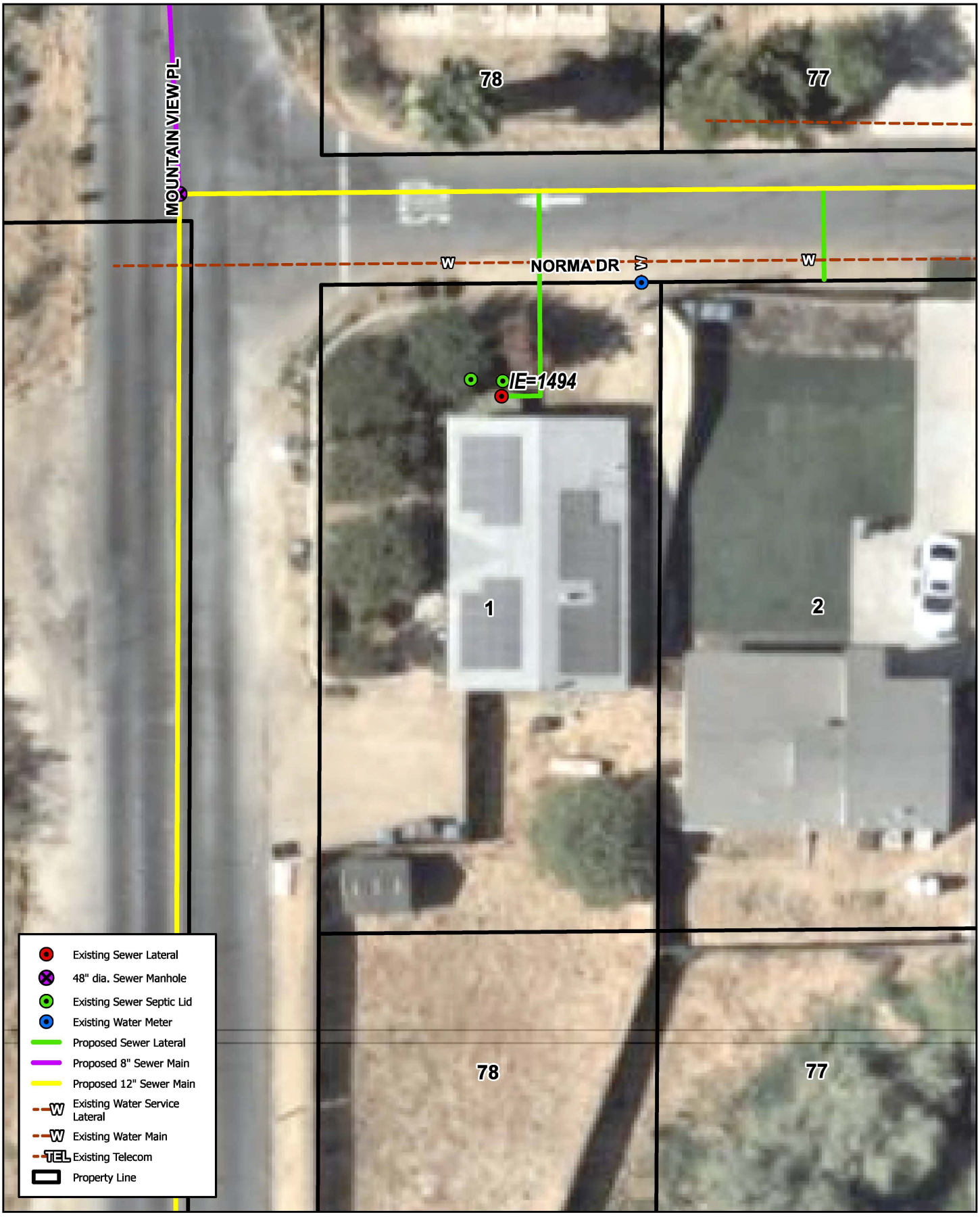


23505 CYPRESS PL, QUAIL VALLEY, CA 92587

LOT #1

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

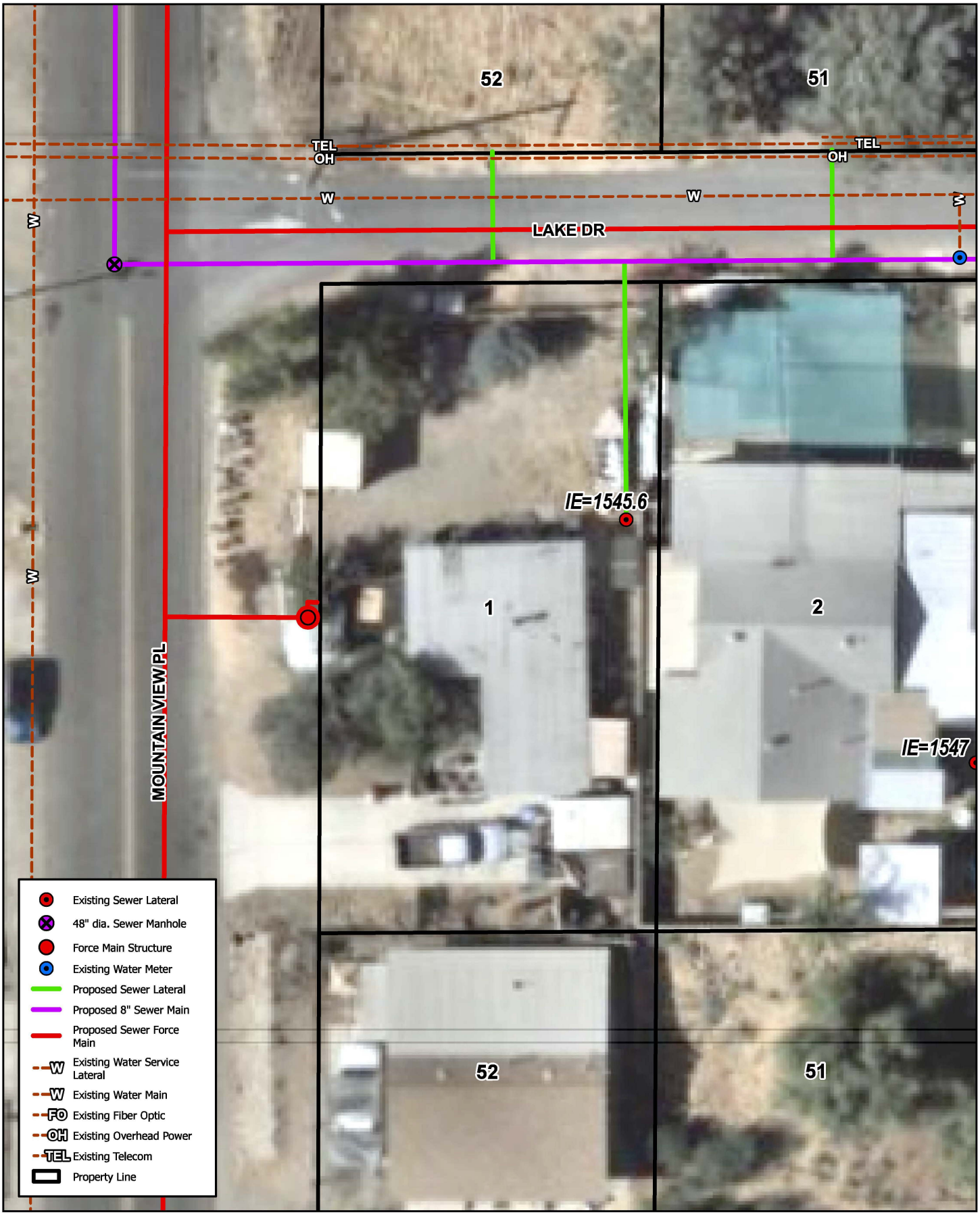


23507 NORMA DR, QUAIL VALLEY, CA 92587

LOT #1

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

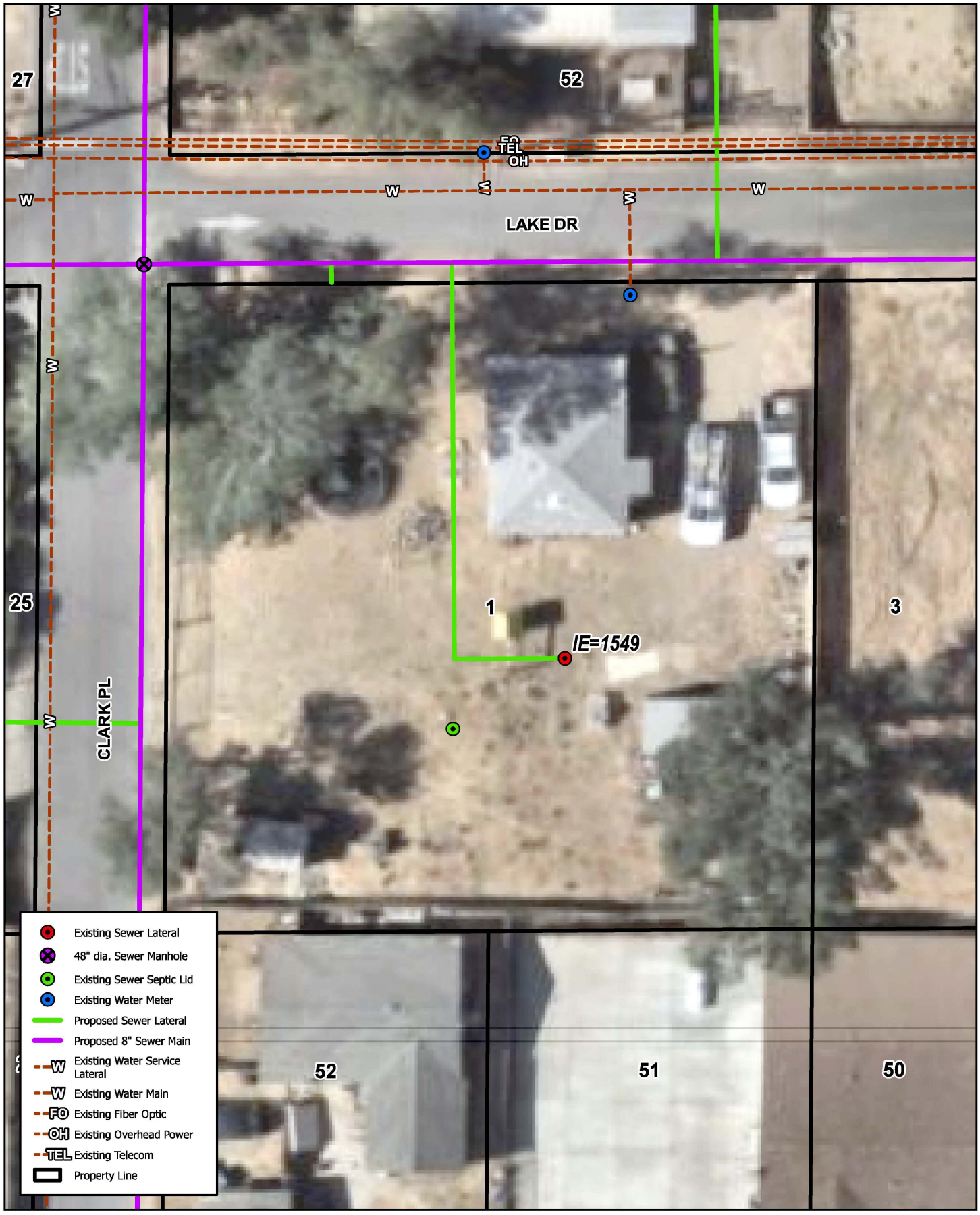


28430 MOUNTAIN VIEW PL, CANYON LAKE, CA 92587

LOT #1

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

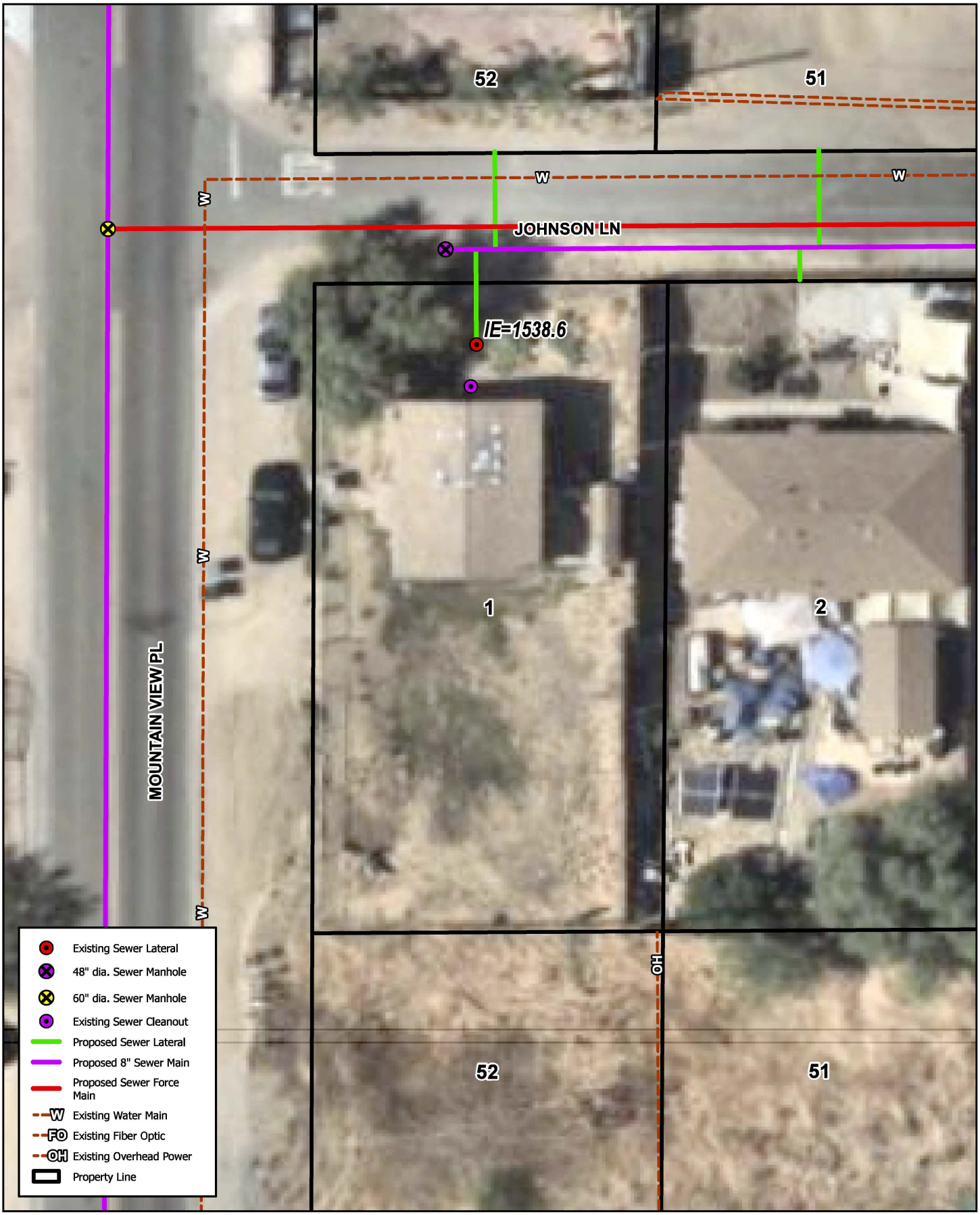


23773 LAKE DR, CANYON LAKE, CA 92587

LOT #1

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

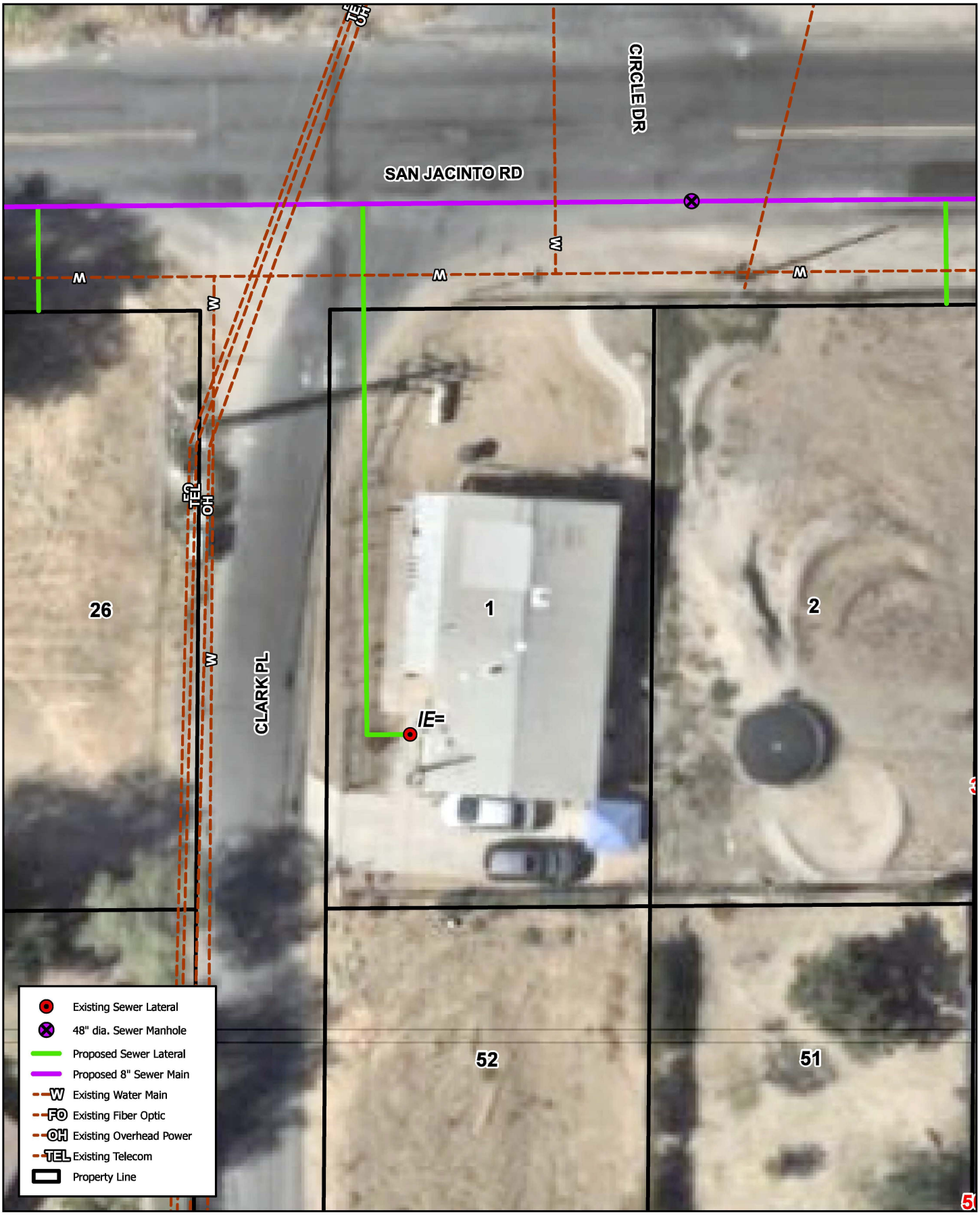


28310 MOUNTAIN VIEW PL, CANYON LAKE, CA 92587

LOT #1

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23751 SAN JACINTO RD, CANYON LAKE, CA 92587

LOT #1

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

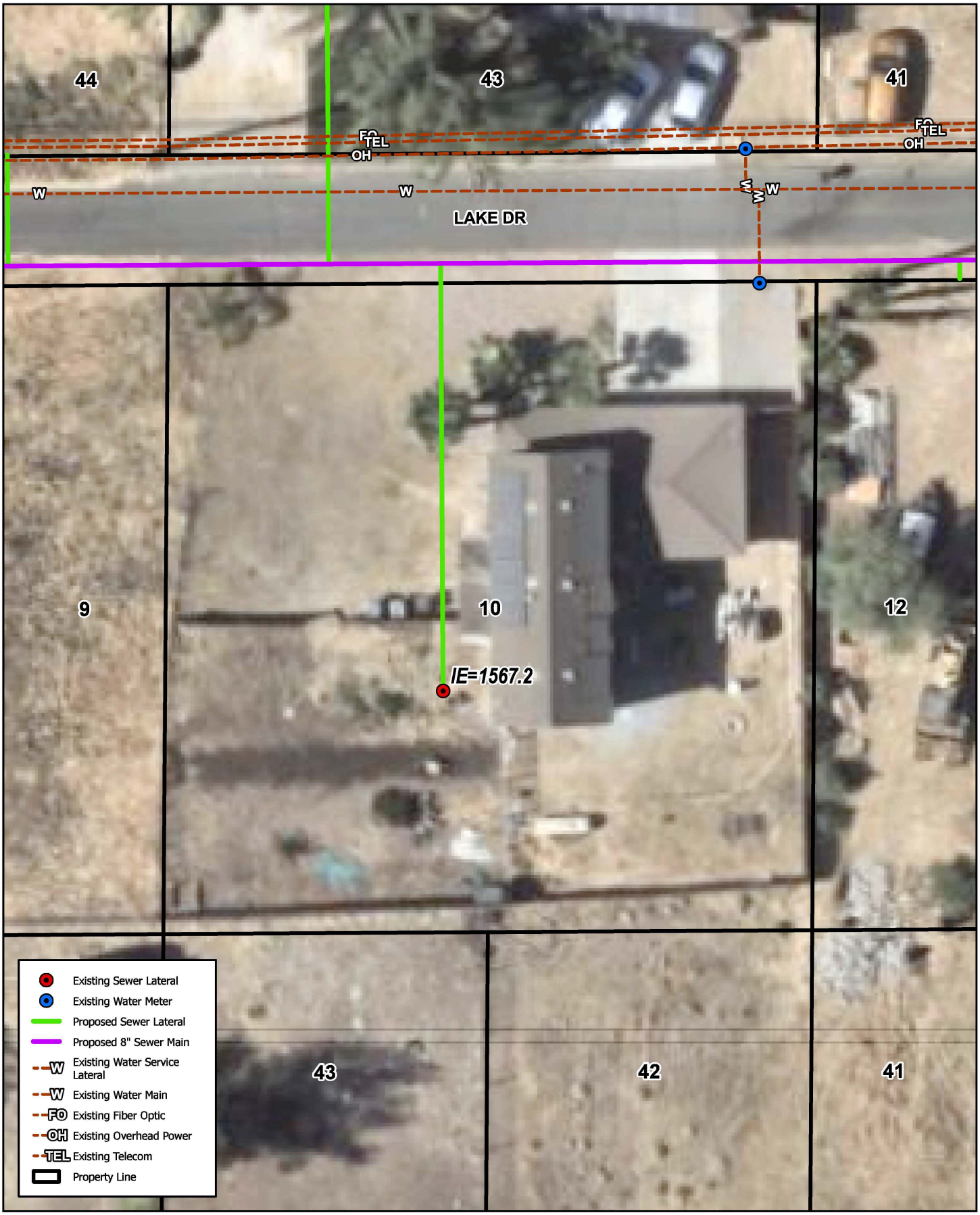


23581 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #10

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

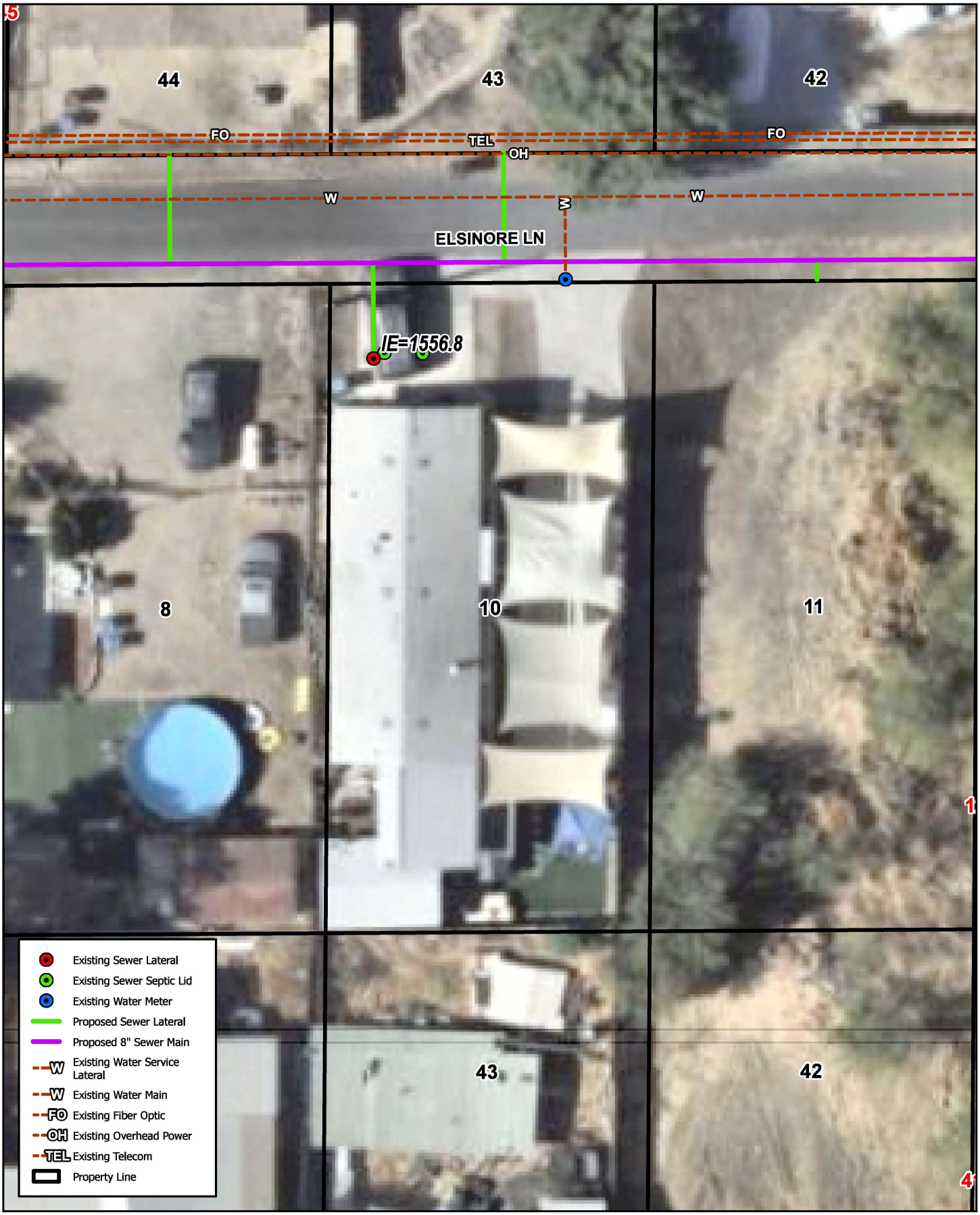


23841 LAKE DR, CANYON LAKE, CA 92587

LOT #10

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

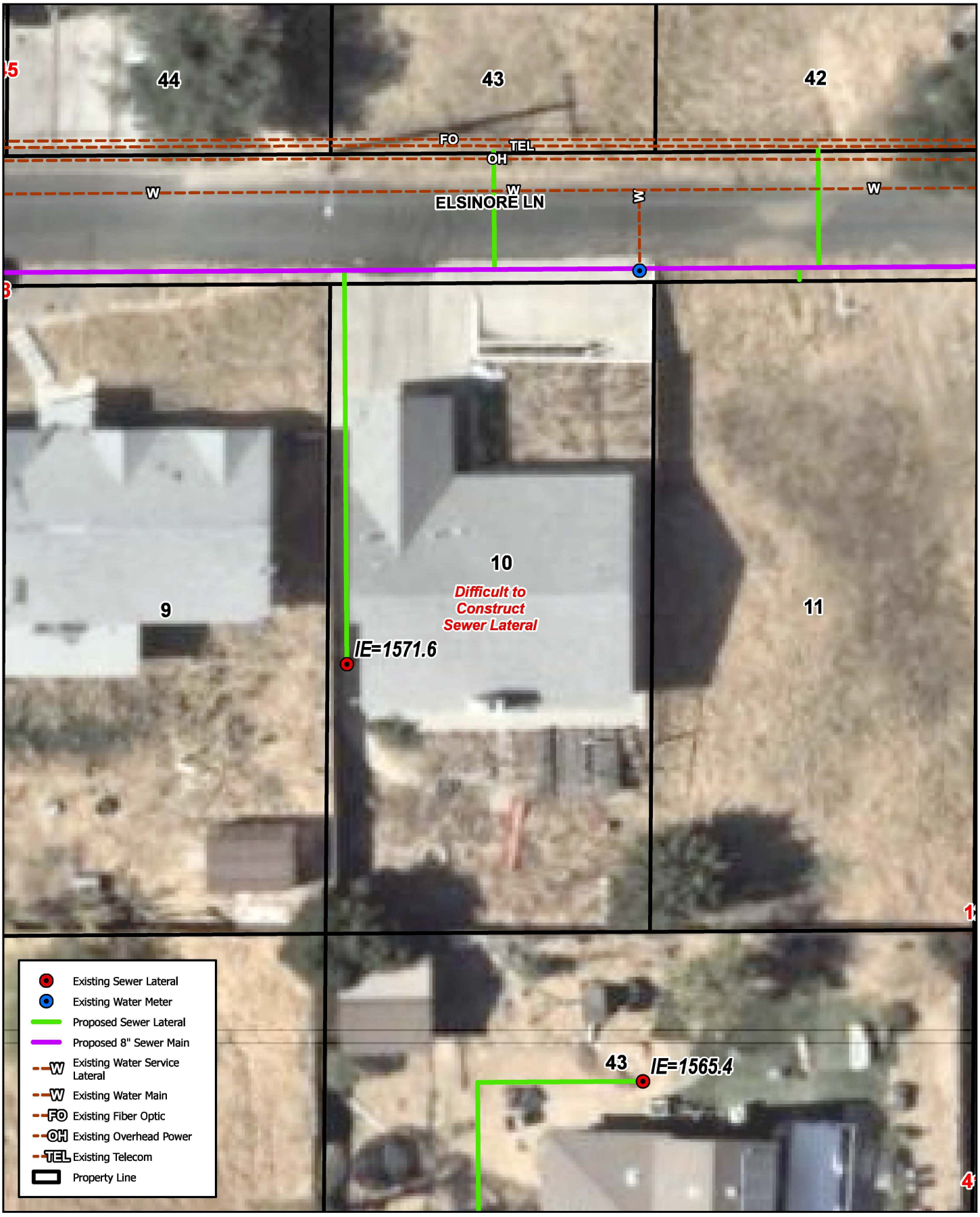


23575 ELSINORE LN, QUAIL VALLEY, CA 92587

LOT #10

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23835 ELSINORE LN, CANYON LAKE, CA 92587

LOT #10

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

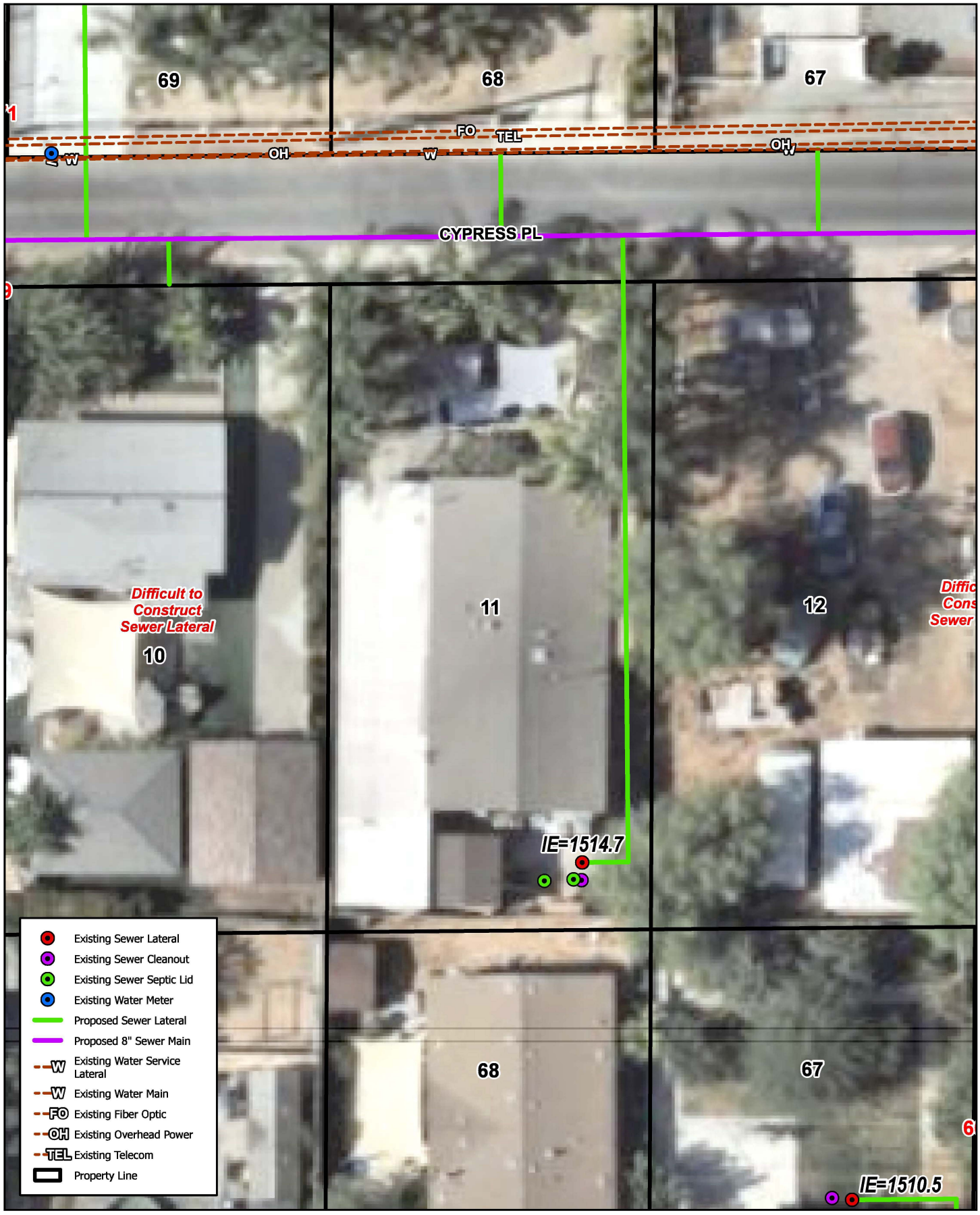


28591 WILLIAMS DR, QUAIL VALLEY, CA 92587

LOT #104

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

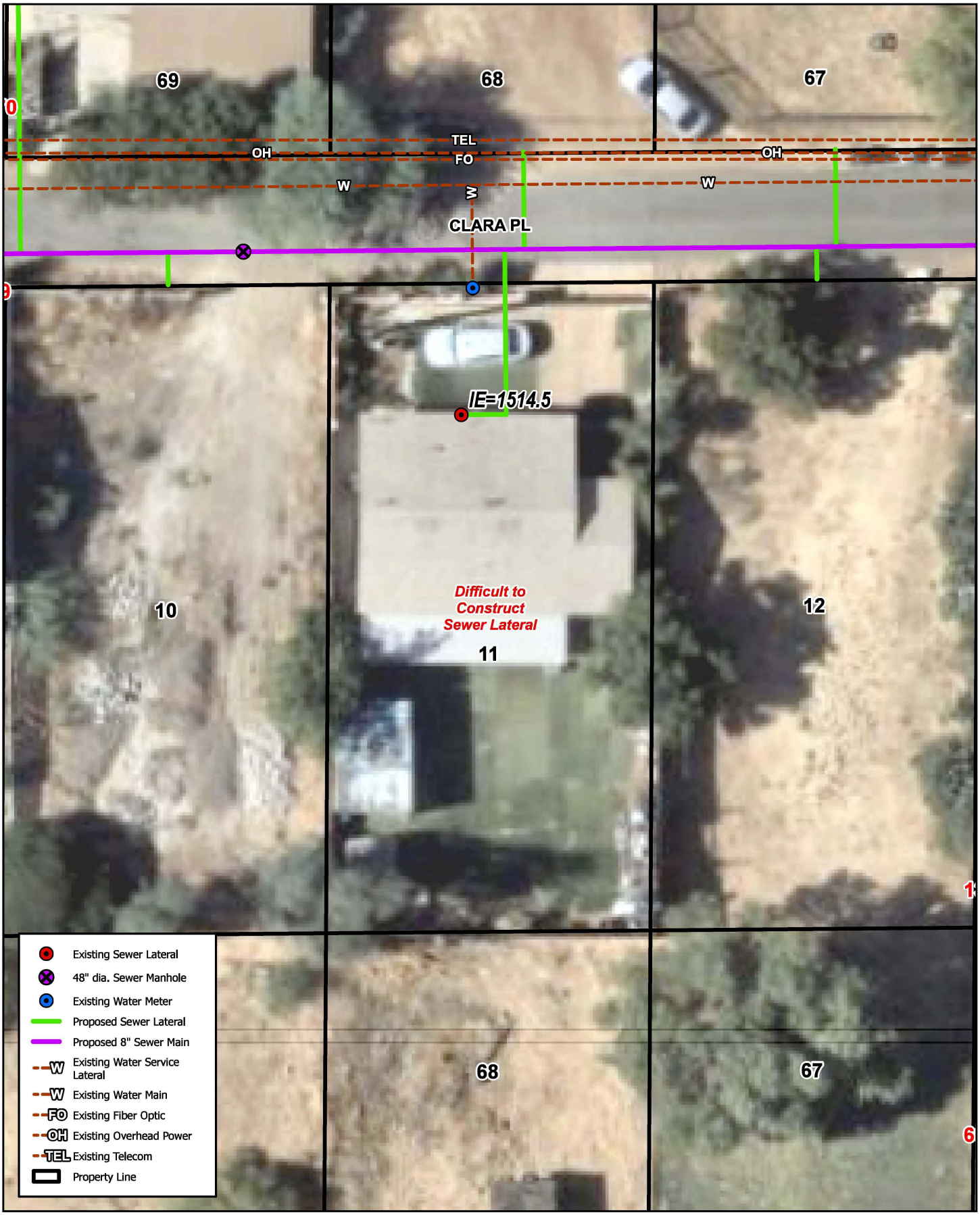


23605 CYPRESS PL, CANYON LAKE, CA 92587

LOT #11

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

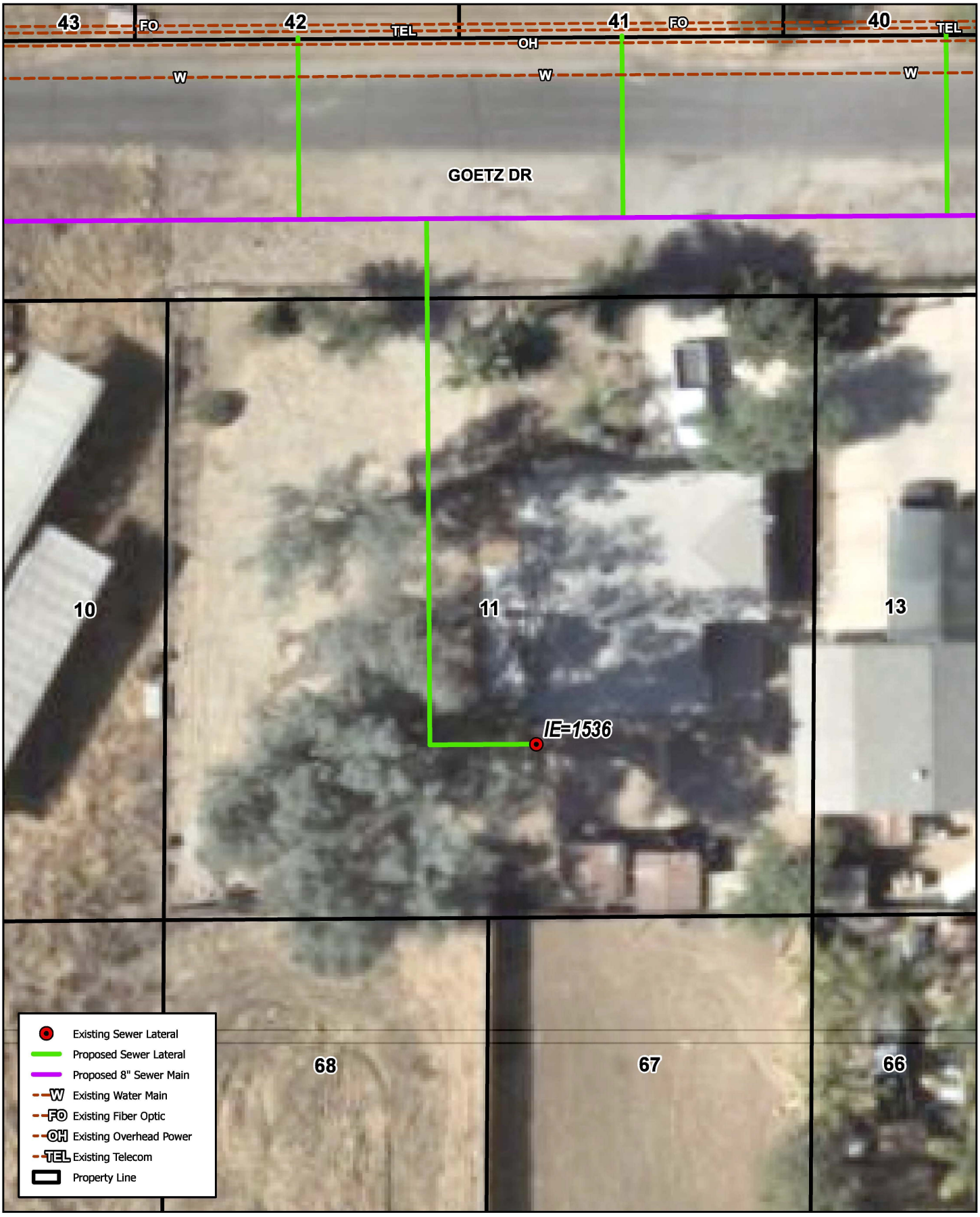


23581 CLARA PL, CANYON LAKE, CA 92587

LOT #11

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

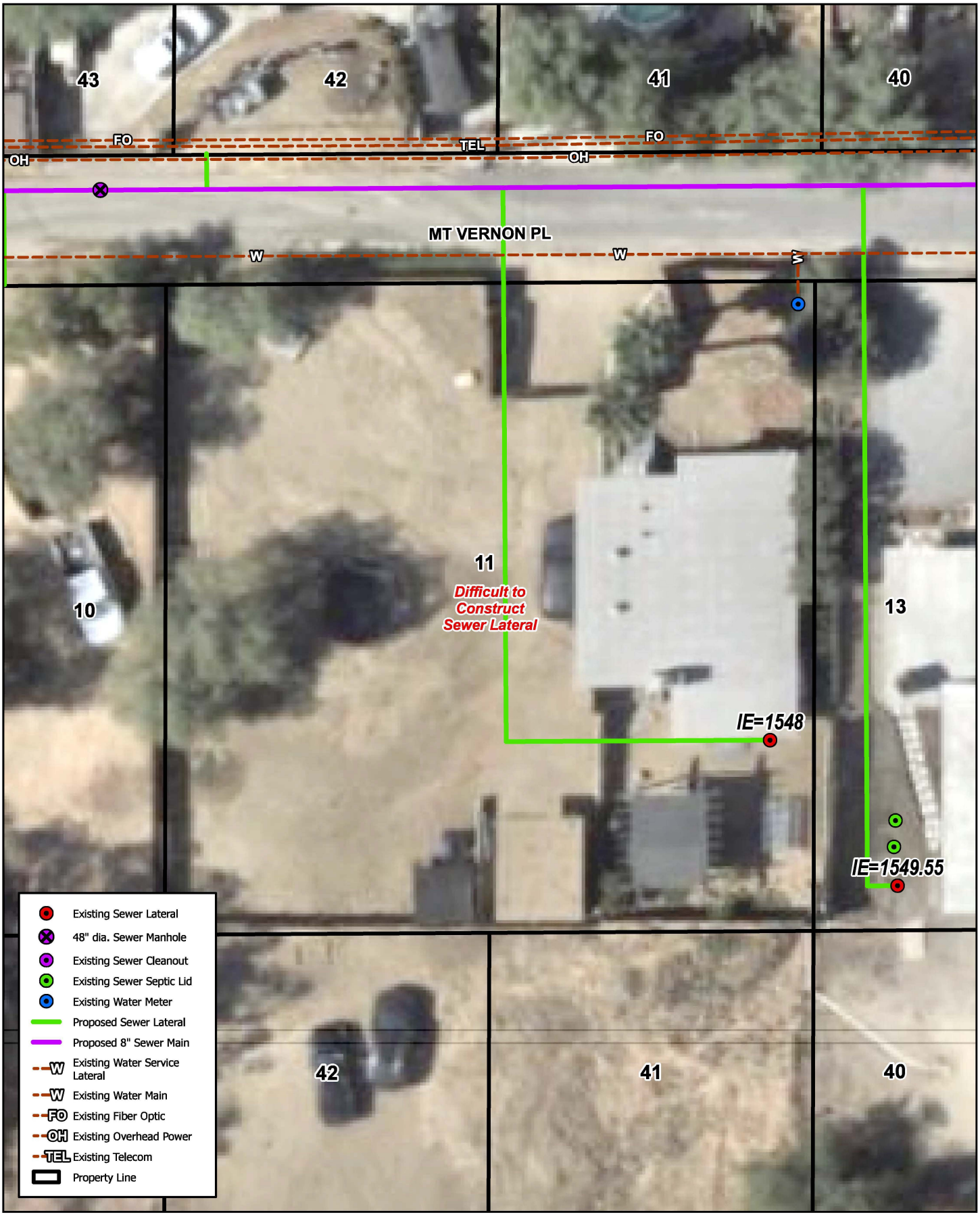


23617 GOETZ DR, CANYON LAKE, CA 92587

LOT #11

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

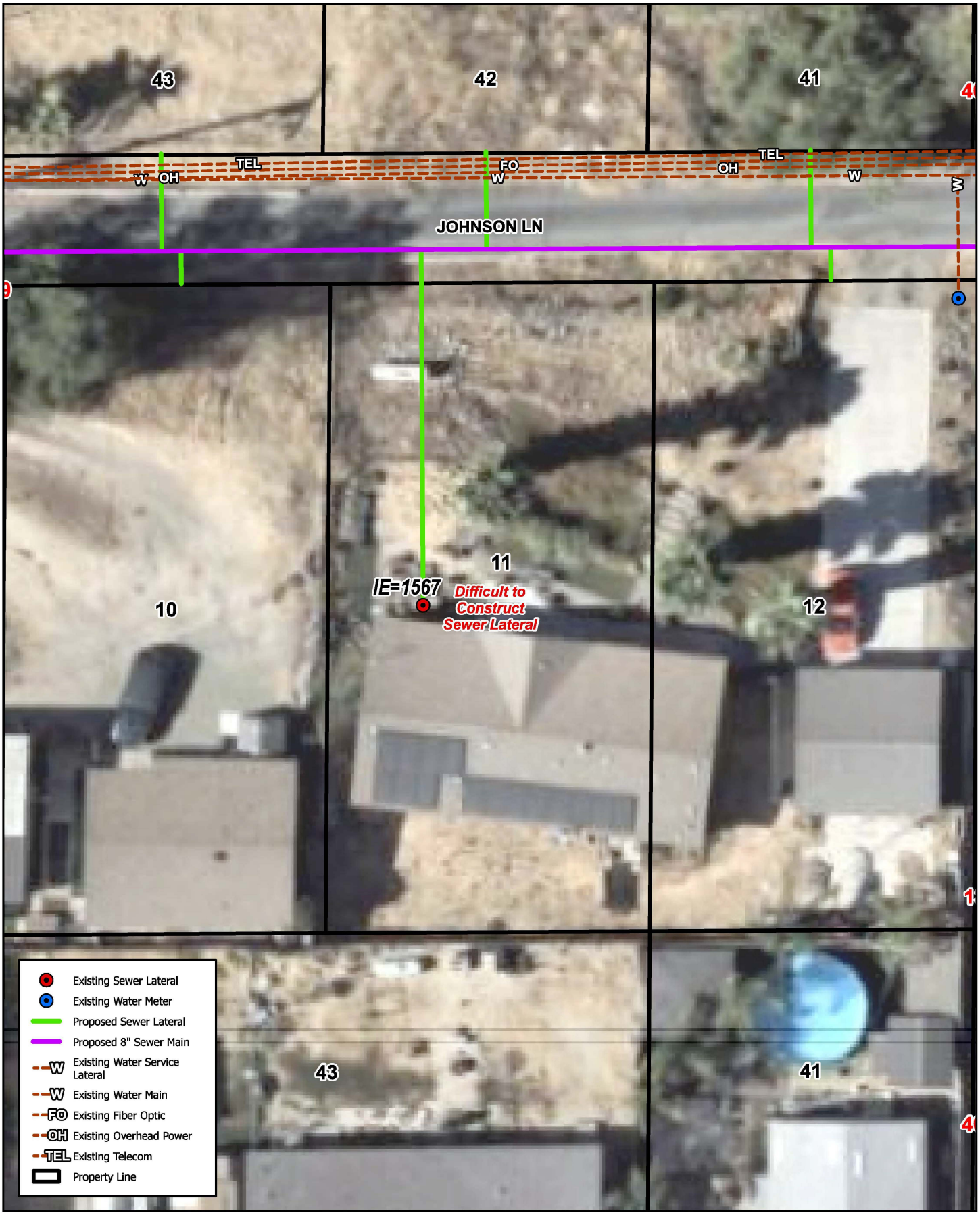


23617 MT VERNON PL, CANYON LAKE, CA 92587

LOT #11

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

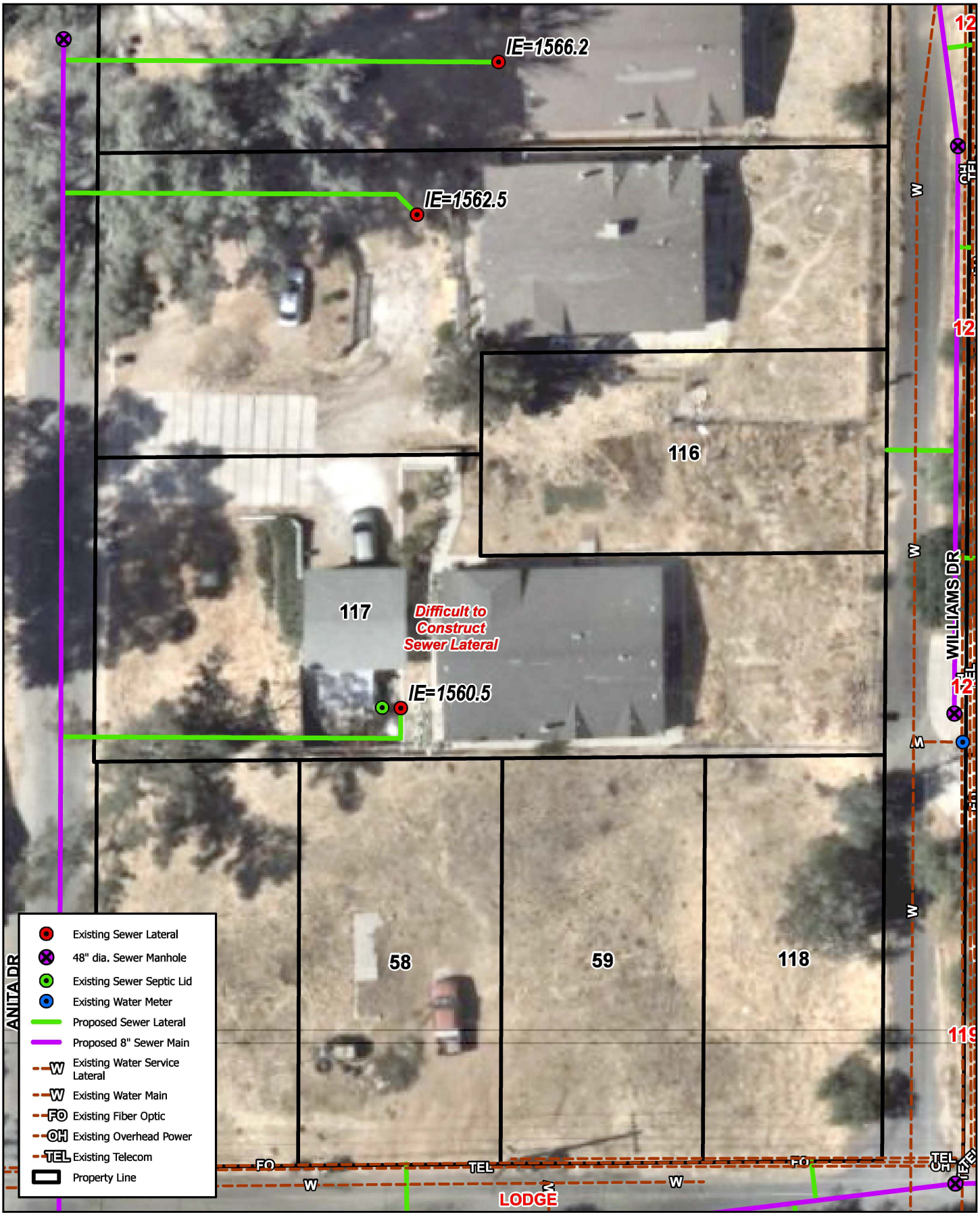


23605 JOHNSON LN, CANYON LAKE, CA 92587

LOT #11

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

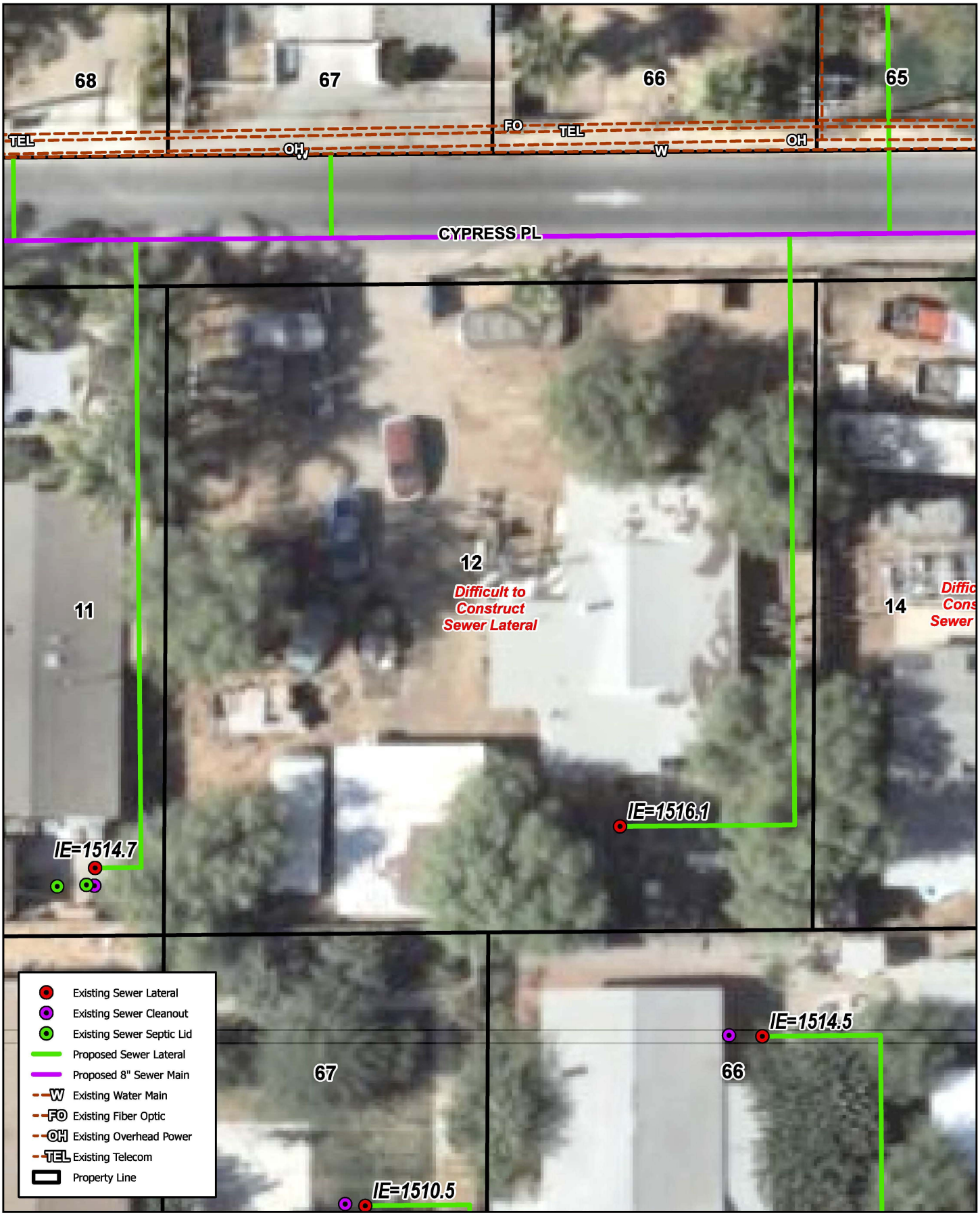


28736 ANITA DR, CANYON LAKE, CA 92587

LOT #117

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

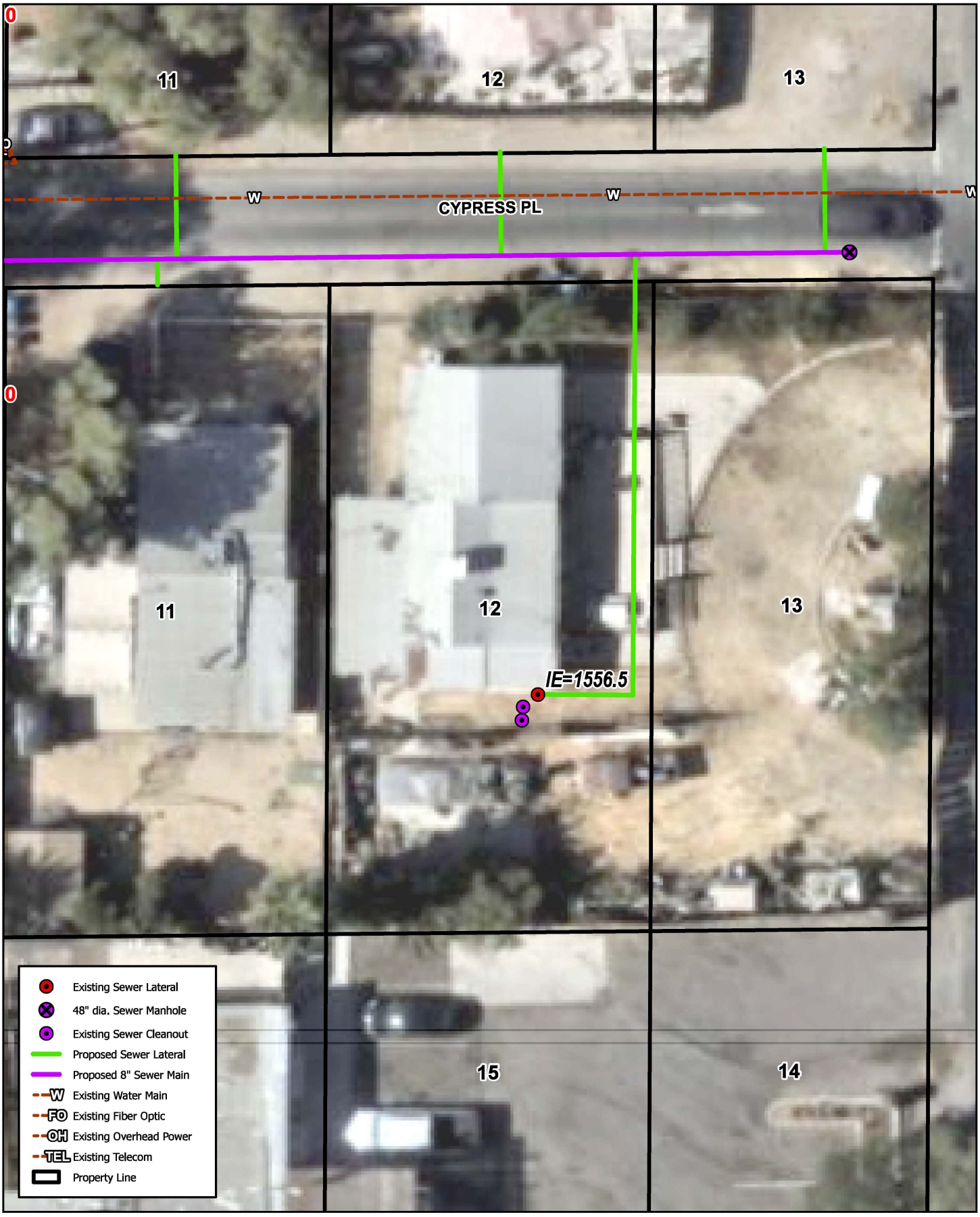


23635 CYPRESS PL, CANYON LAKE, CA 92587

LOT #12

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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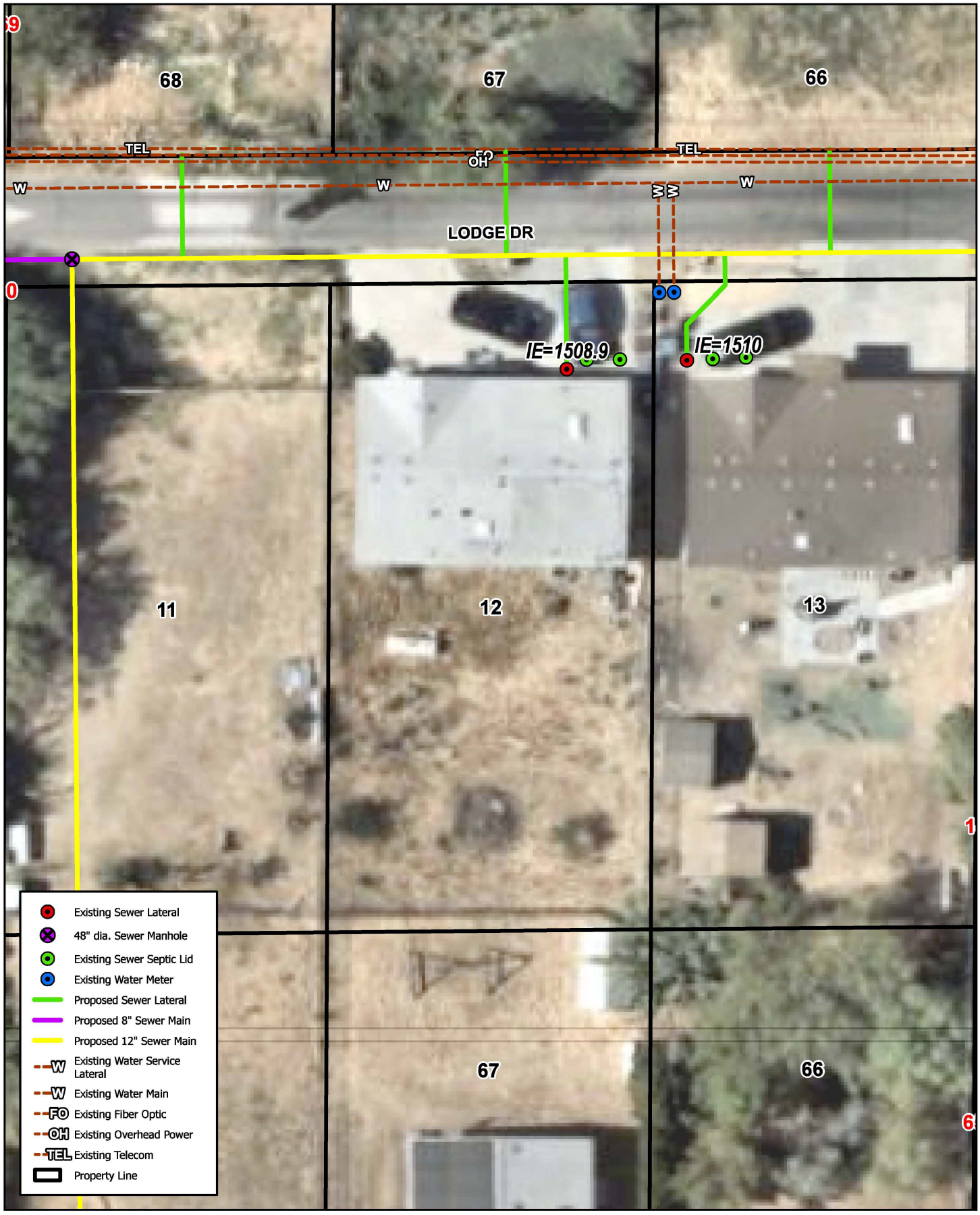
LOT #12

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

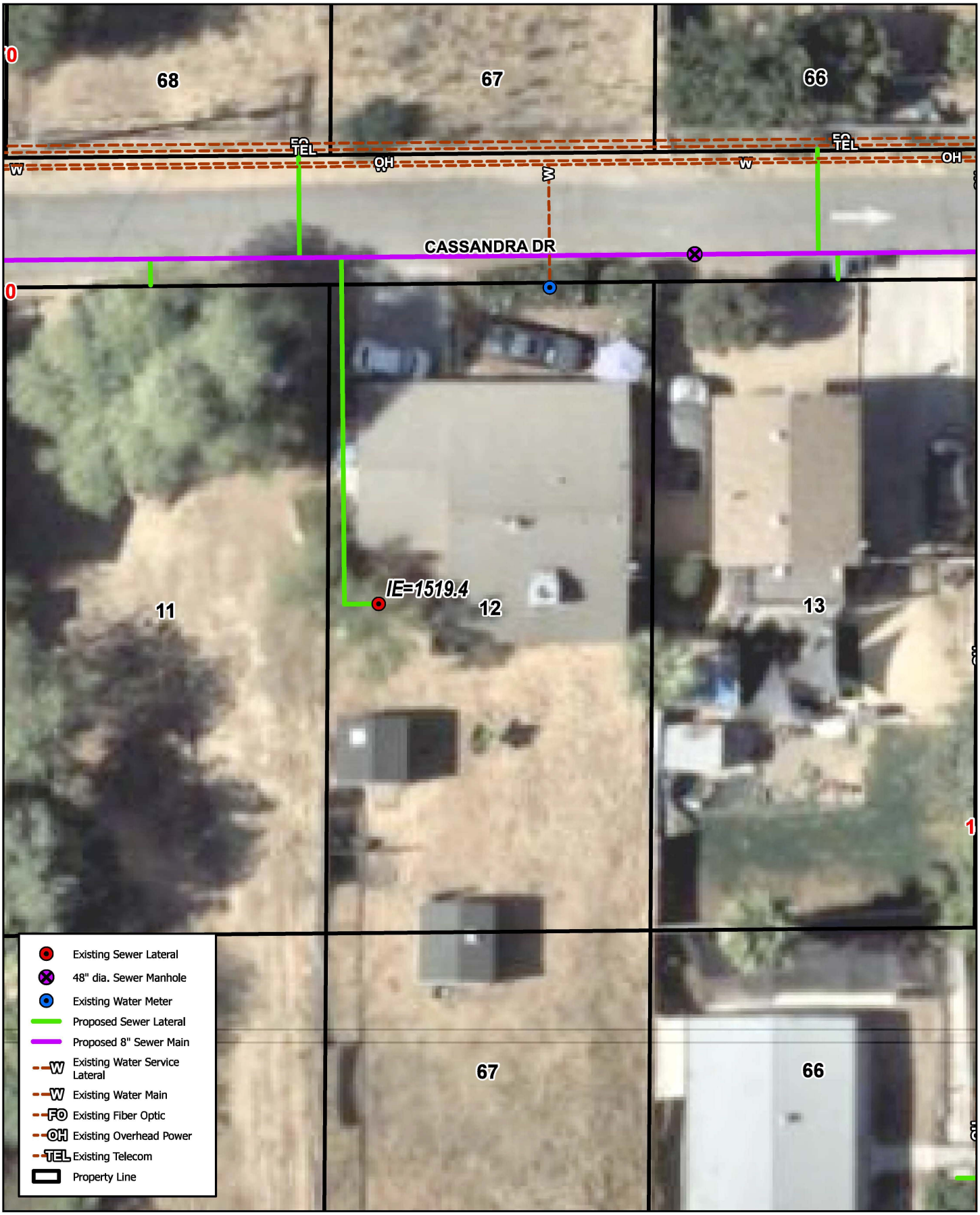


23613 LODGE DR, CANYON LAKE, CA 92587

LOT #12

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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Quail Valley - Subarea 4 Sewer Improvement Plans

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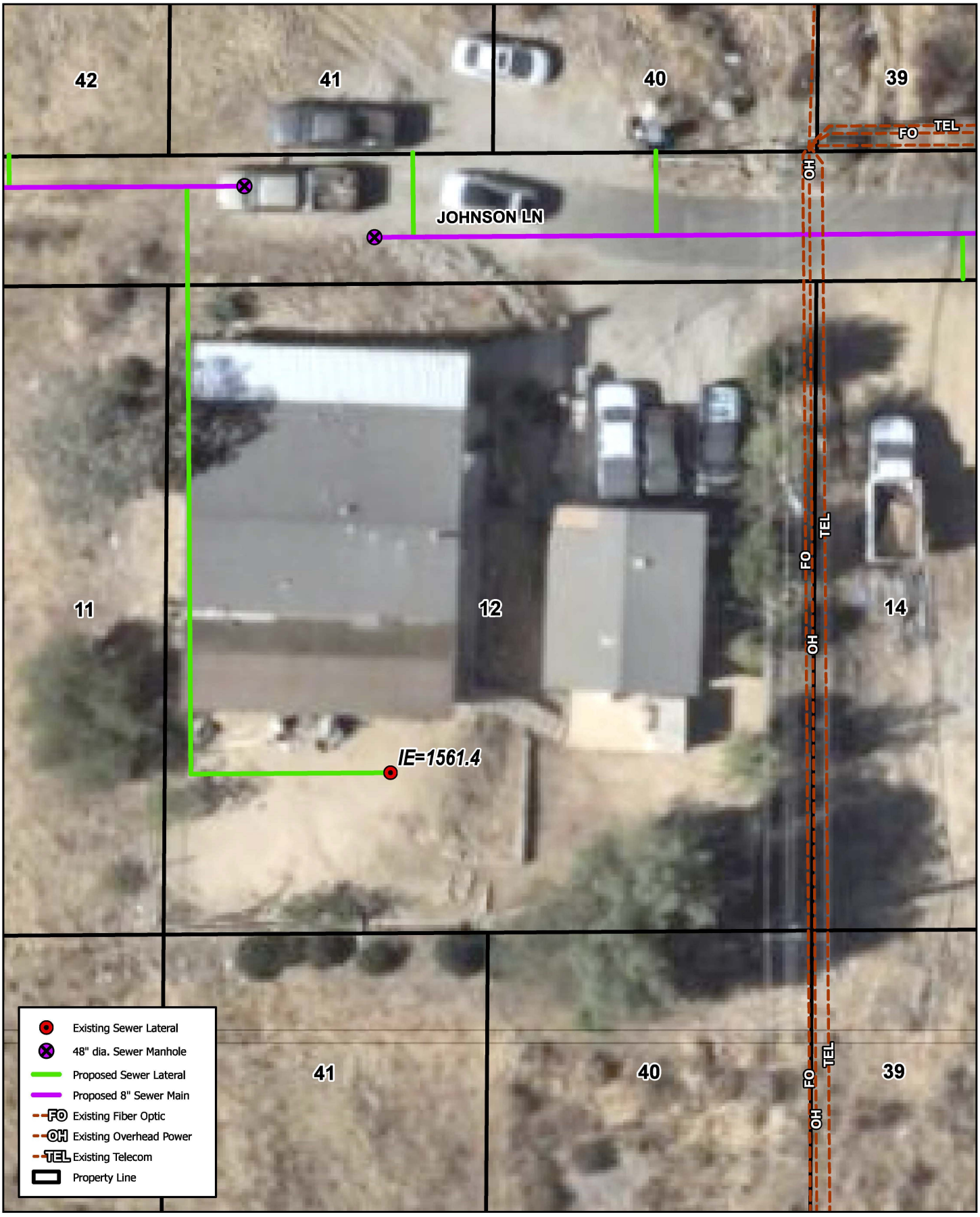

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Quail Valley - Subarea 4 Sewer Improvement Plans

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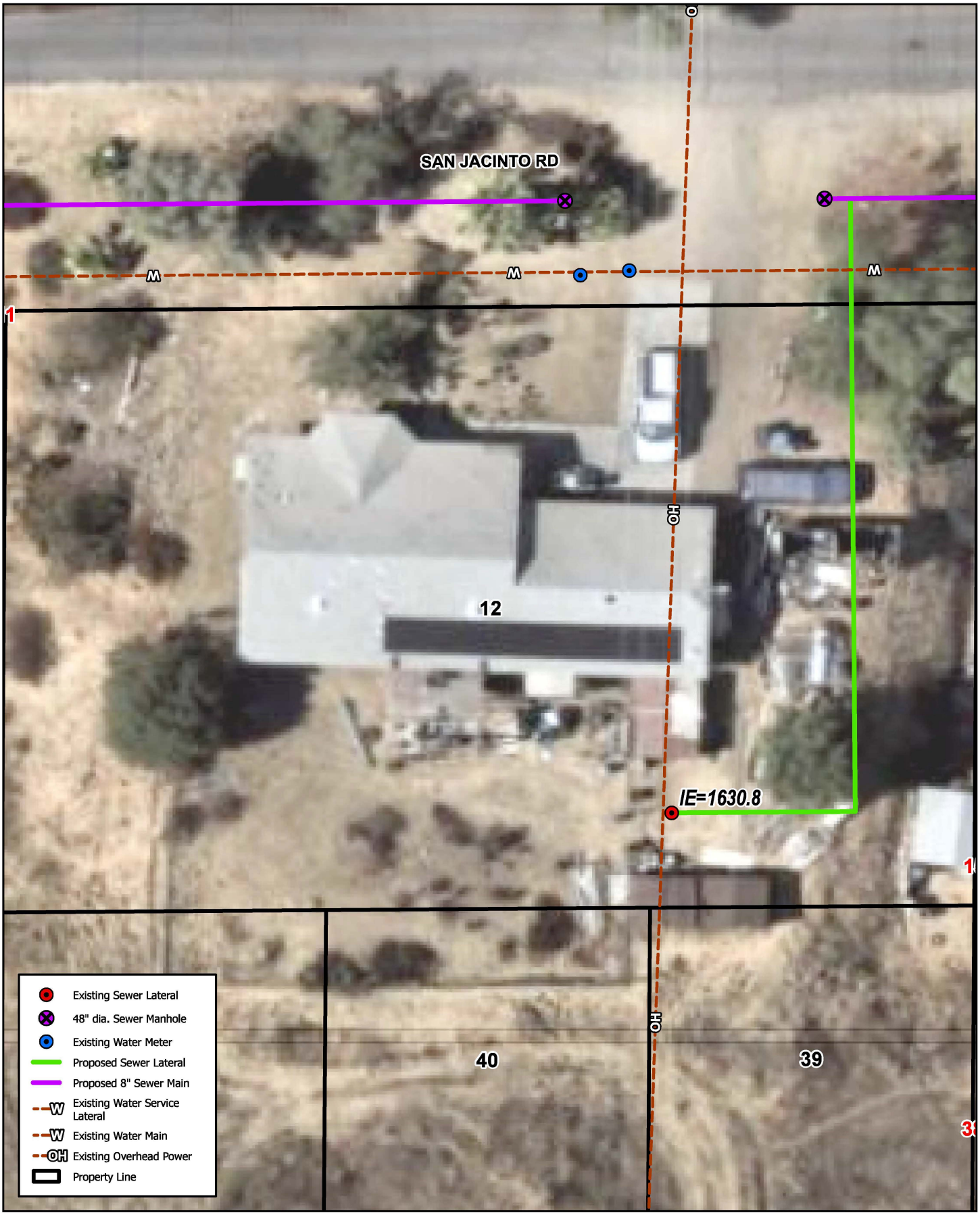

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LOT #12

Quail Valley - Subarea 4 Sewer Improvement Plans

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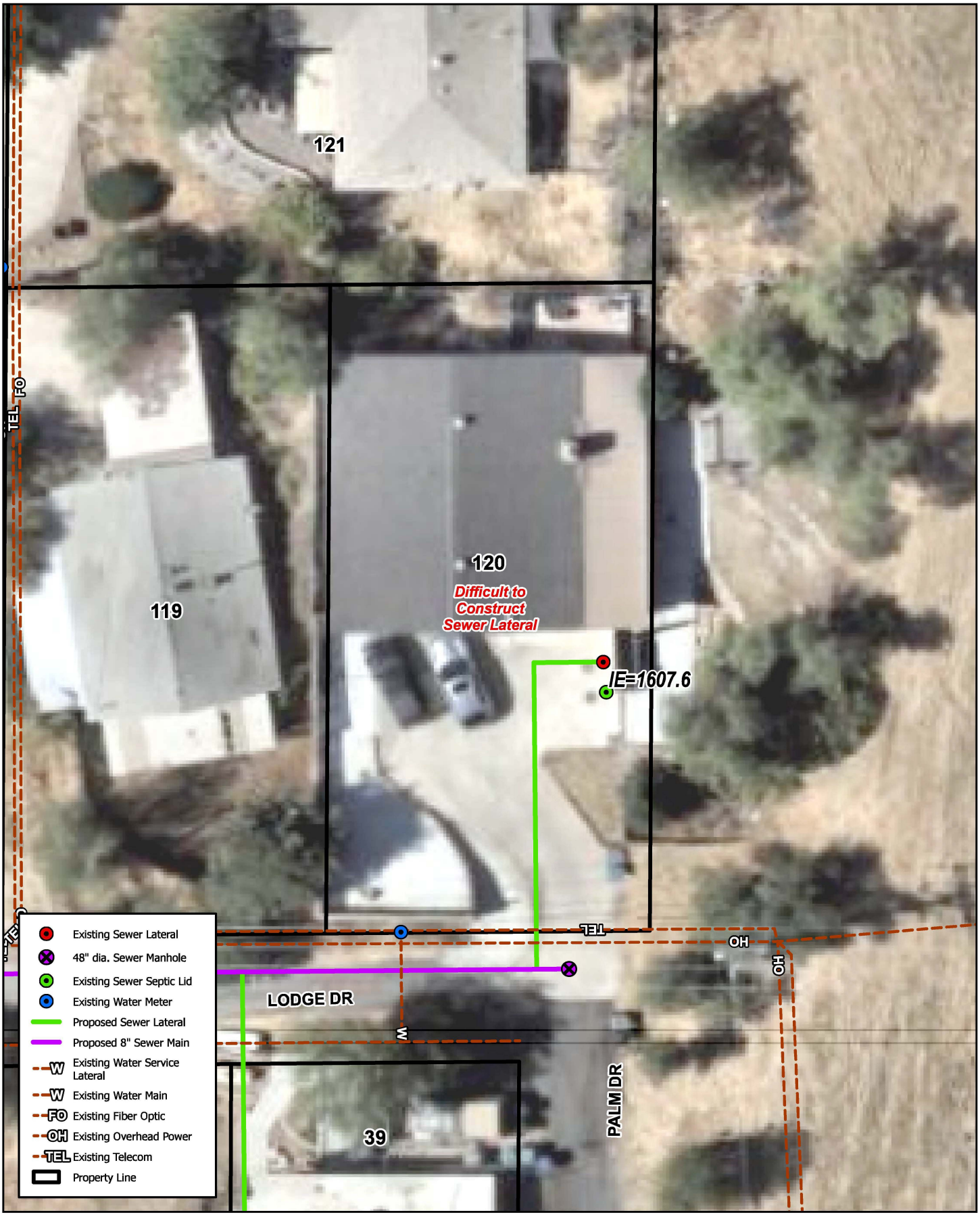

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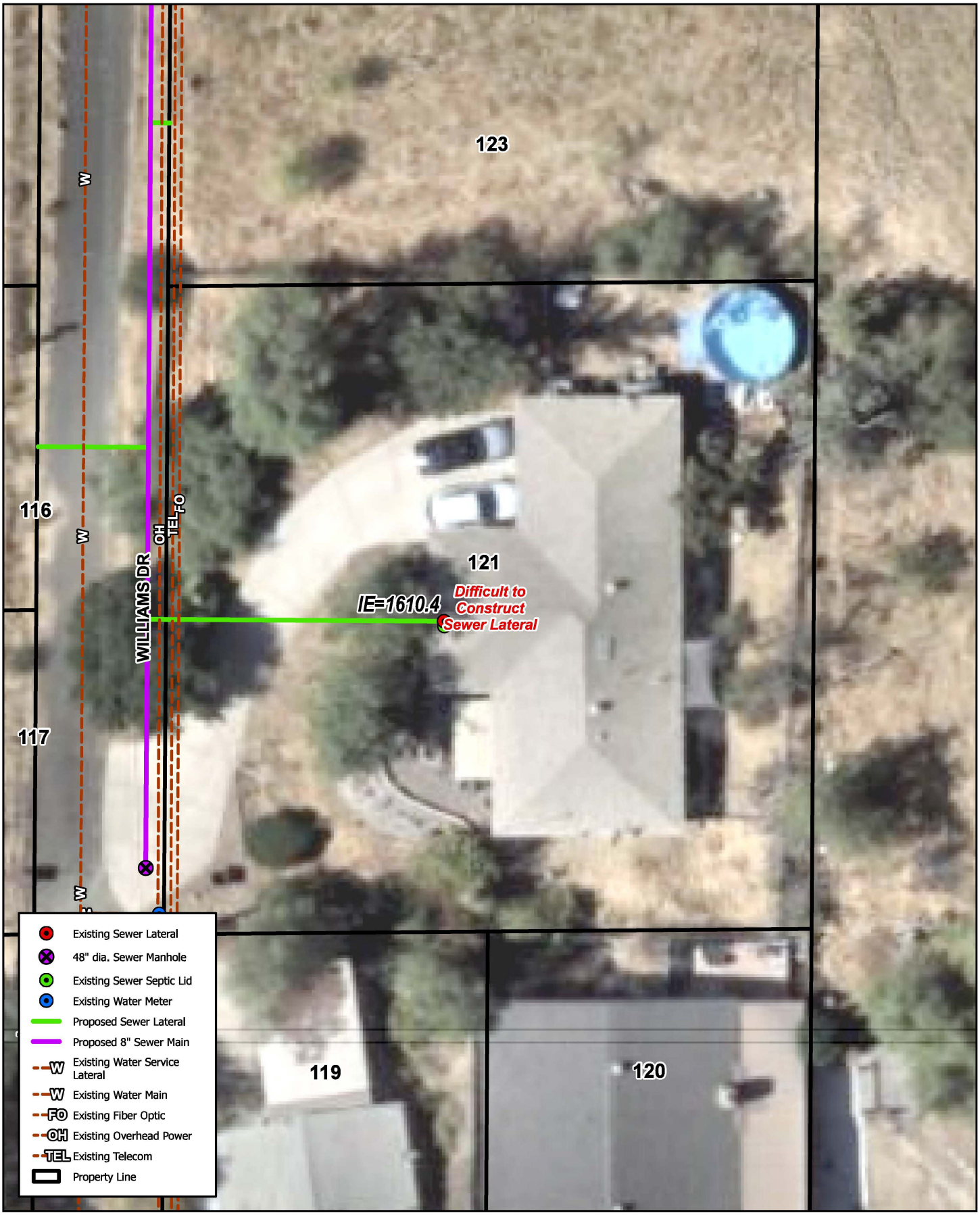
LOT #120

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

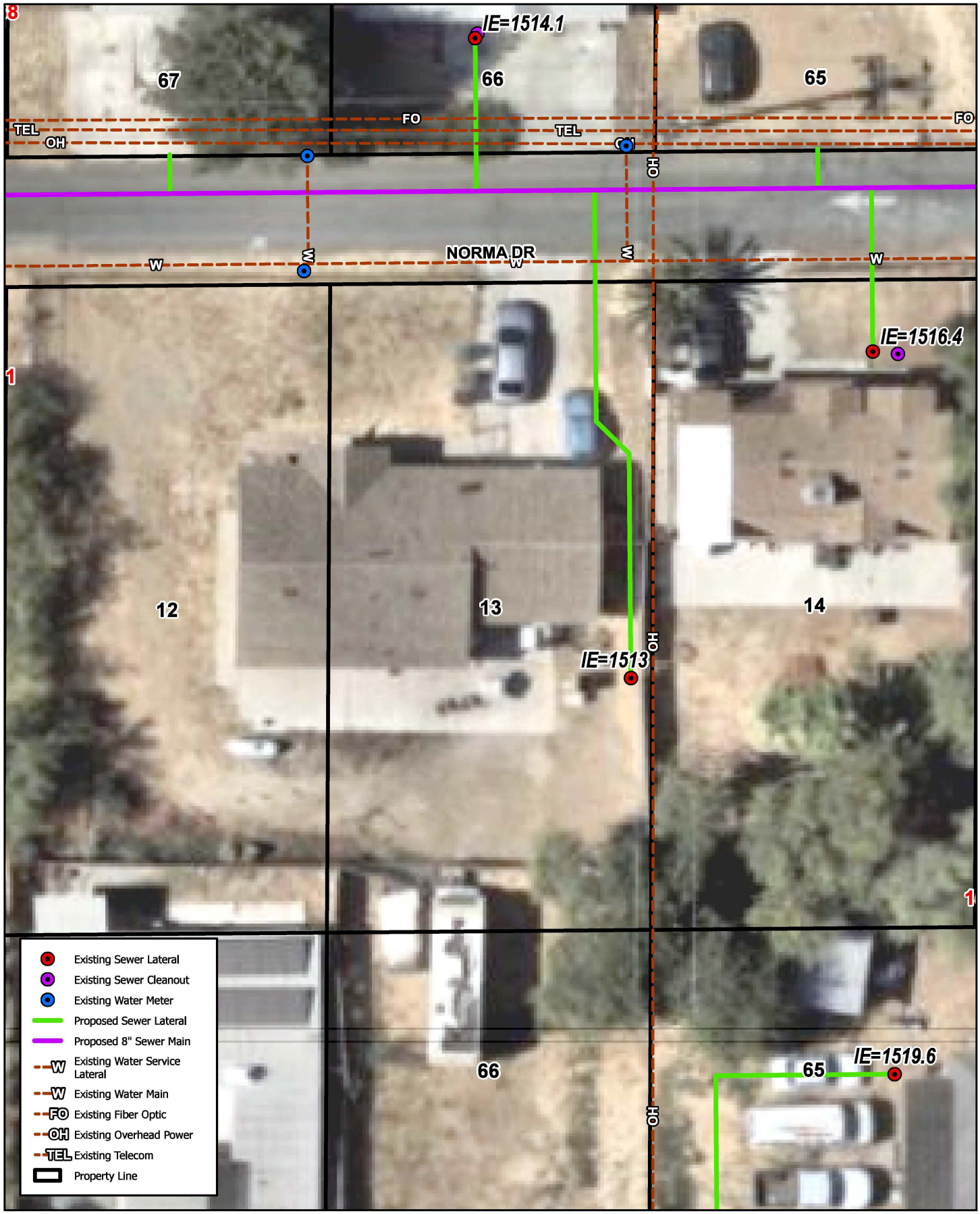


28720 WILLIAMS DR, CANYON LAKE, CA 92587

LOT #121

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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Quail Valley - Subarea 4 Sewer Improvement Plans

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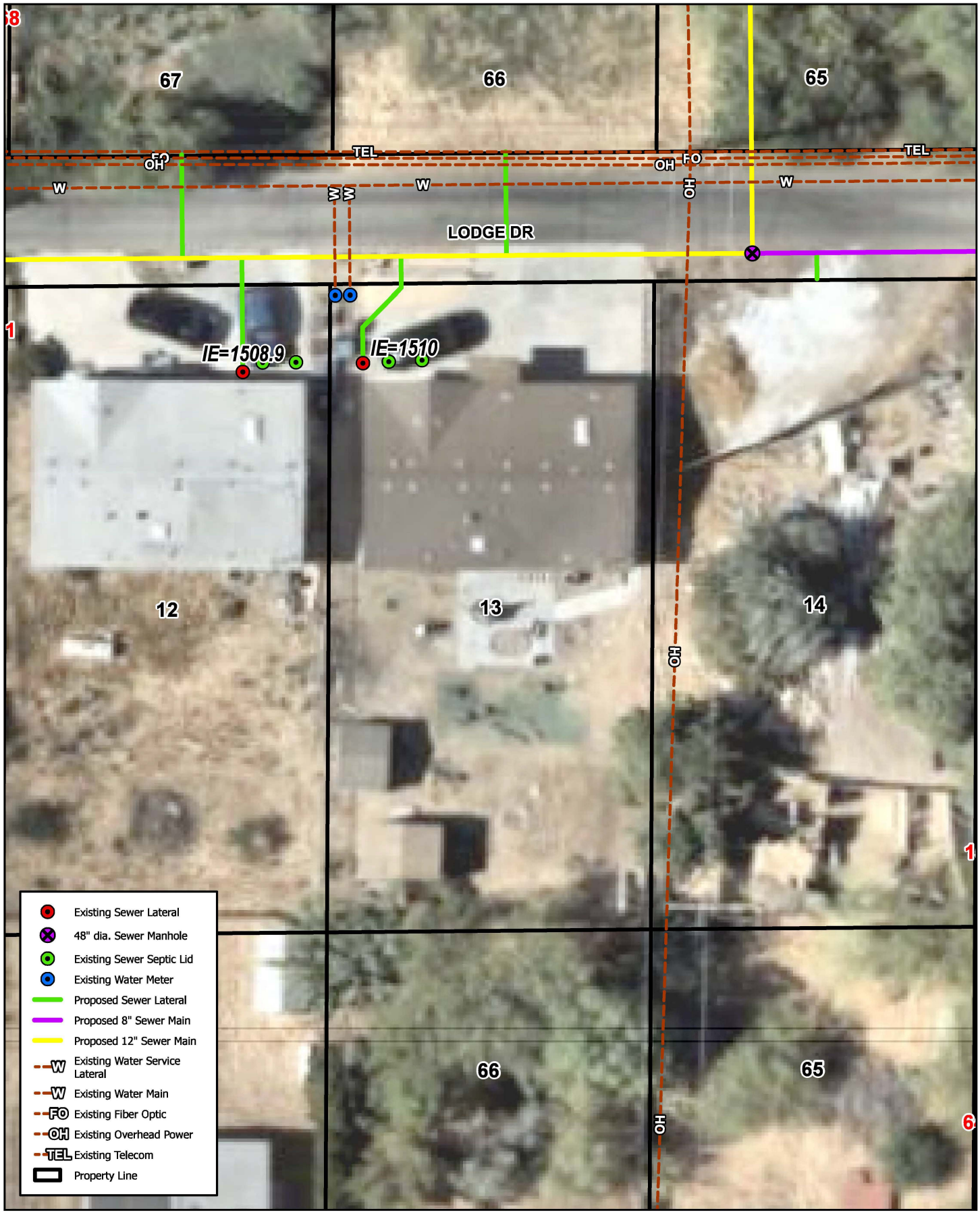

23625 LODGE DR, CANYON LAKE, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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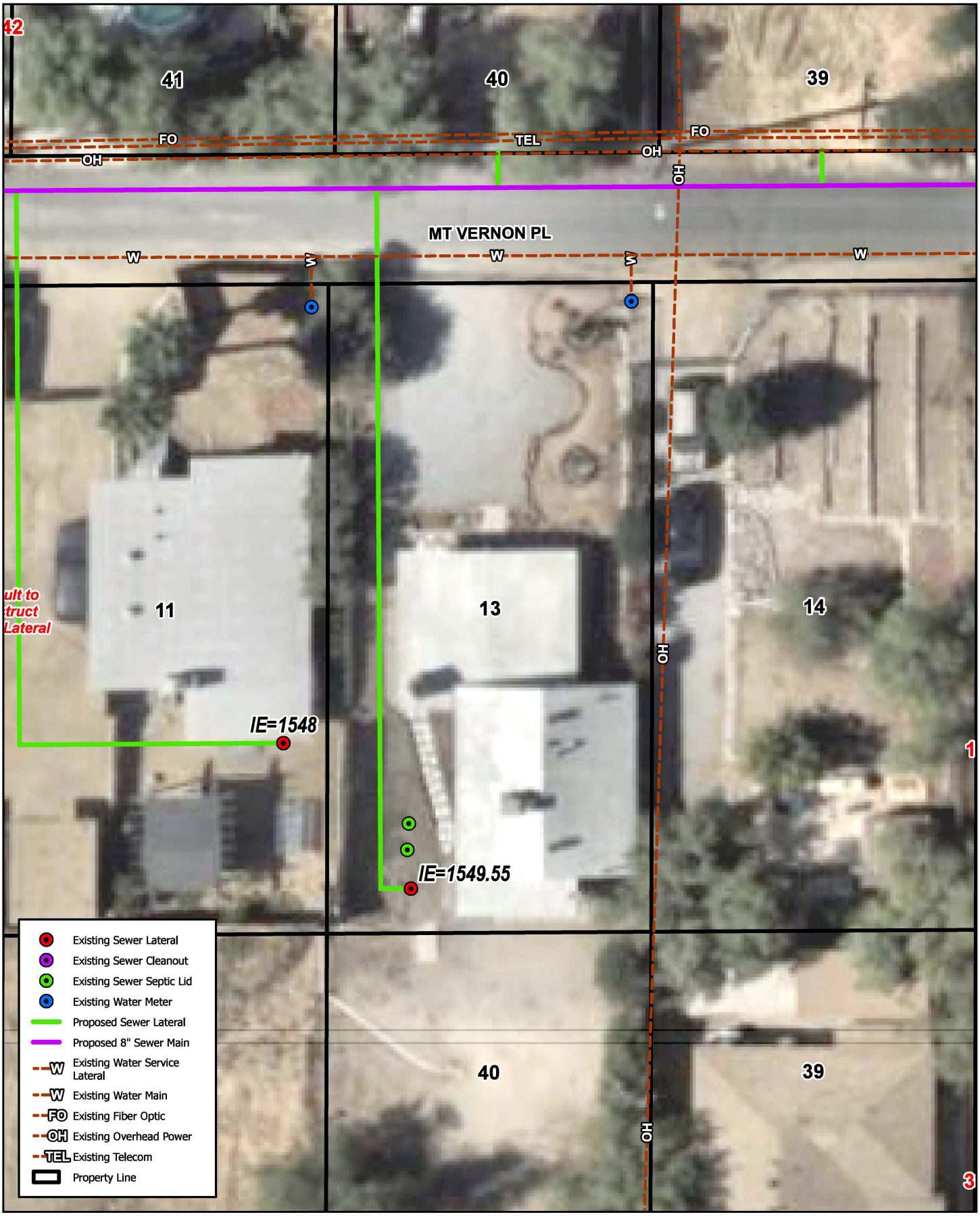

23625 MT VERNON PL, CANYON LAKE, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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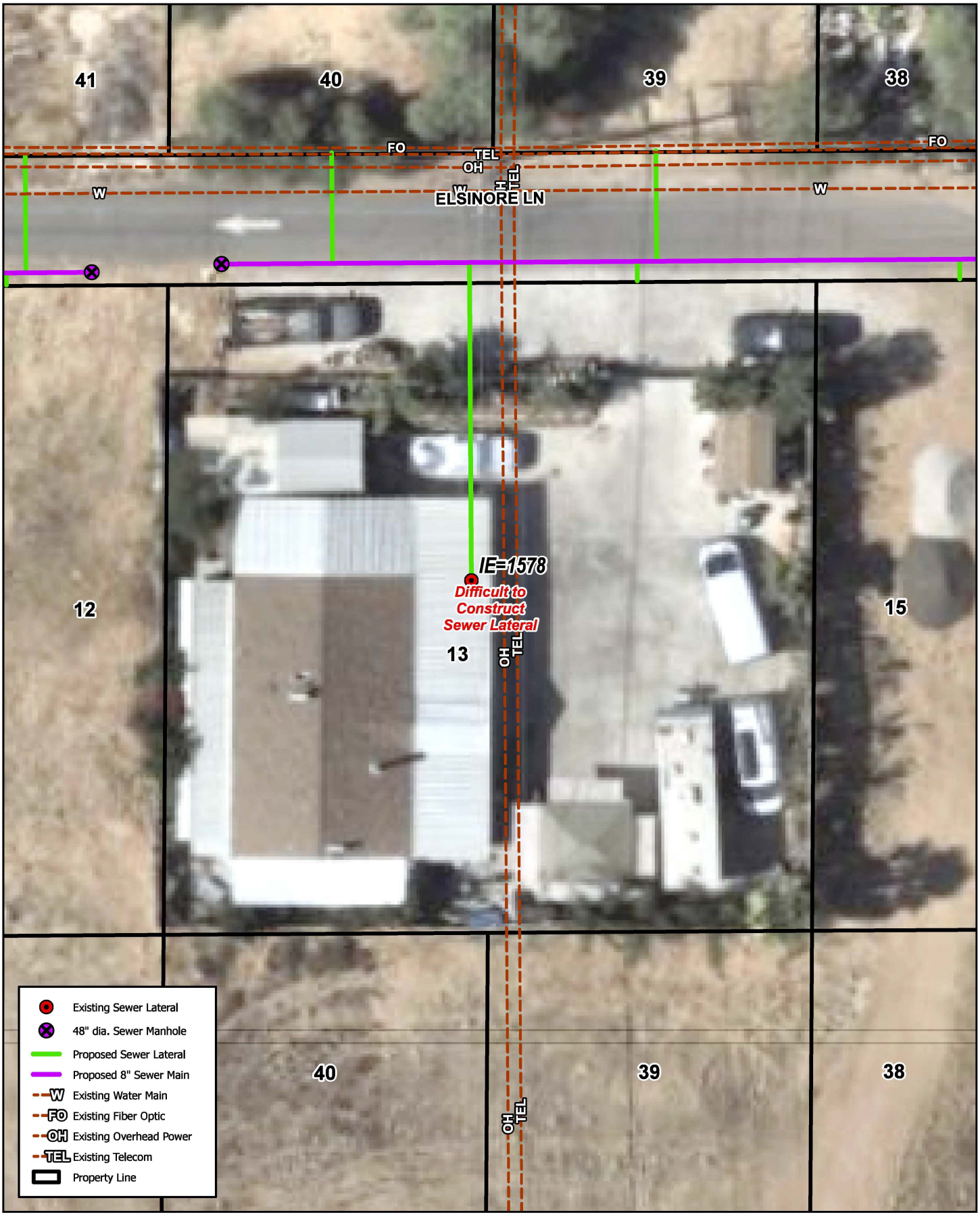

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Quail Valley - Subarea 4 Sewer Improvement Plans

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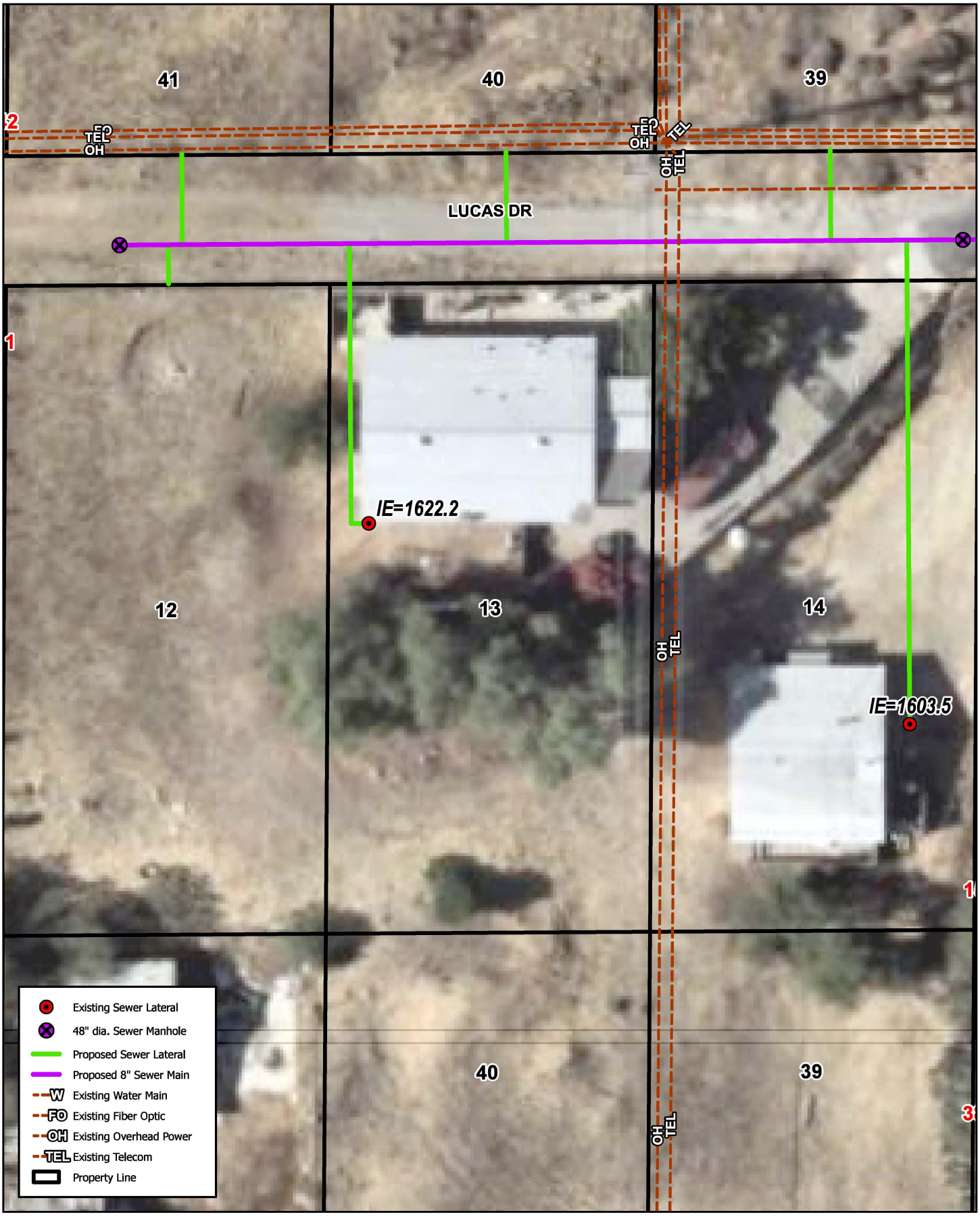

23887 LUCAS DR, CANYON LAKE, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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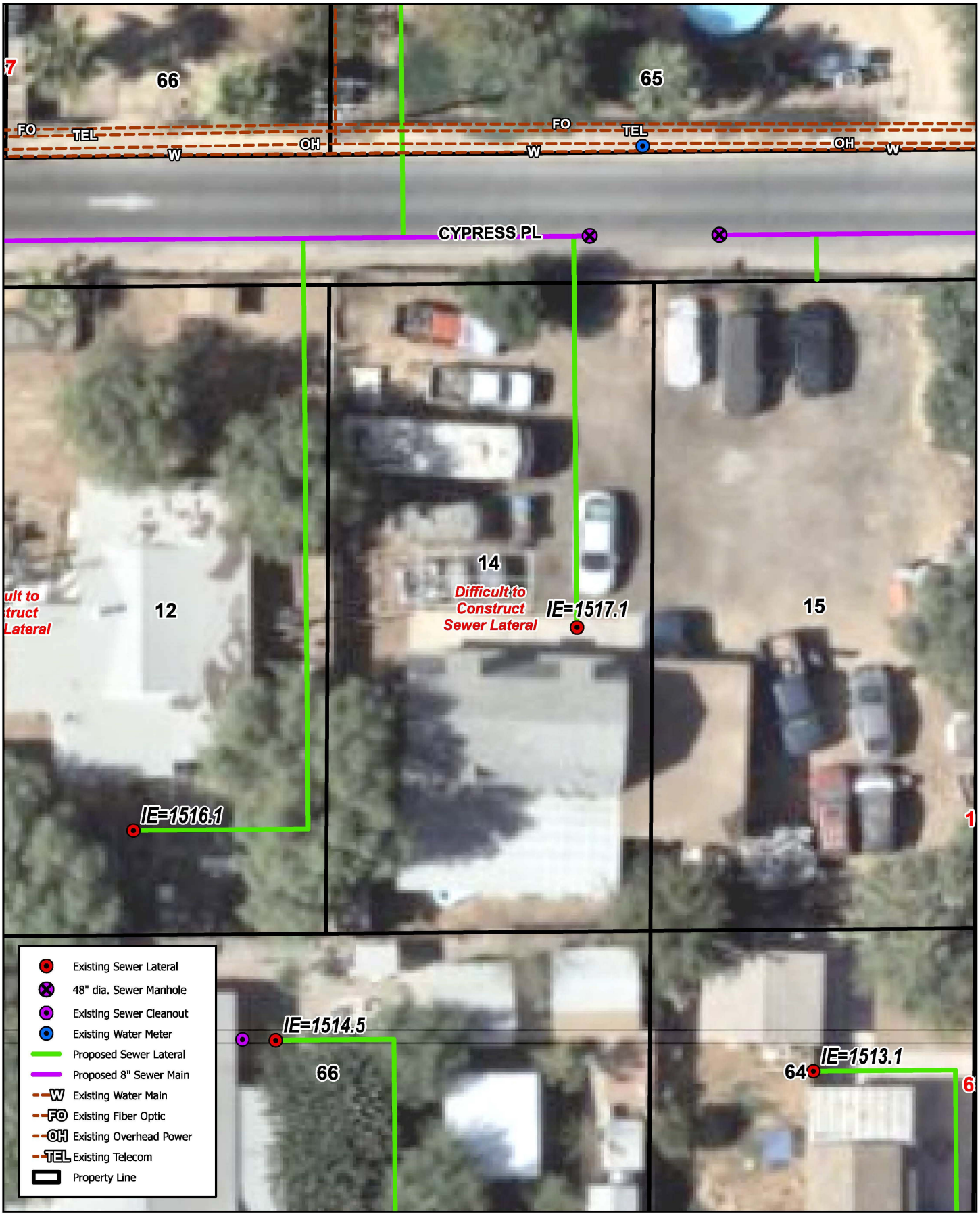
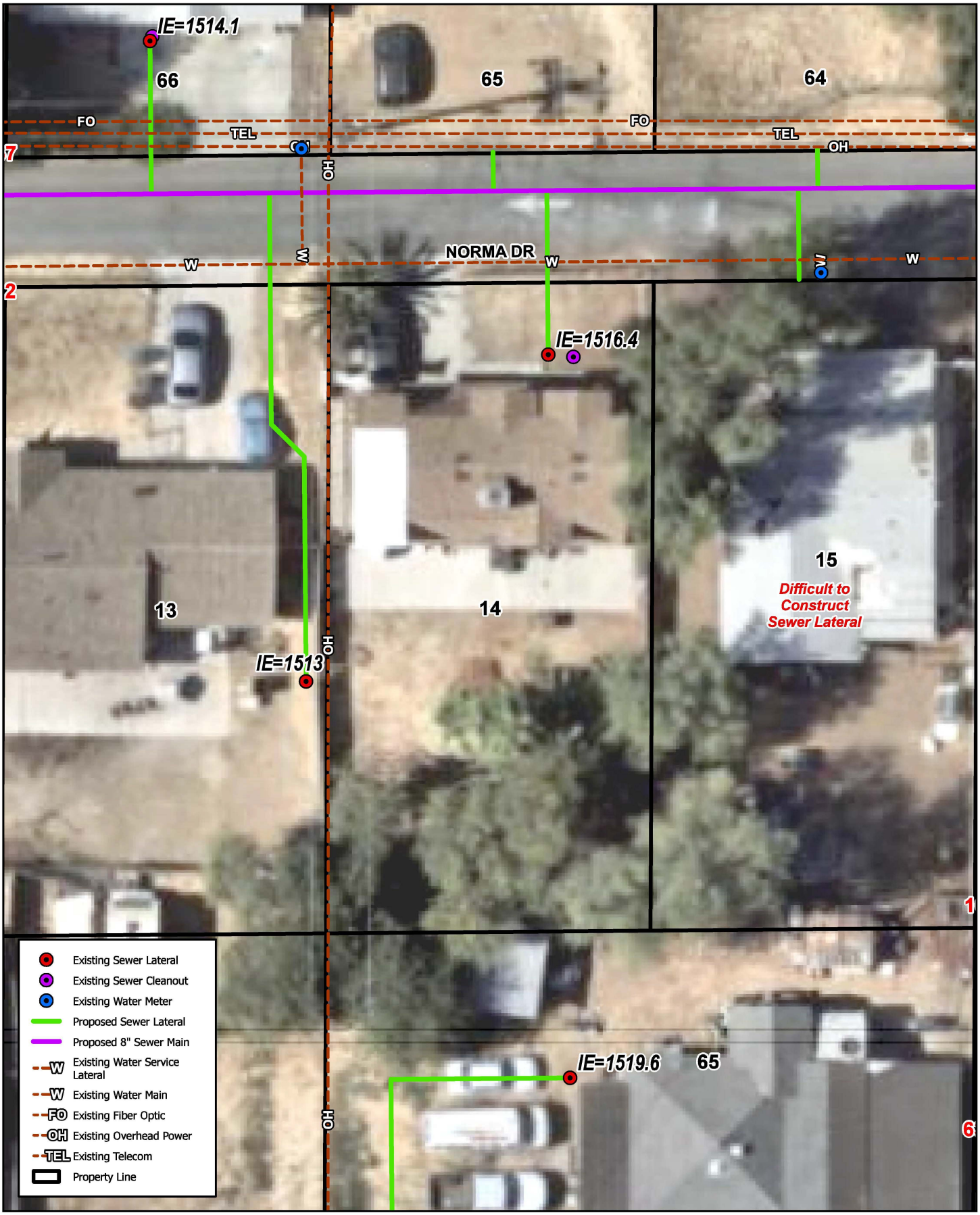


23645 CYPRESS PL, CANYON LAKE, CA 92587

LOT #14

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23635 NORMA DR, QUAIL VALLEY, CA 92587

LOT #14

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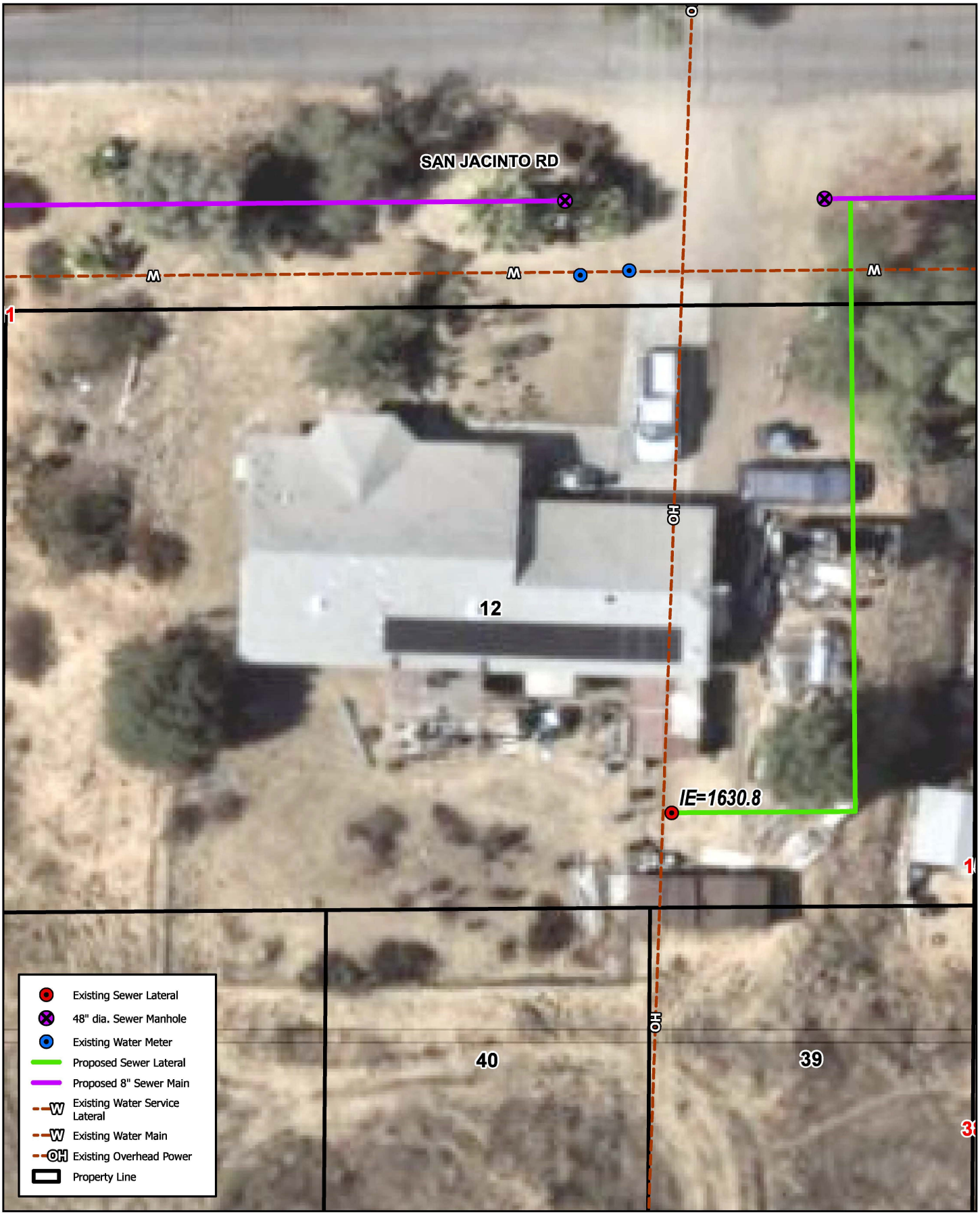
Quail Valley - Subarea 4 Sewer Improvement Plans



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Quail Valley - Subarea 4 Sewer Improvement Plans

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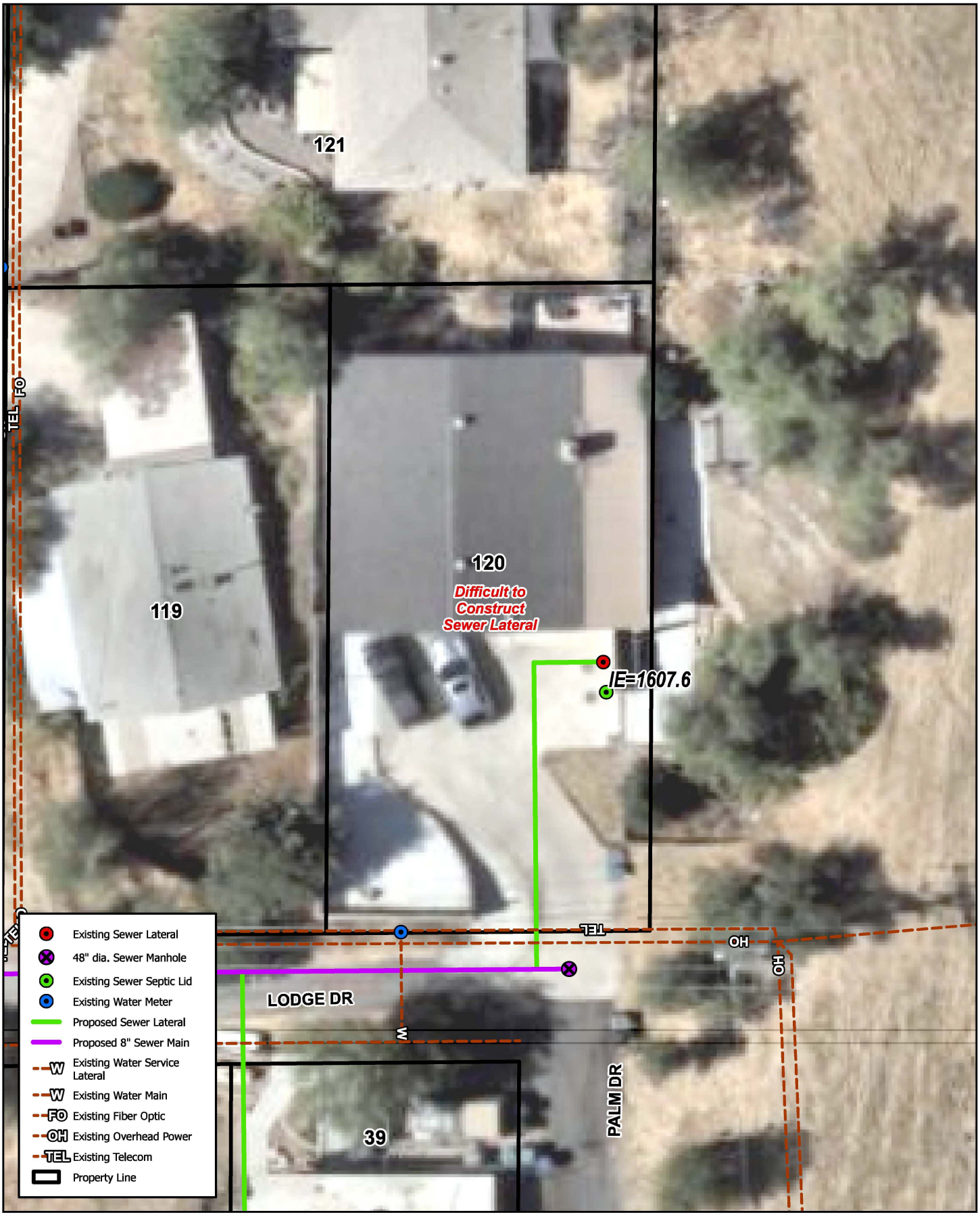

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LOT #120

Quail Valley - Subarea 4 Sewer Improvement Plans

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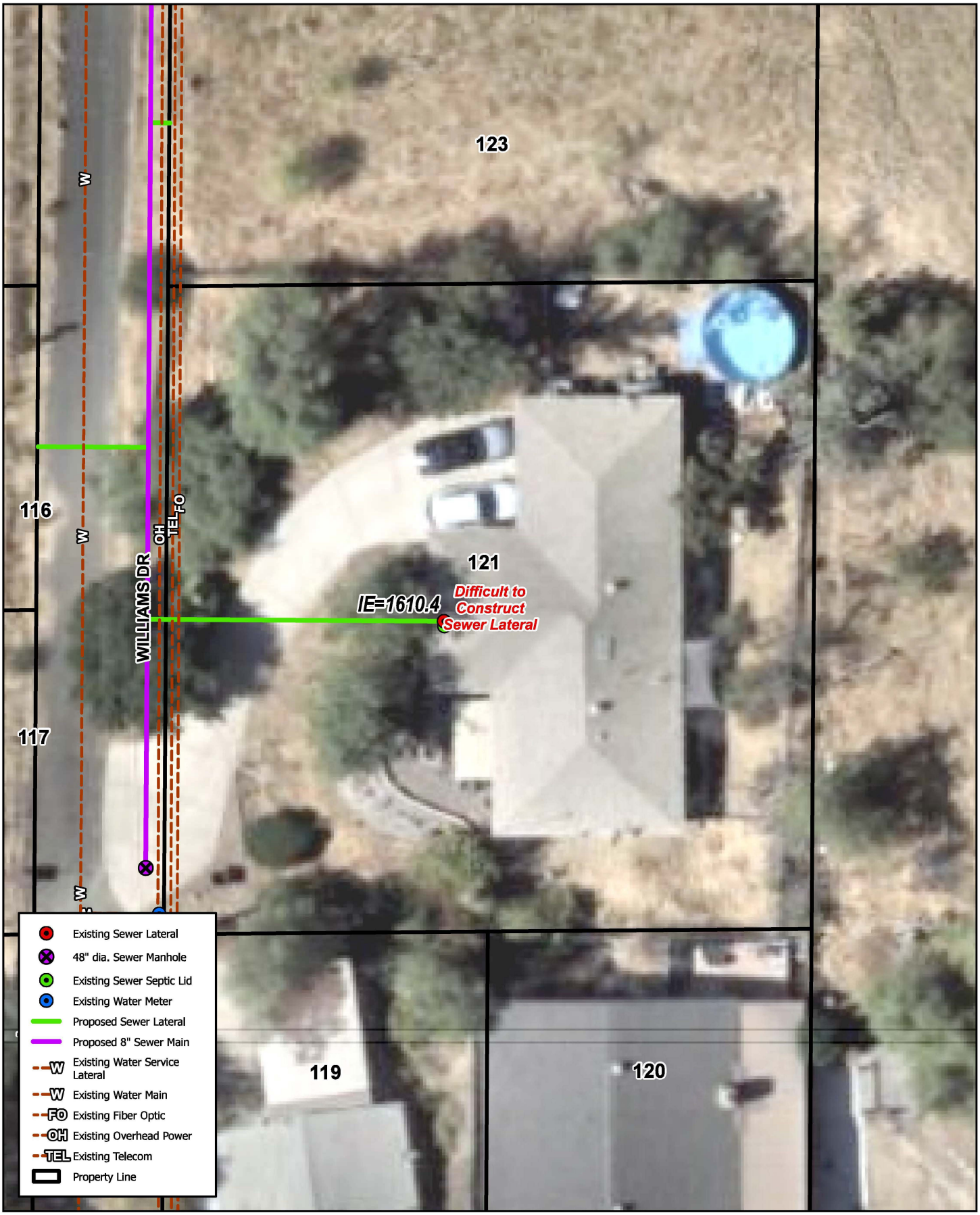

28720 WILLIAMS DR, CANYON LAKE, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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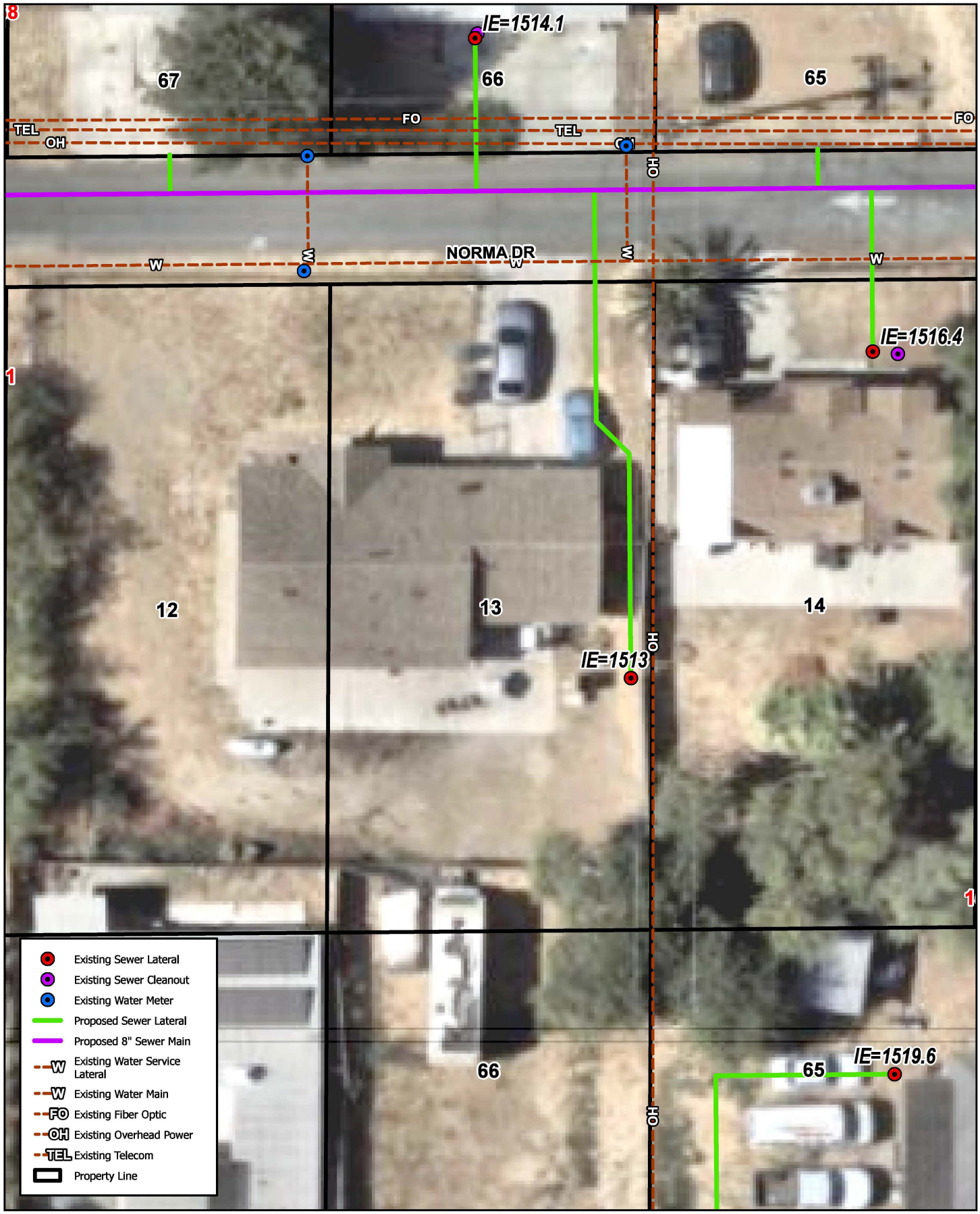

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LOT #13

Quail Valley - Subarea 4 Sewer Improvement Plans

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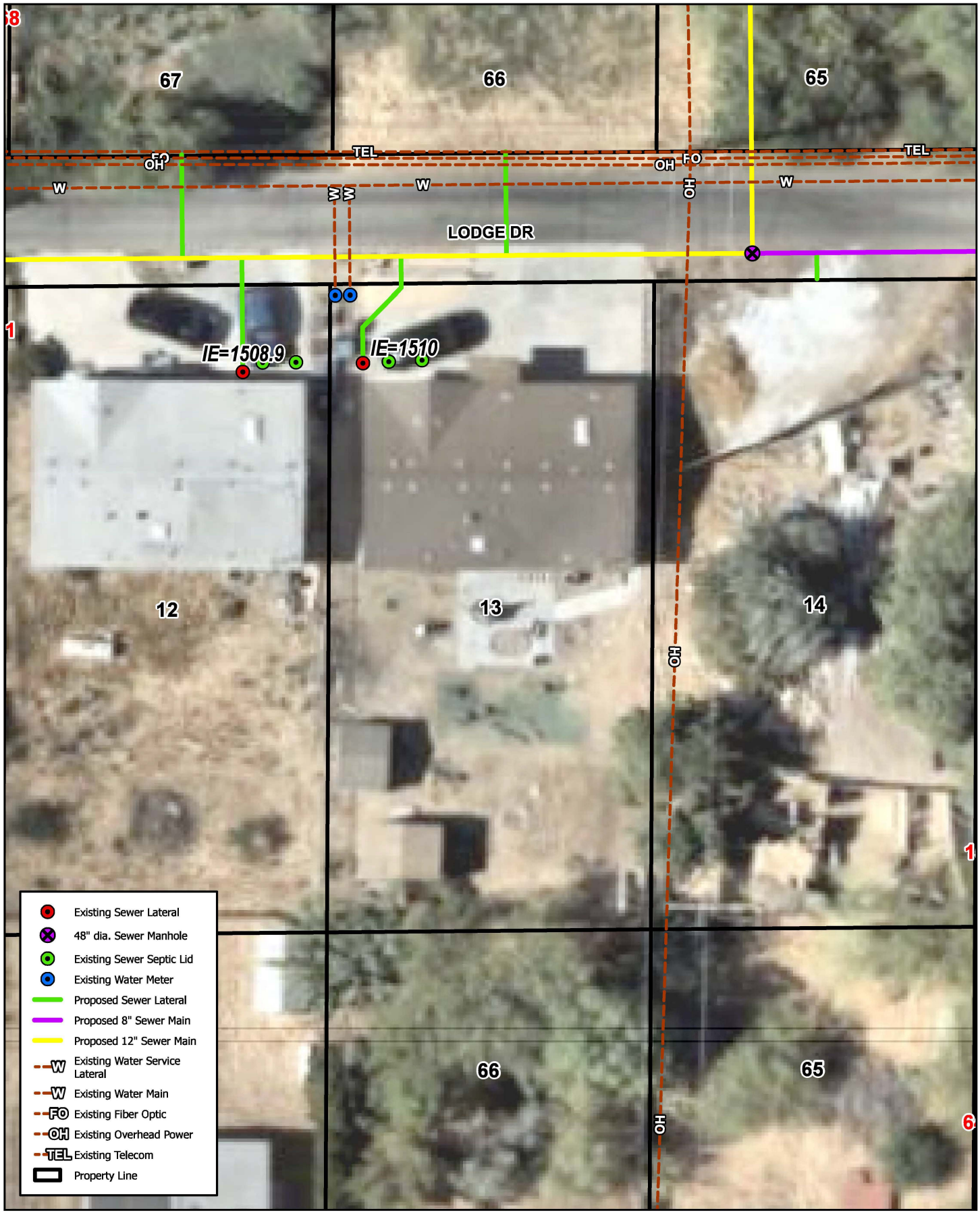

23625 LODGE DR, CANYON LAKE, CA 92587

LOT #13

Quail Valley - Subarea 4 Sewer Improvement Plans

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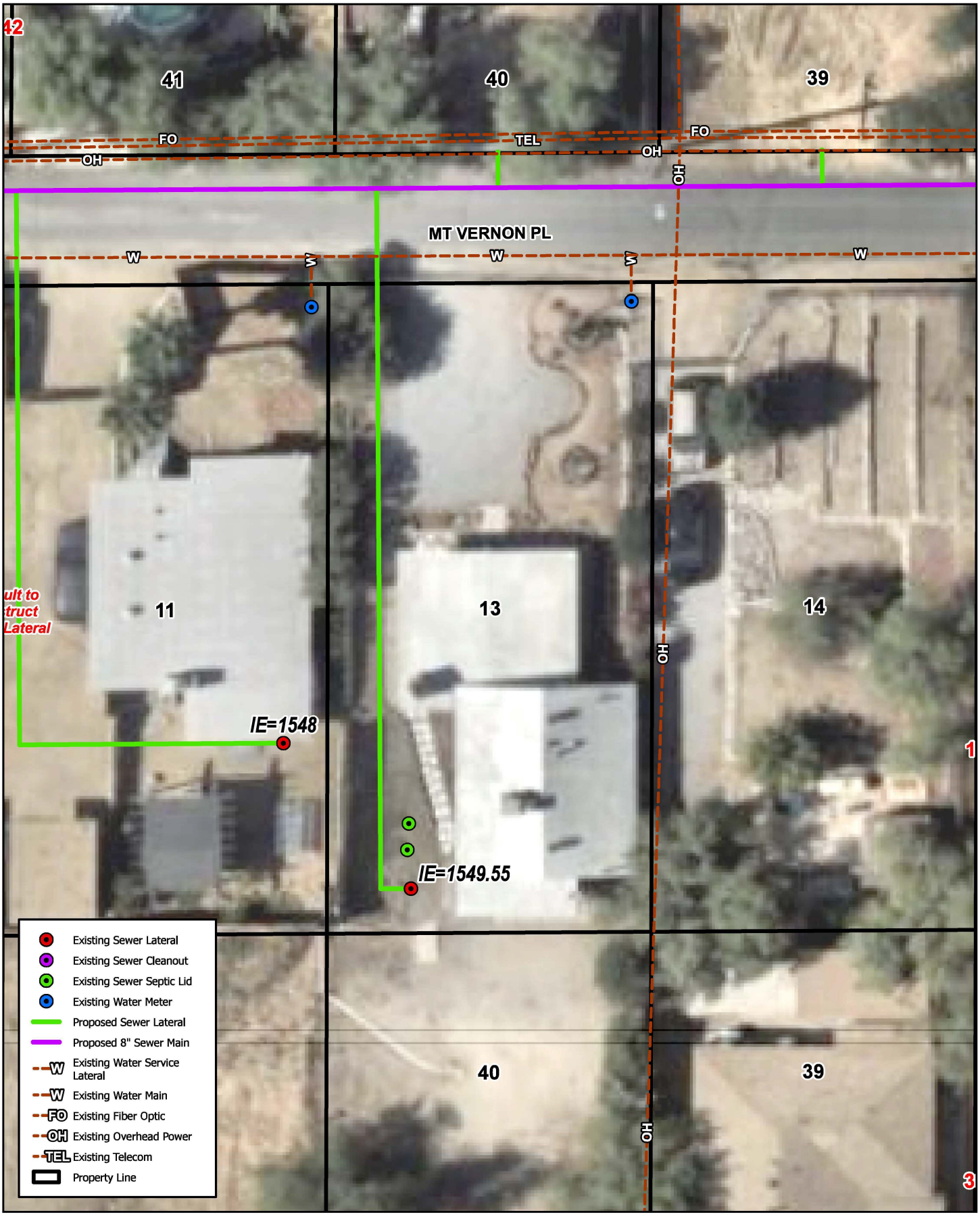

23625 MT VERNON PL, CANYON LAKE, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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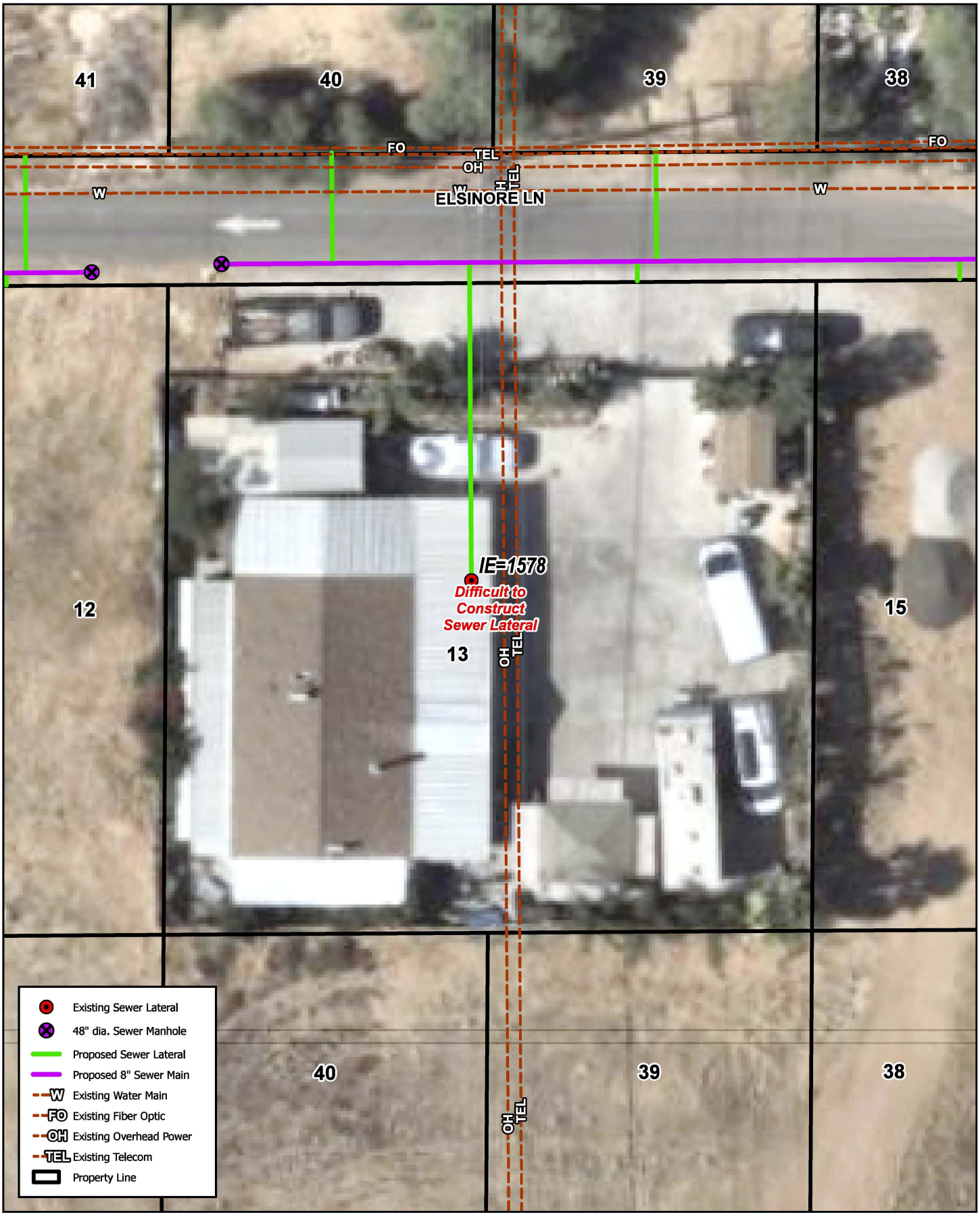

23875 ELSINORE LN, CANYON LAKE, CA 92587

LOT #13

Quail Valley - Subarea 4 Sewer Improvement Plans

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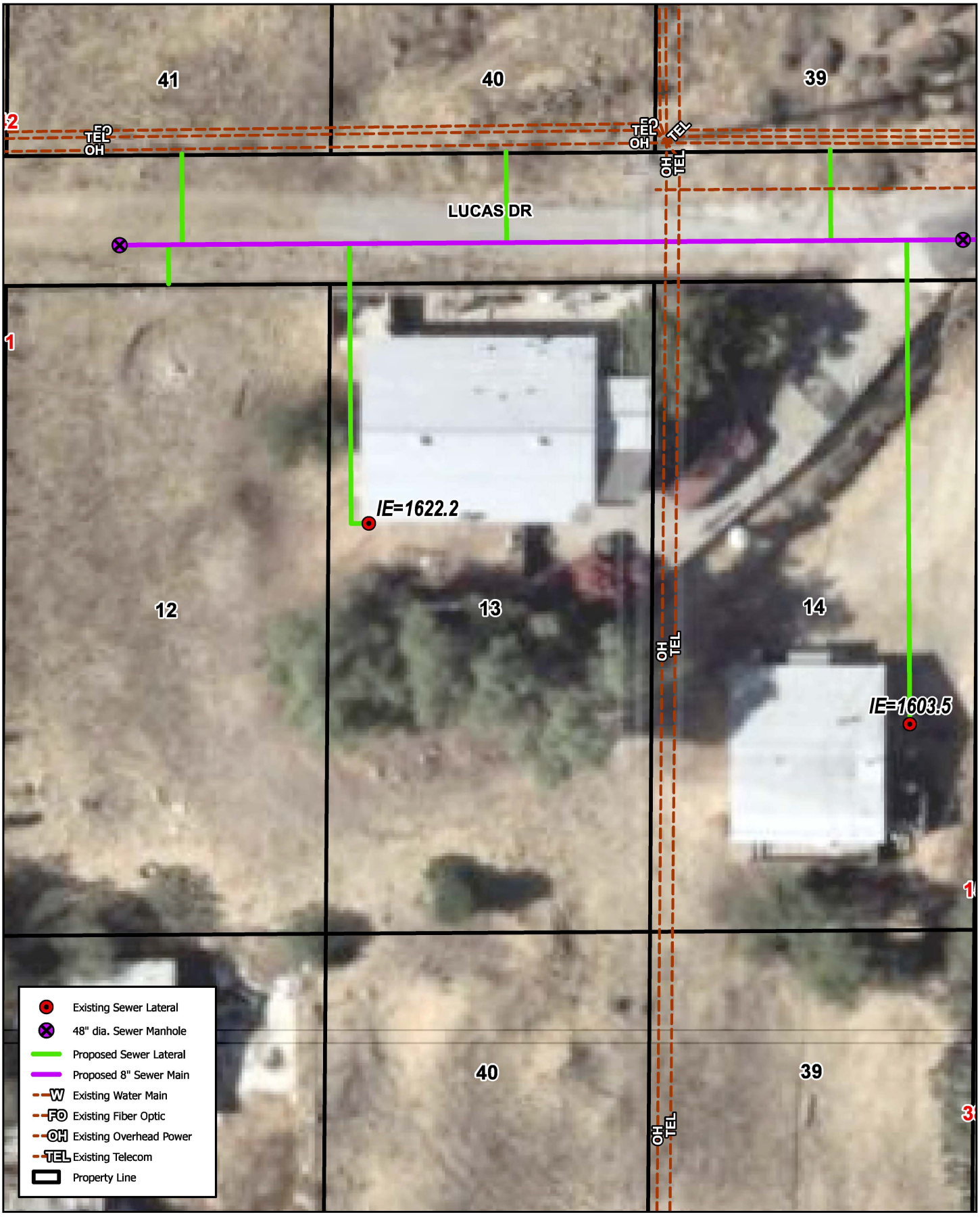

23887 LUCAS DR, CANYON LAKE, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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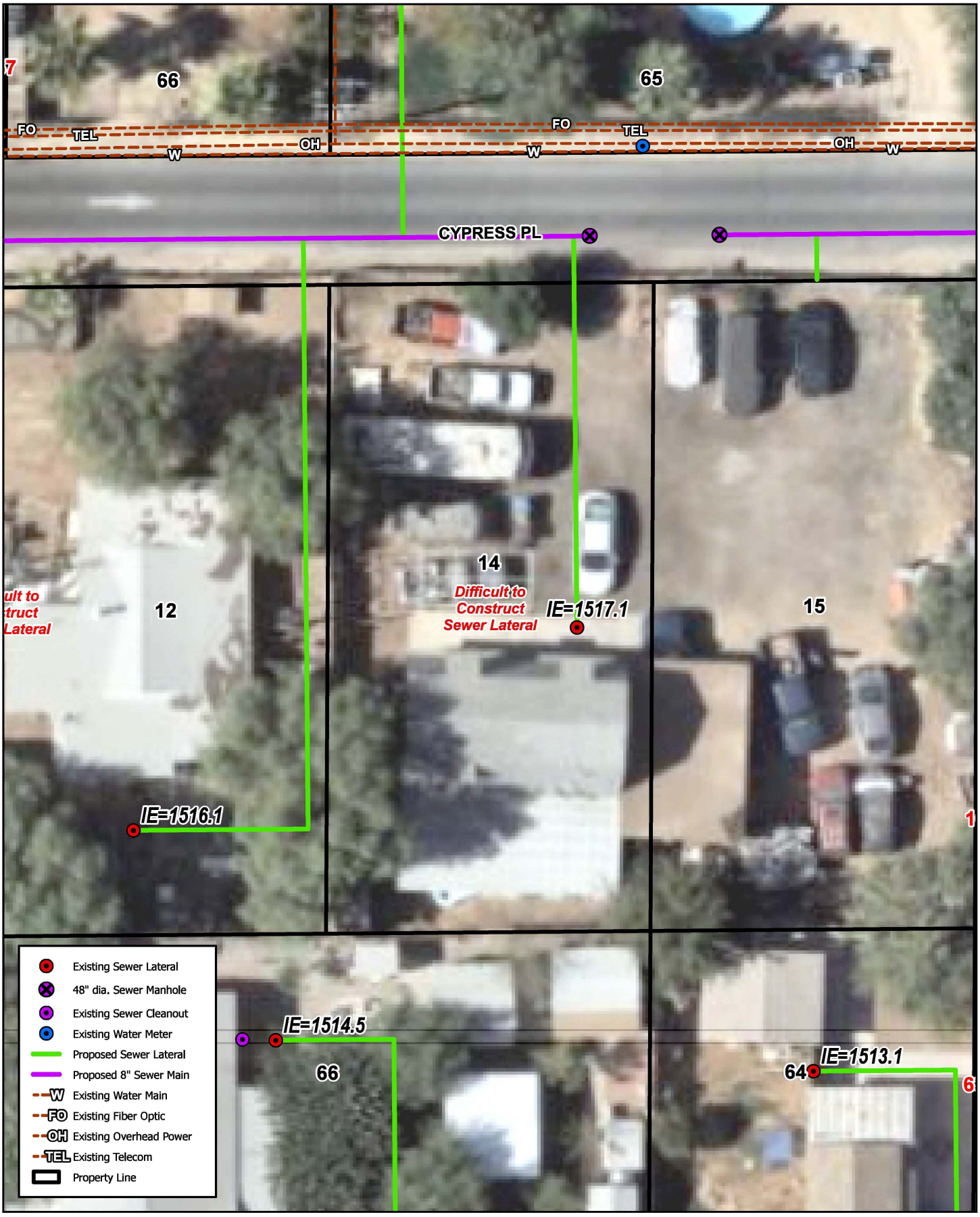

23645 CYPRESS PL, CANYON LAKE, CA 92587

LOT #14

Quail Valley - Subarea 4 Sewer Improvement Plans

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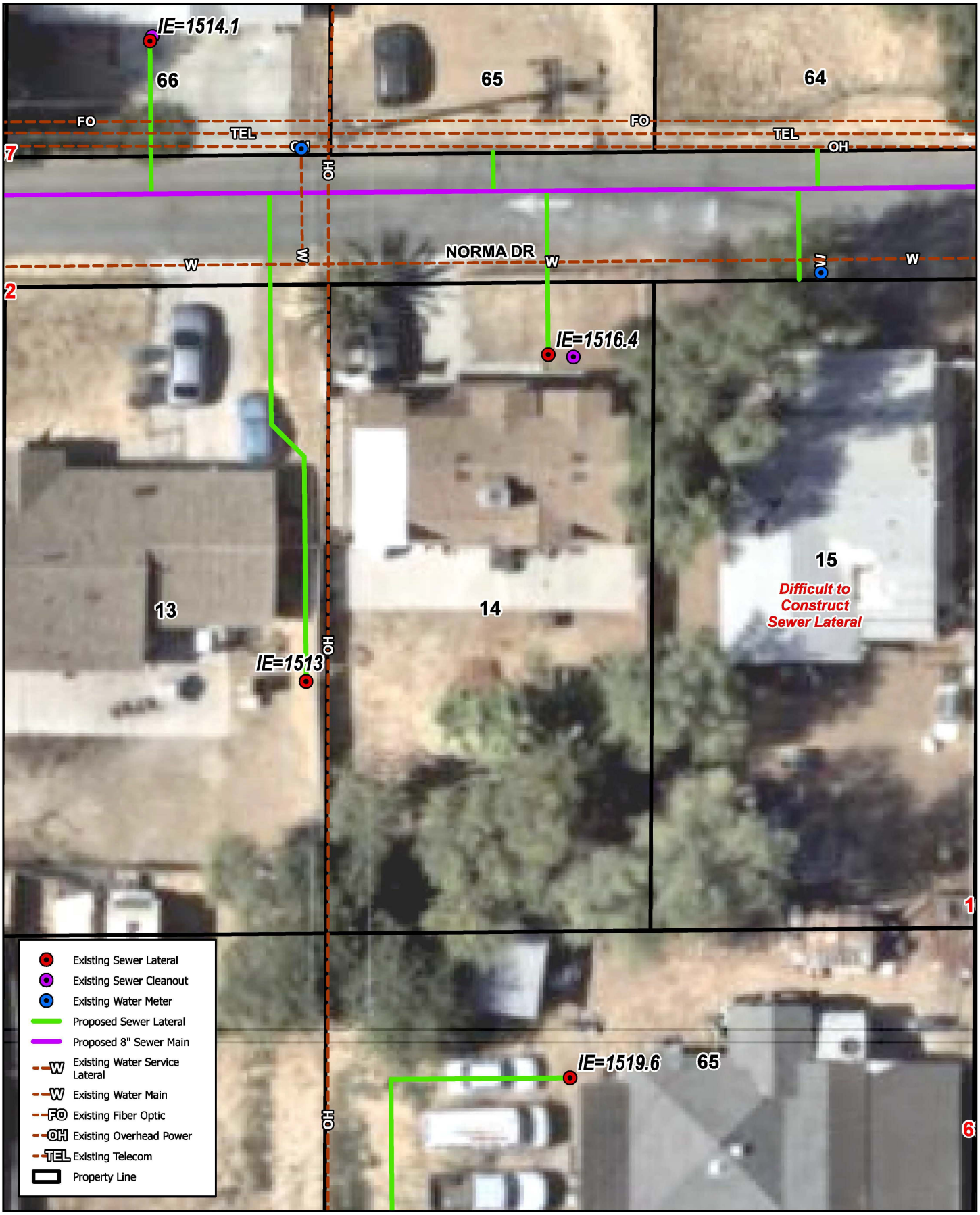

23635 NORMA DR, QUAIL VALLEY, CA 92587

LOT #14

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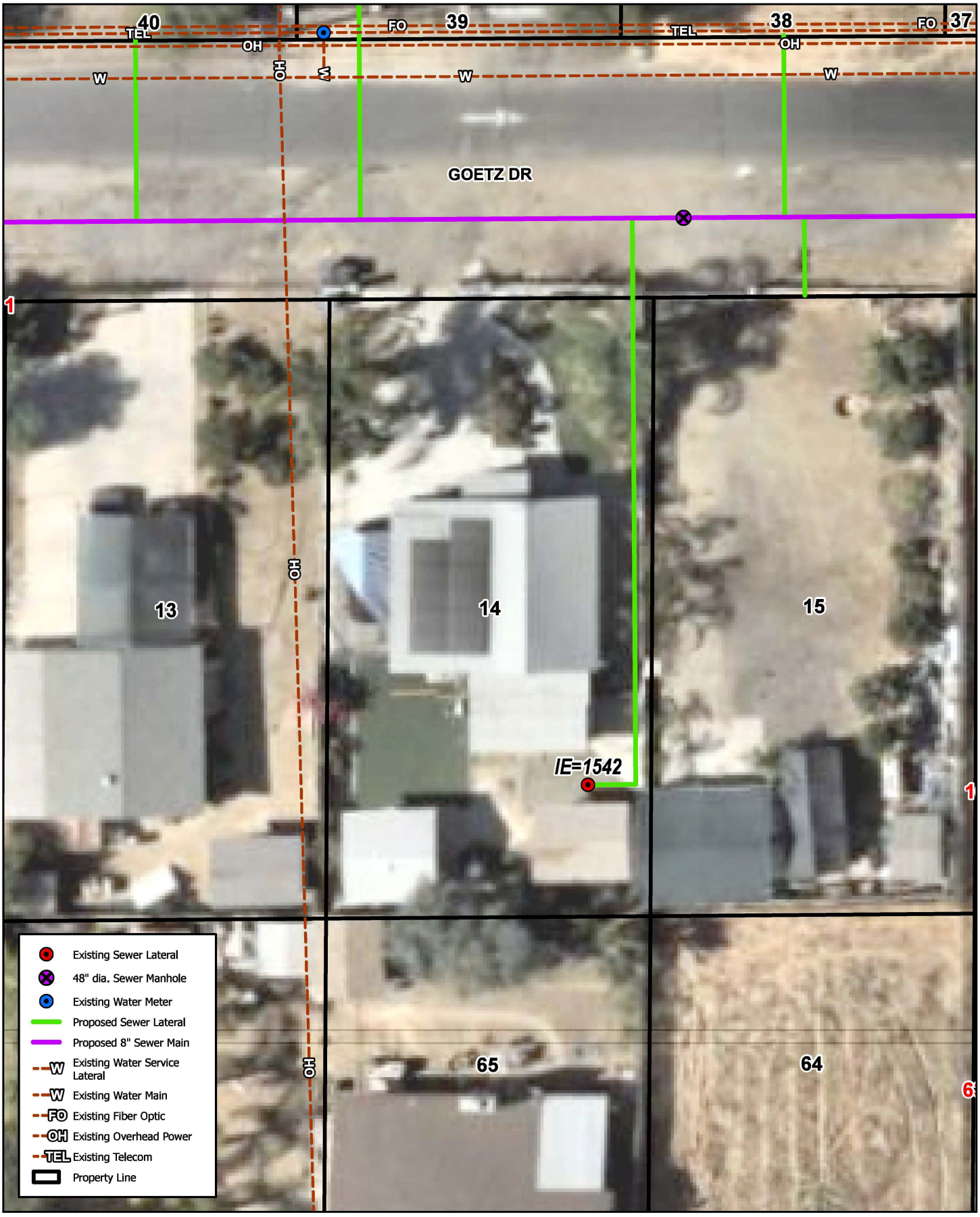
Quail Valley - Subarea 4 Sewer Improvement Plans



23633 GOETZ DRIVE, CANYON LAKE, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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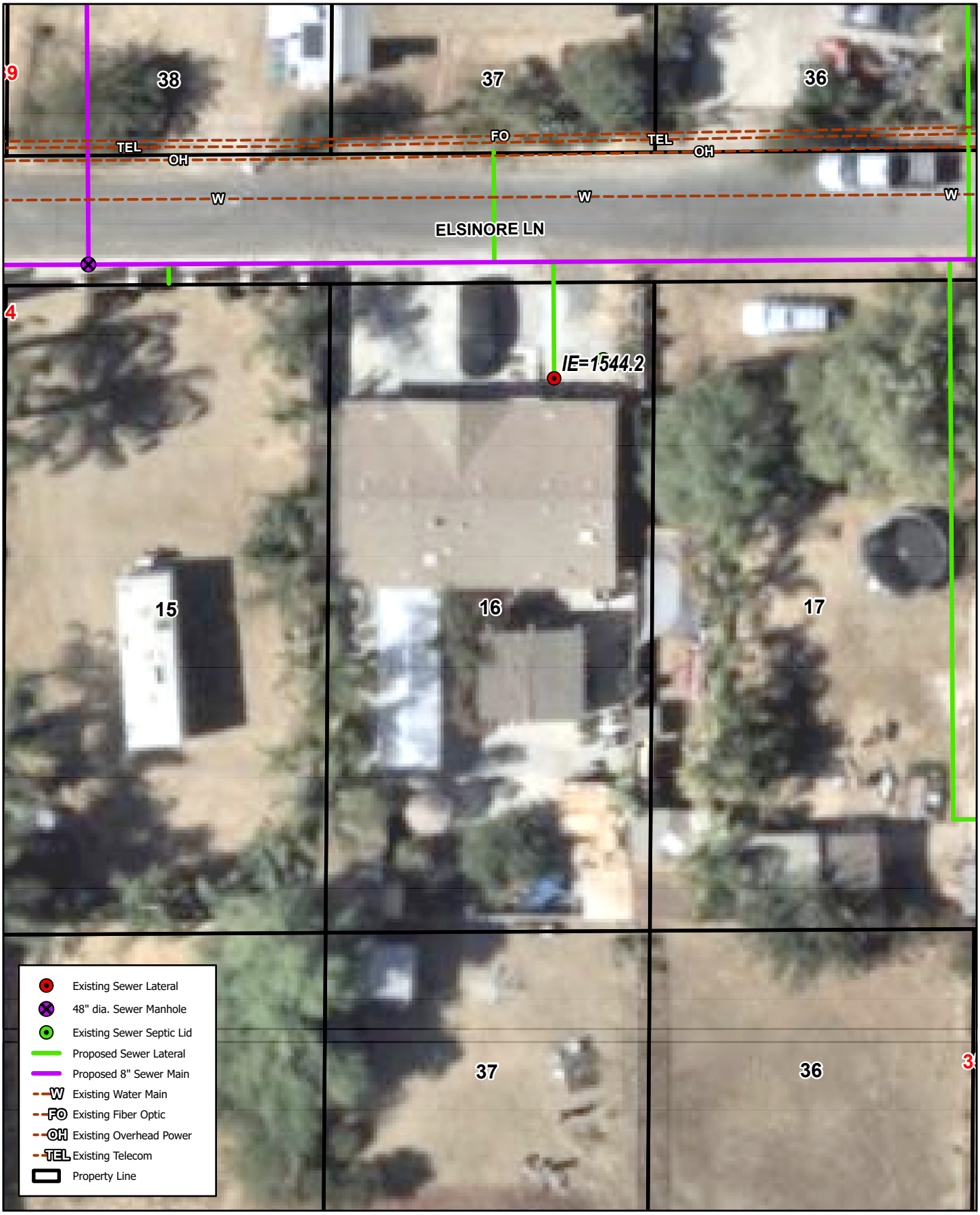

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LOT #16

Quail Valley - Subarea 4 Sewer Improvement Plans

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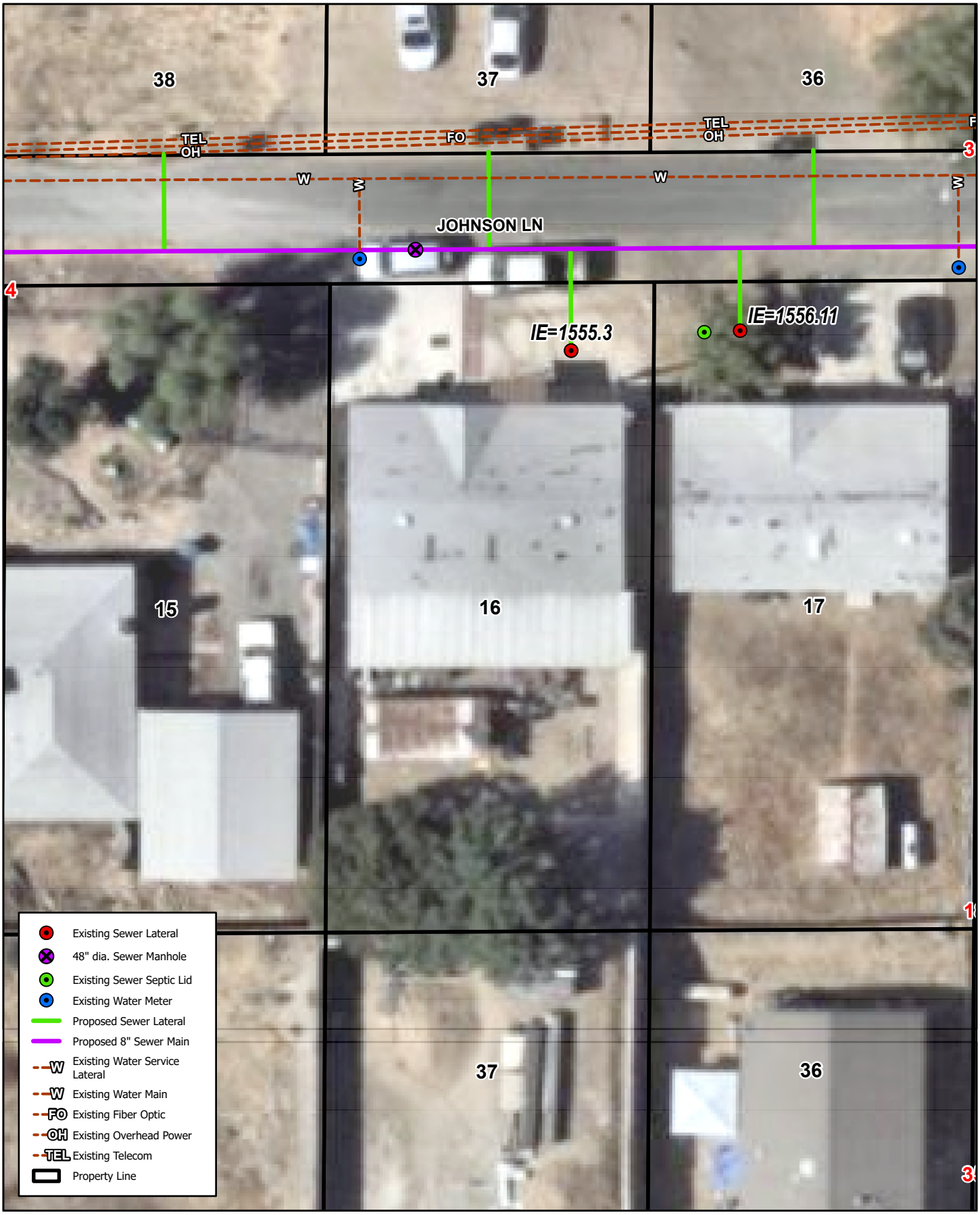

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LOT #16

Quail Valley - Subarea 4 Sewer Improvement Plans

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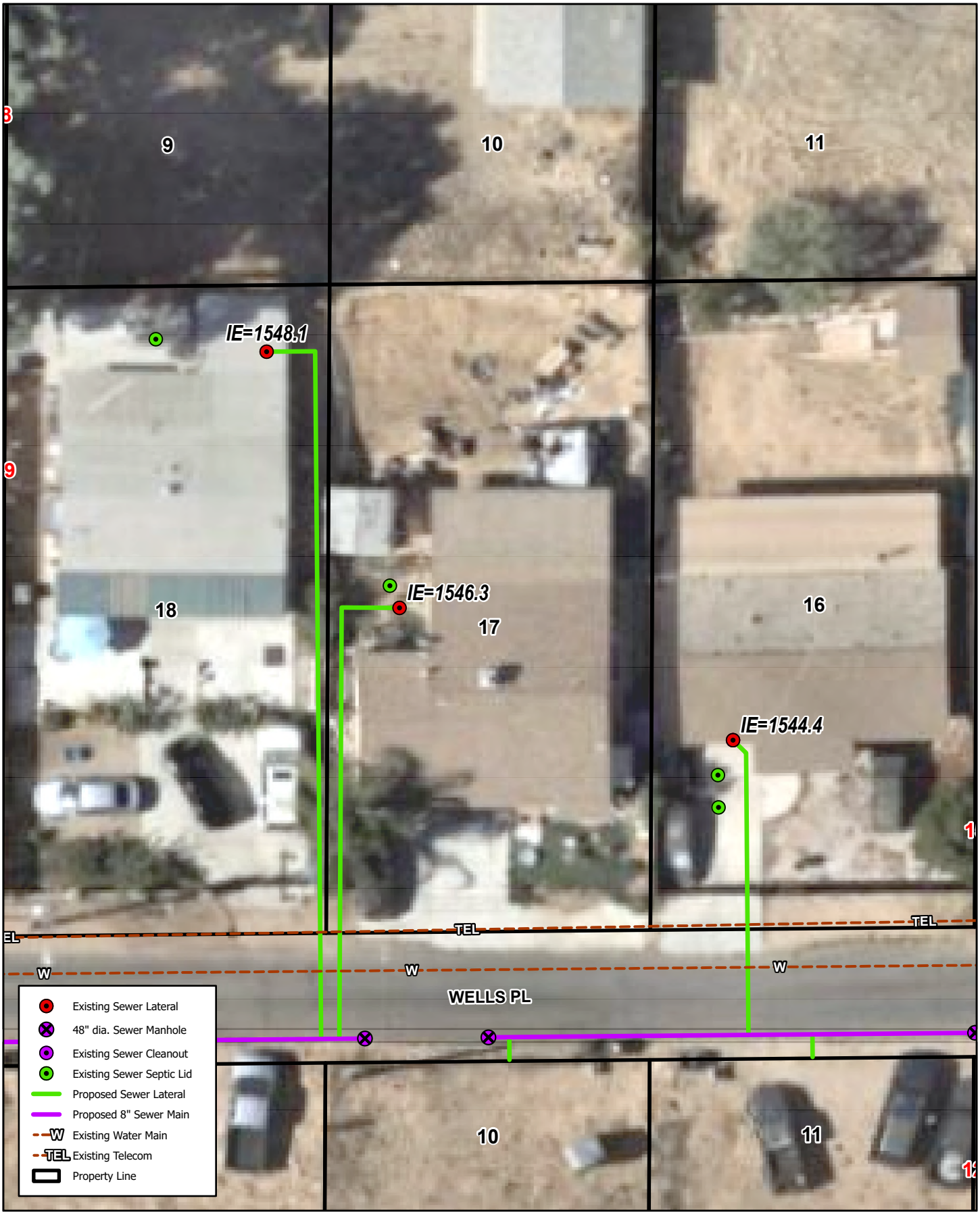

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Quail Valley - Subarea 4 Sewer Improvement Plans

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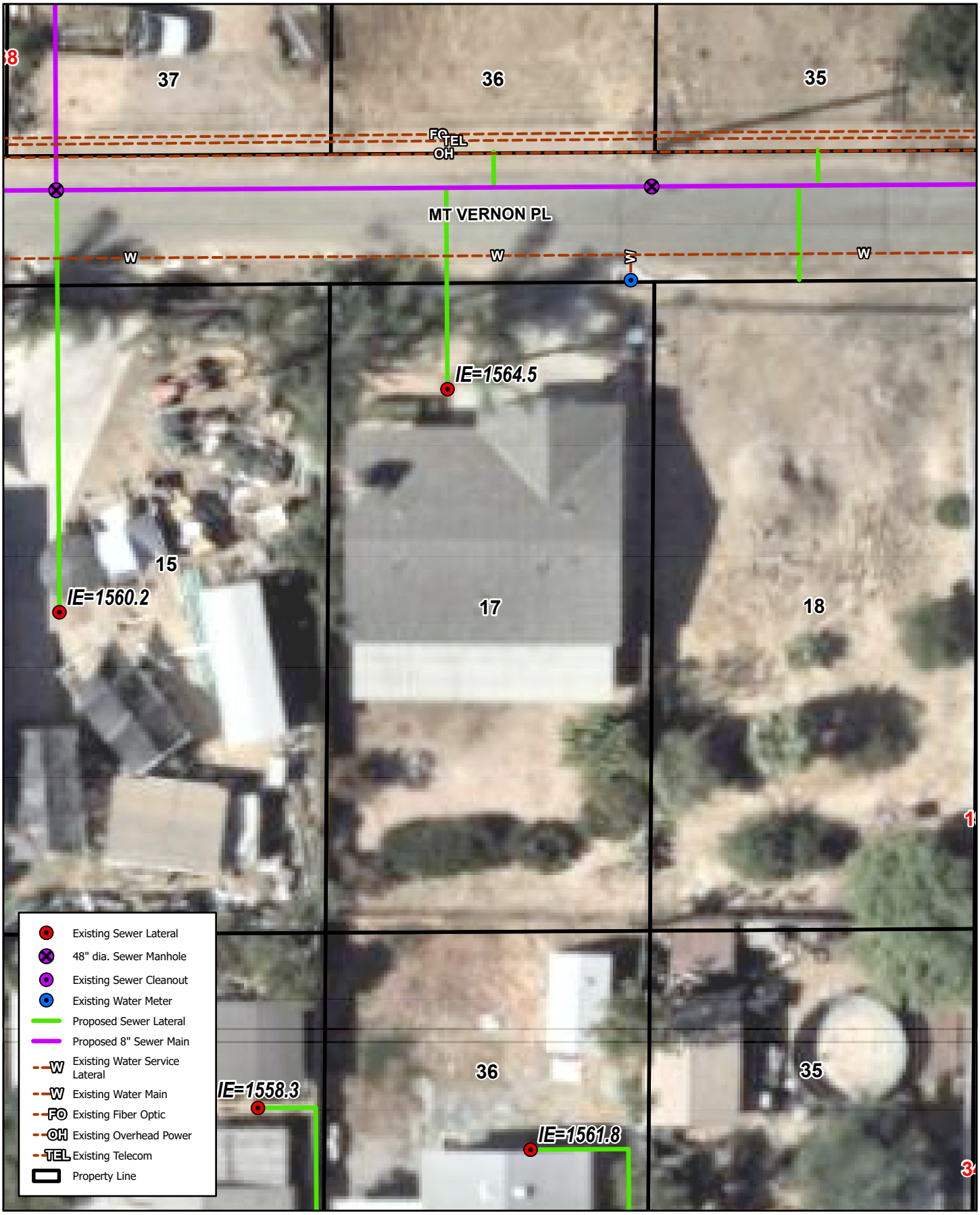

23899 MOUNT VERNON PL, QUAIL VALLEY, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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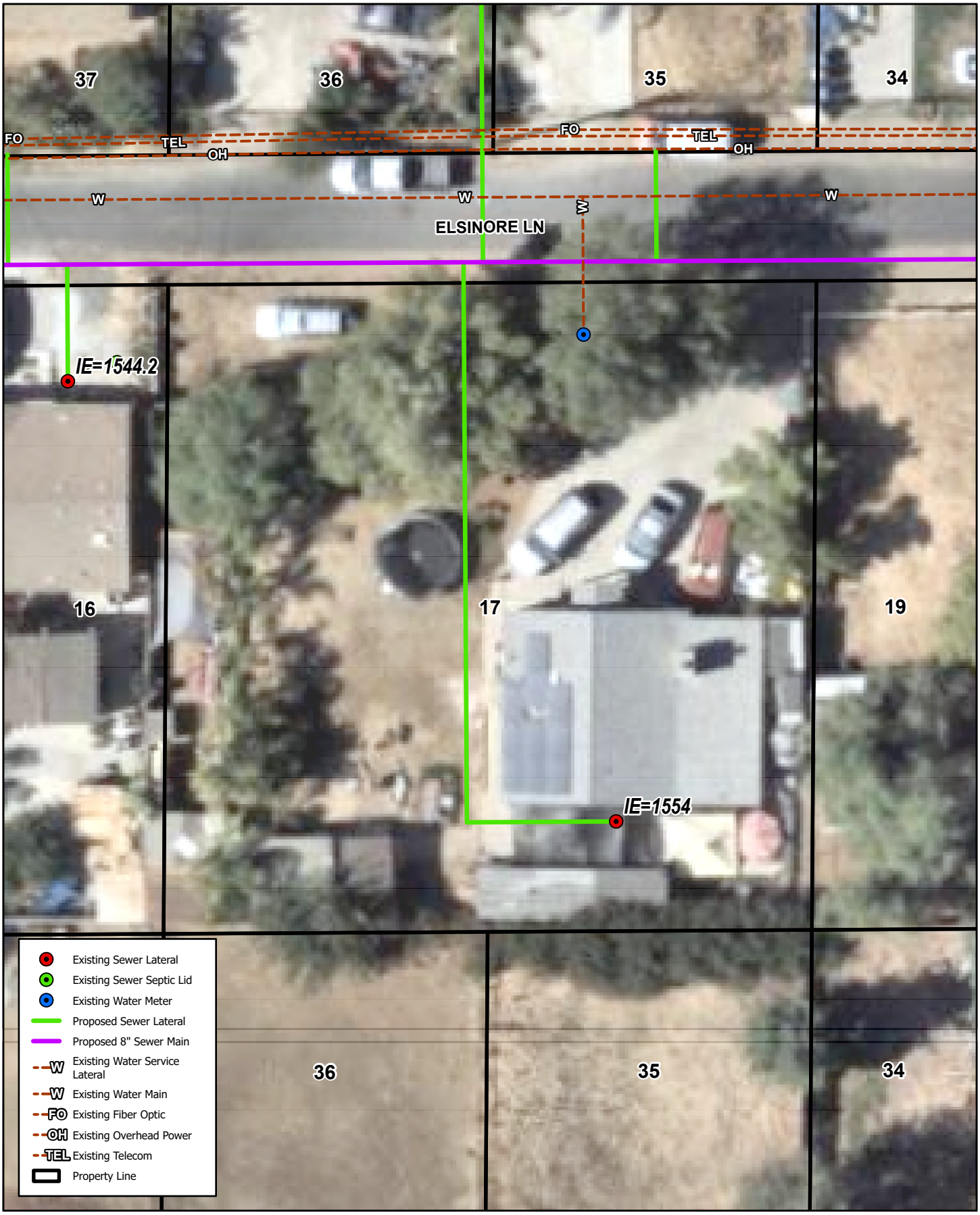

23667 ELSINORE LN, CANYON LAKE, CA 92587

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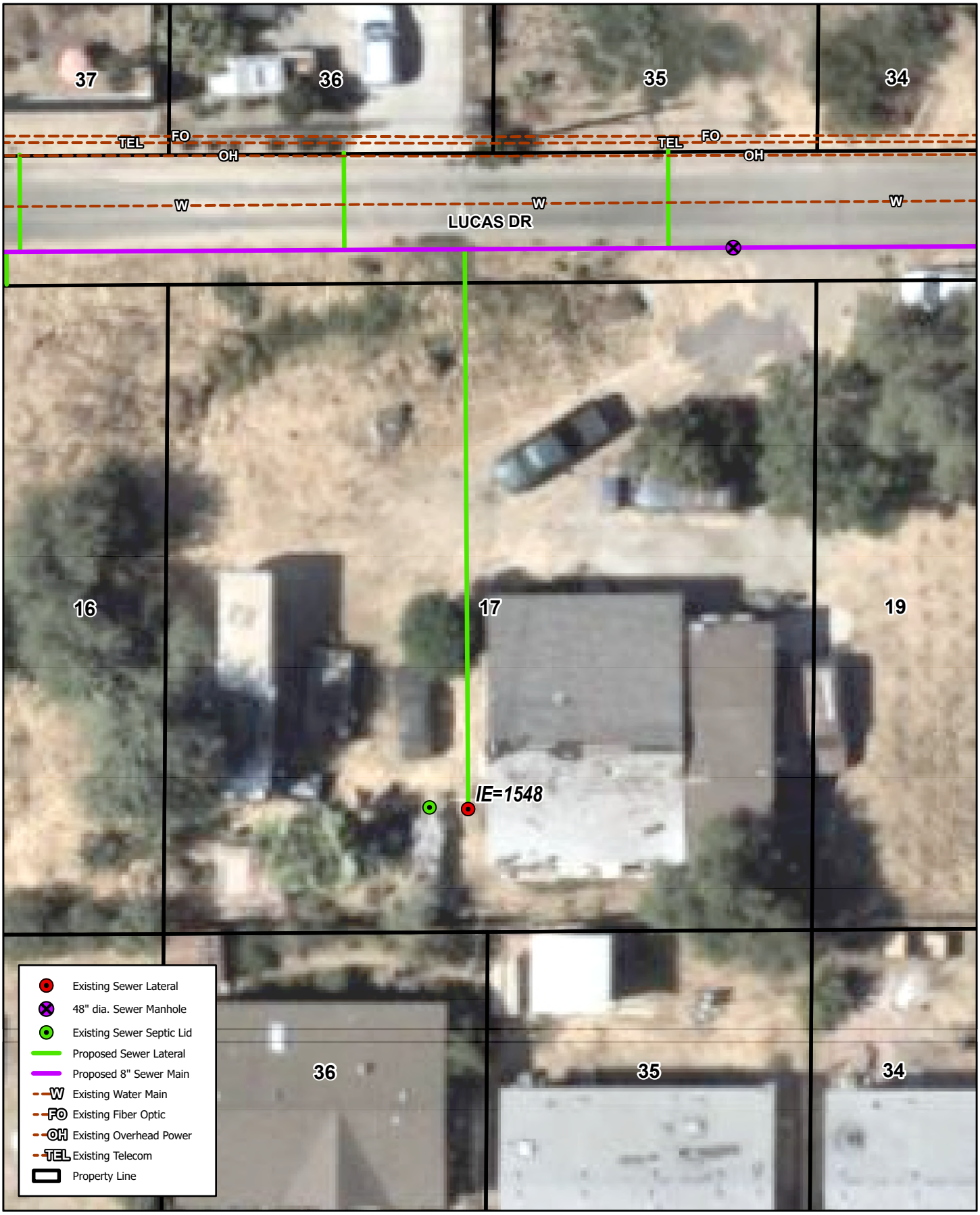

23671 LUCAS DR, CANYON LAKE, CA 92587

LOT #17

Quail Valley - Subarea 4 Sewer Improvement Plans

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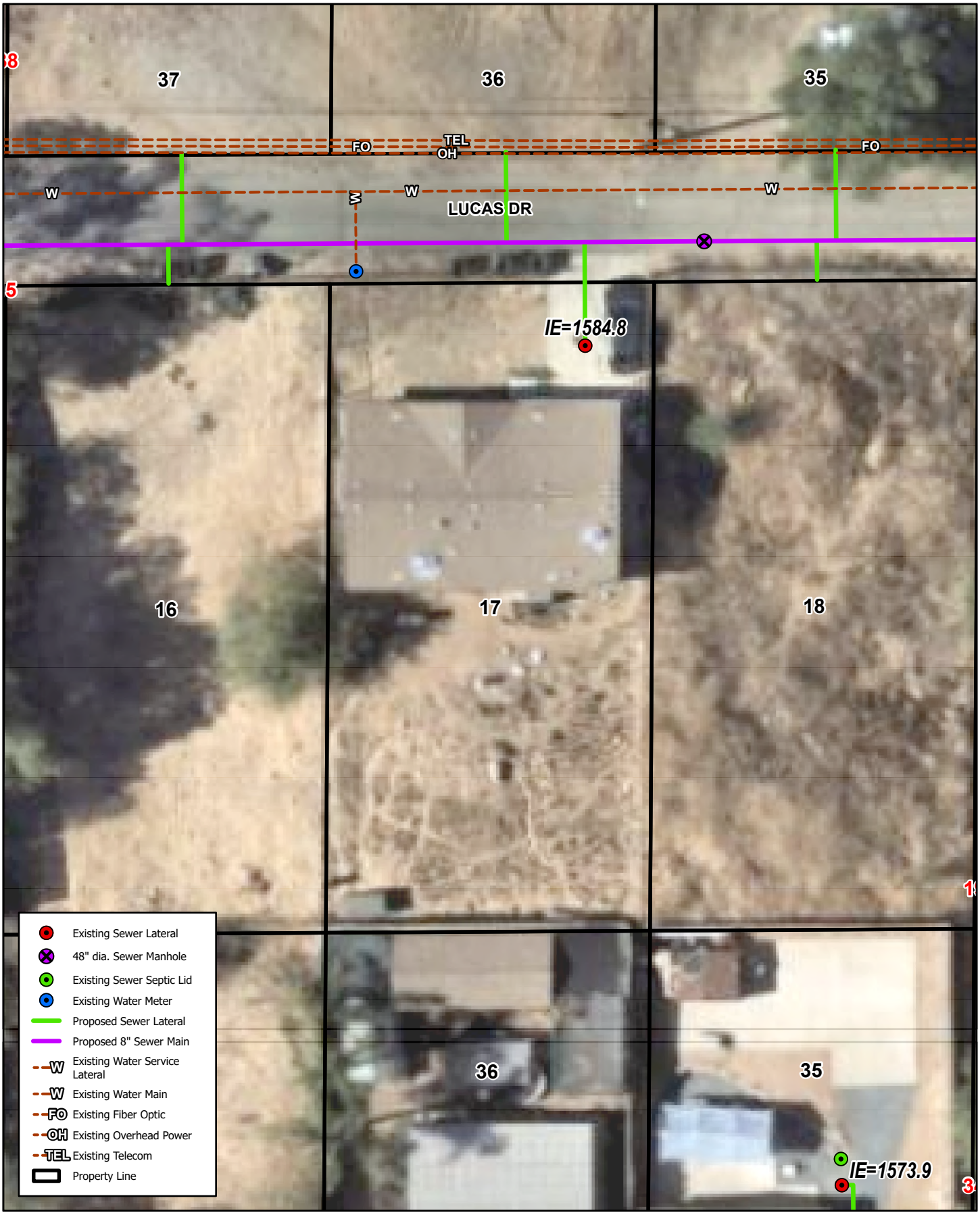

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Quail Valley - Subarea 4 Sewer Improvement Plans

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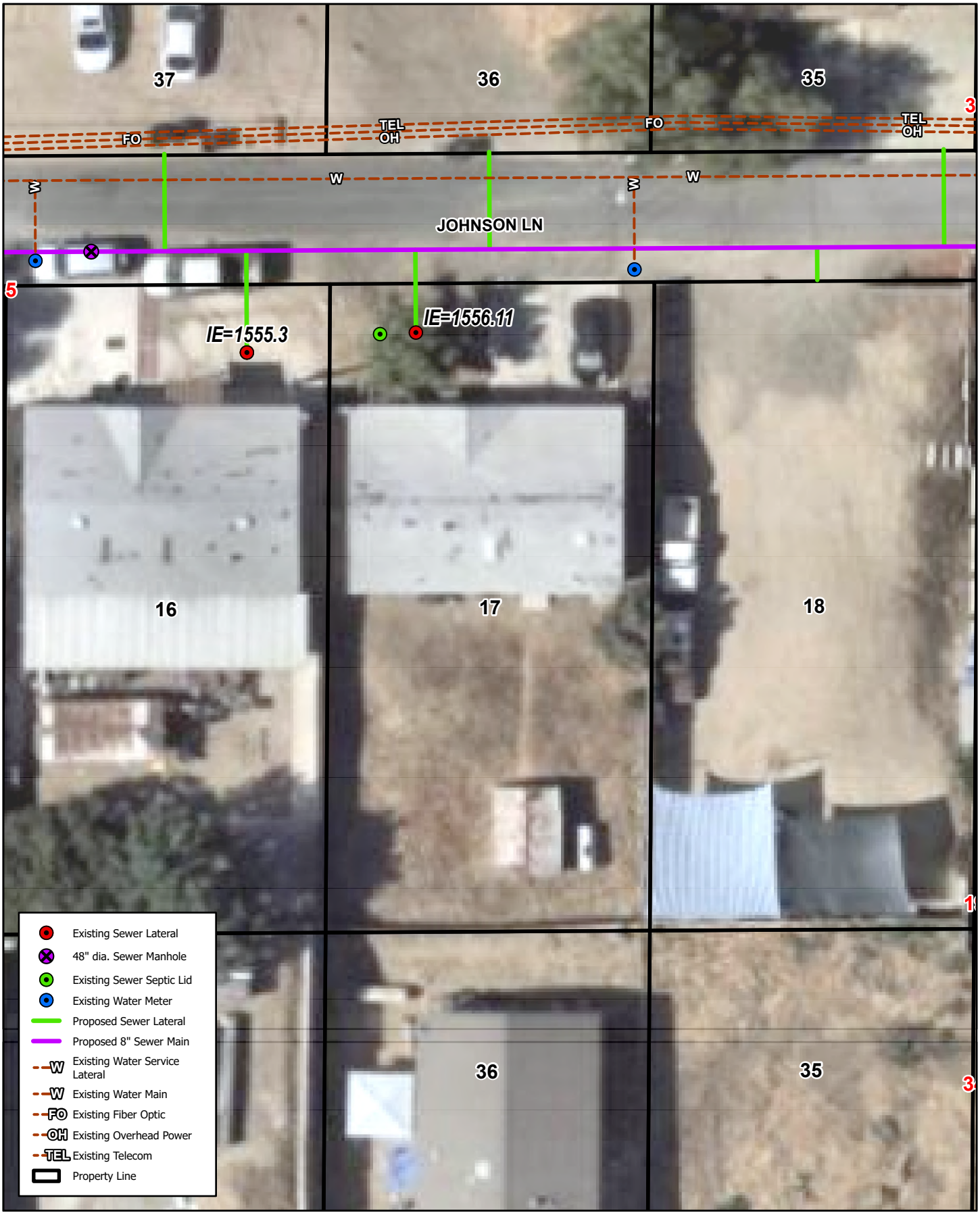

23665 JOHNSON LN, CANYON LAKE, CA 92587

LOT #17

Quail Valley - Subarea 4 Sewer Improvement Plans

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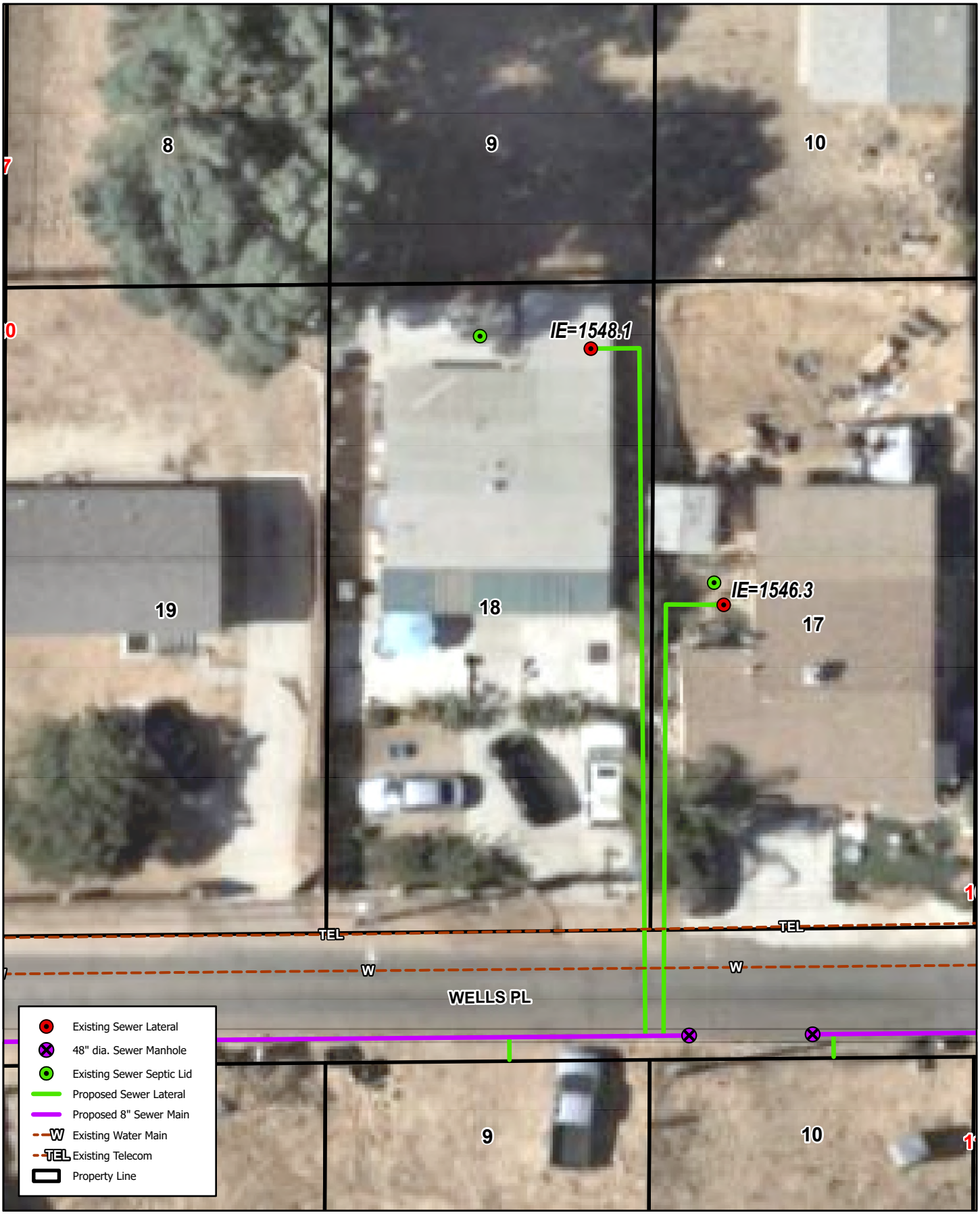

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LOT #18

Quail Valley - Subarea 4 Sewer Improvement Plans

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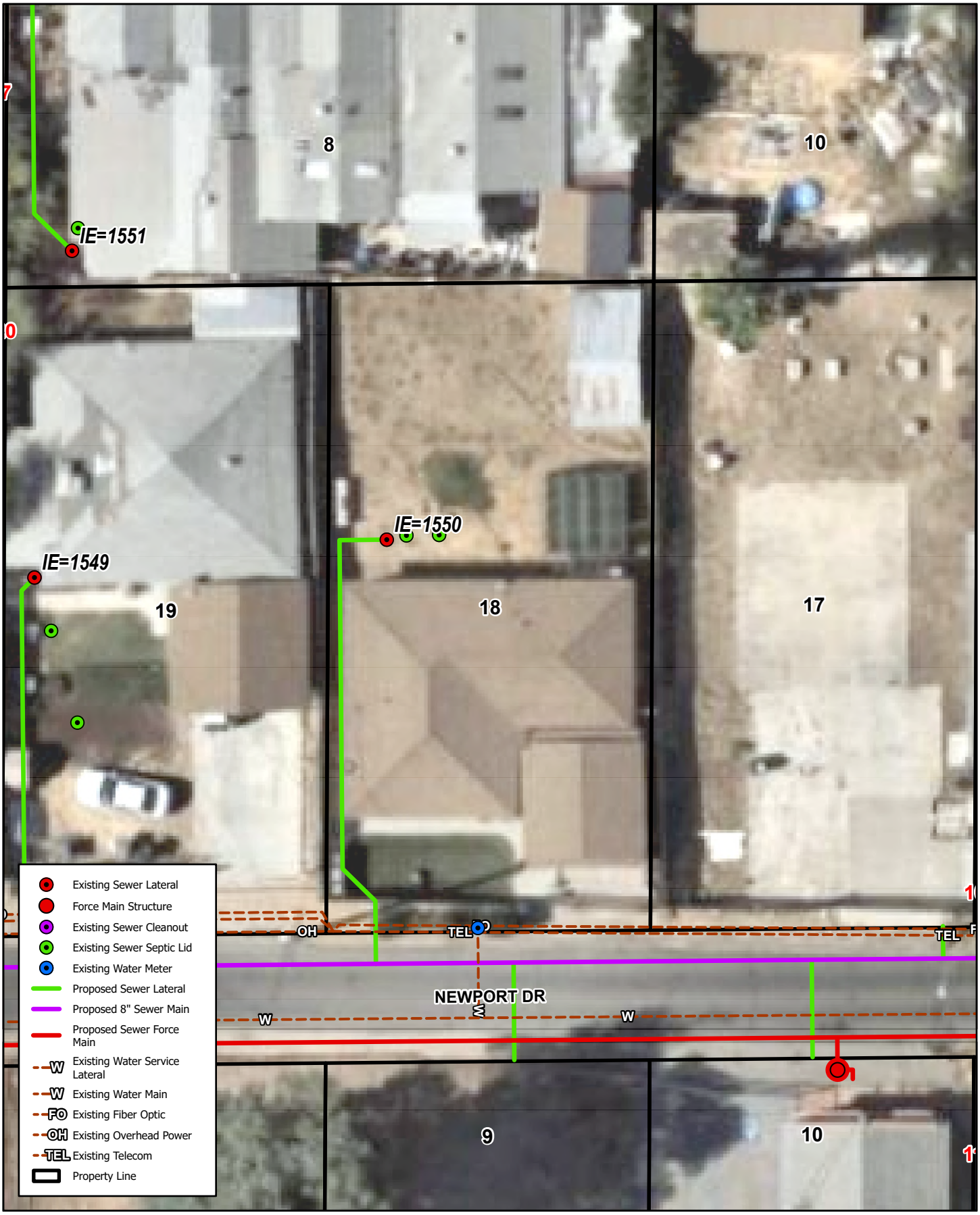


23960 NEWPORT DR, QUAIL VALLEY, CA 92587

LOT #18

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23685 NORMA DR, QUAIL VALLEY, CA 92587

LOT #18

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

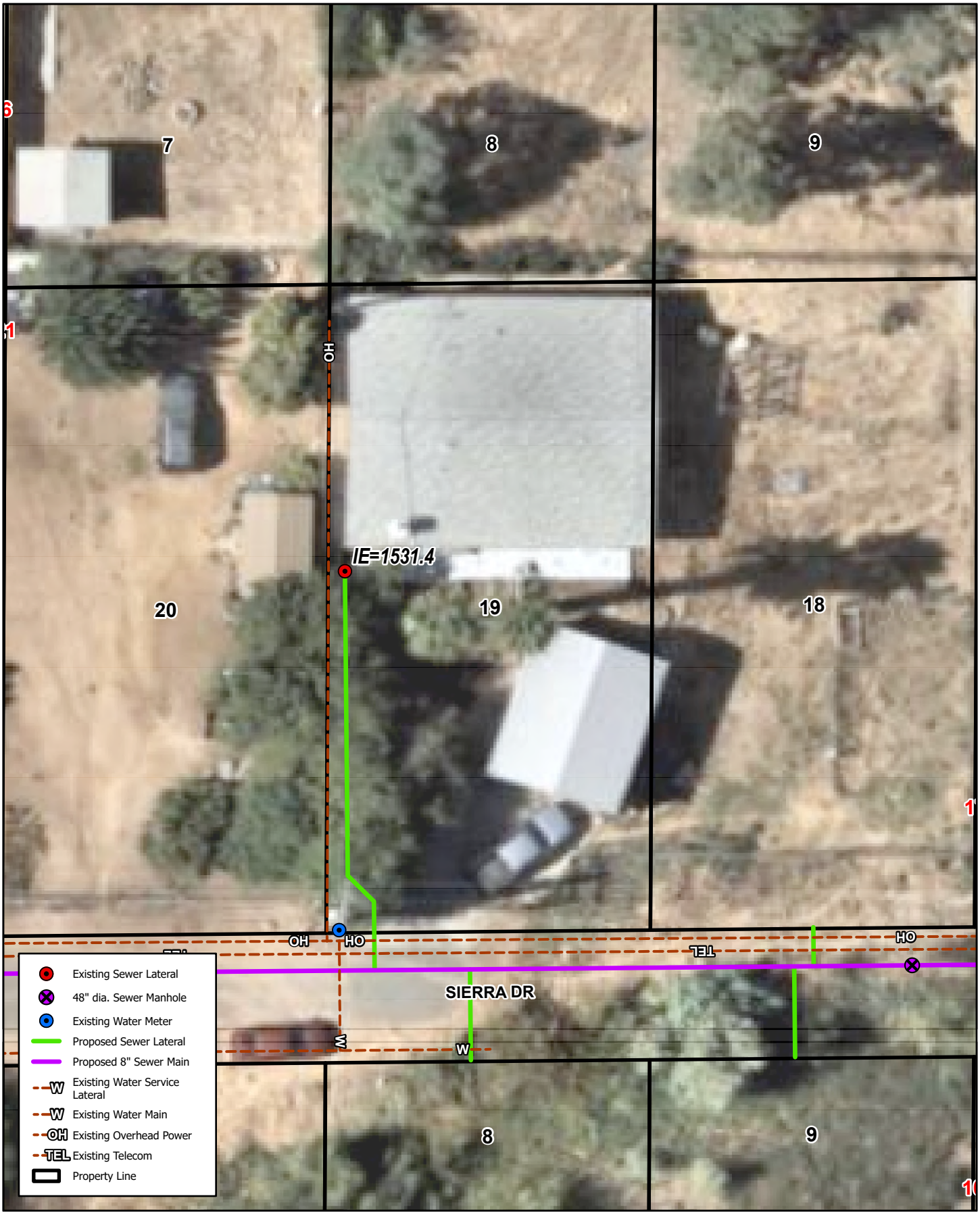


23935 ELSINORE LN, CANYON LAKE, CA 92587

LOT #18

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23940 SIERRA DR, CANYON LAKE, CA 92587

LOT #19

Quail Valley - Subarea 4 Sewer Improvement Plans

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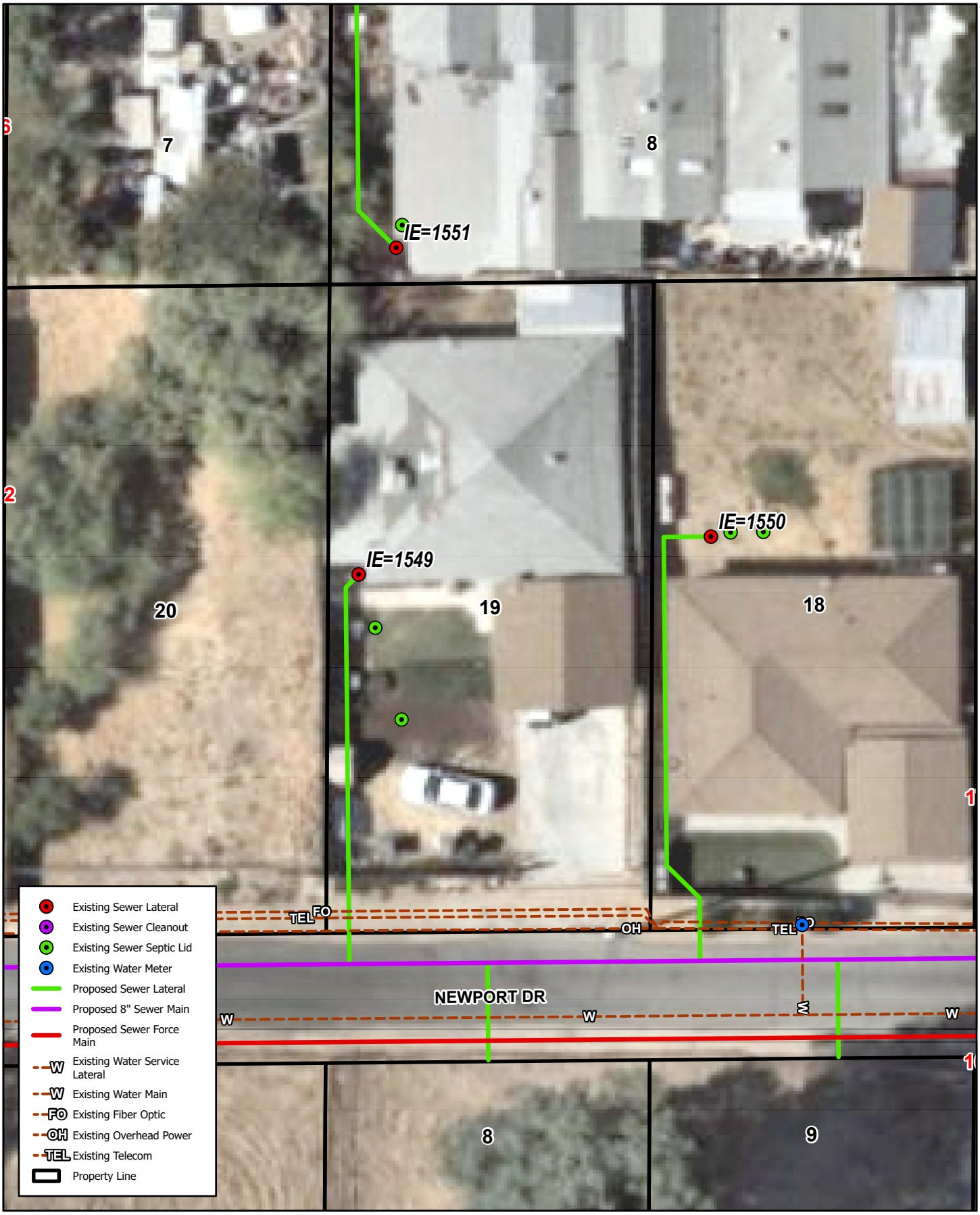

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Quail Valley - Subarea 4 Sewer Improvement Plans

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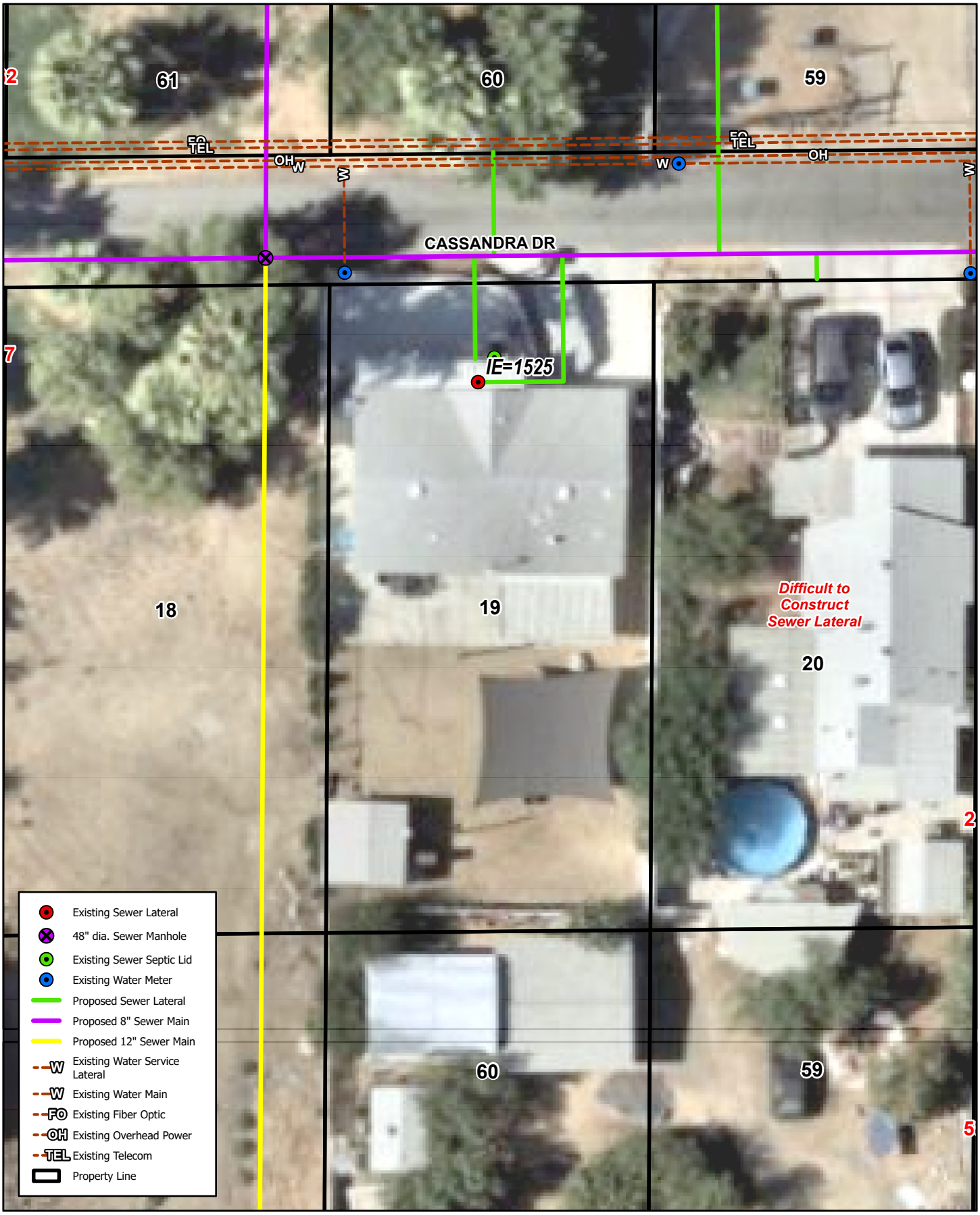

23663 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #19

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23675 GOETZ RD, CANYON LAKE, CA 92587

LOT #19

Quail Valley - Subarea 4 Sewer Improvement Plans

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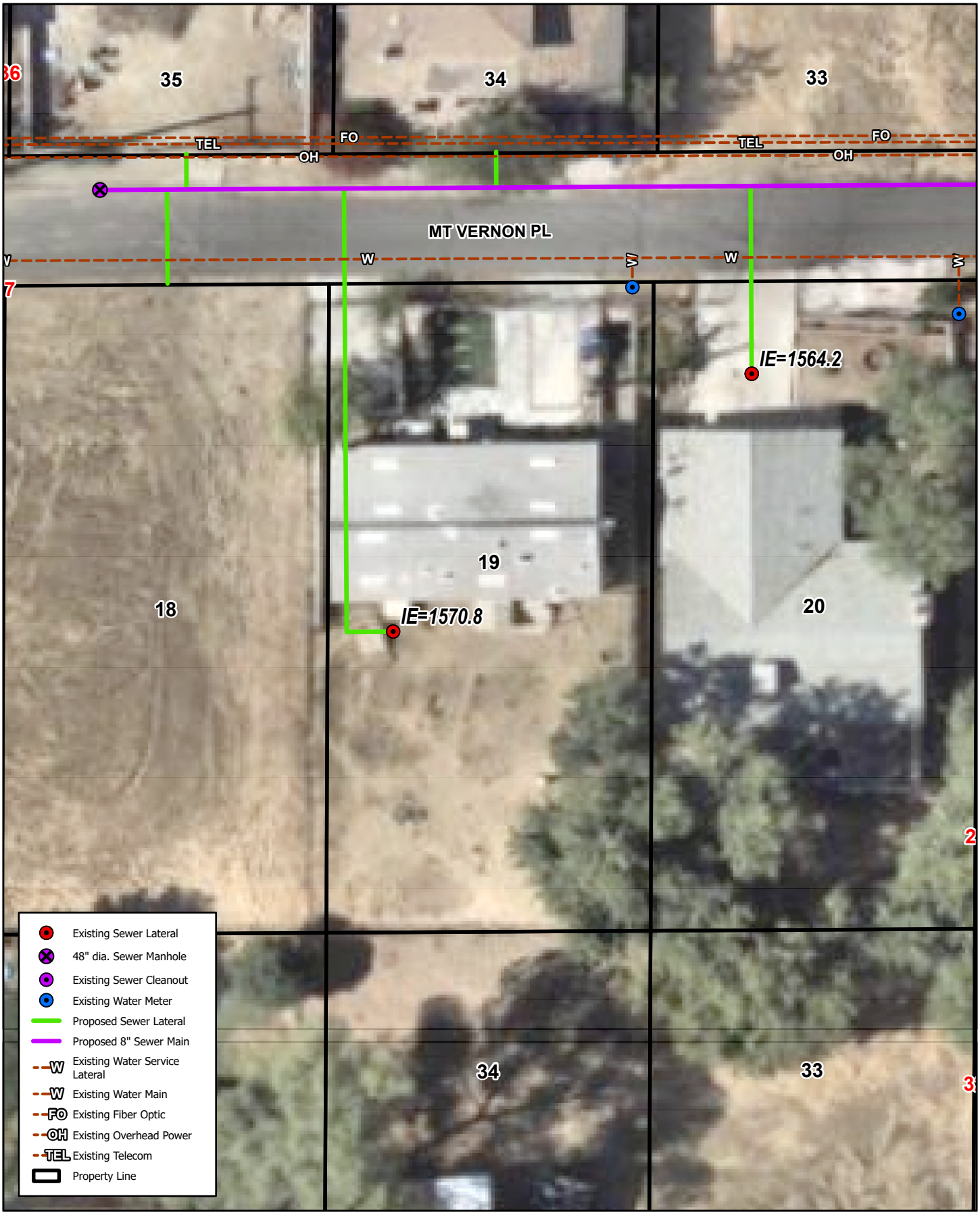

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LOT #19

Quail Valley - Subarea 4 Sewer Improvement Plans

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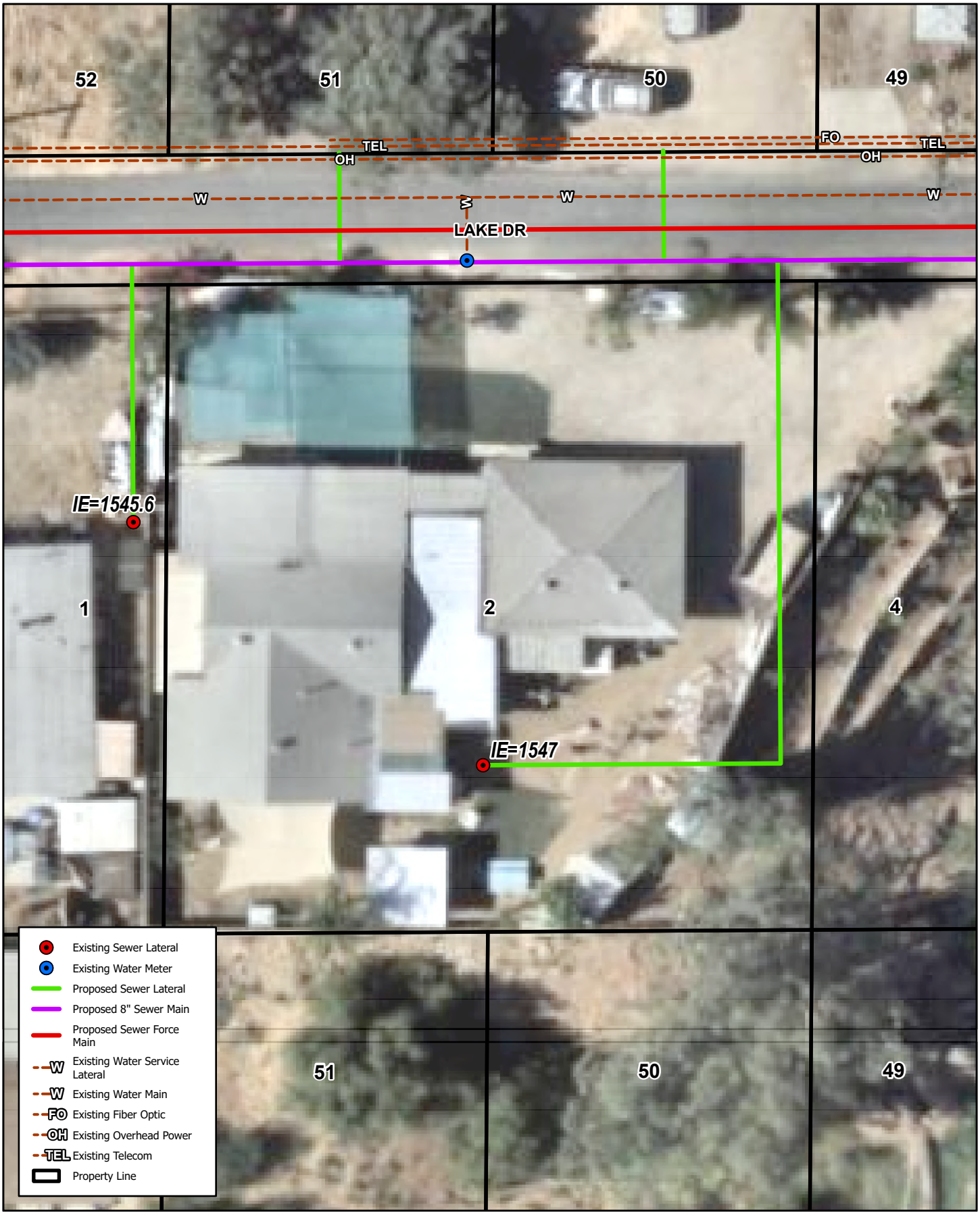

23513 LAKE DR, QUAIL VALLEY, CA 92587

LOT #2

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23541 SAN JACINTO, QUAIL VALLEY , CA 92587

LOT #2

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23946 WELLS PL, QUAIL VALLEY, CA 92587

LOT #20

Quail Valley - Subarea 4 Sewer Improvement Plans

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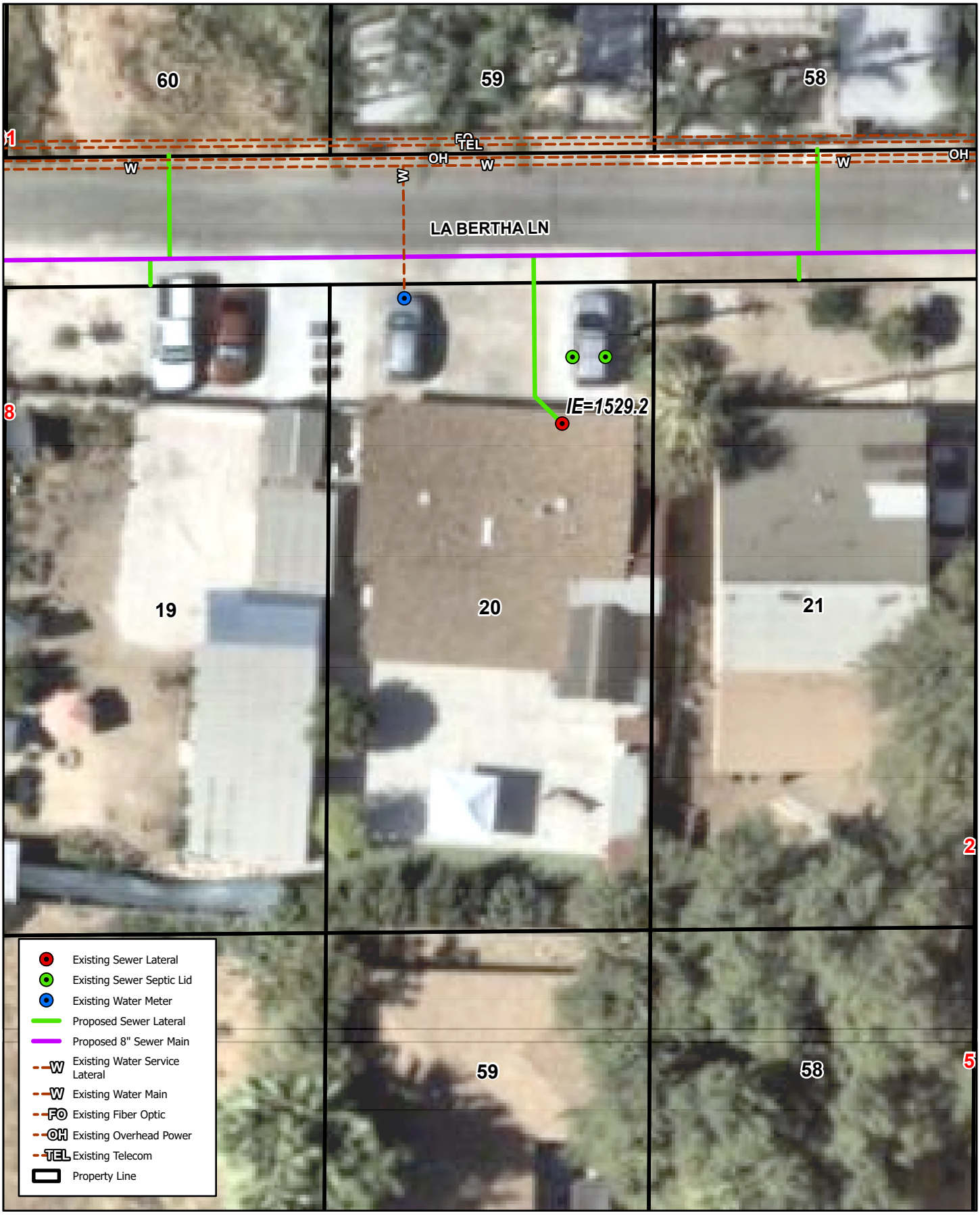


23665 LA BERTHA LN, QUAIL VALLEY, CA 92587

LOT #20

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

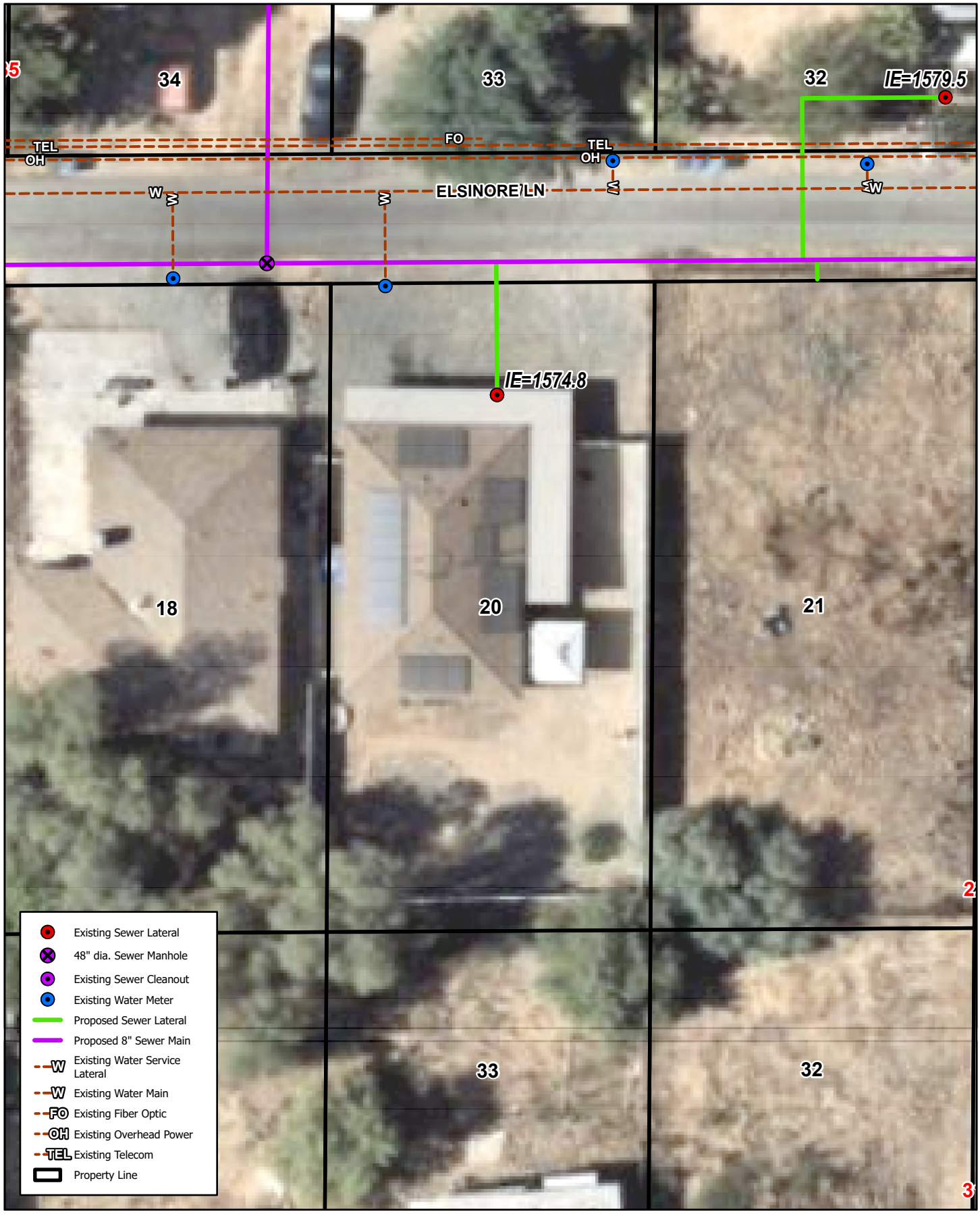


23703 MT VERNON PL, QUAIL VALLEY, CA 92587

LOT #20

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

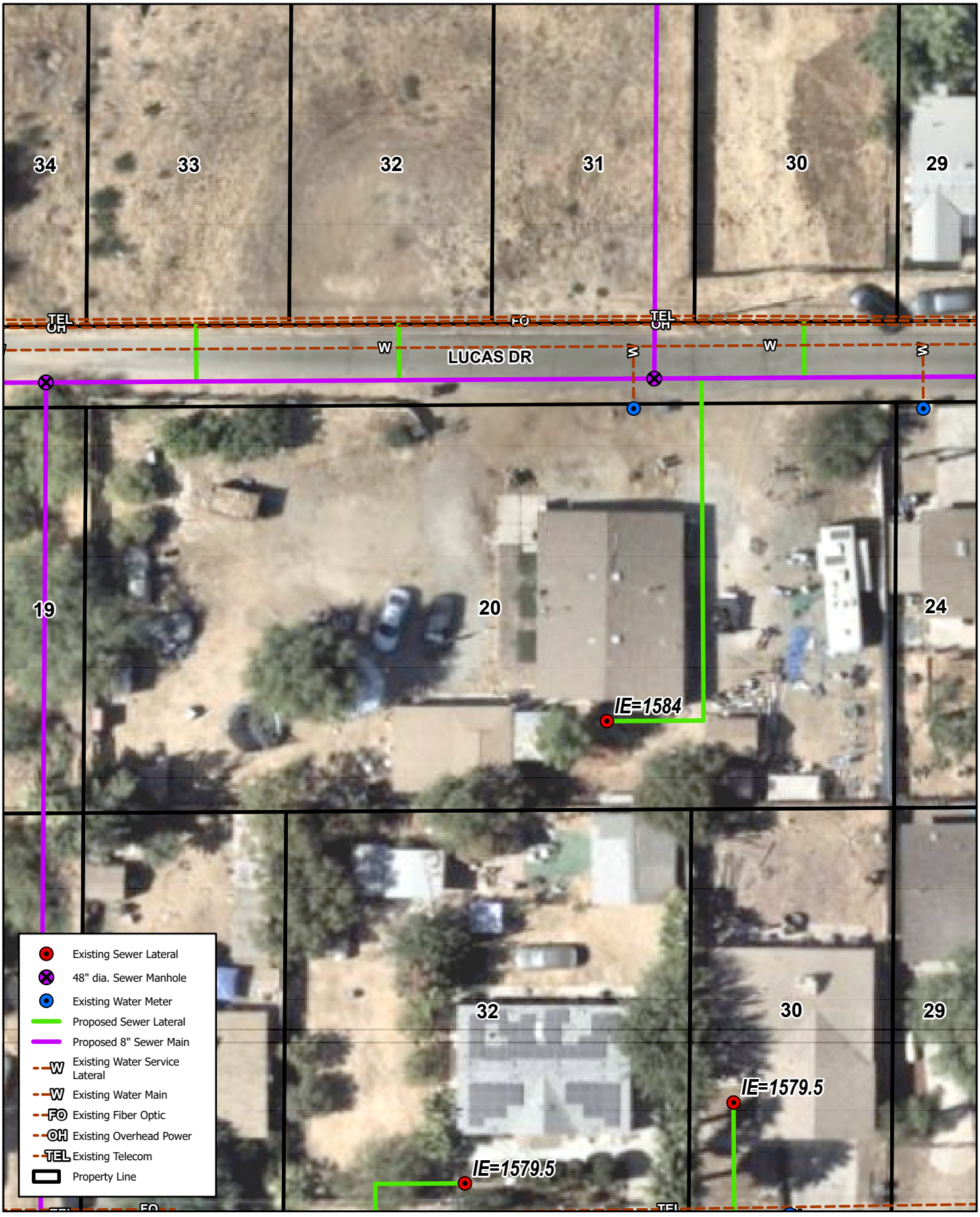


23939 ELSINORE LN, QUAIL VALLEY, CA 92587

LOT #20

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

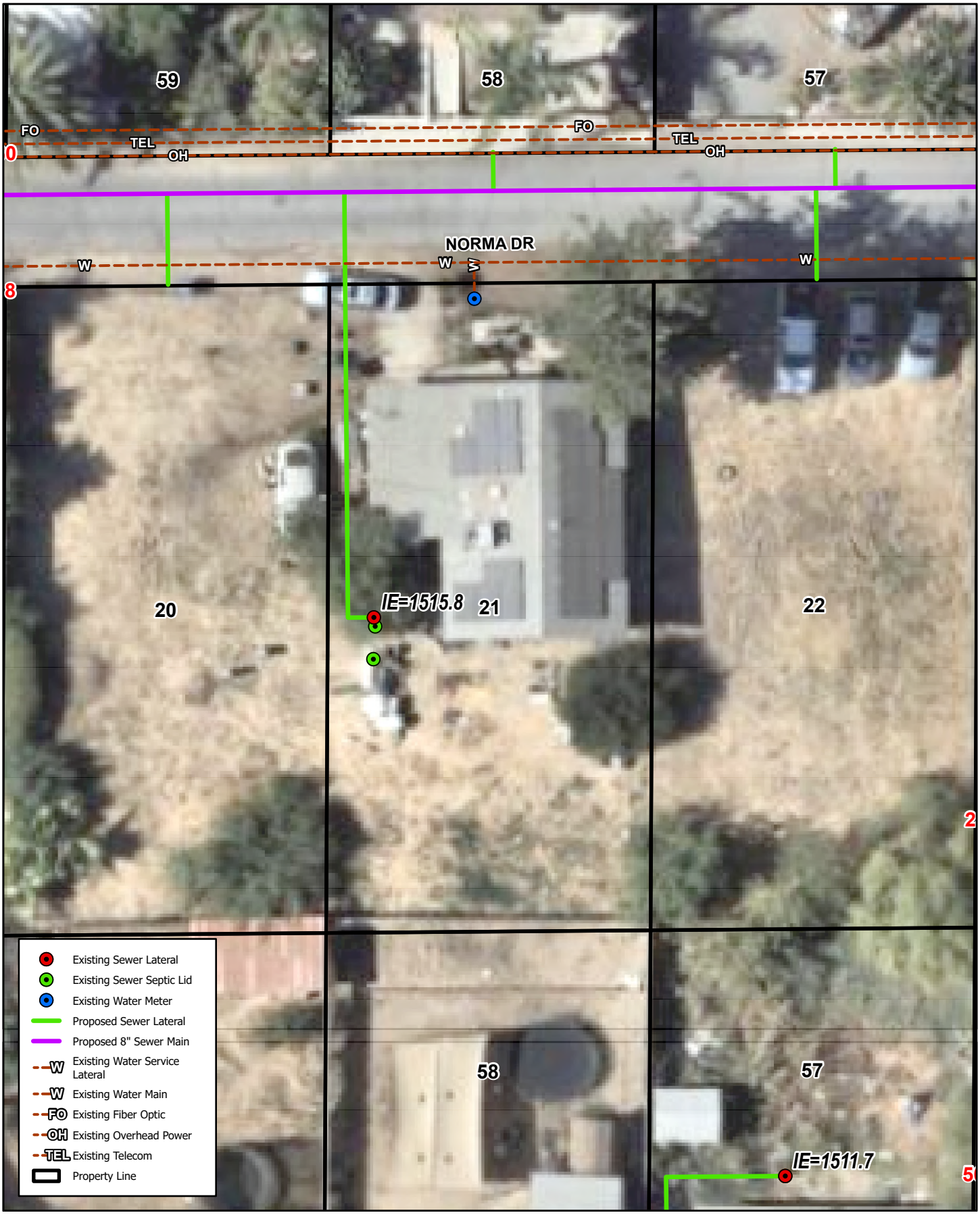


23959 LUCAS DR, CANYON LAKE, CA 92587

LOT #20

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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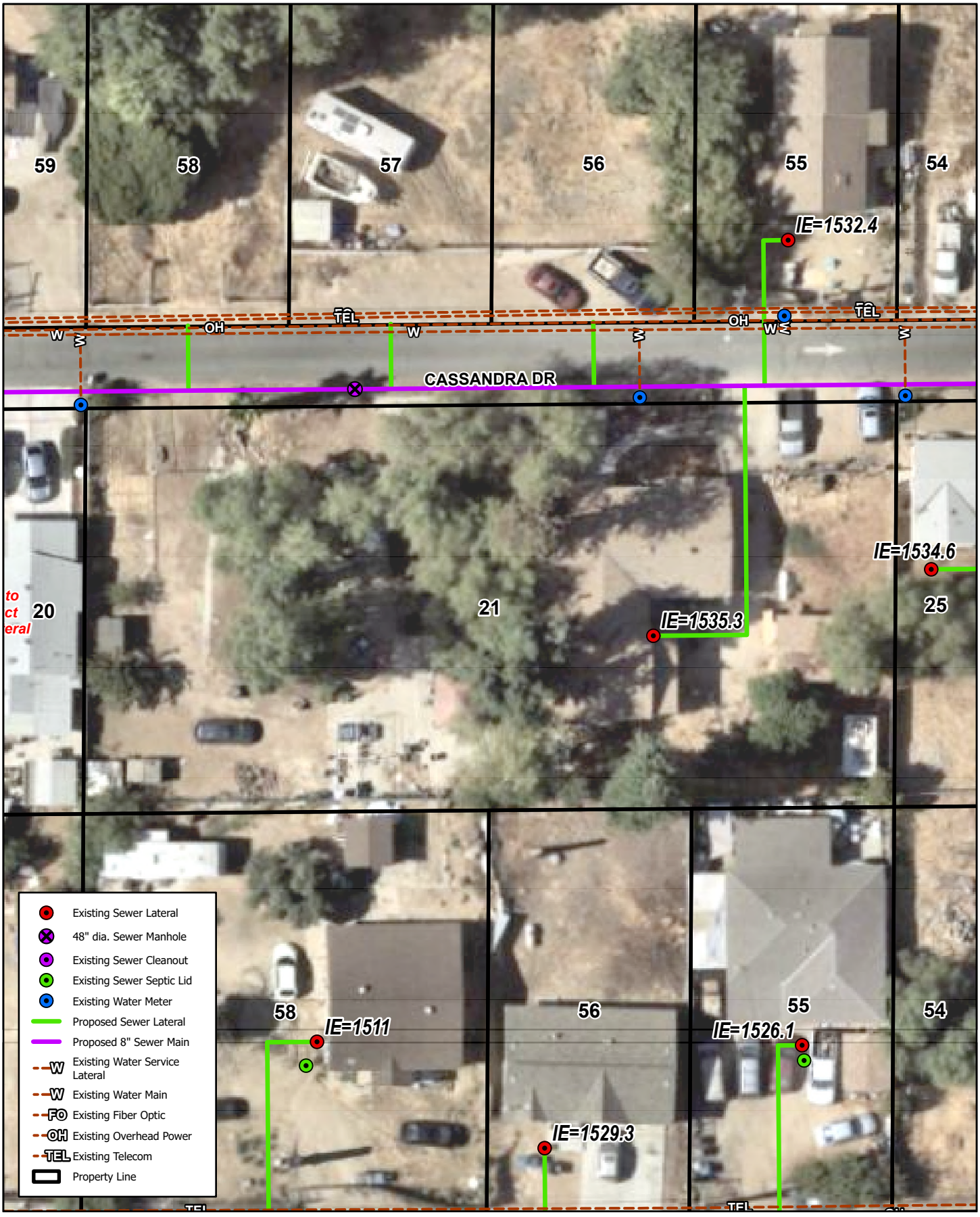
LOT #21

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

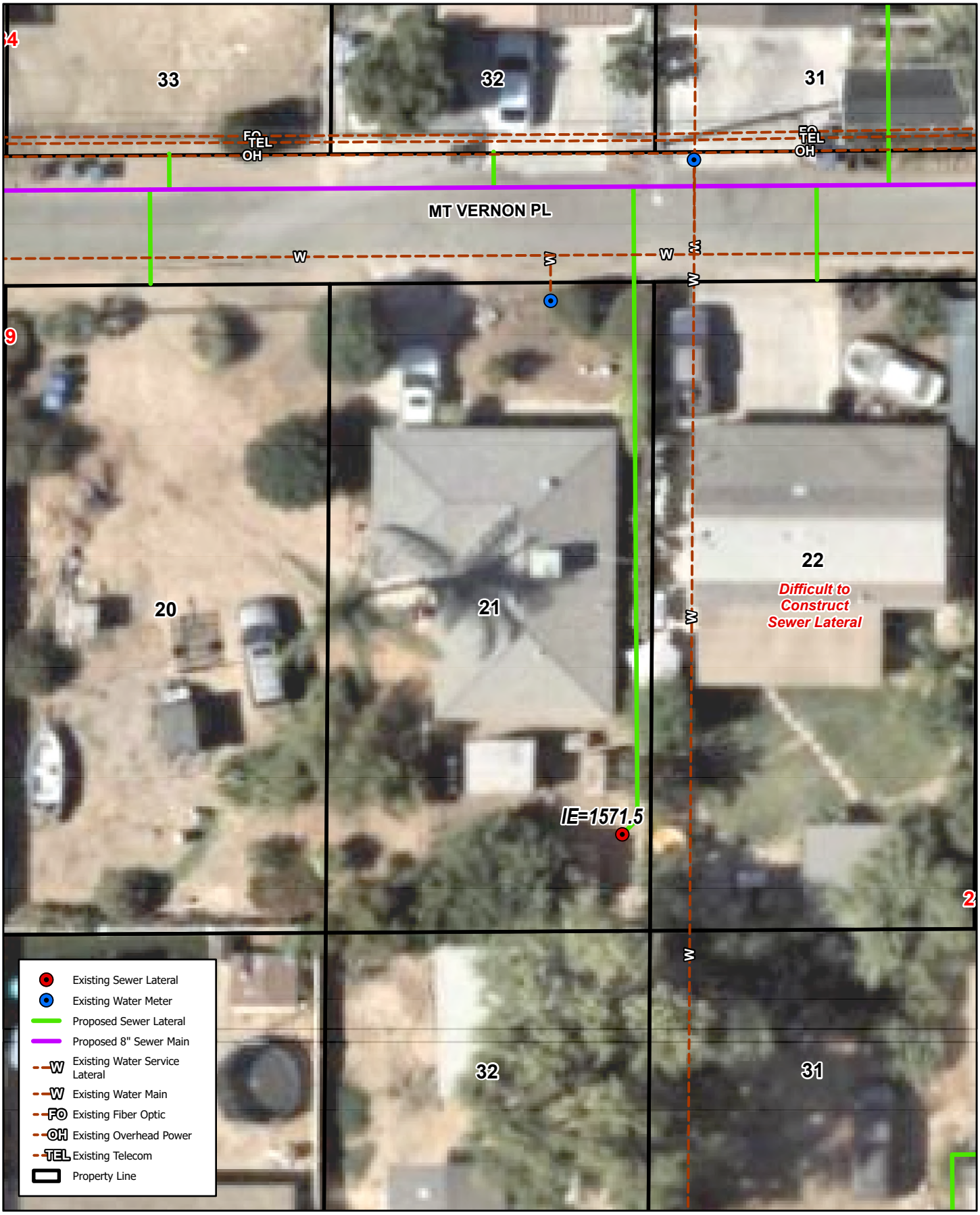


23715 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #21

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23945 MT VERNON PL, QUAIL VALLEY, CA 92587

LOT #21

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

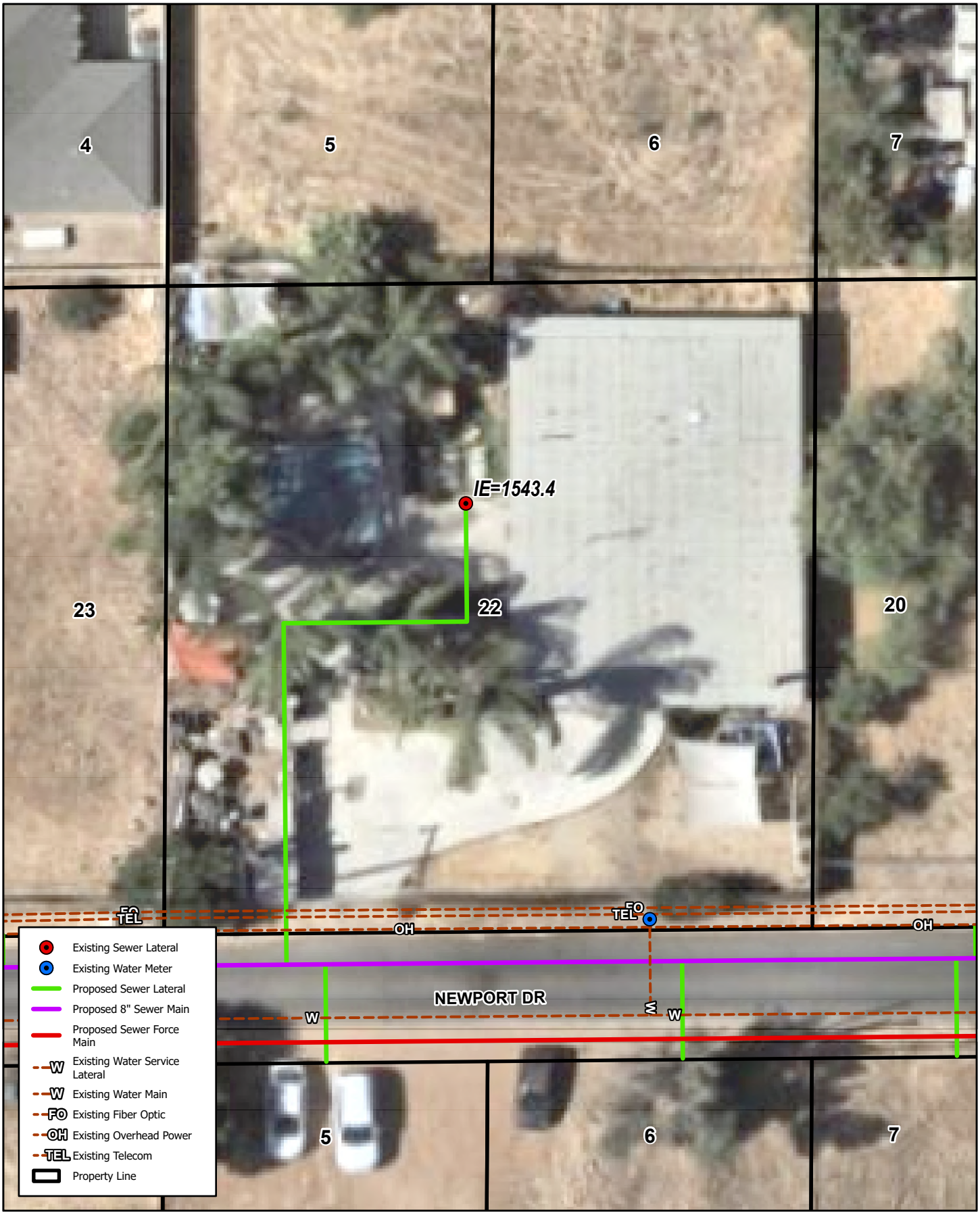


23963 SAN JACINTO RD, CANYON LAKE, CA 92587

LOT #21

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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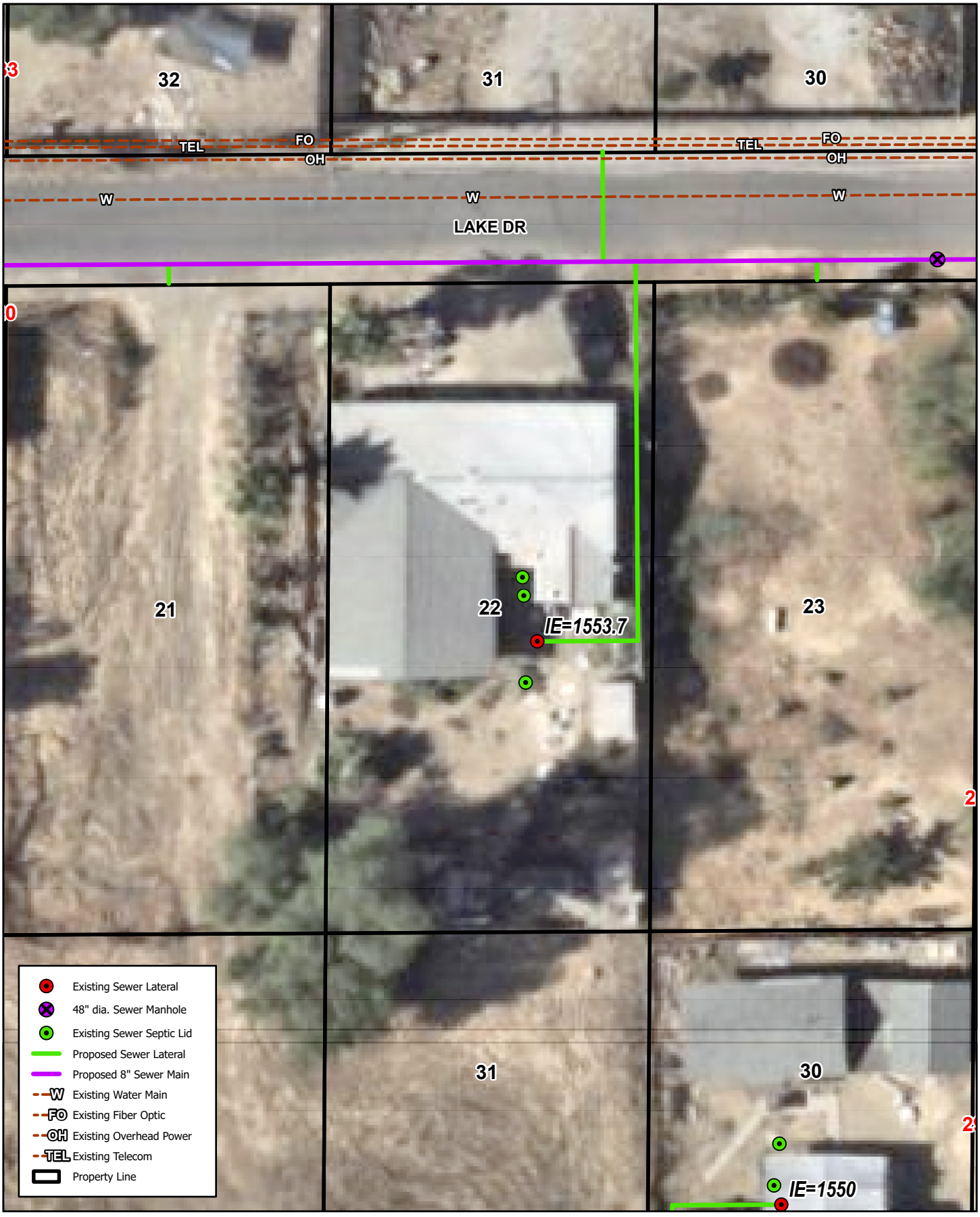
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

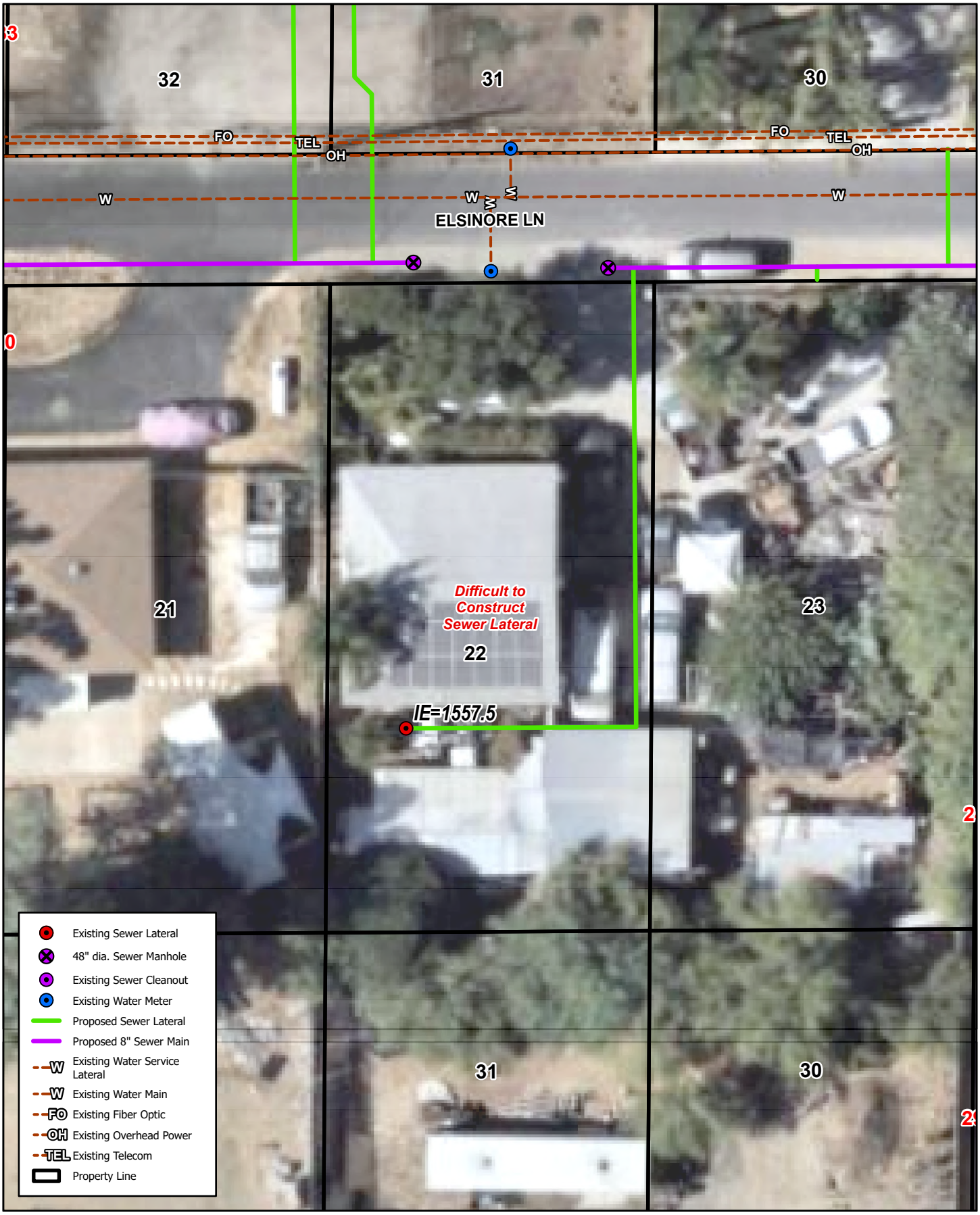


23711 LAKE DR, CANYON LAKE, CA 92587

LOT #22

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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LOT #22

Quail Valley - Subarea 4 Sewer Improvement Plans

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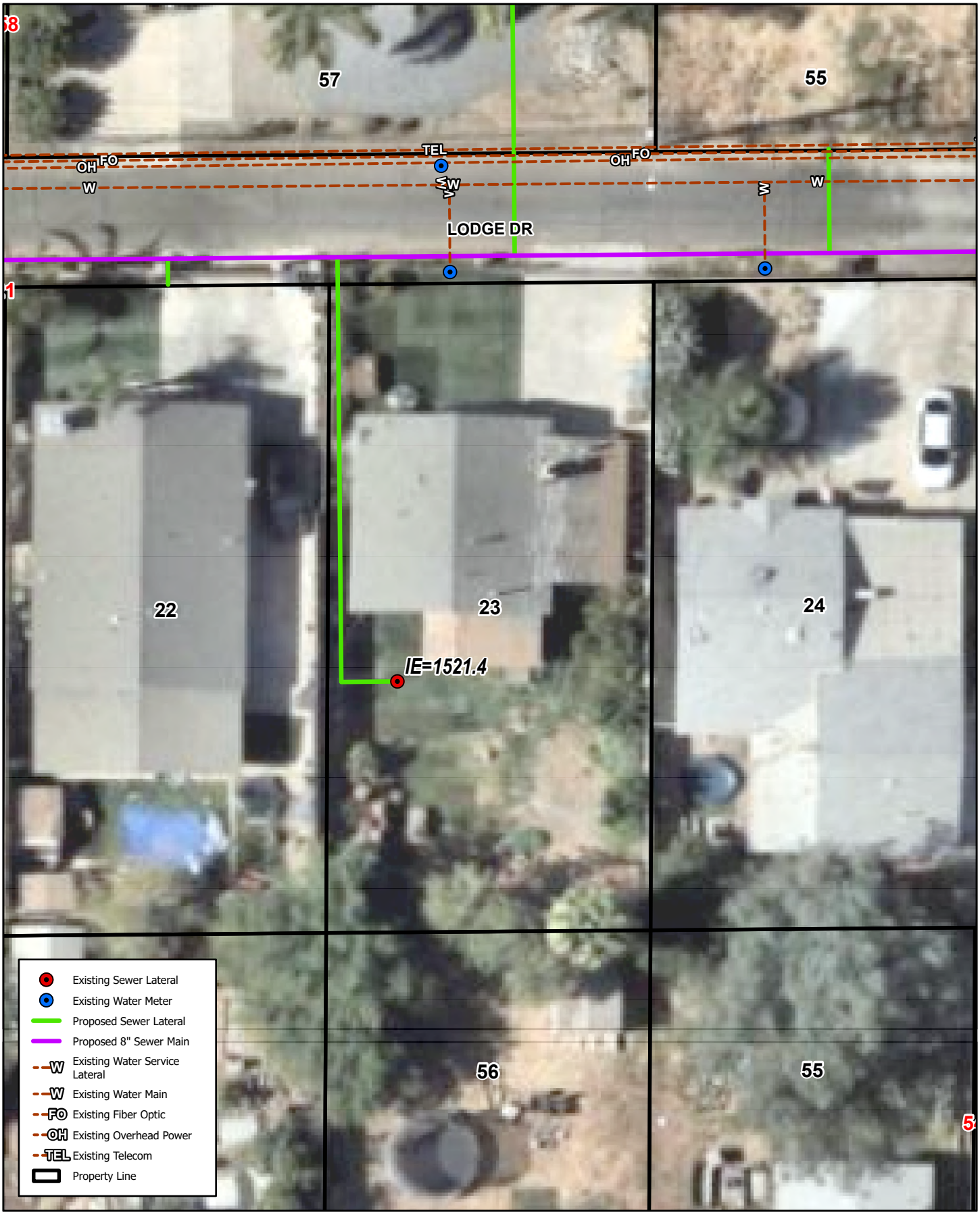

23733 LODGE DR, QUAIL VALLEY, CA 92587

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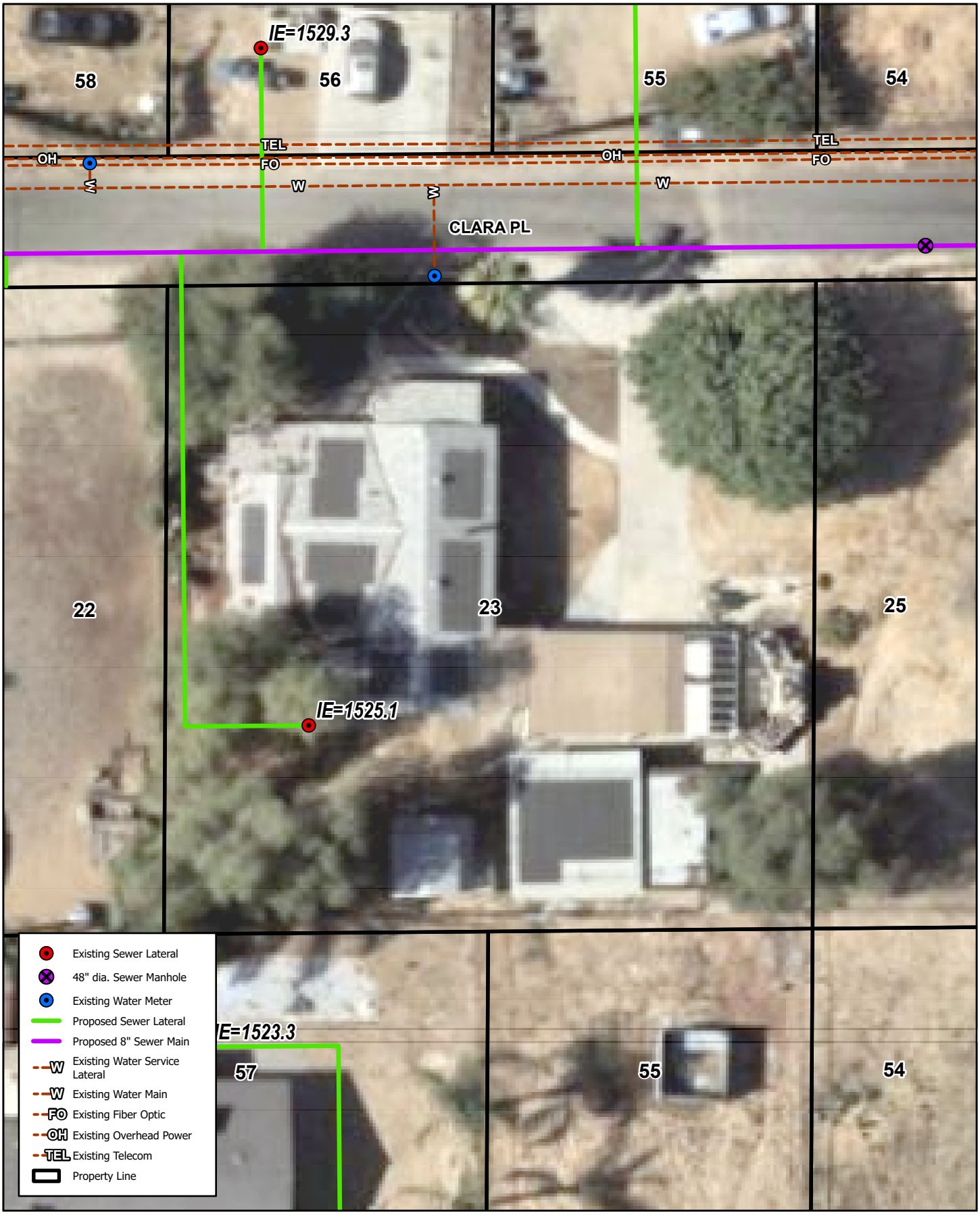
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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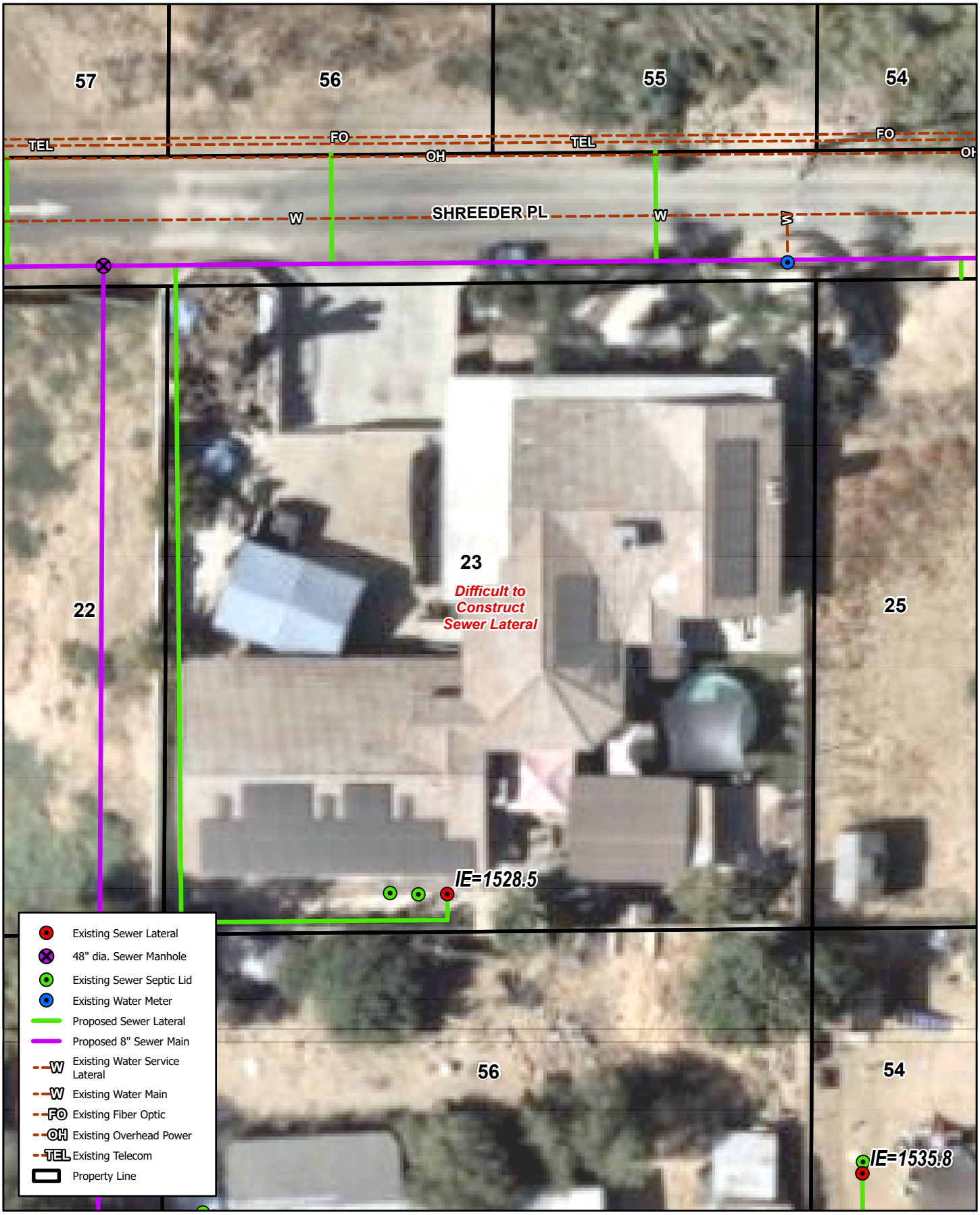
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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Quail Valley - Subarea 4 Sewer Improvement Plans

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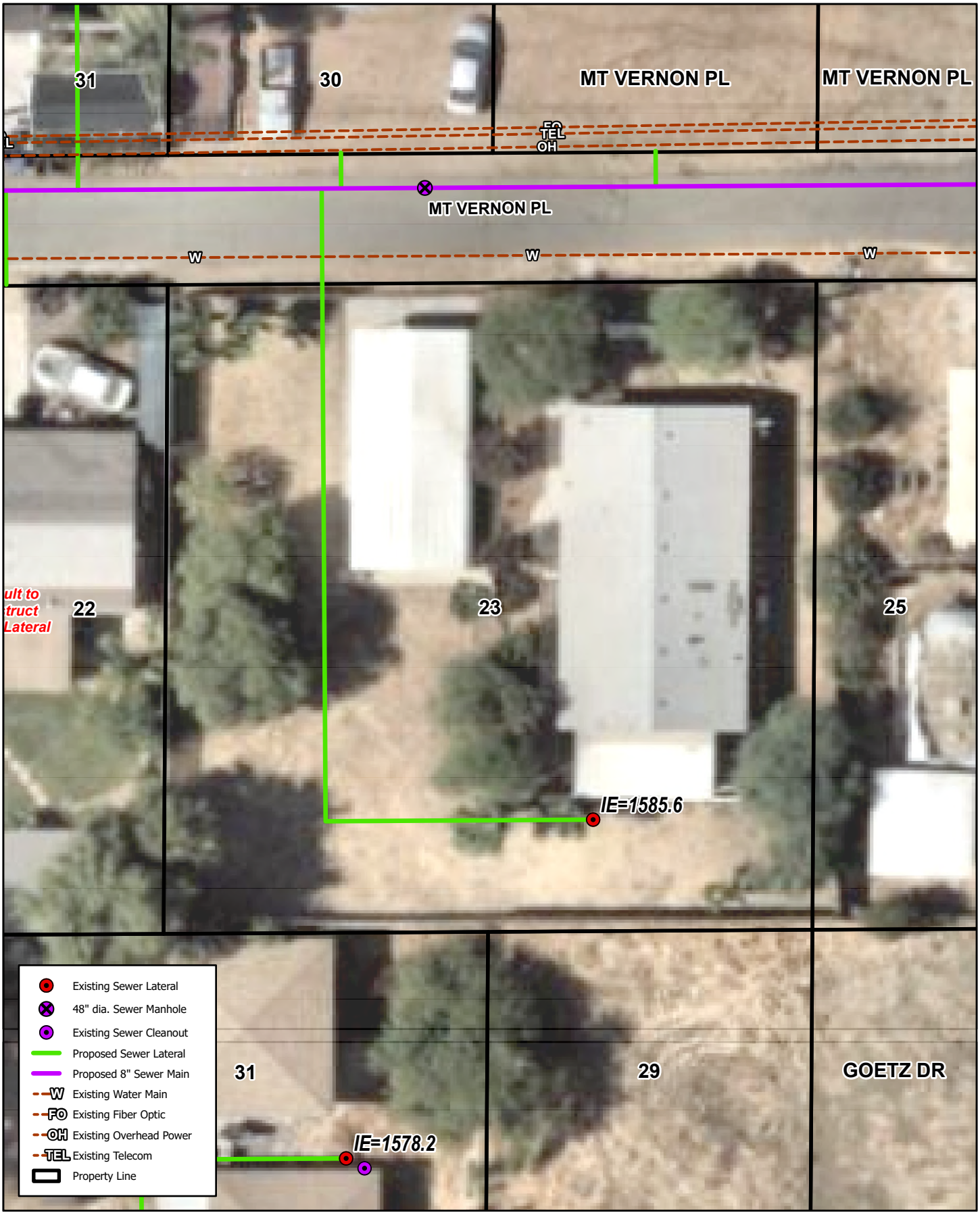

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Quail Valley - Subarea 4 Sewer Improvement Plans

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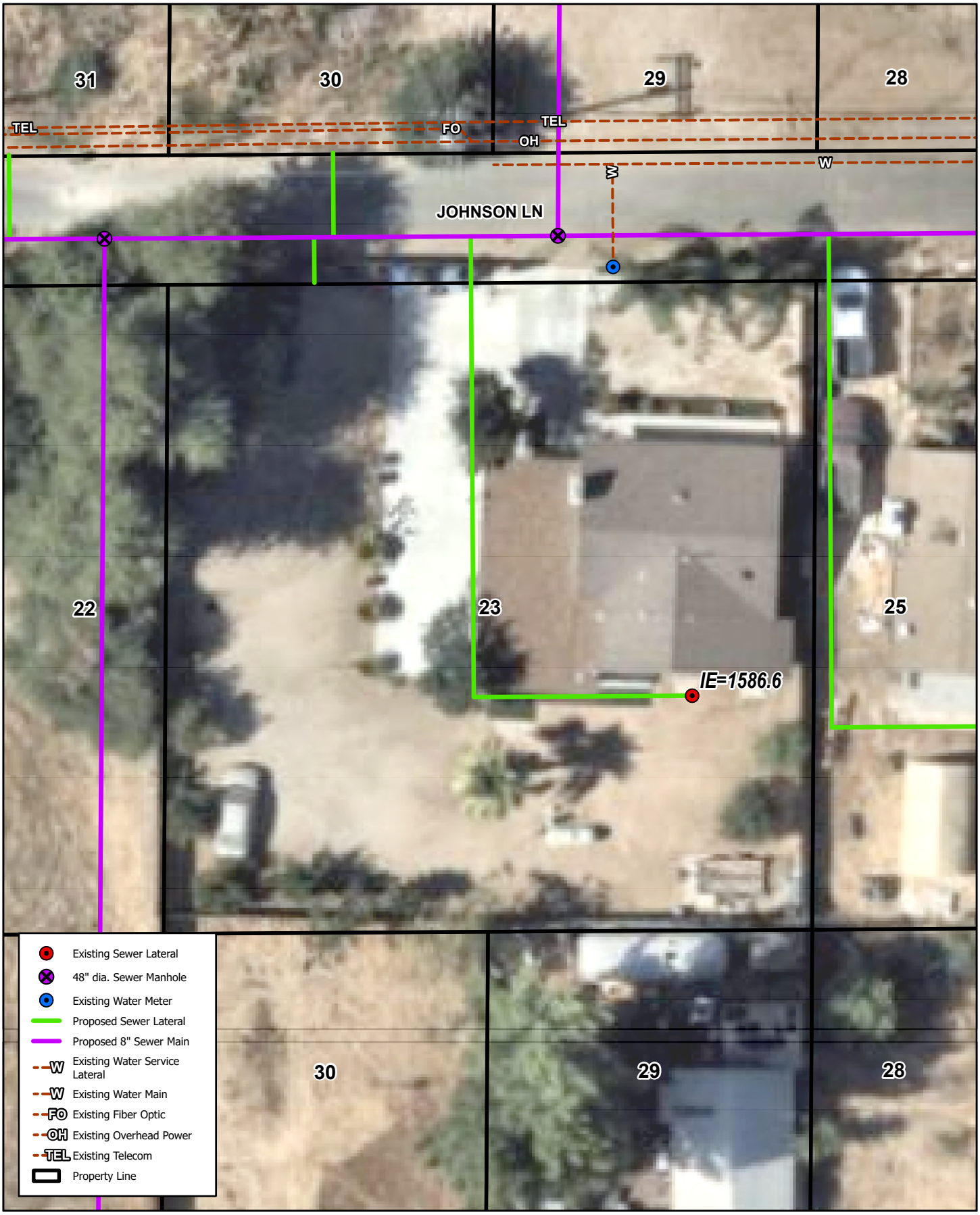

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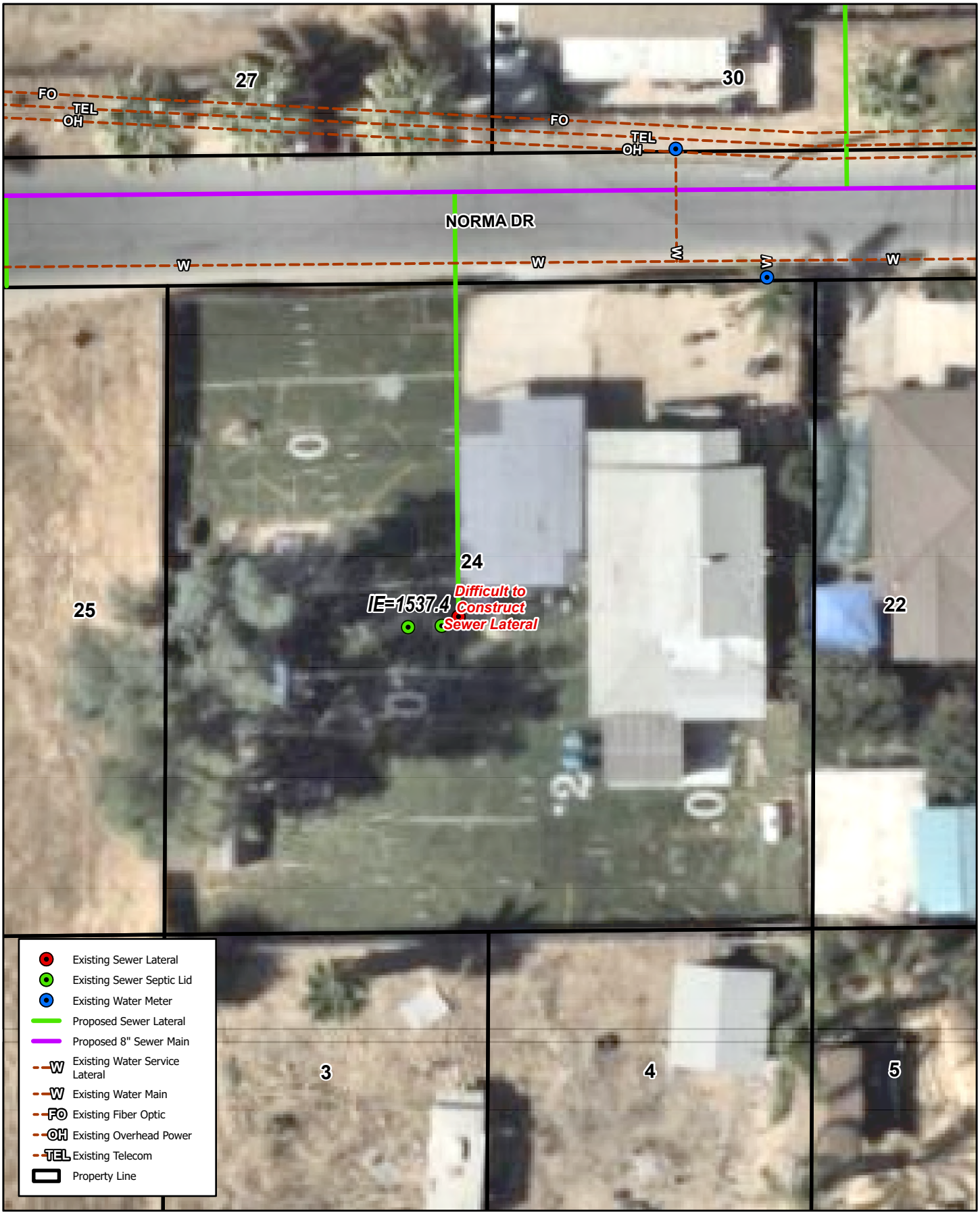
LOT #23

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

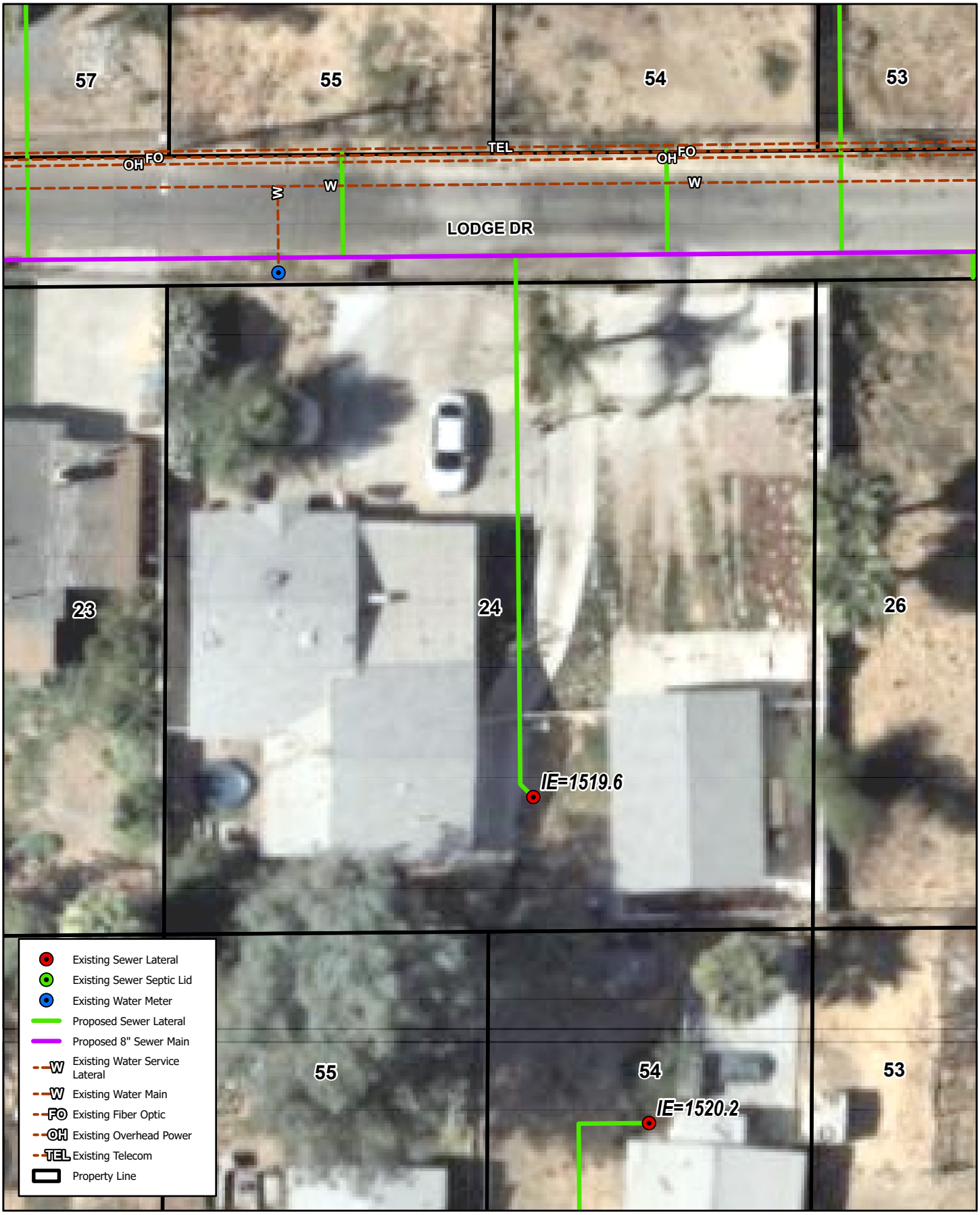


23887 NORMA DR, CANYON LAKE, CA 92587

LOT #24

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

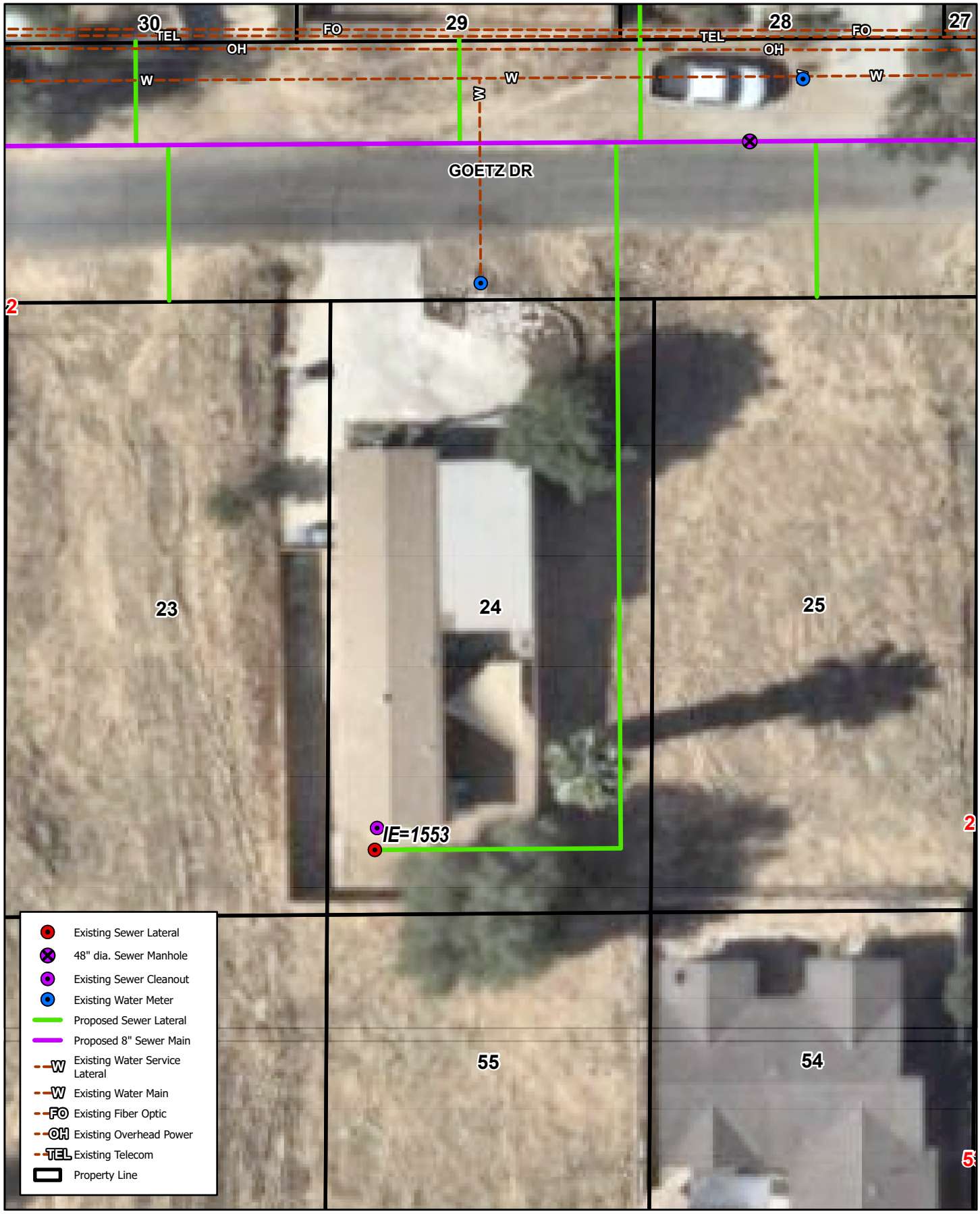


23741 LODGE DR, CANYON LAKE, CA 92587

LOT #24

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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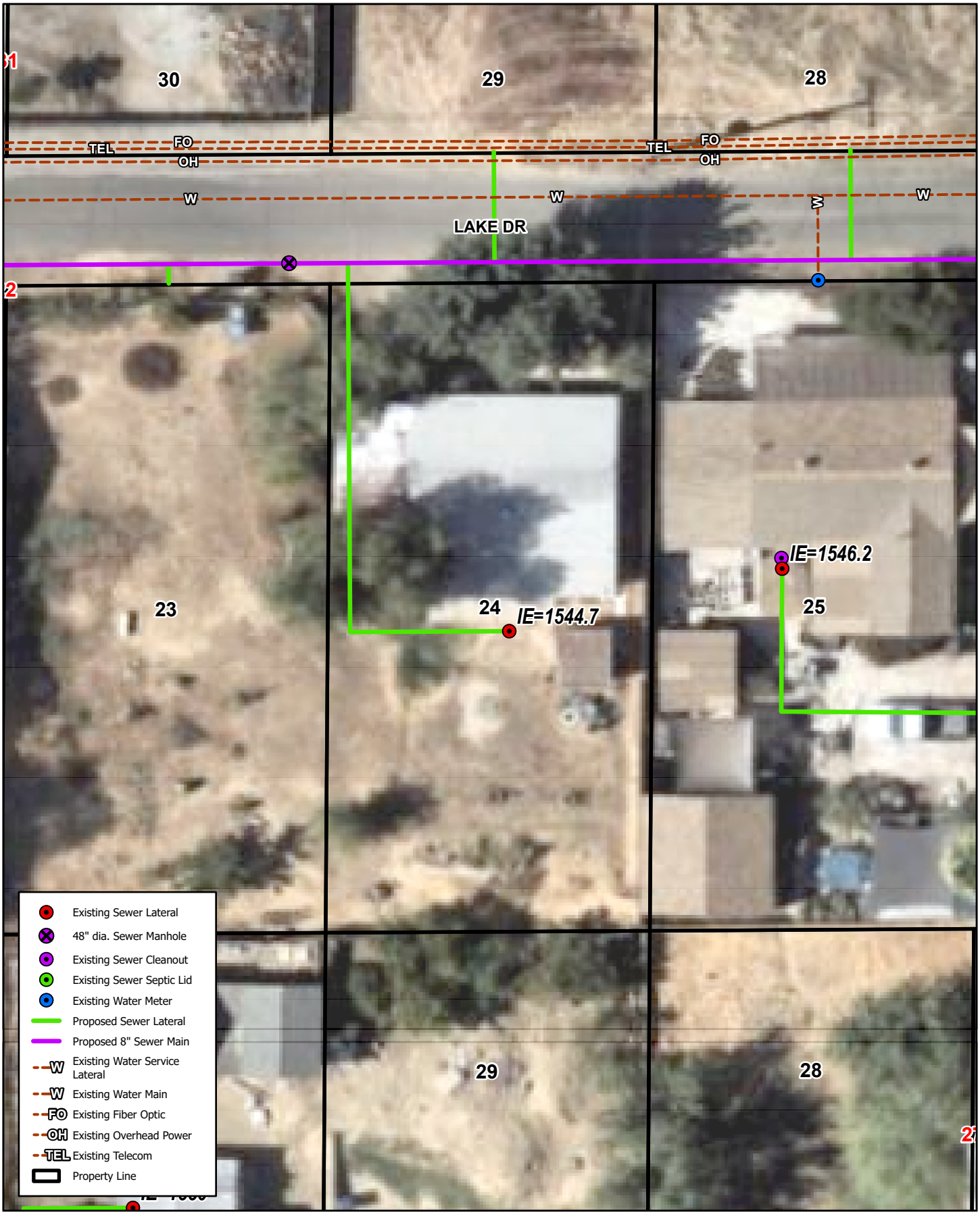
LOT #24

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23729 LAKE DR, QUAIL VALLEY, CA 92587

LOT #24

Quail Valley - Subarea 4 Sewer Improvement Plans

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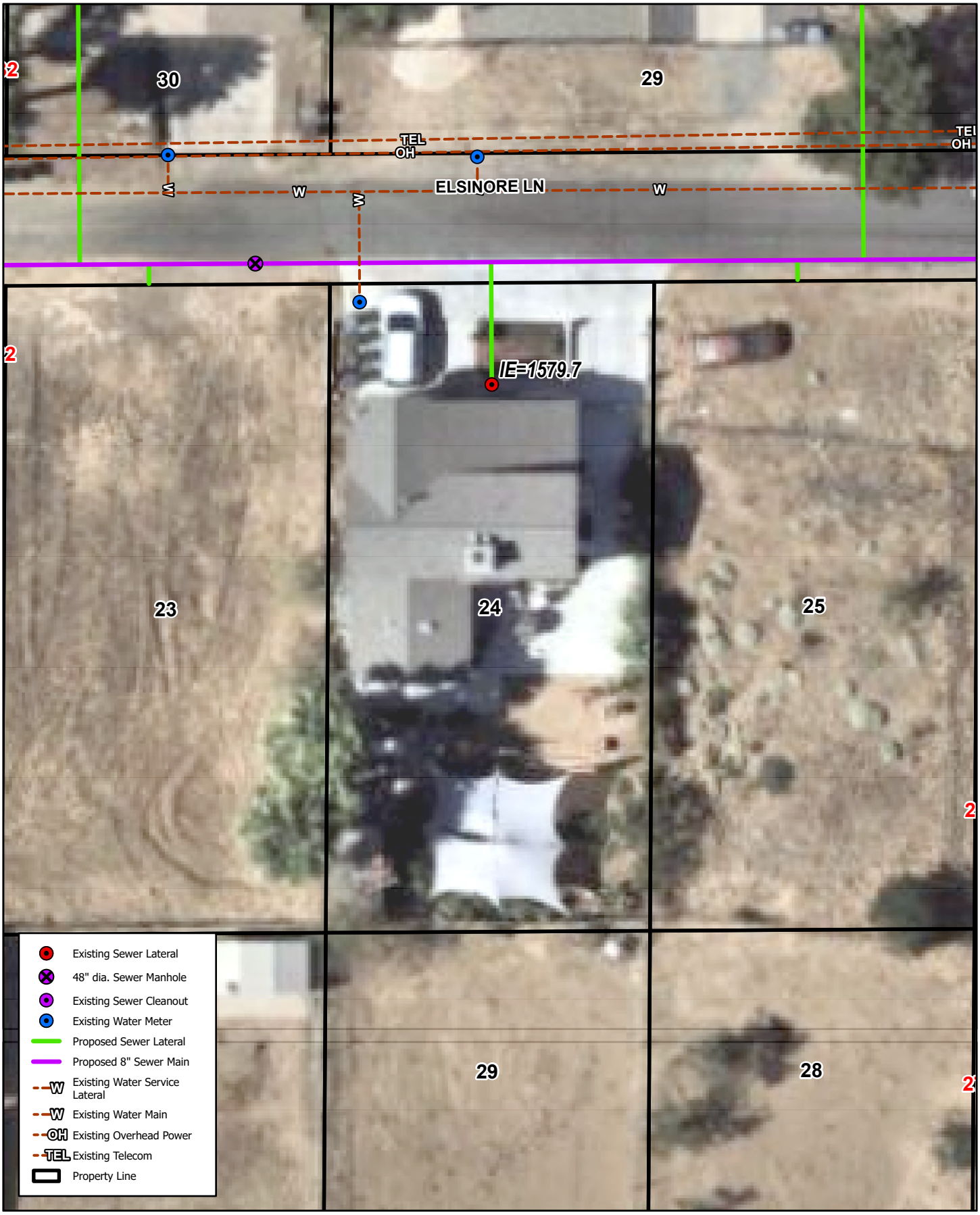

23975 ELSINORE LN, QUAIL VALLEY, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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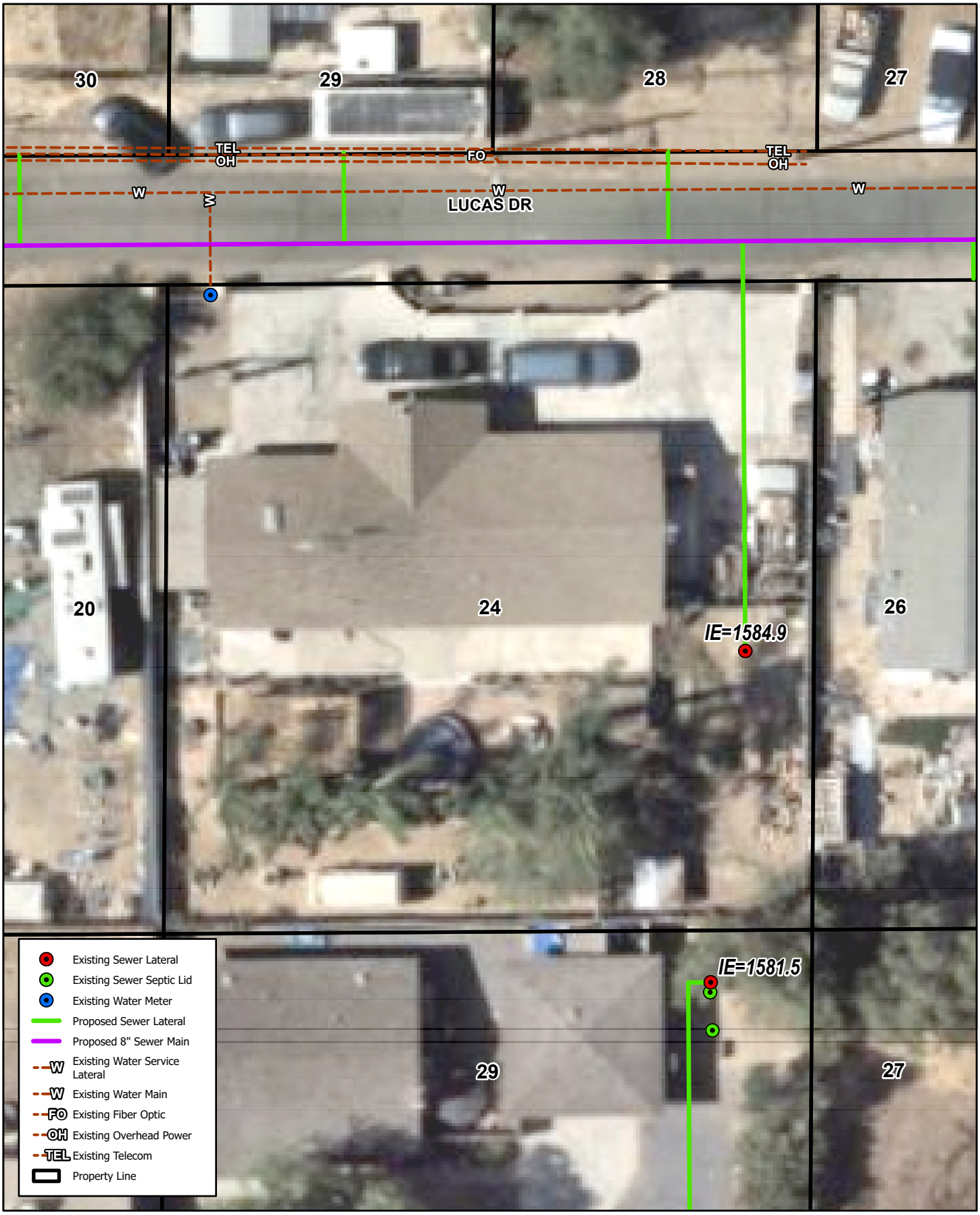
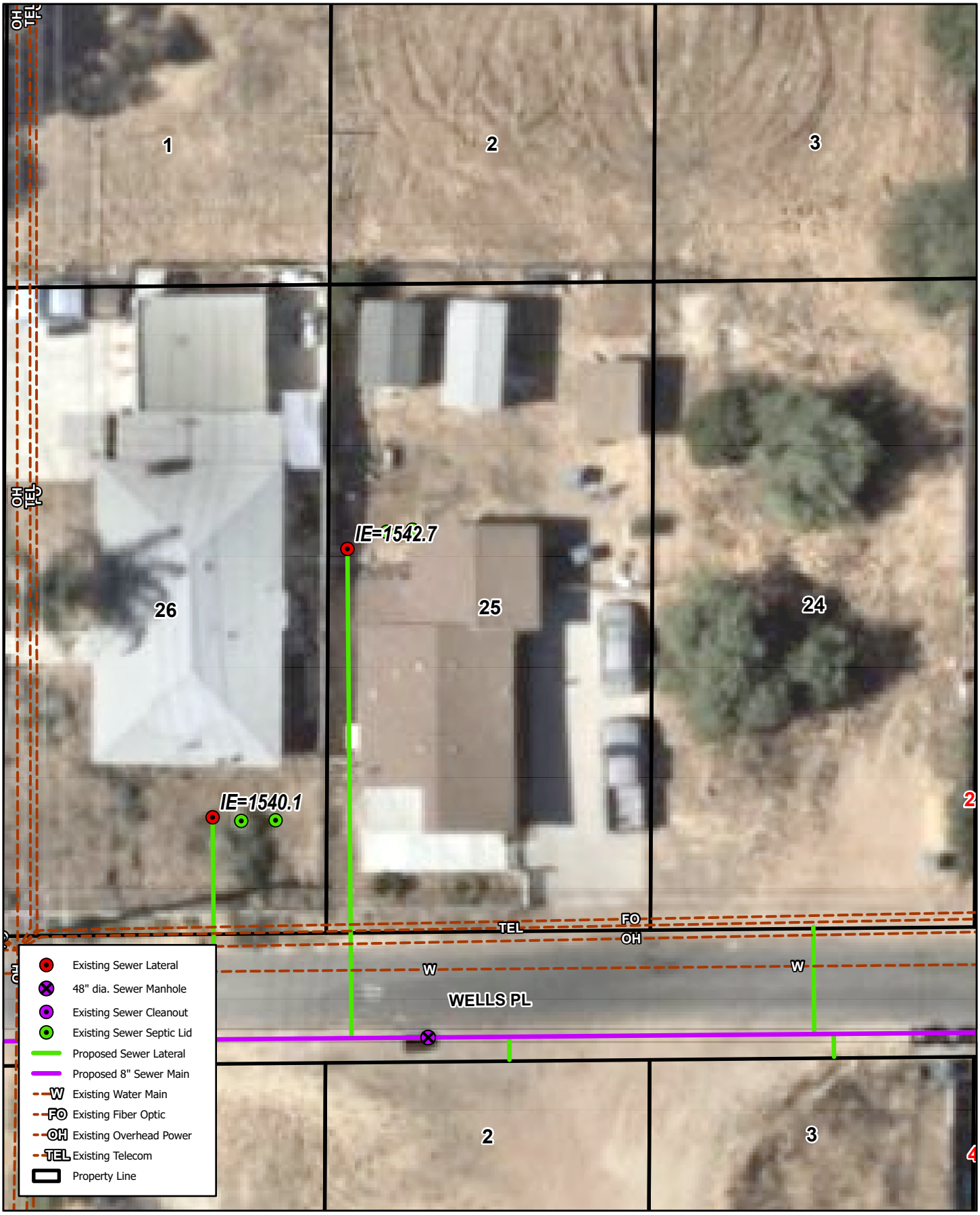


23981 LUCAS DR, QUAIL VALLEY, CA 92587

LOT #24

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

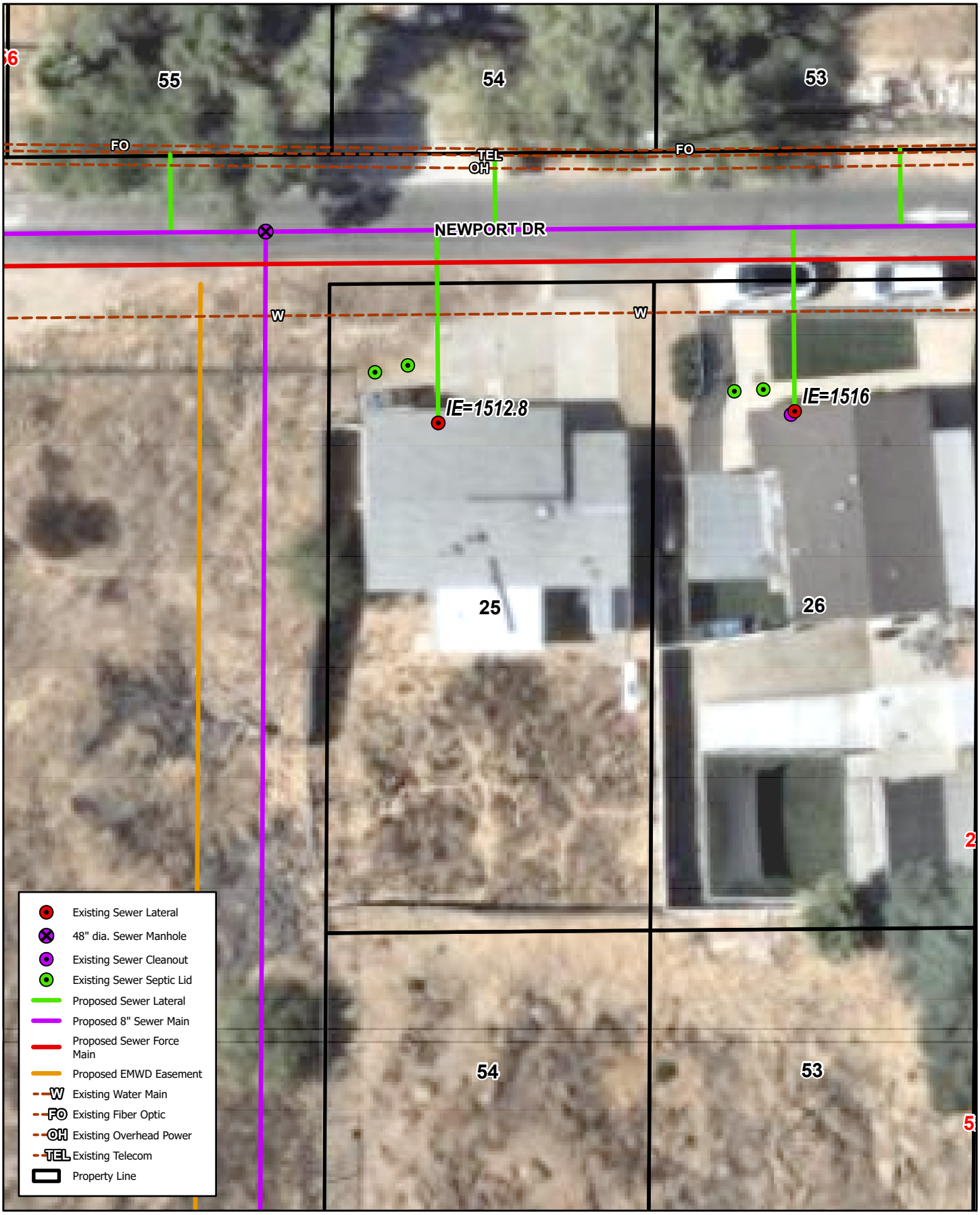


23872 WELLS PL, CANYON LAKE, CA 92587

LOT #25

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23739 NEWPORT DR, CANYON LAKE, CA 92587

LOT #25

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

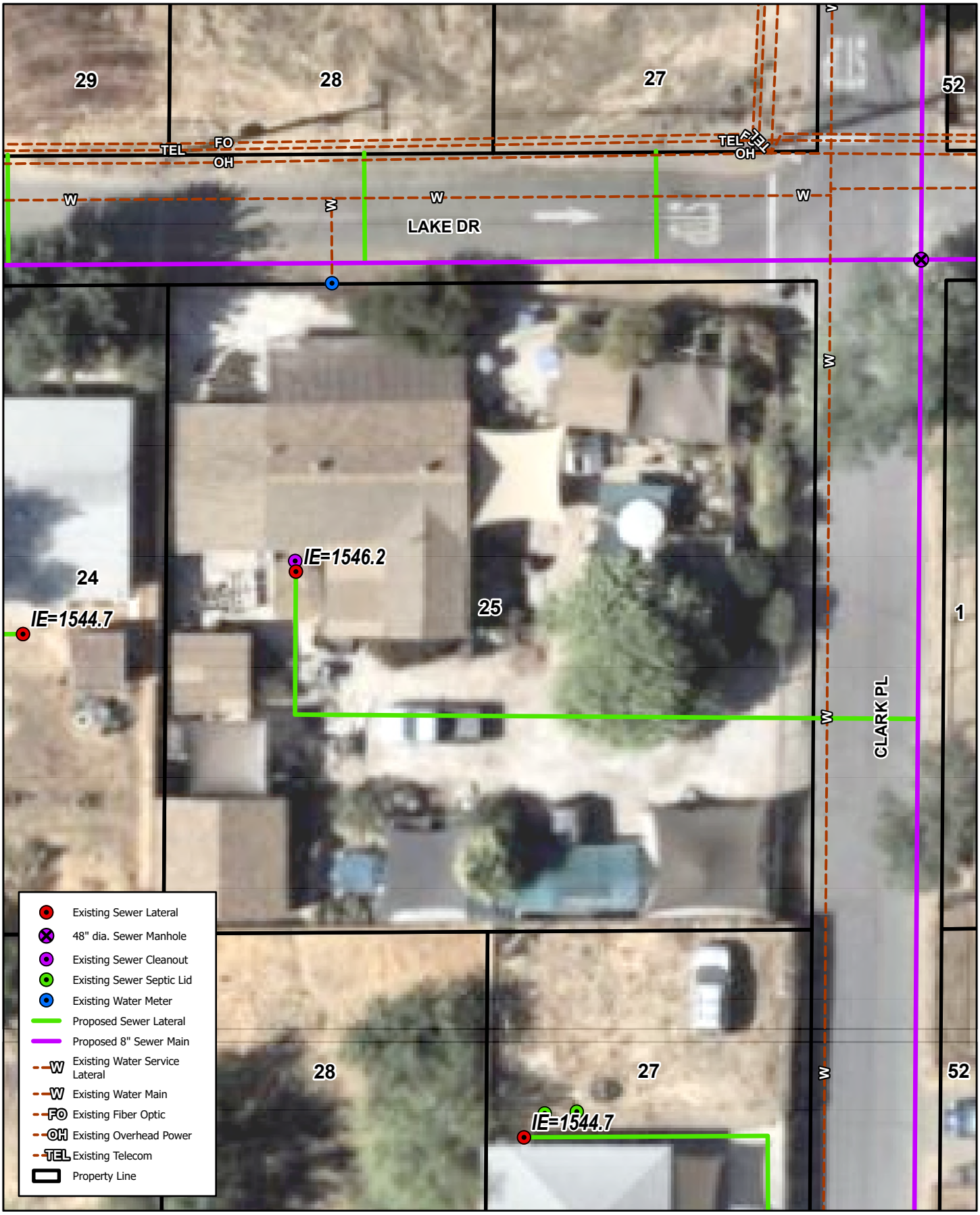


23705 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #25

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23739 LAKE DR, QUAIL VALLEY, CA 92587

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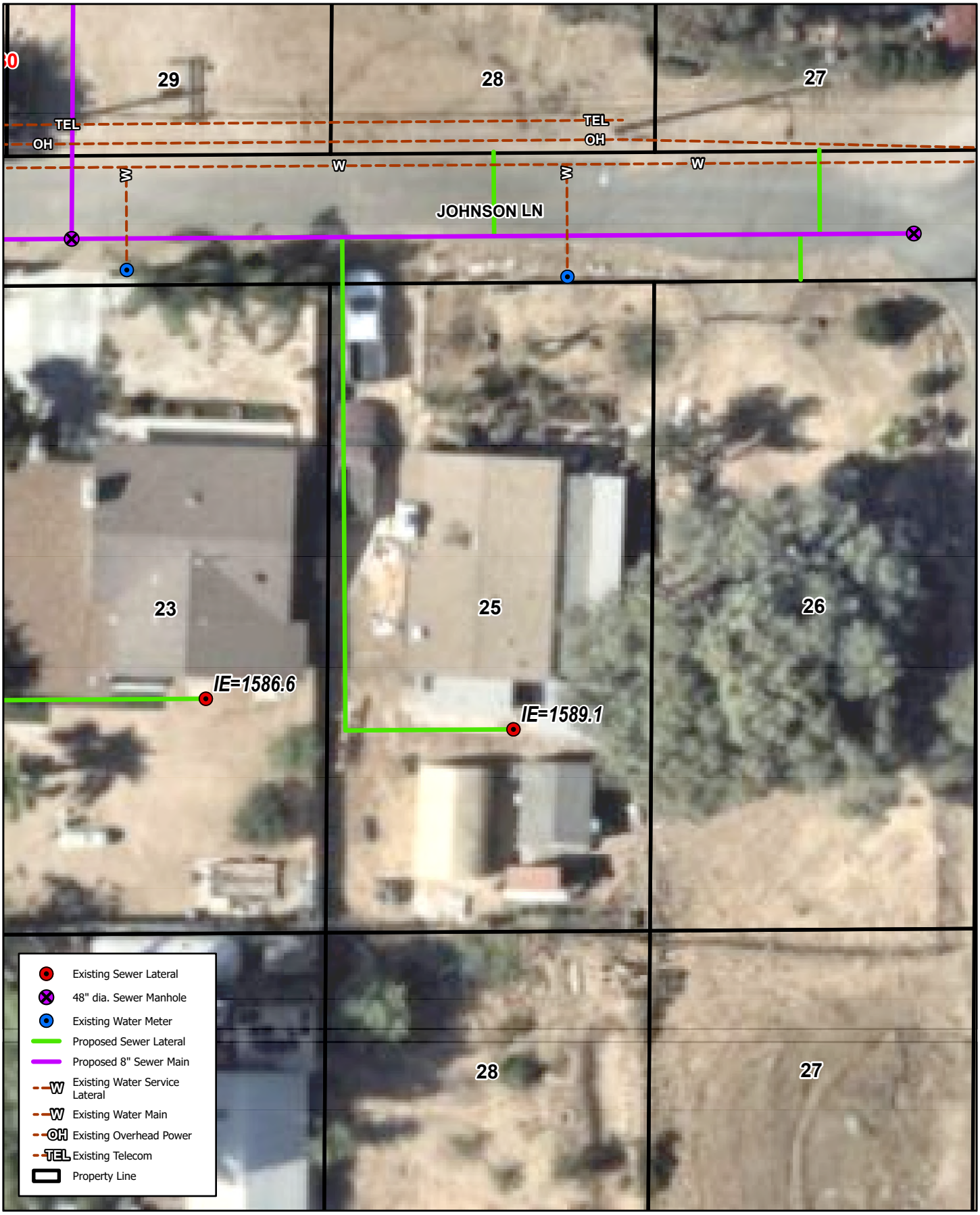
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23995 JOHNSON LN, CANYON LAKE, CA 92587

LOT #25

Quail Valley - Subarea 4 Sewer Improvement Plans

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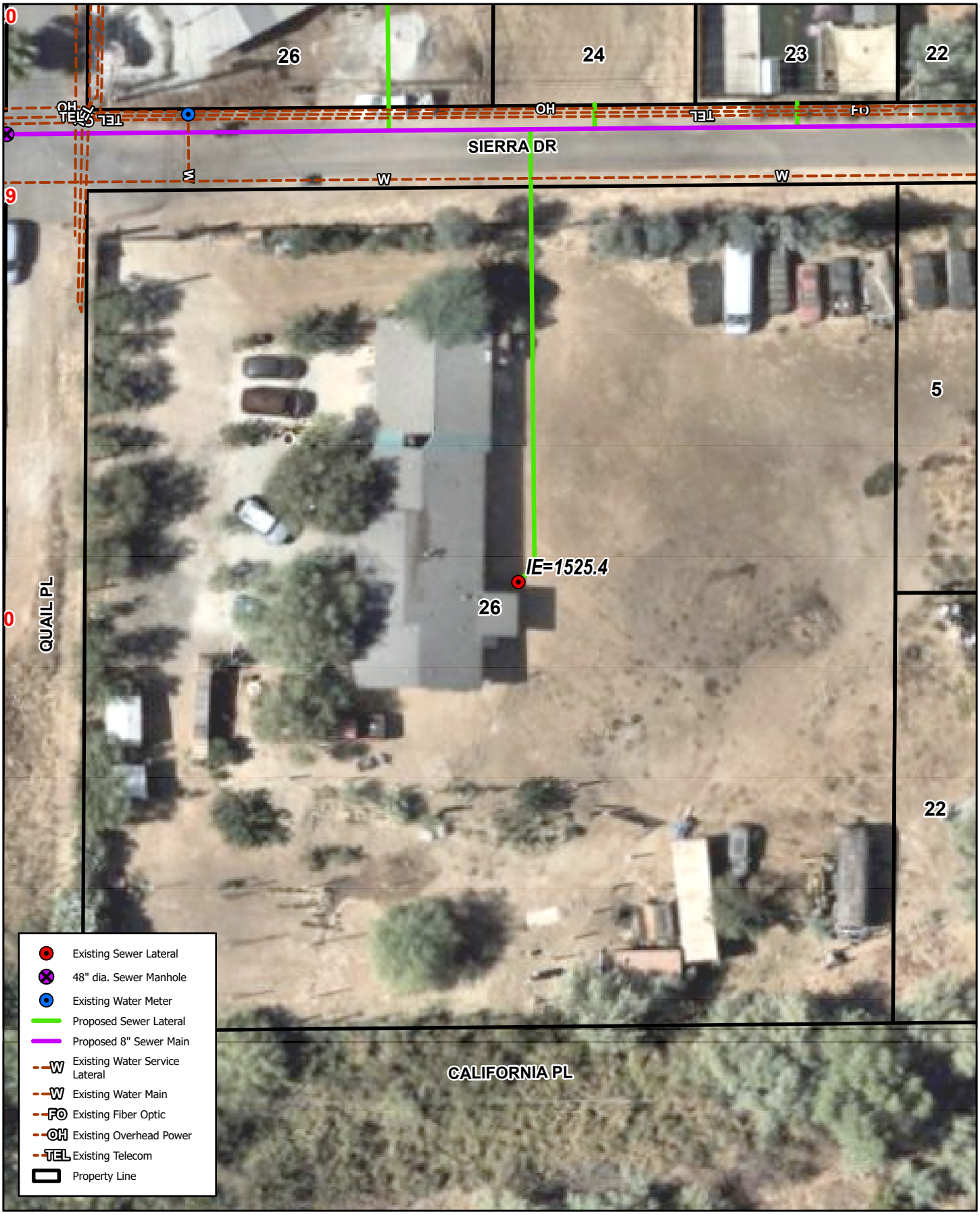
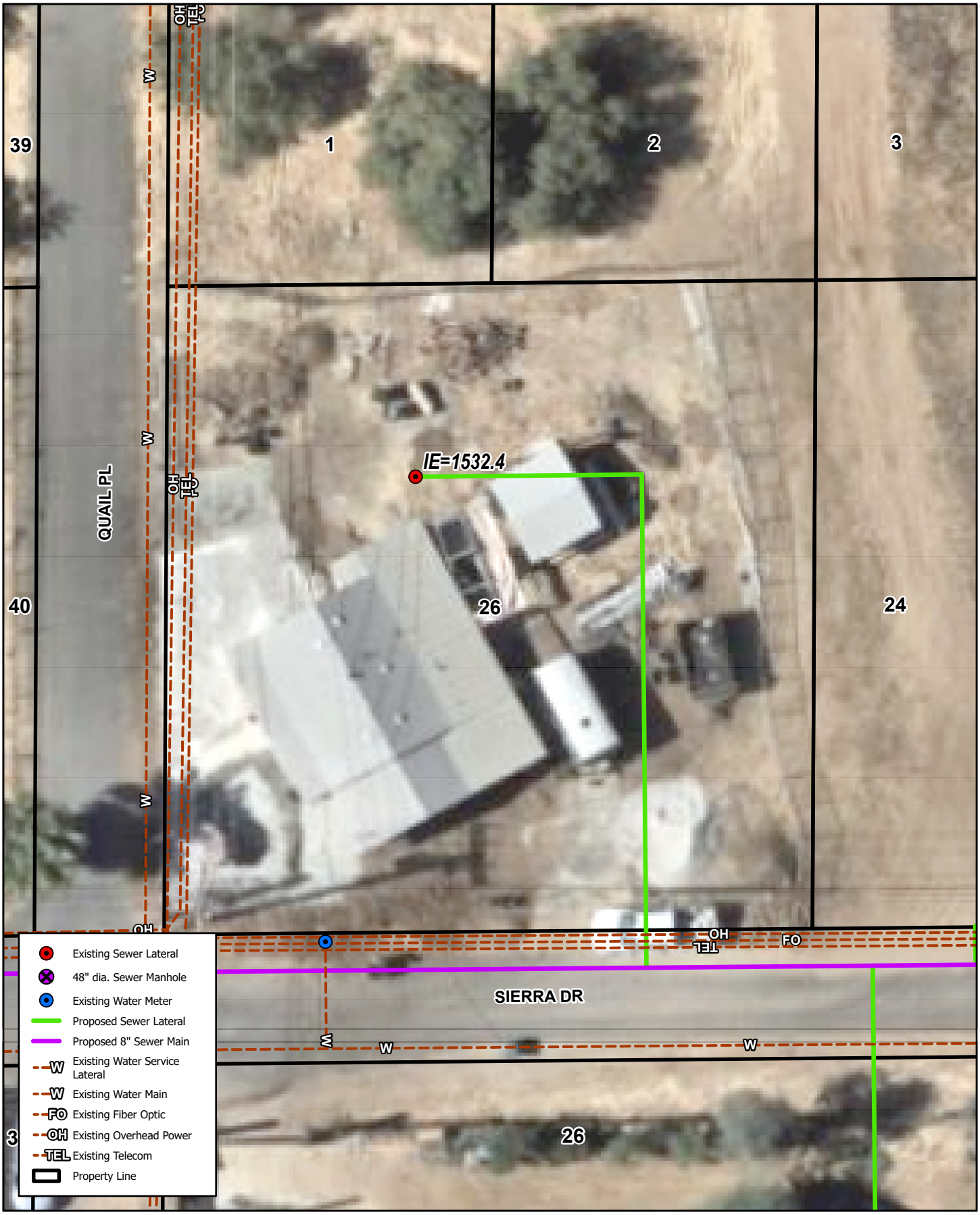


23881 SIERRA DR, CANYON LAKE, CA 92587

LOT #26

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23860 SIERRA DR, CANYON LAKE, CA 92587

LOT #26

Quail Valley - Subarea 4 Sewer Improvement Plans

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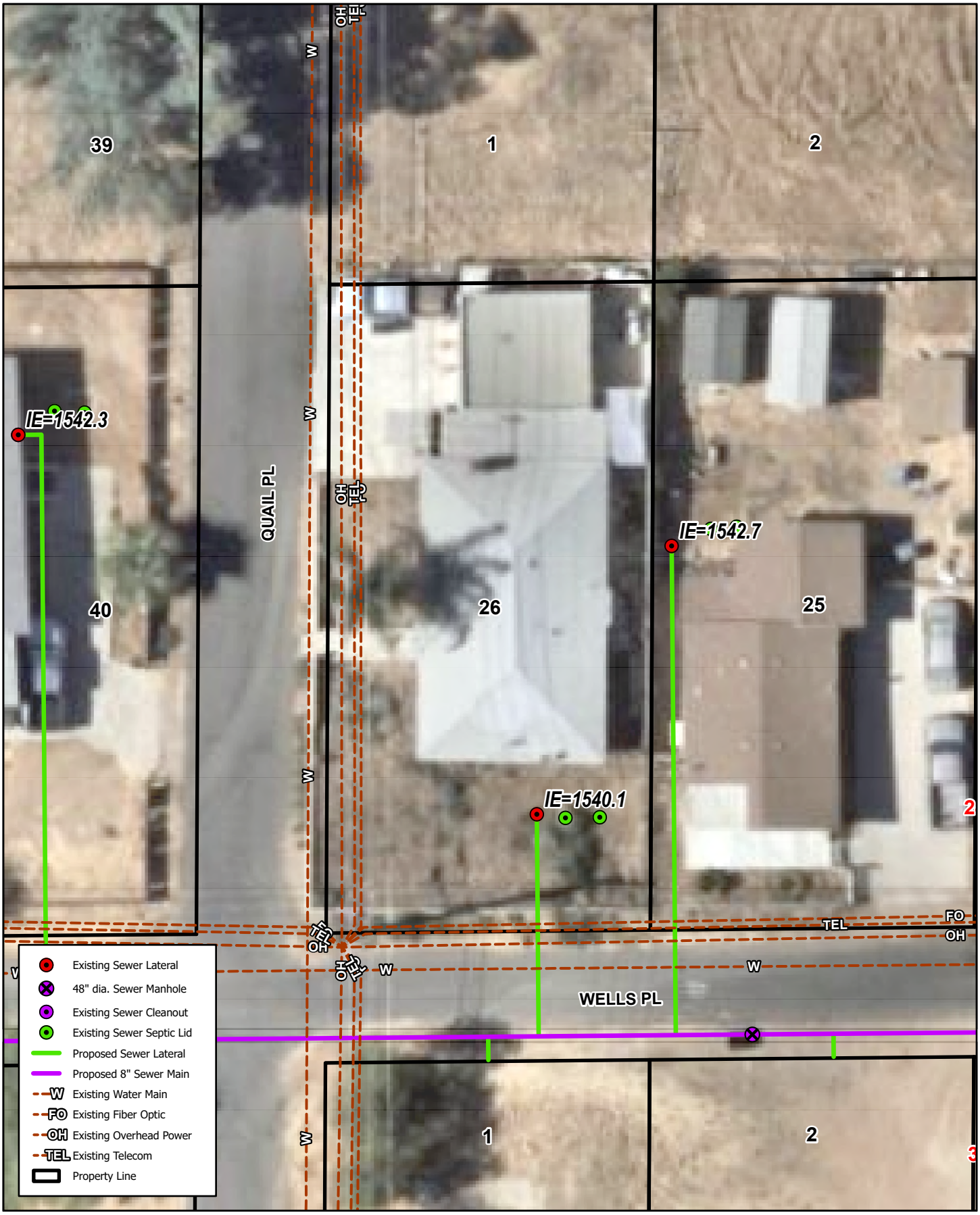

28890 QUAIL PL, QUAIL VALLEY, CA 92587

LOT #26

Quail Valley - Subarea 4 Sewer Improvement Plans

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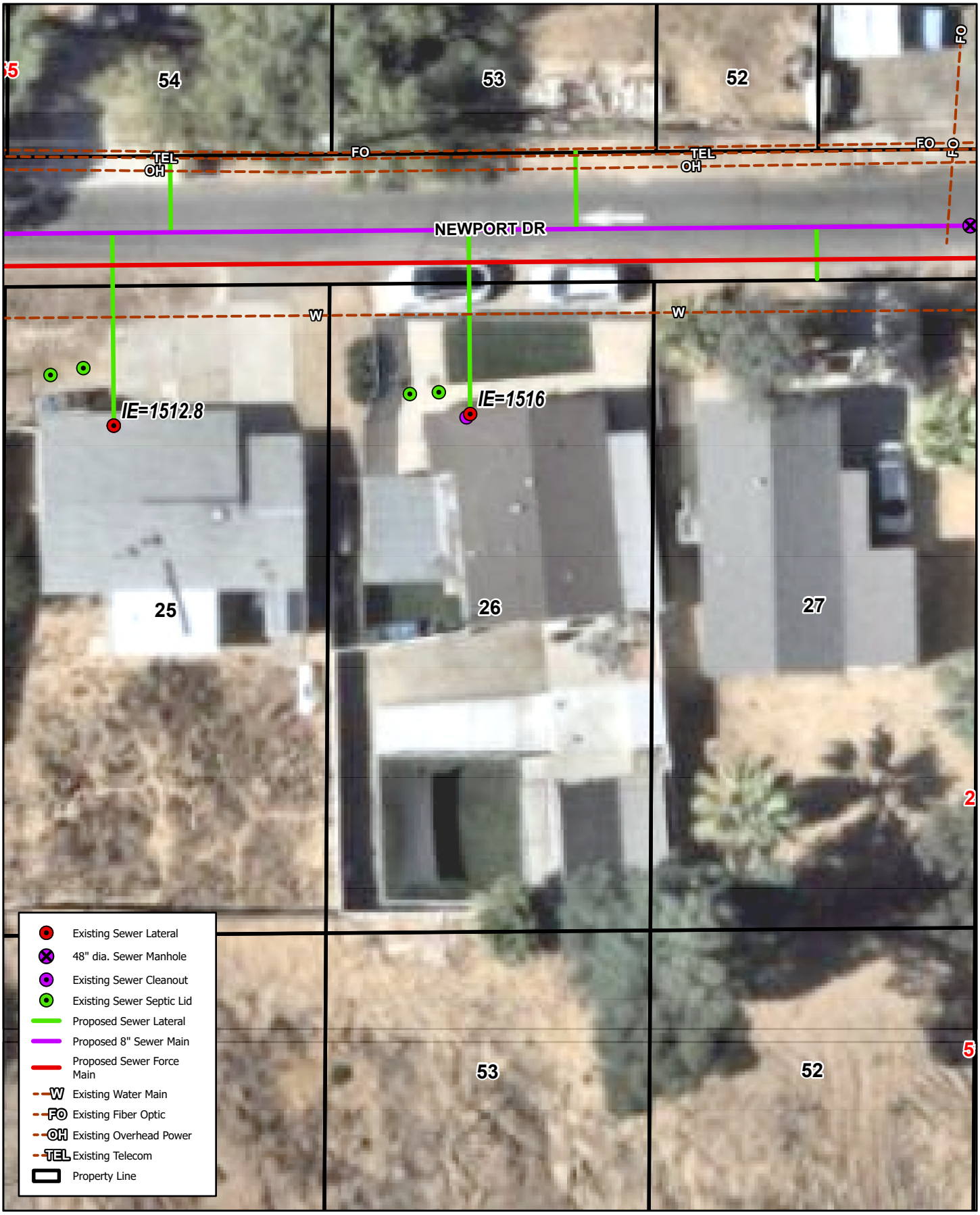

23745 NEWPORT DR, CANYON LAKE, CA 92587

LOT #26

Quail Valley - Subarea 4 Sewer Improvement Plans

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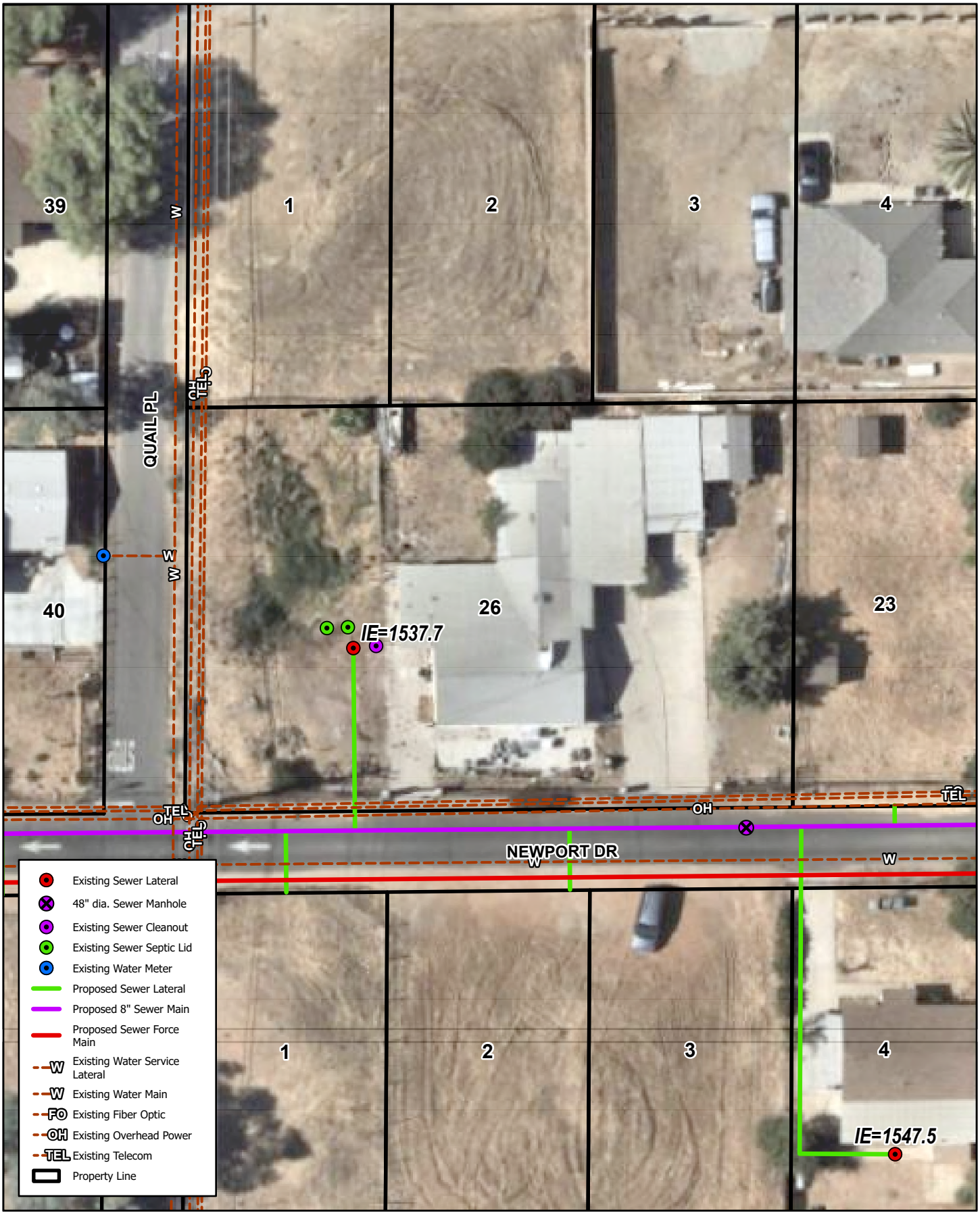

23874 NEWPORT DR, QUAIL VALLEY, CA 92587

LOT #26

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23753 CYPRESS PL, CANYON LAKE, CA 92587

LOT #26

Quail Valley - Subarea 4 Sewer Improvement Plans

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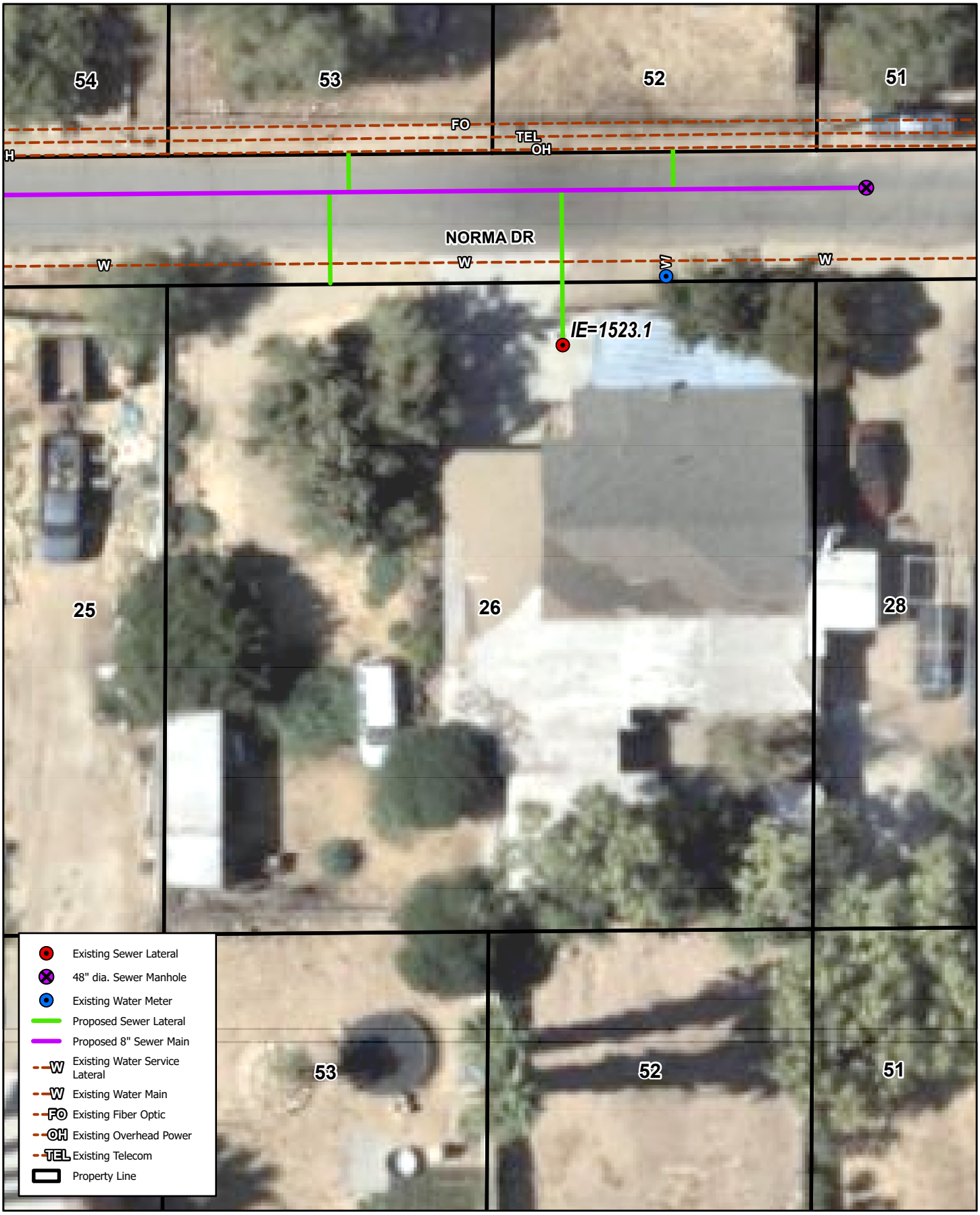

23757 NORMA DR, CANYON LAKE, CA 92587

LOT #26

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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LOT #26

Quail Valley - Subarea 4 Sewer Improvement Plans

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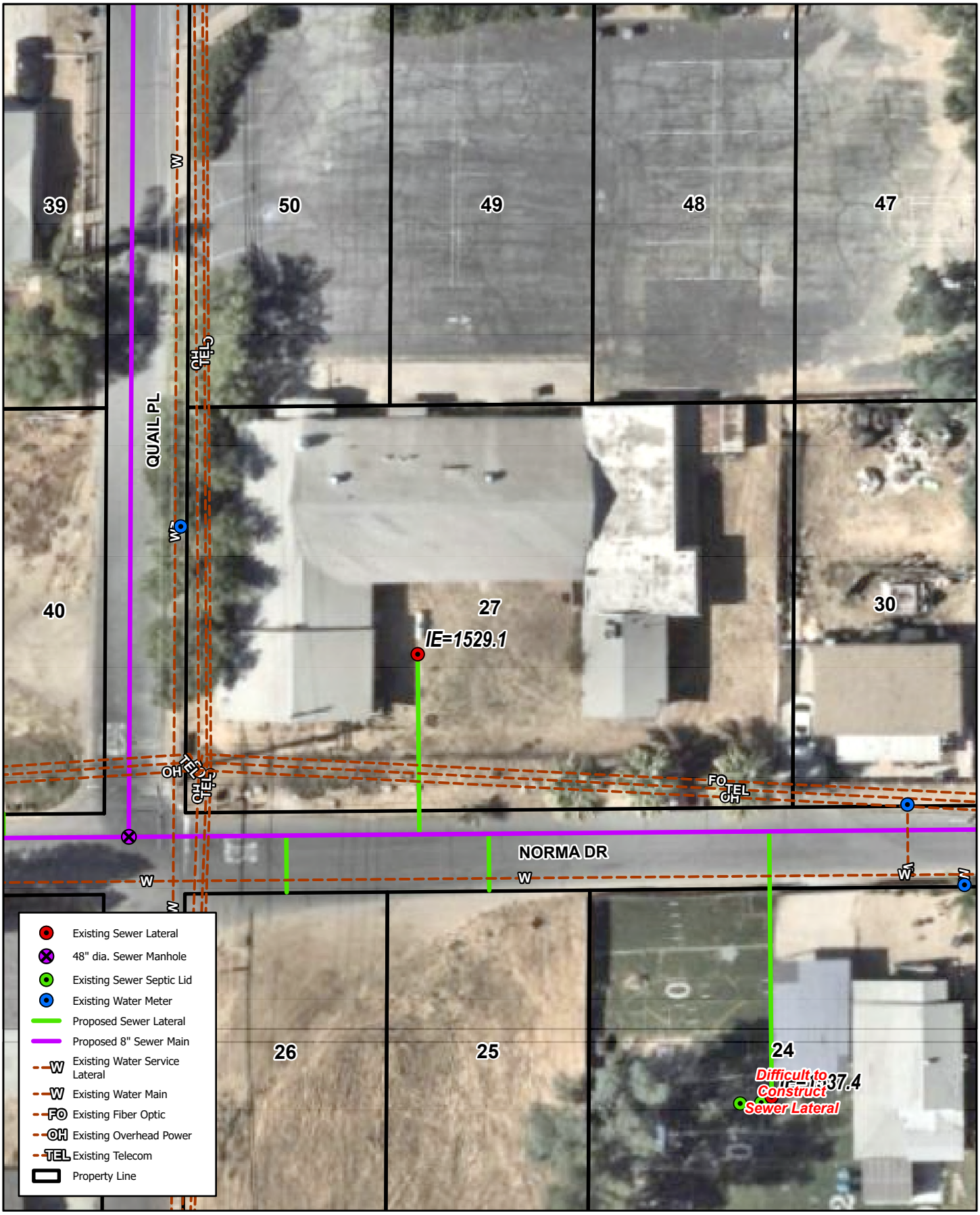

28780 QUAIL PL, CANYON LAKE, CA 92587

LOT #27

Quail Valley - Subarea 4 Sewer Improvement Plans

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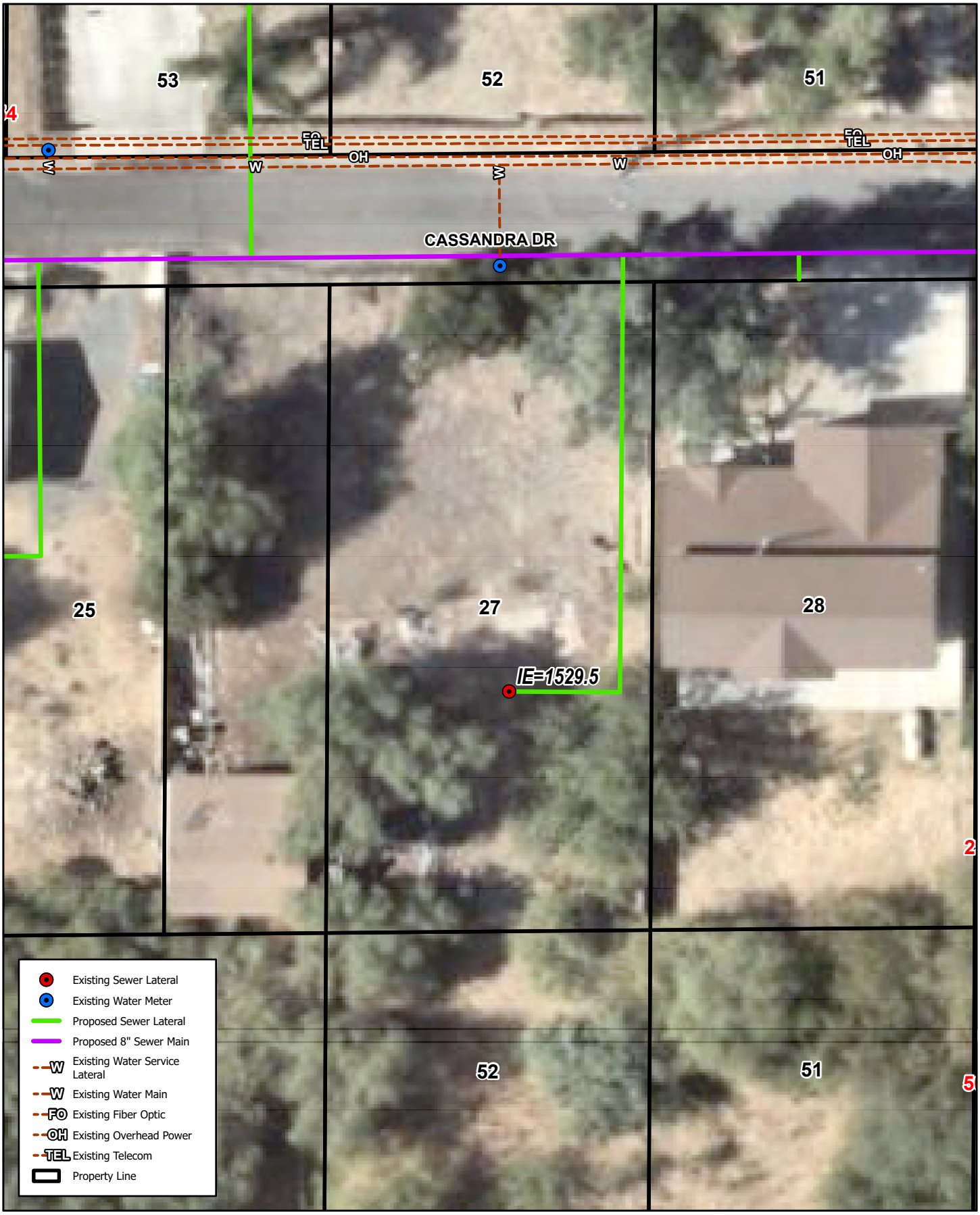
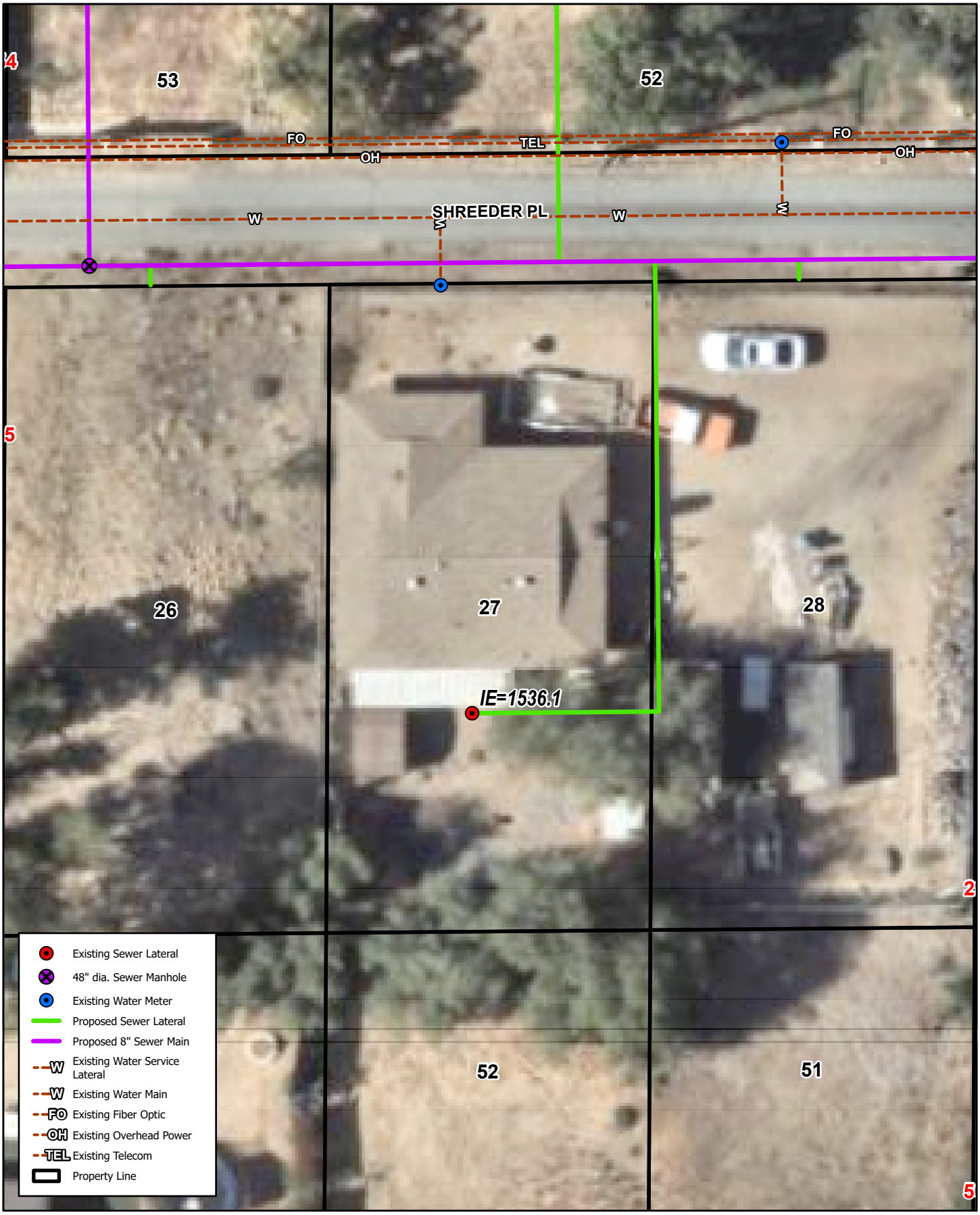


23723 CASSANDRA DR, QUAIL VALLEY, CA 92587

LOT #27

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23727 SHREEDER PL, CANYON LAKE, CA 92587

LOT #27

Quail Valley - Subarea 4 Sewer Improvement Plans

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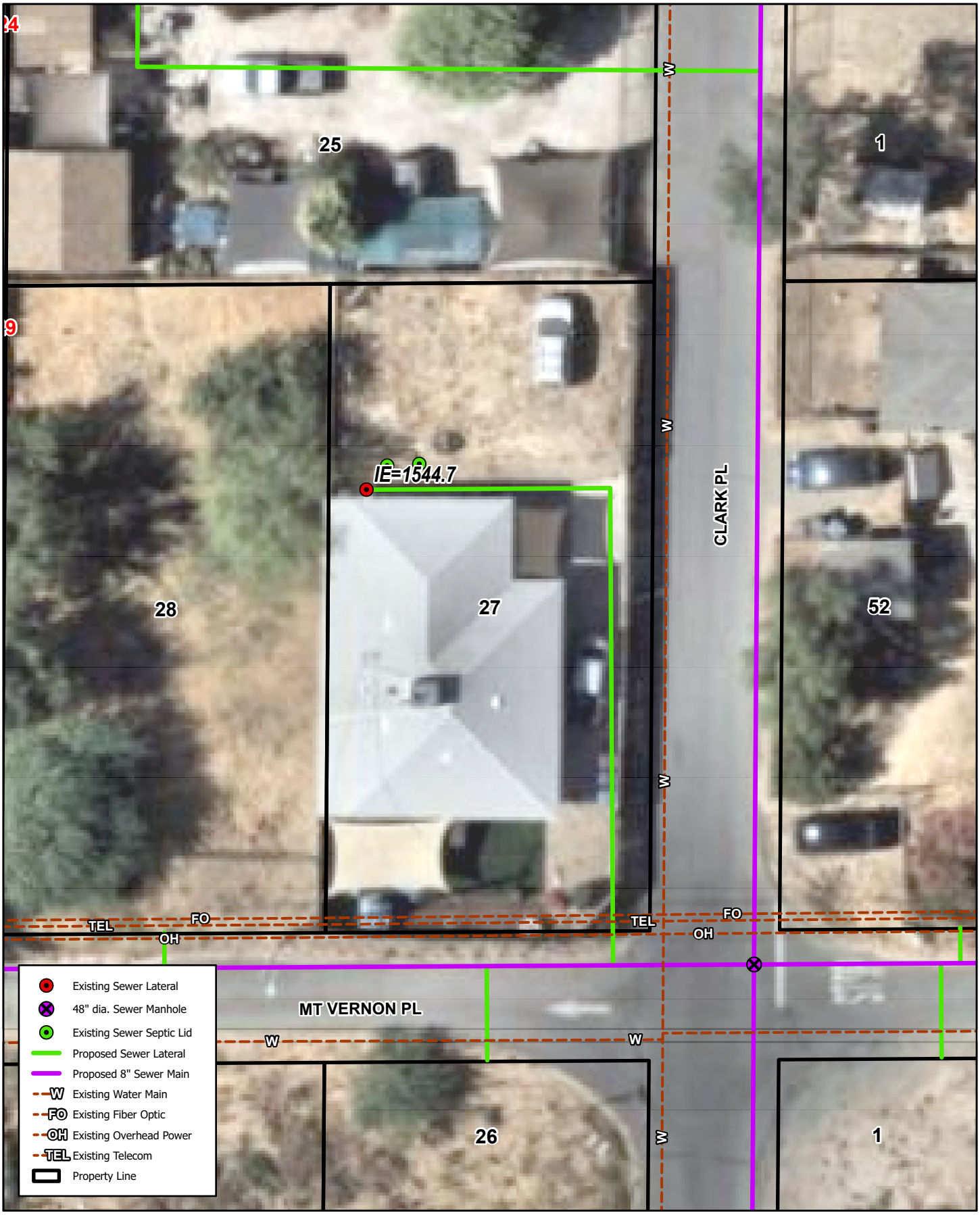

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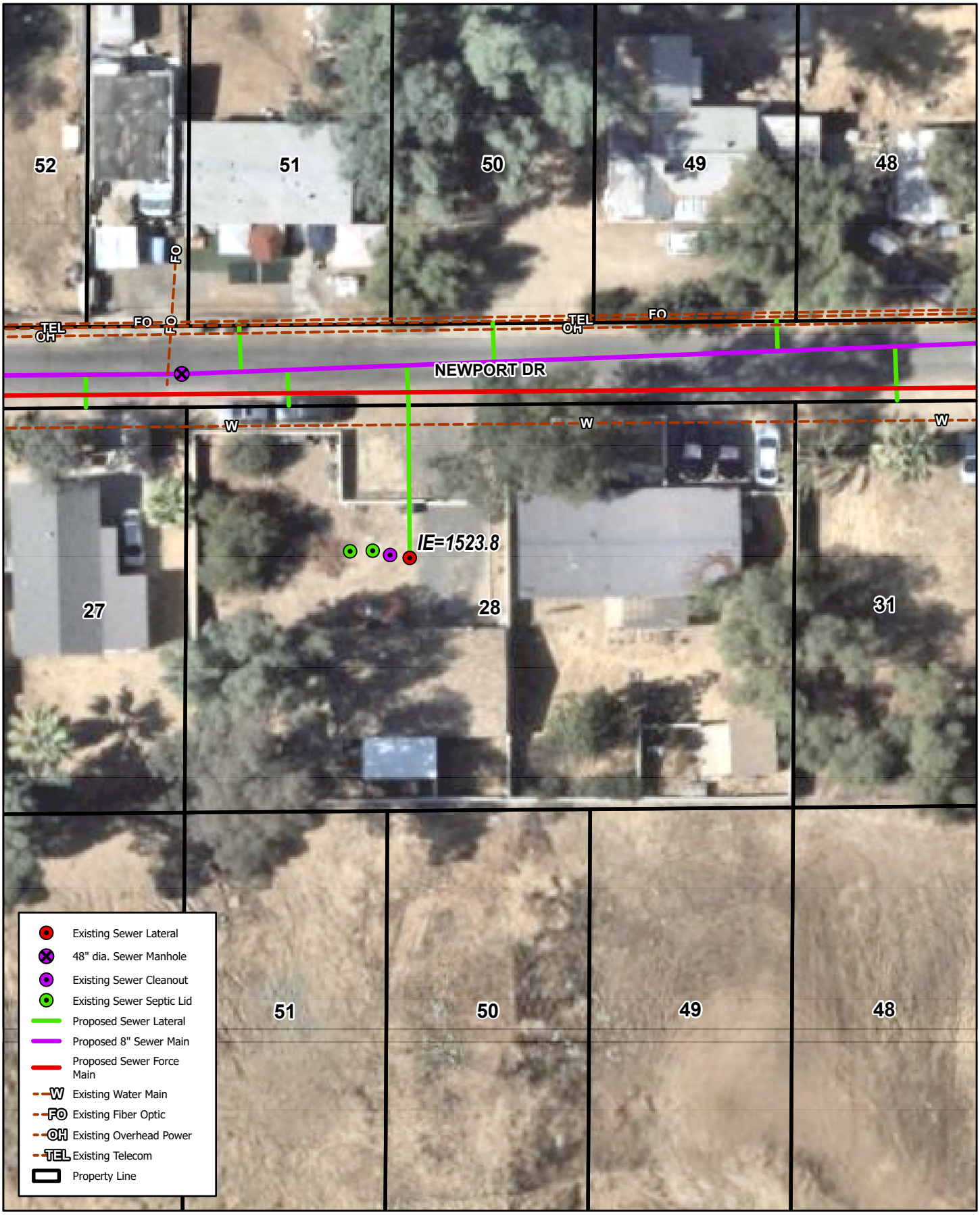
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

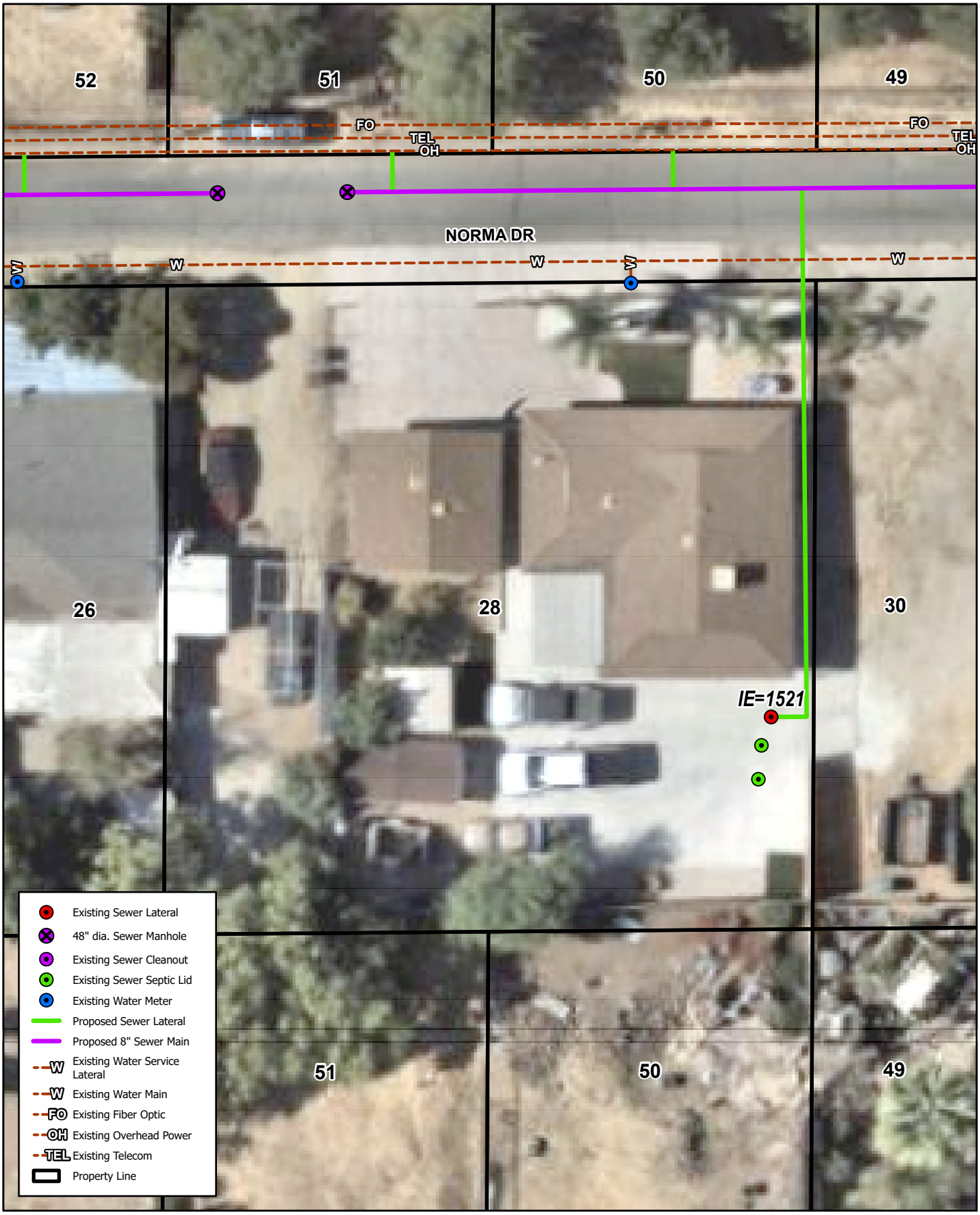


23775 NEWPORT DR, CANYON LAKE, CA 92587

LOT #28

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23769 NORMA DR, CANYON LAKE, CA 92587

LOT #28

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

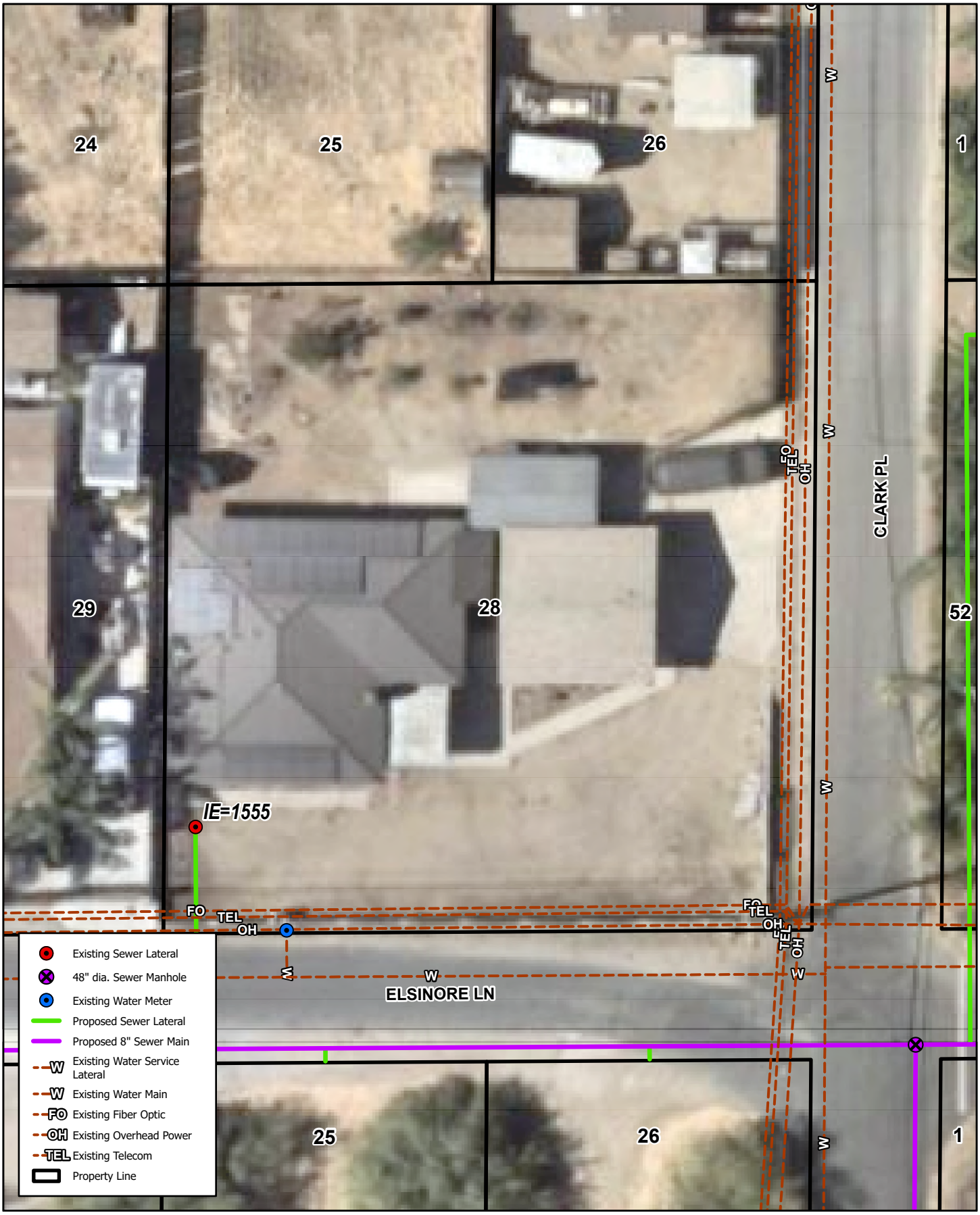


23742 GOETZ DR, CANYON LAKE, CA 92587

LOT #28

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

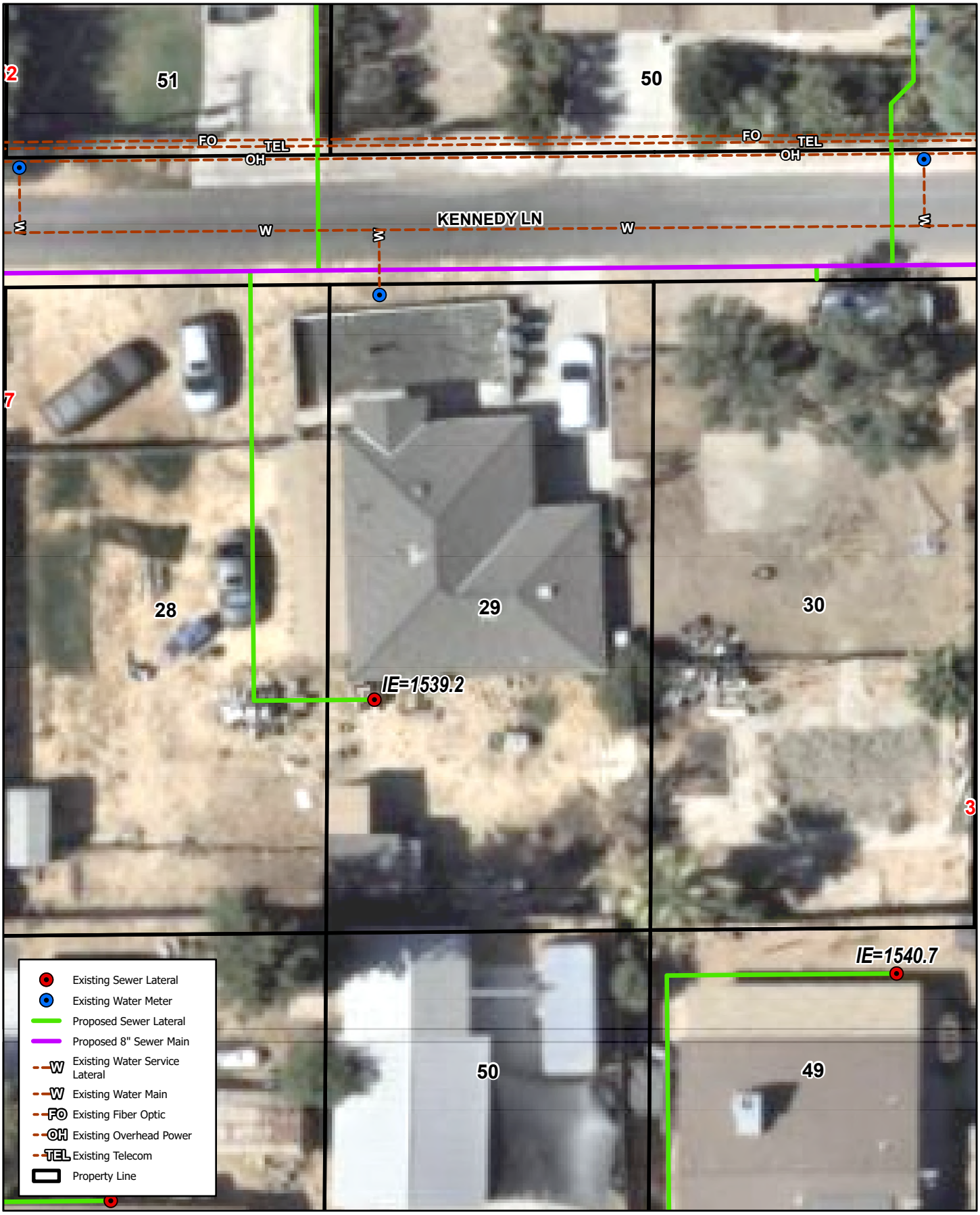


23740 ELSINORE LN, CANYON LAKE, CA 92587

LOT #28

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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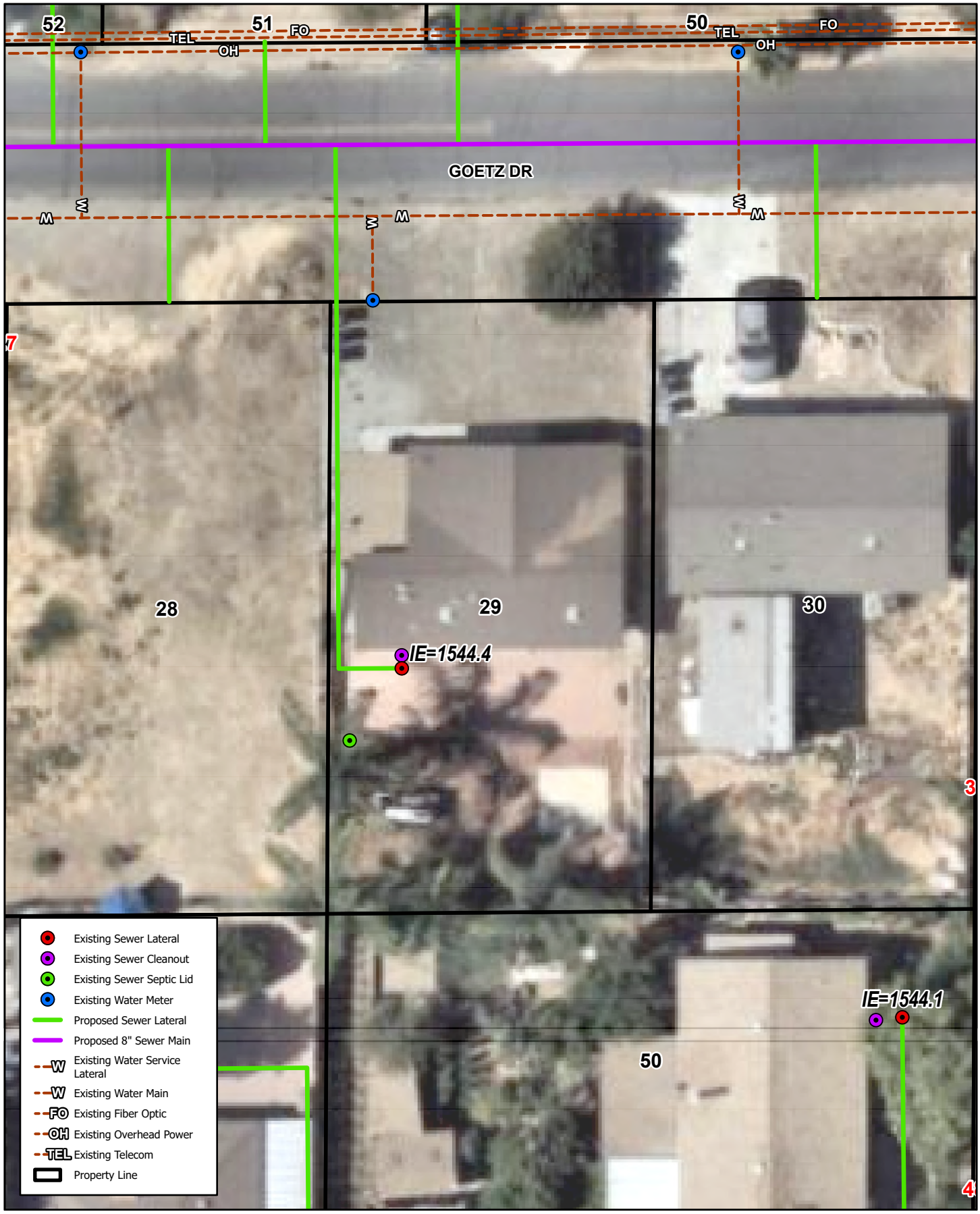
LOT #29

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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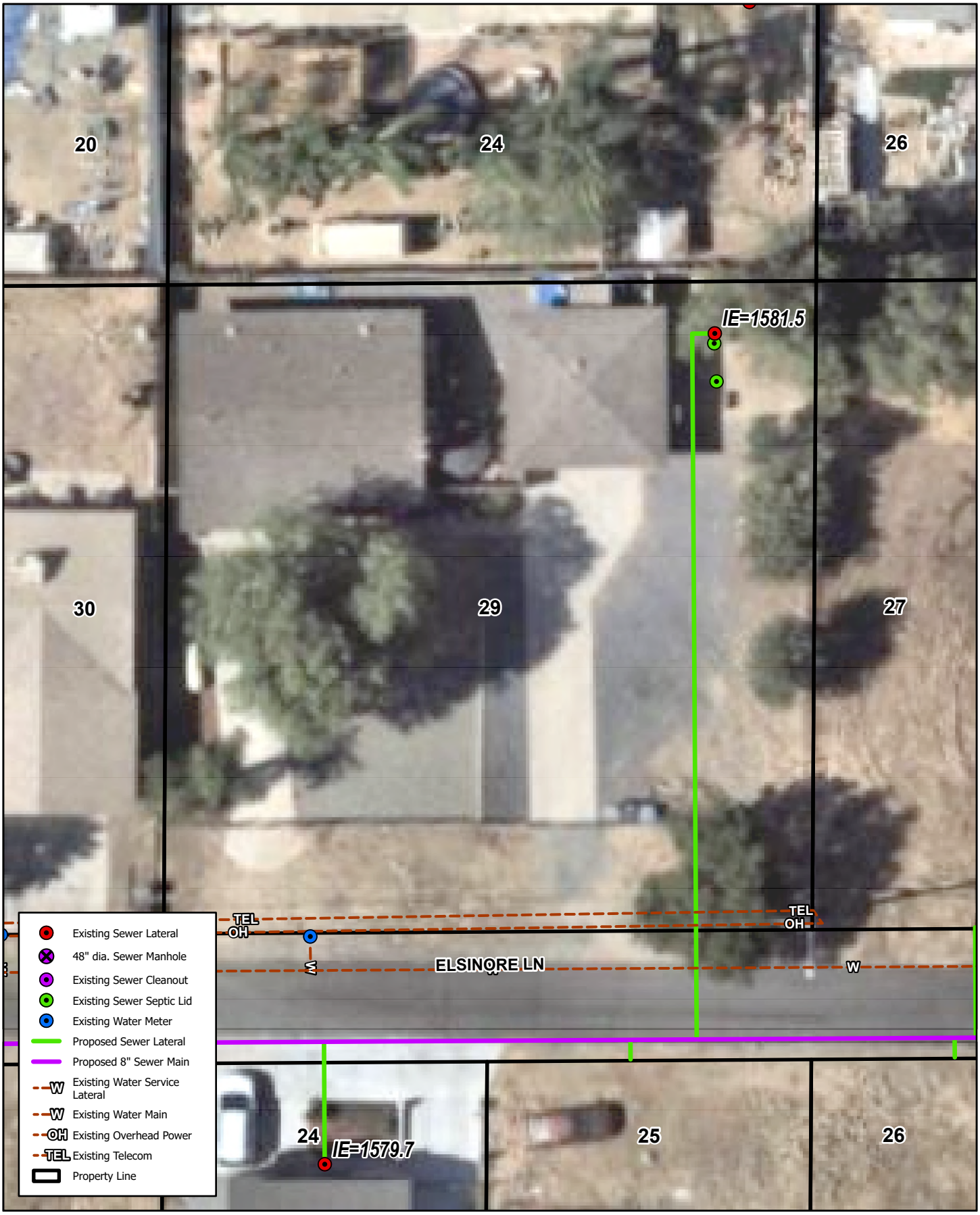
LOT #29

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

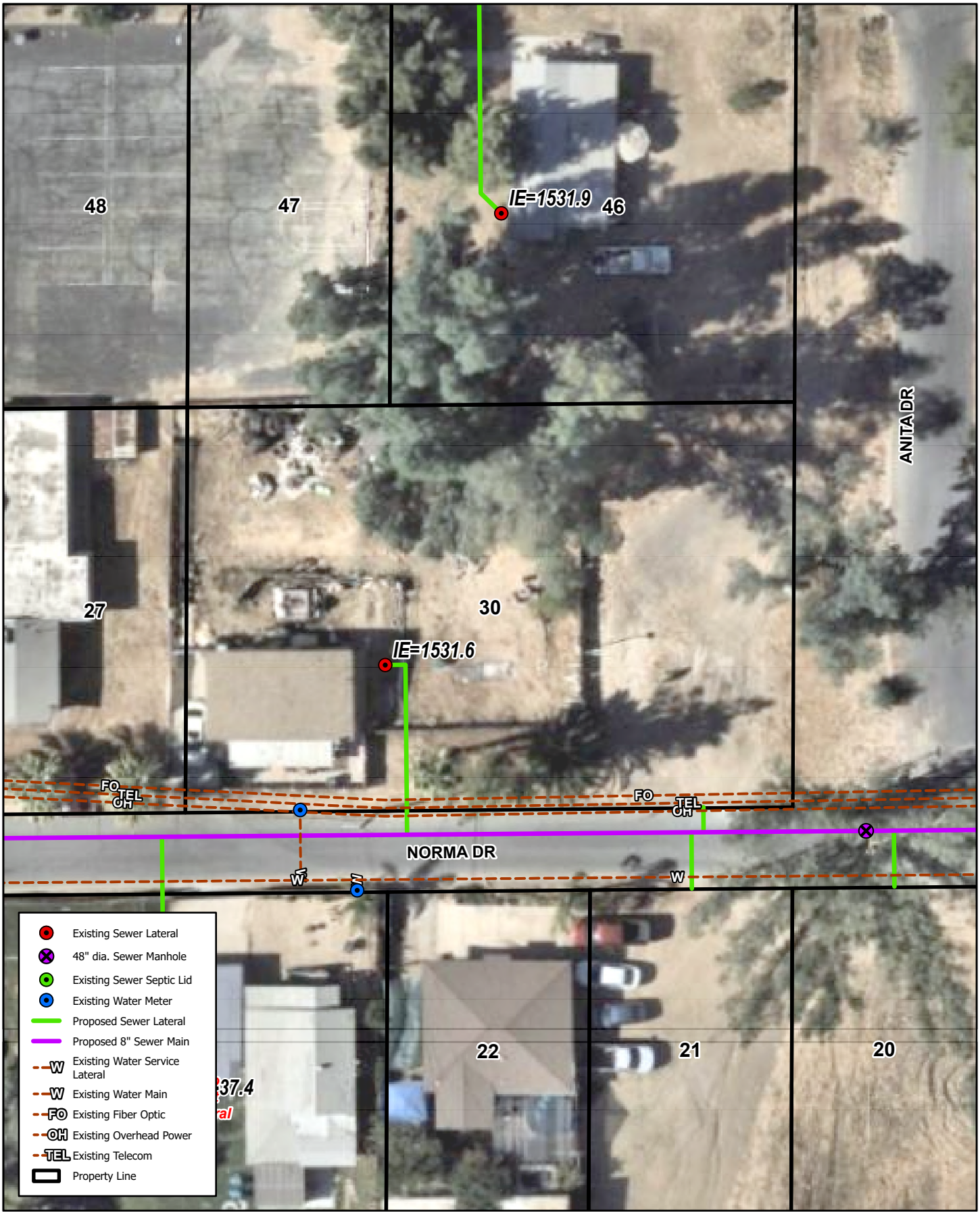


23978 ELSINORE LN, CANYON LAKE, CA 92587

LOT #29

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23905 LODGE DR QUAIL VALLEY CA 92587

LOT #30

Quail Valley - Subarea 4 Sewer Improvement Plans

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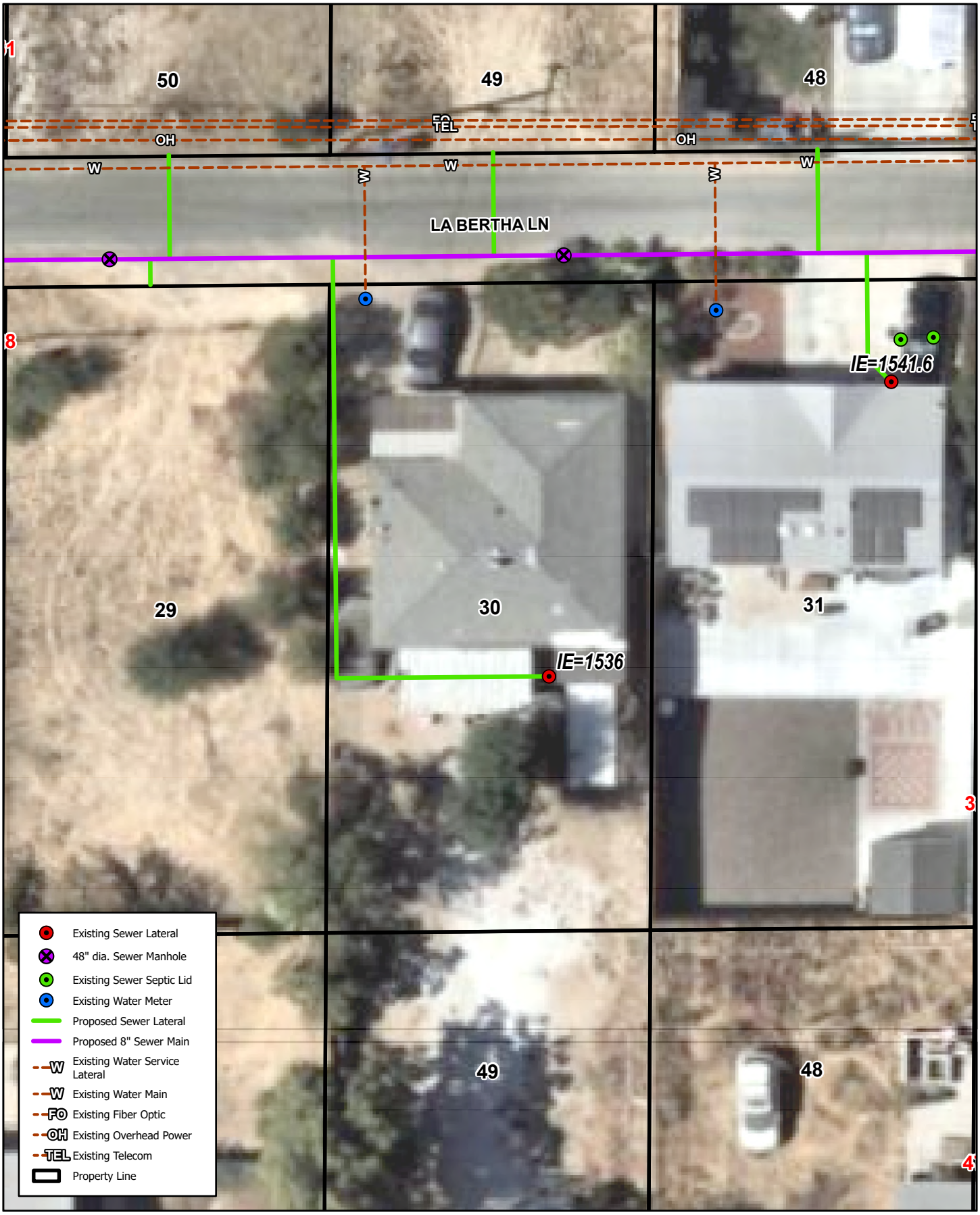

23755 LA BERTHA LN, CANYON LAKE, CA 92587

LOT #30

Quail Valley - Subarea 4 Sewer Improvement Plans

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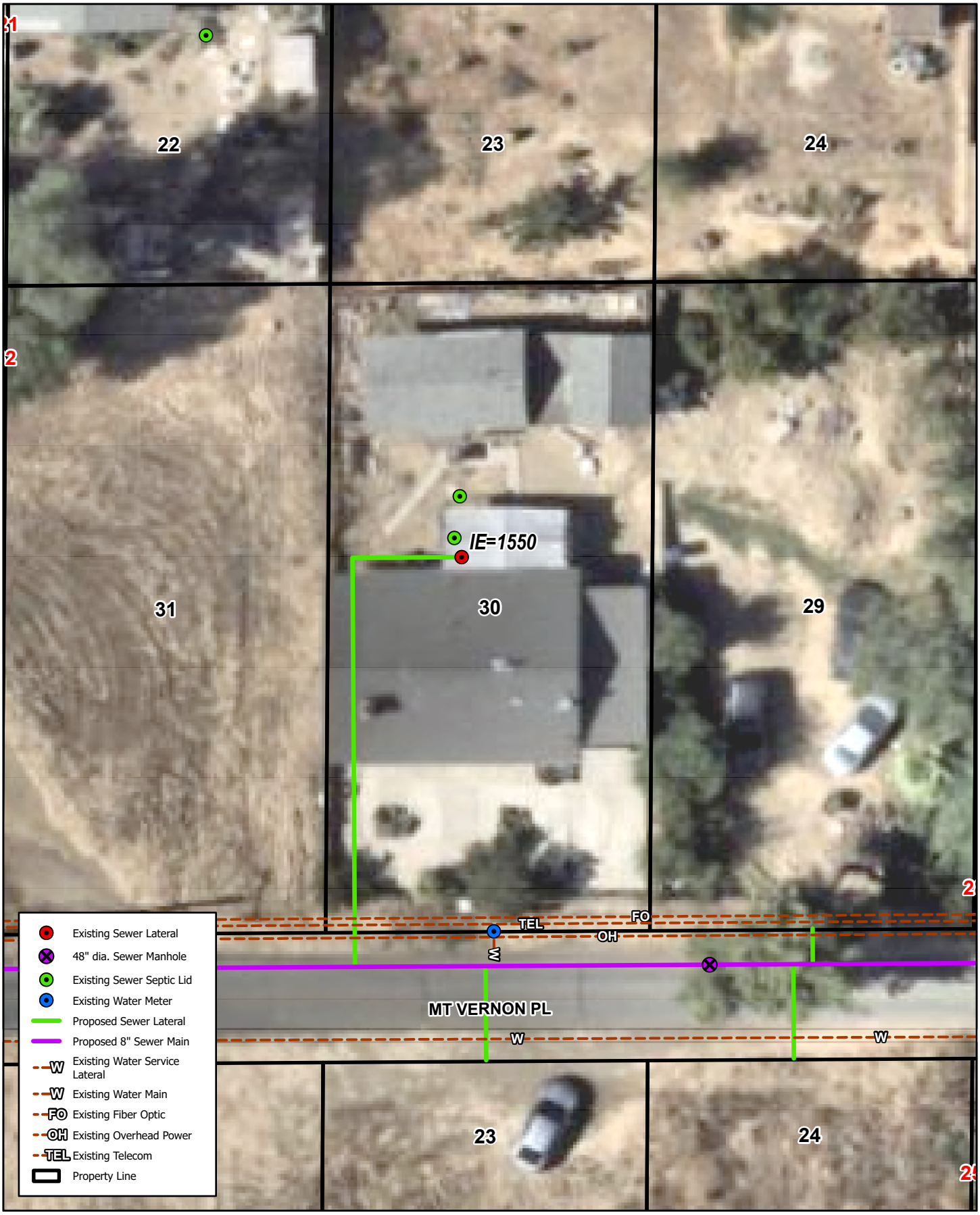


23720 MT VERNON PL, QUAIL VALLEY, CA 92587

LOT #30

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23972 LAKE DR, CANYON LAKE, CA 92587

LOT #30

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

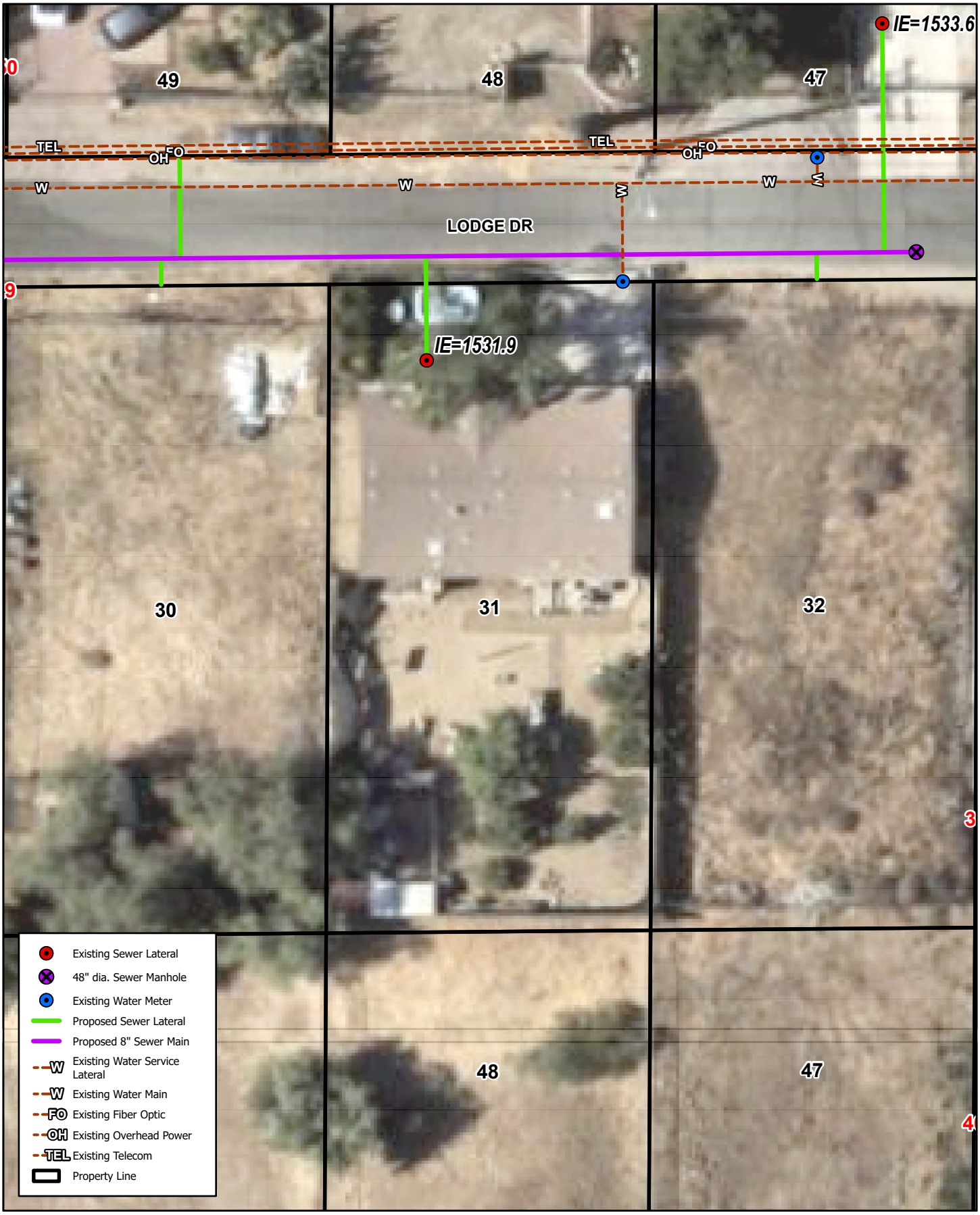


23966 ELSINORE LN, CANYON LAKE, CA 92587

LOT #30

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

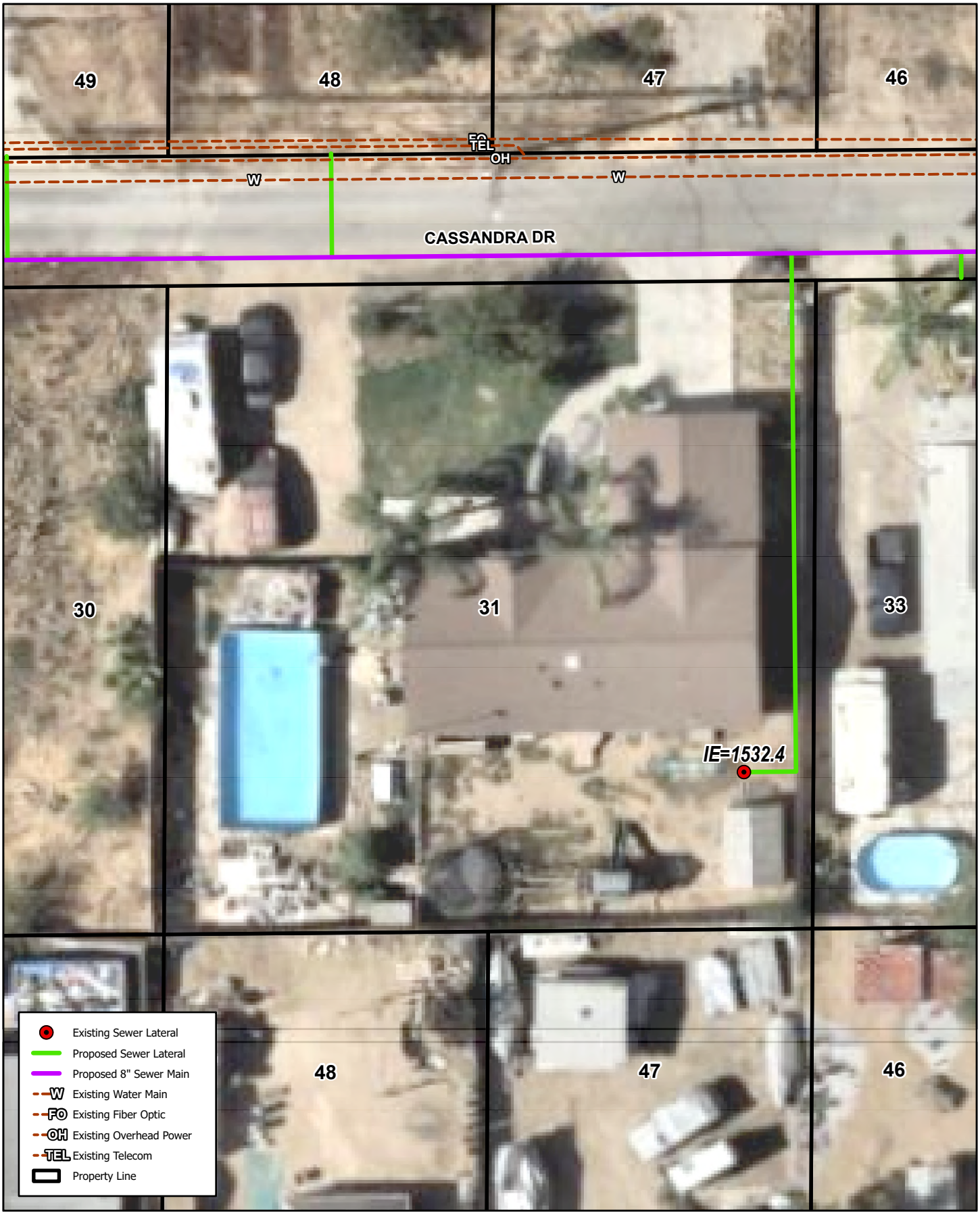


23785 LODGE DR, CANYON LAKE, CA 92587

LOT #31

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

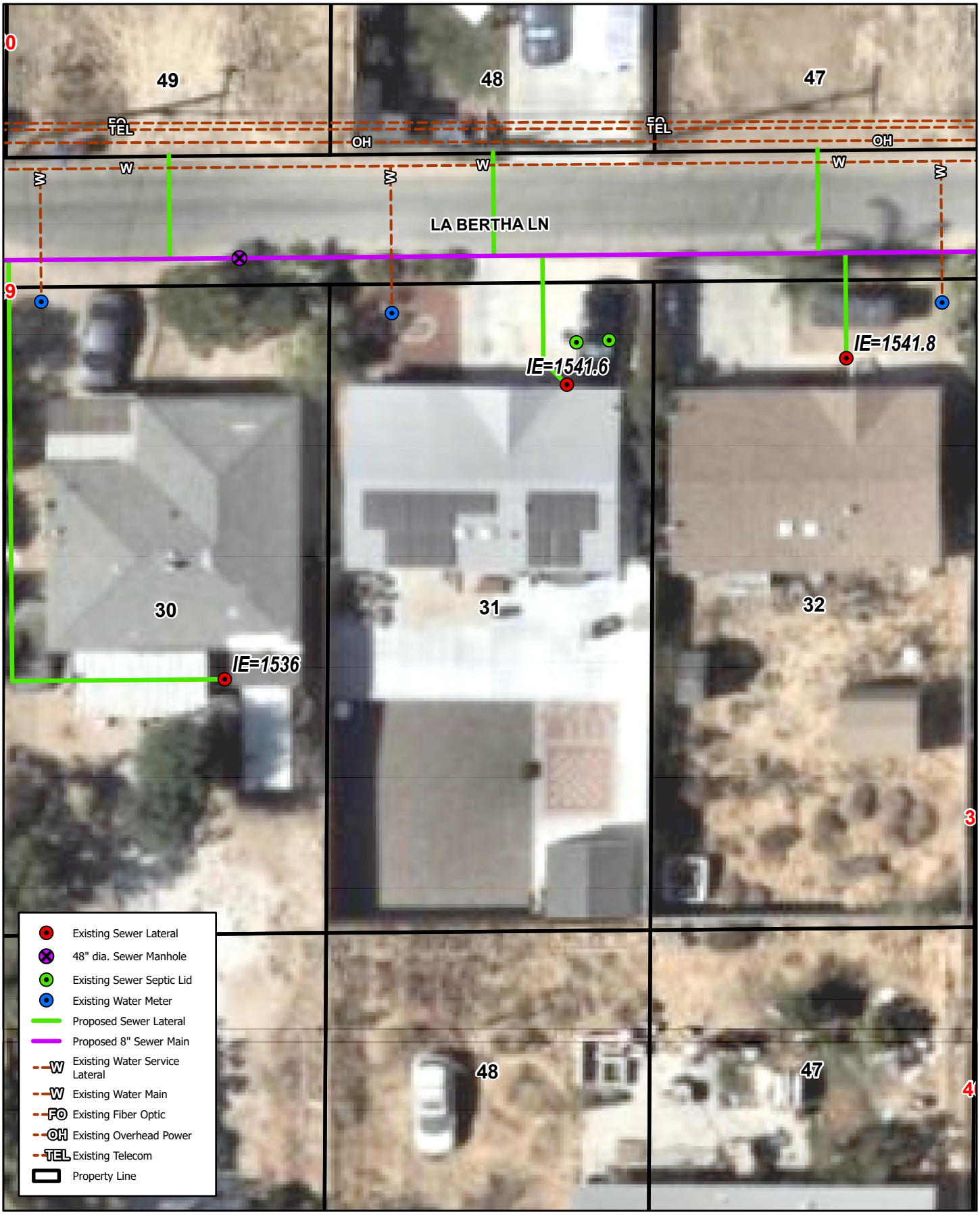


23771 CASSANDRA DR, QUAIL VALLEY, CA 92587

LOT #31

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

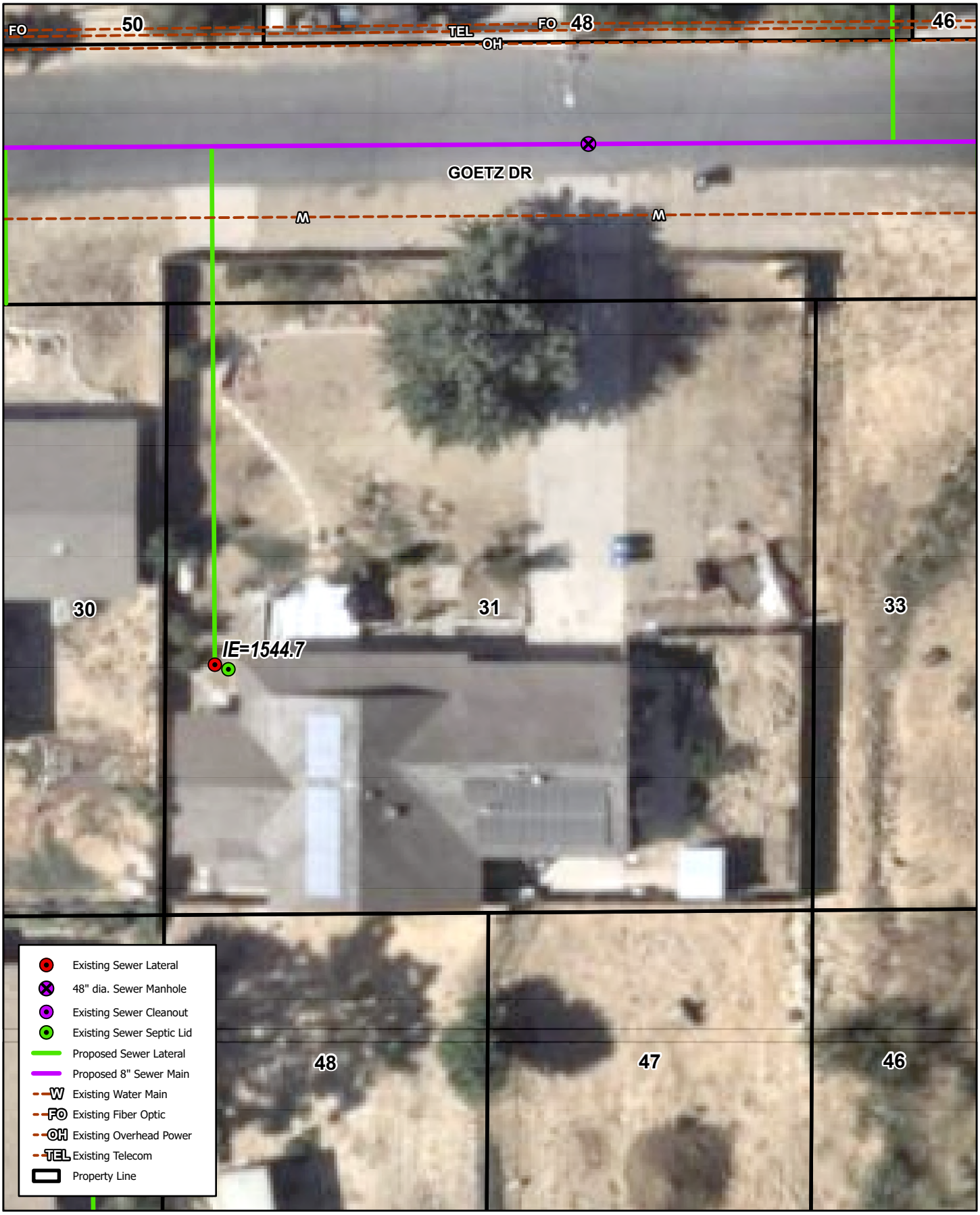


23769 LA BERTHA LN, CANYON LAKE, CA 92587

LOT #31

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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LOT #31

Quail Valley - Subarea 4 Sewer Improvement Plans

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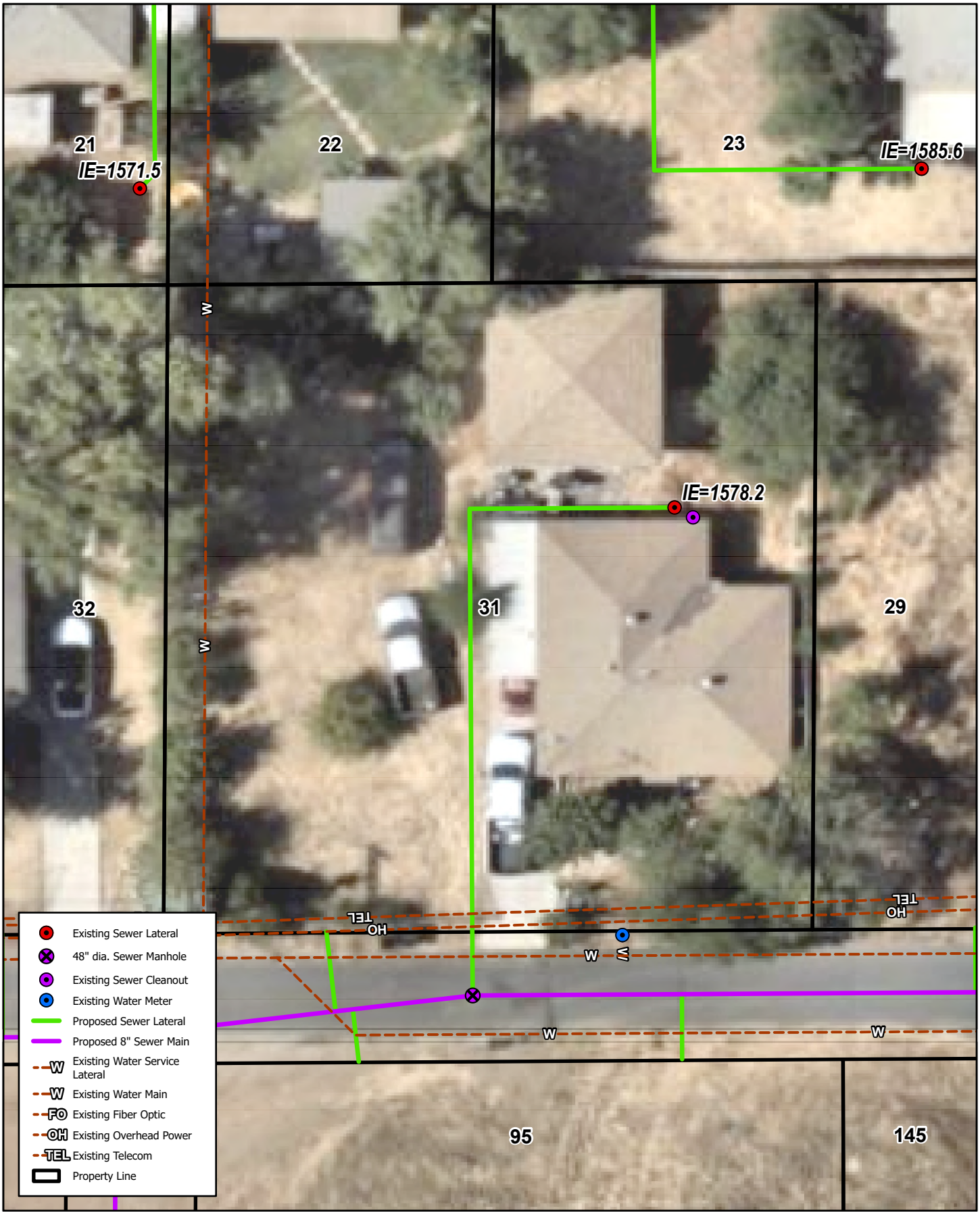

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Quail Valley - Subarea 4 Sewer Improvement Plans

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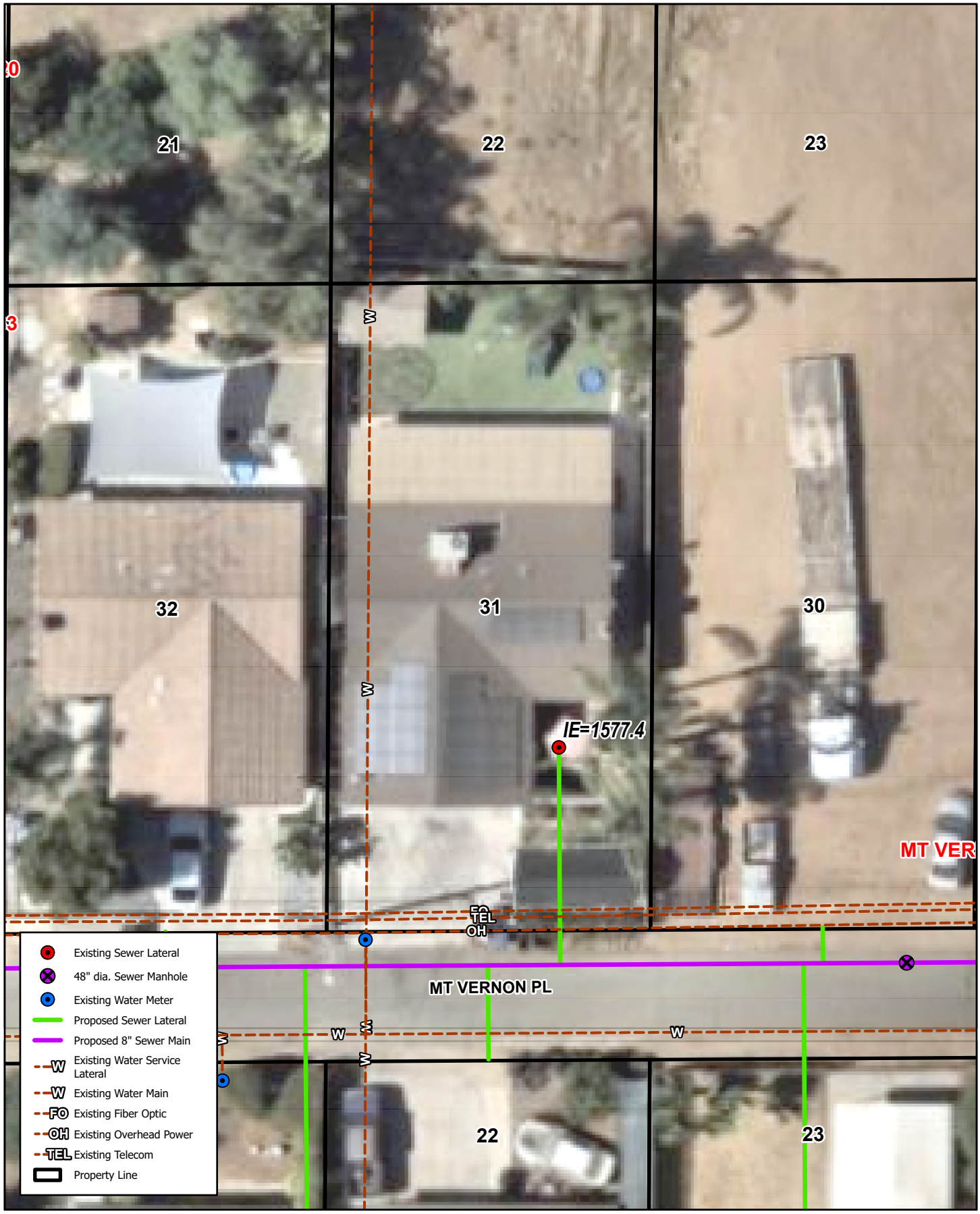

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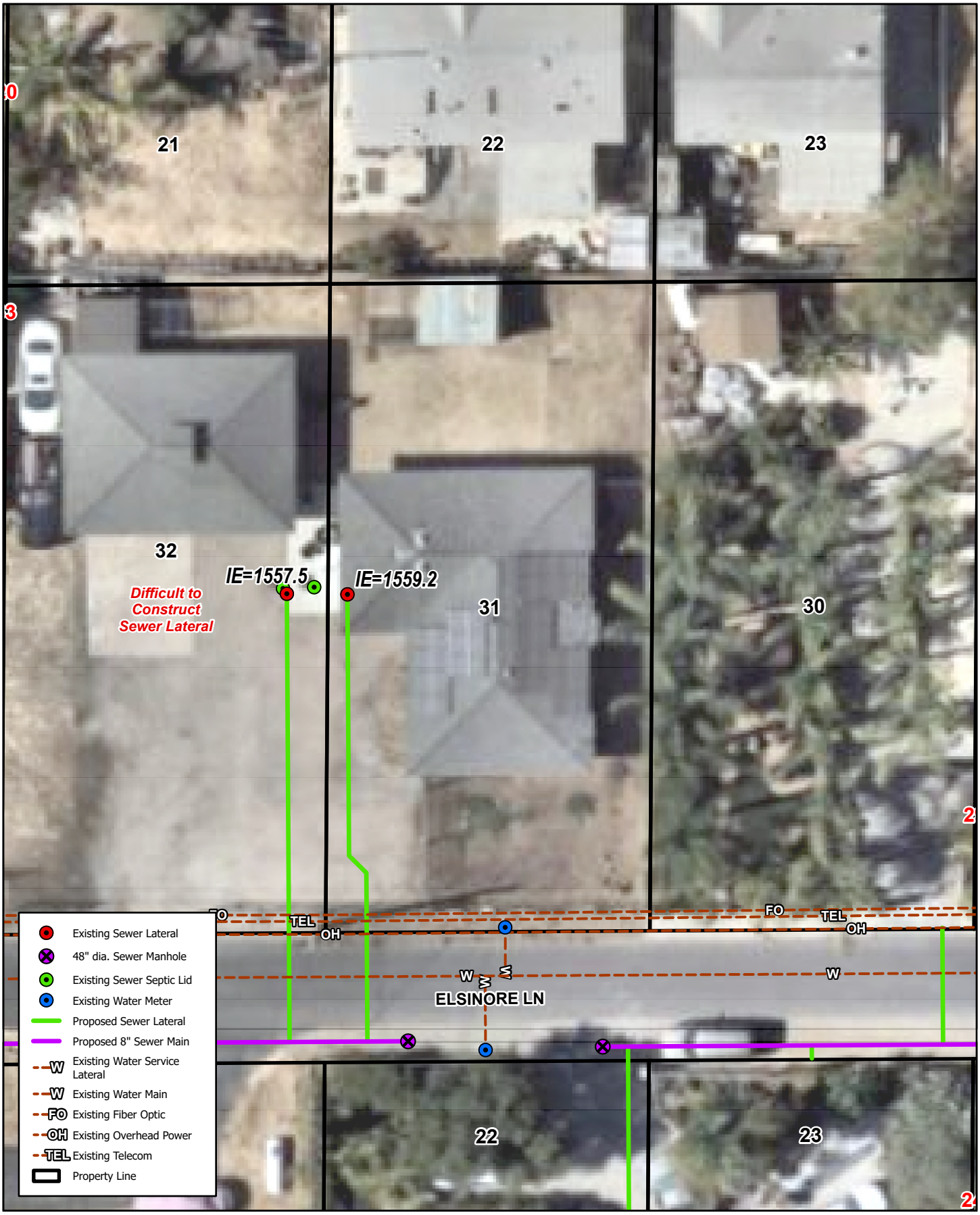
LOT #31

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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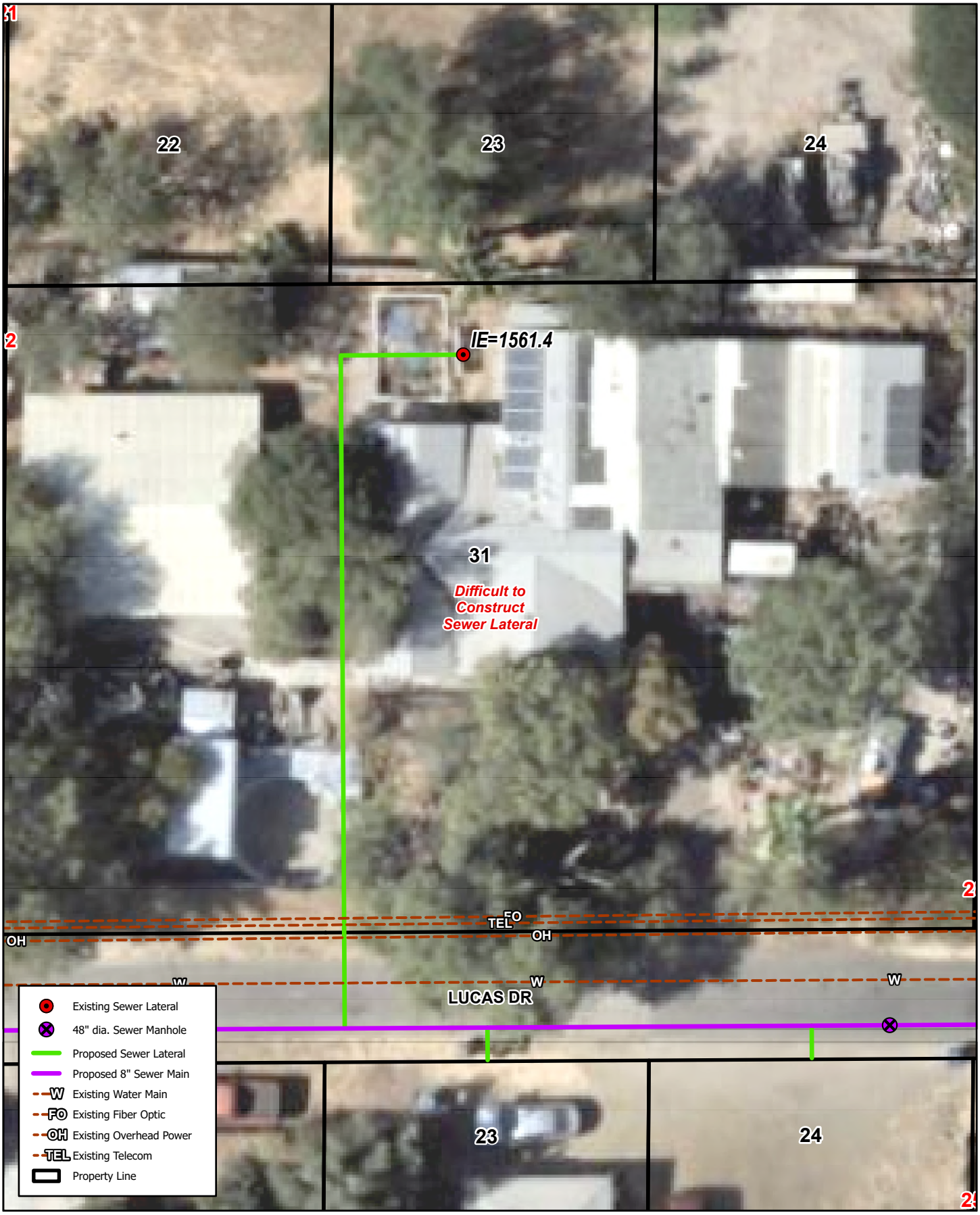

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Quail Valley - Subarea 4 Sewer Improvement Plans

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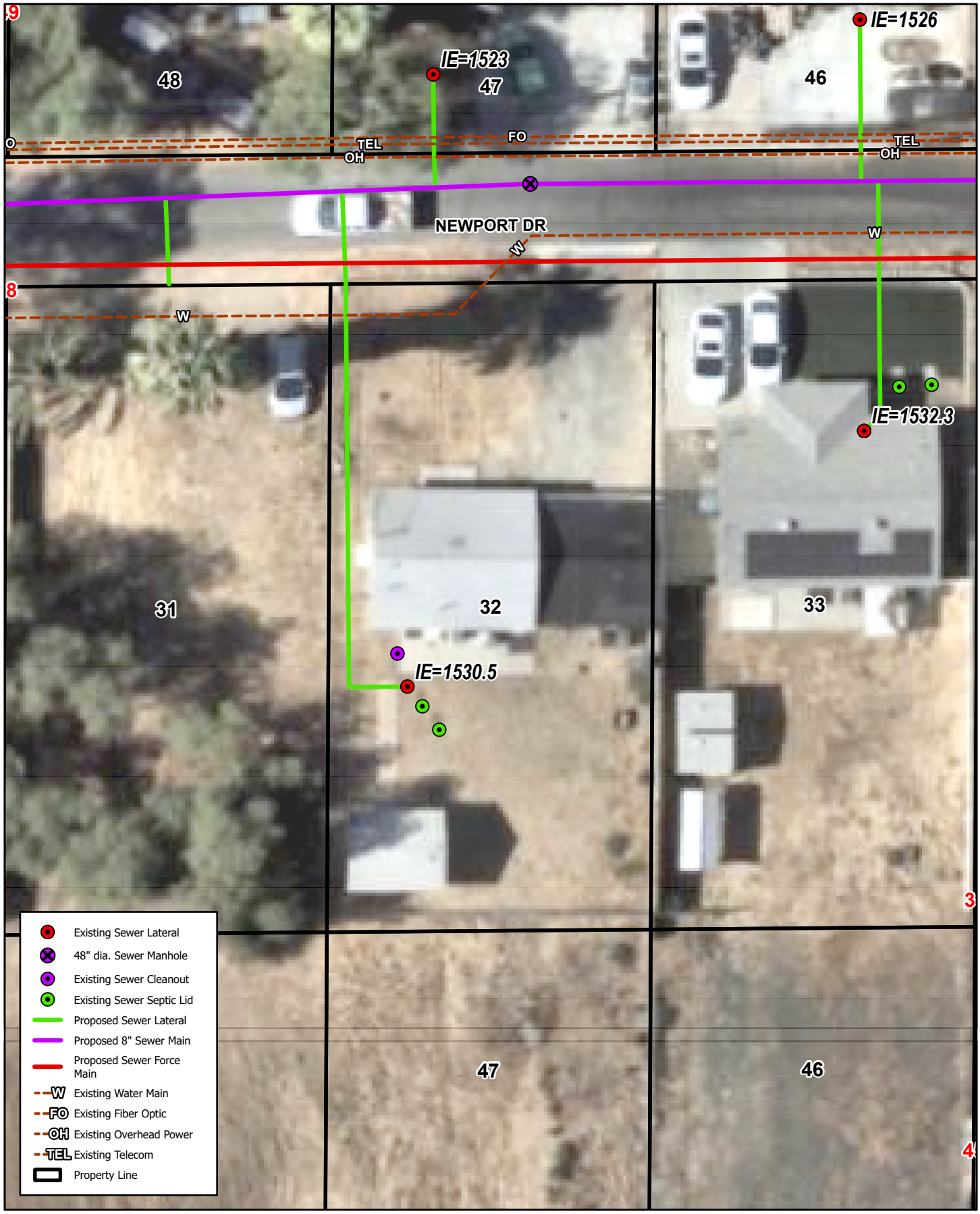

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LOT #32

Quail Valley - Subarea 4 Sewer Improvement Plans

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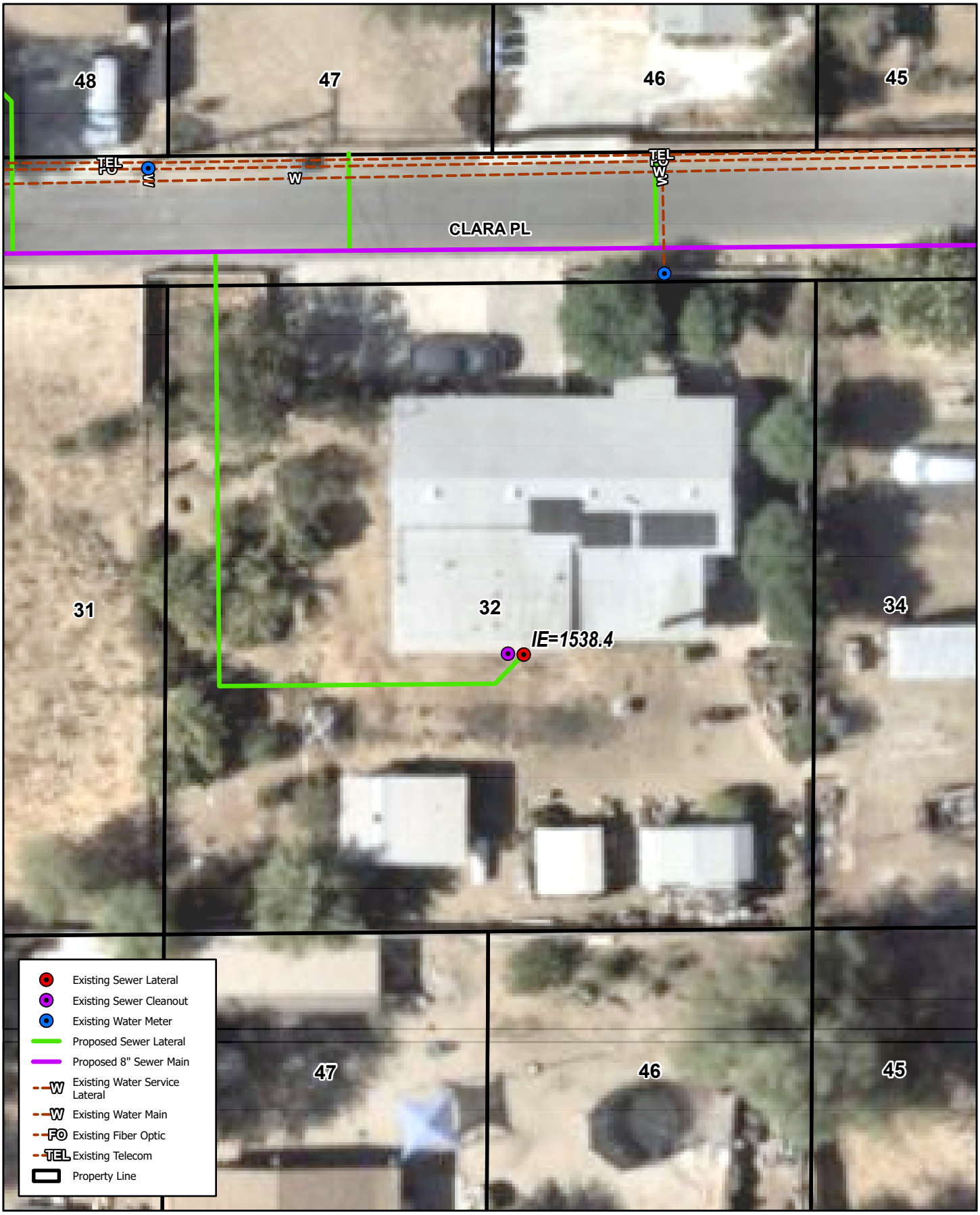

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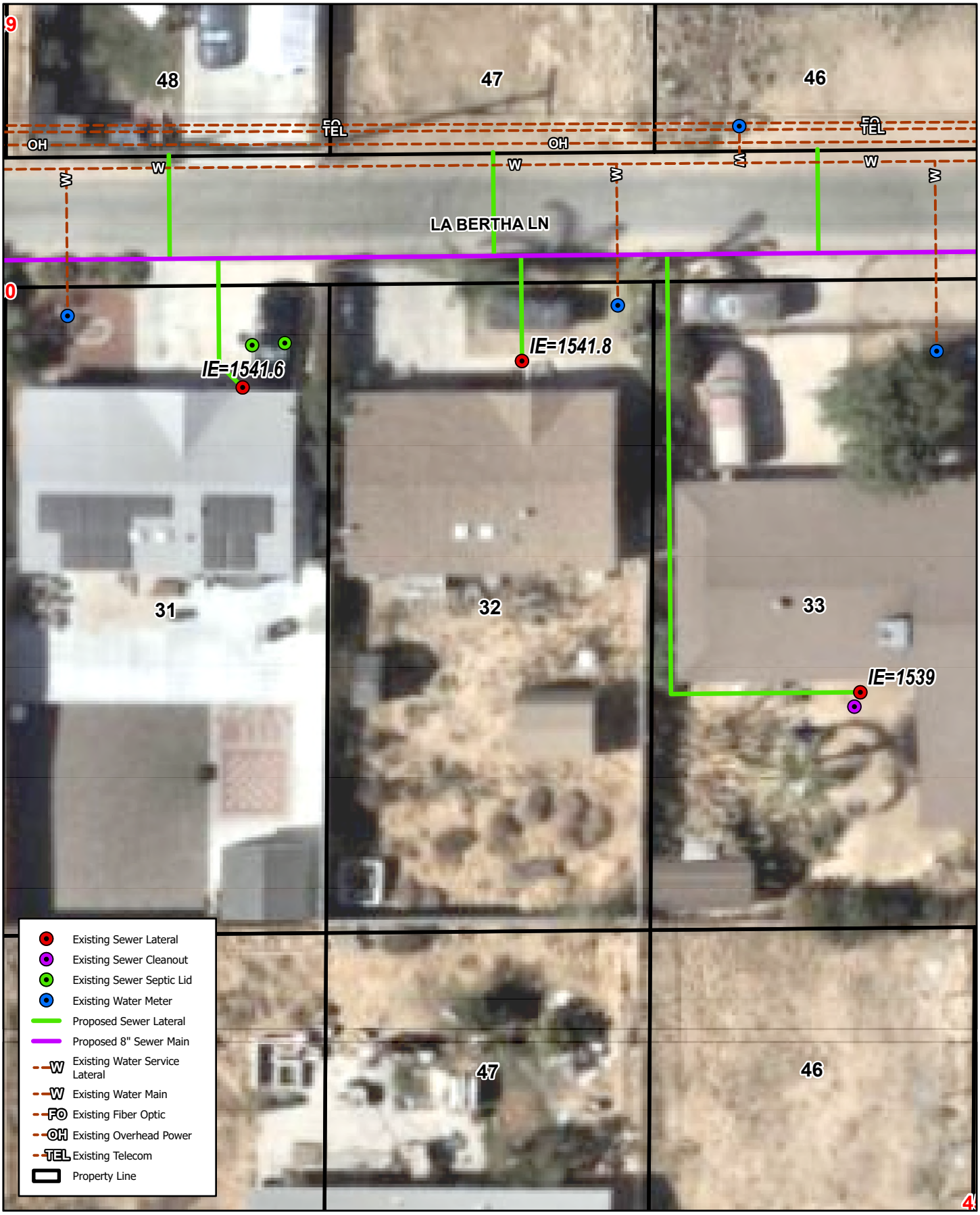

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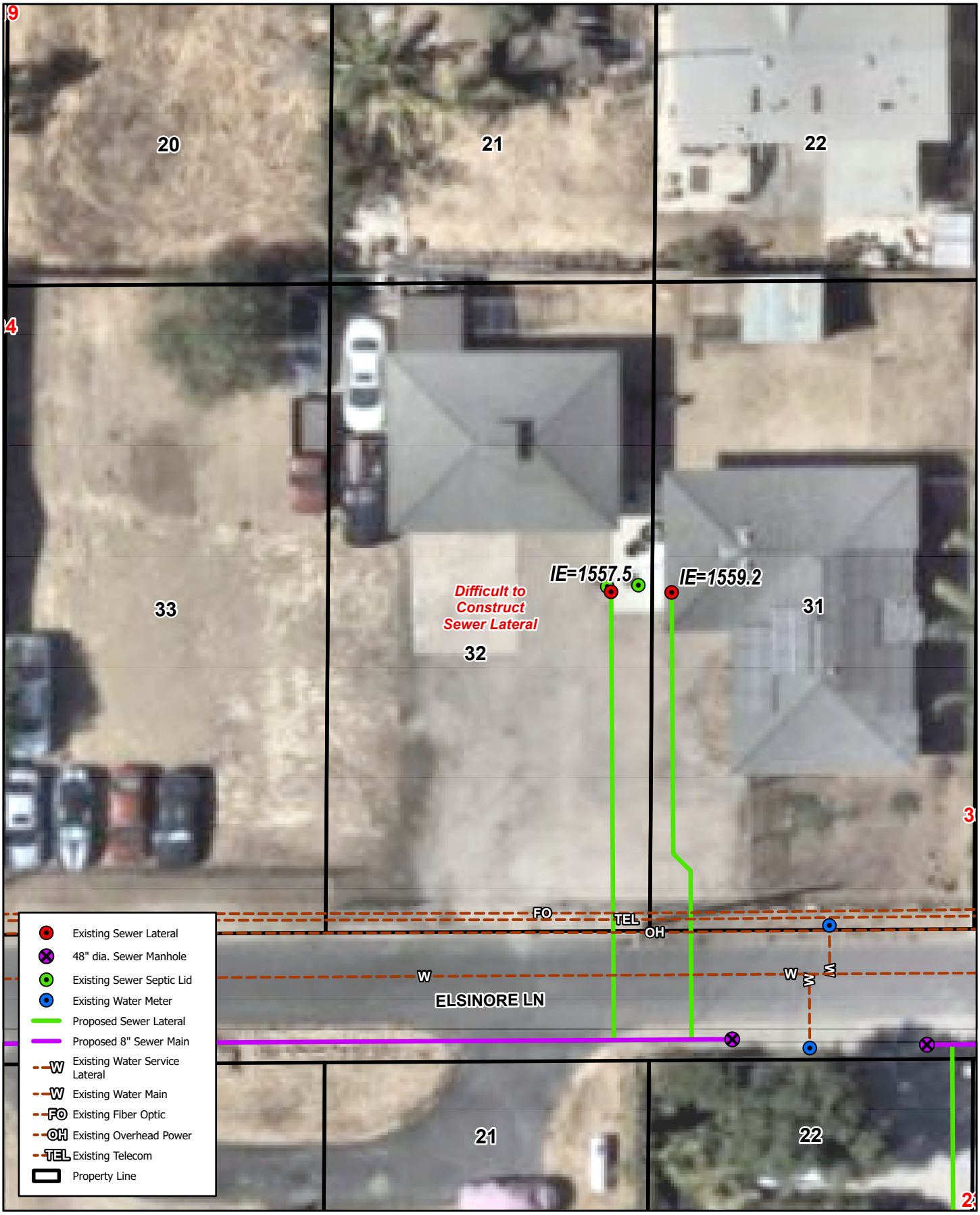

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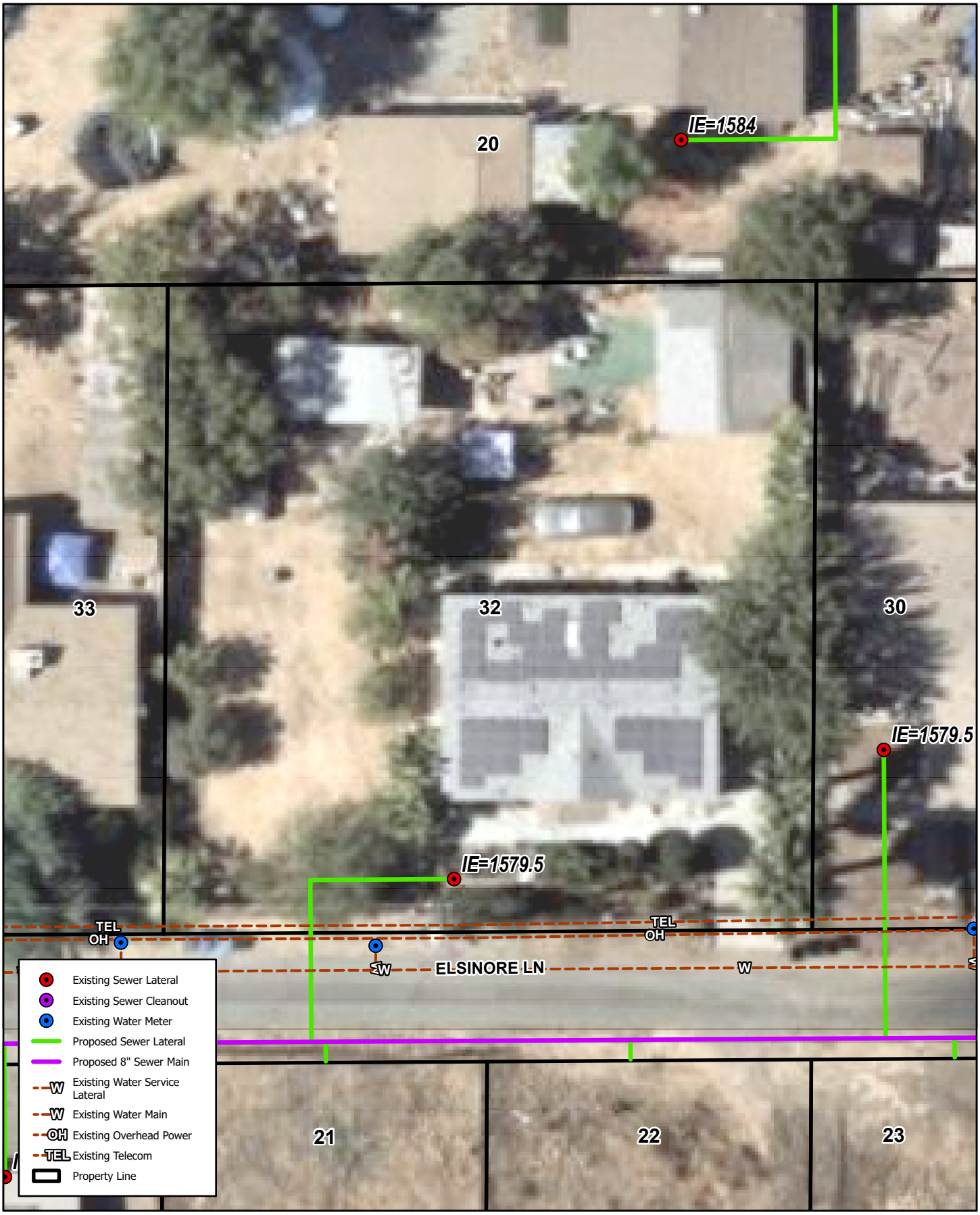

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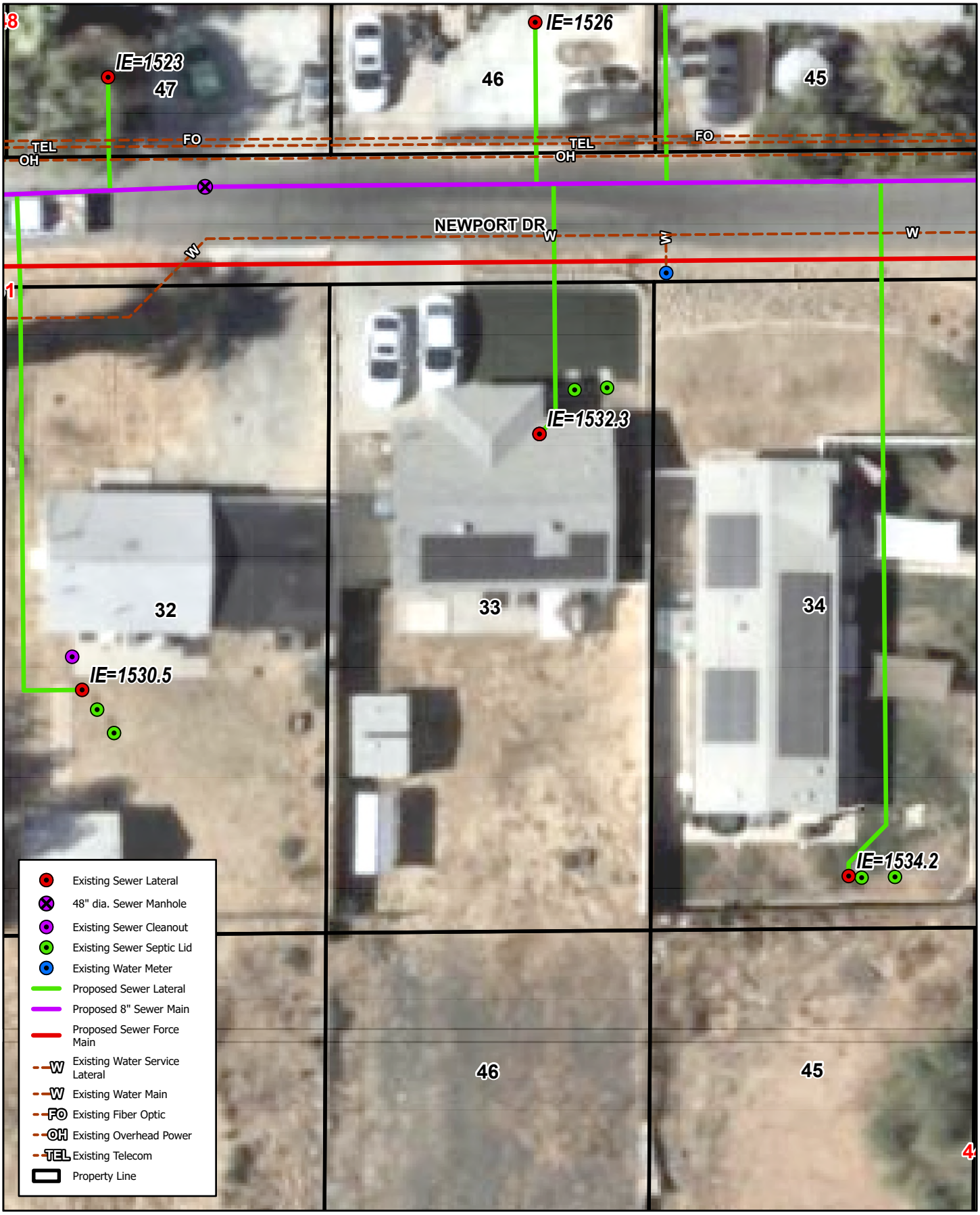

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LOT #33

Quail Valley - Subarea 4 Sewer Improvement Plans

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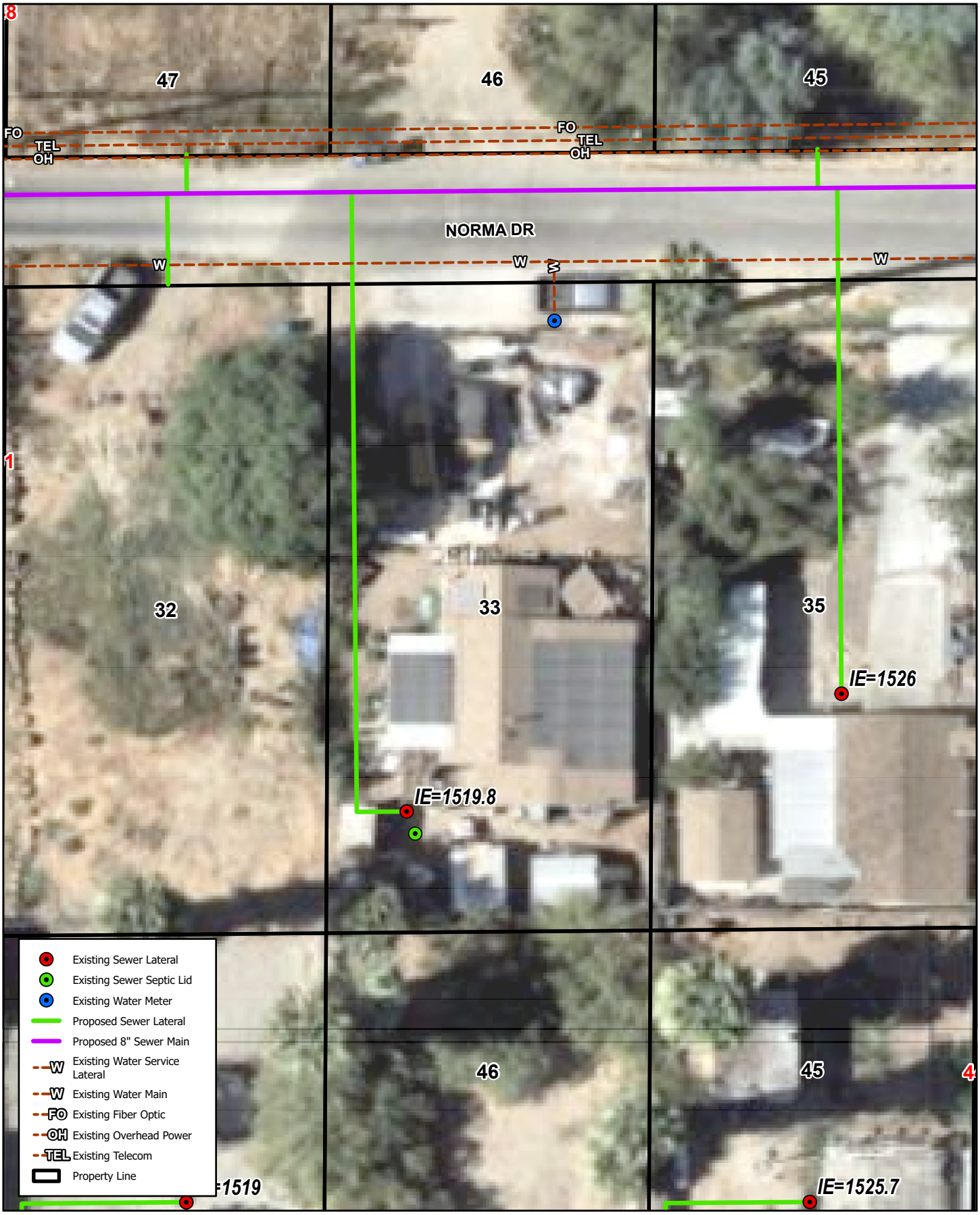

23799 NORMA DR, CANYON LAKE, CA 92587

LOT #33

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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LOT #33

Quail Valley - Subarea 4 Sewer Improvement Plans

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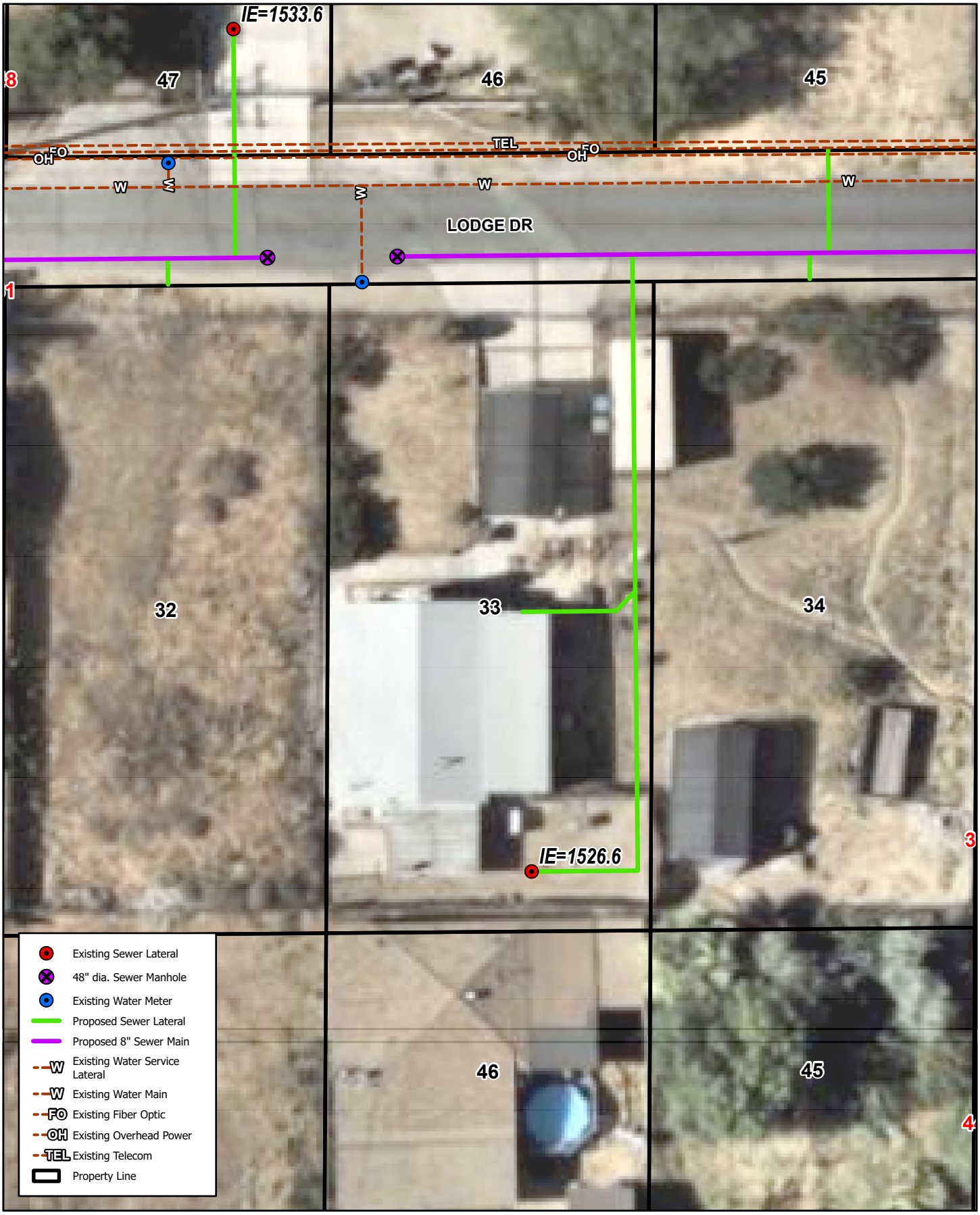

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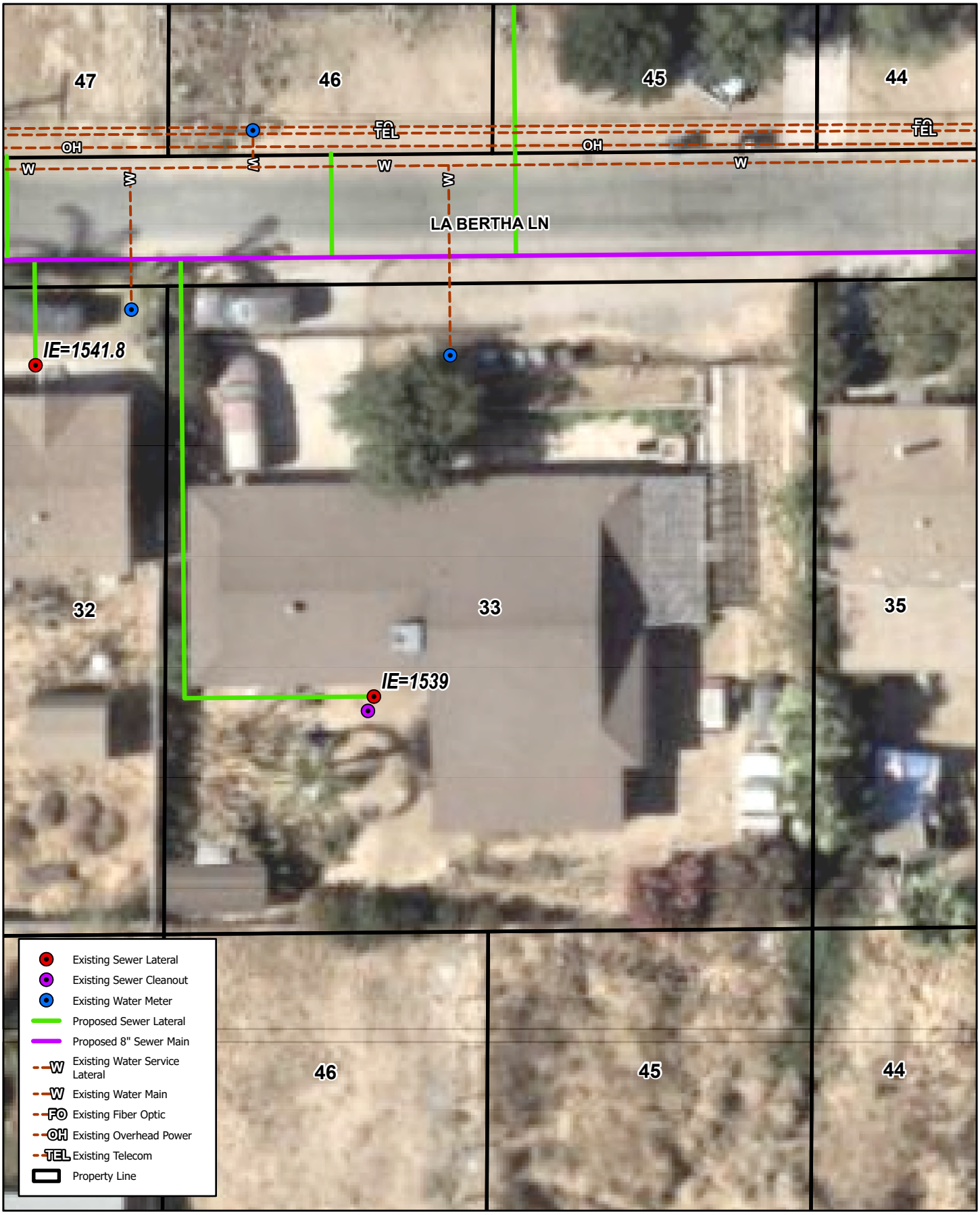

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LOT #33

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23930 ELSINORE LN, CANYON LAKE, CA 92587

LOT #33

Quail Valley - Subarea 4 Sewer Improvement Plans

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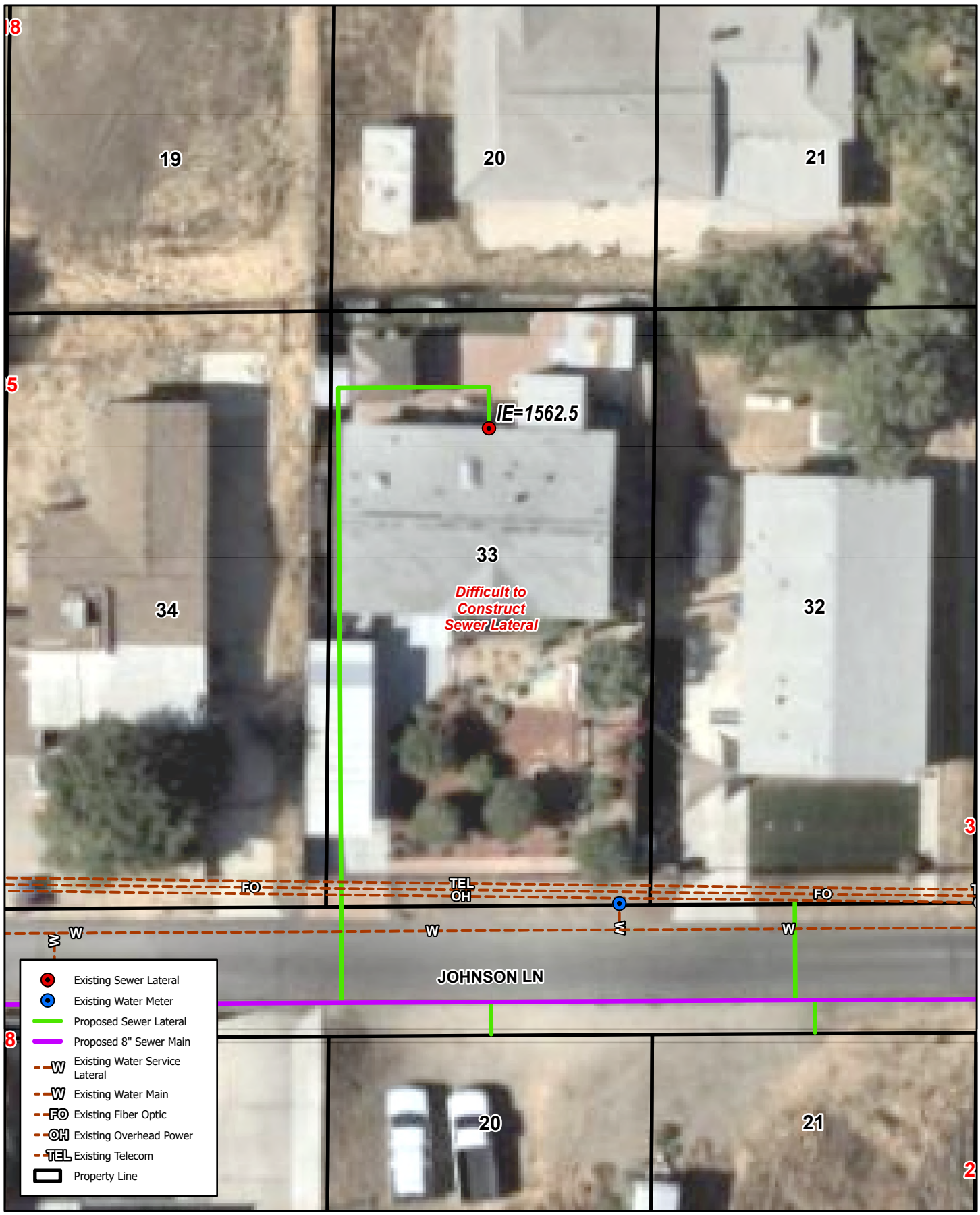

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Quail Valley - Subarea 4 Sewer Improvement Plans

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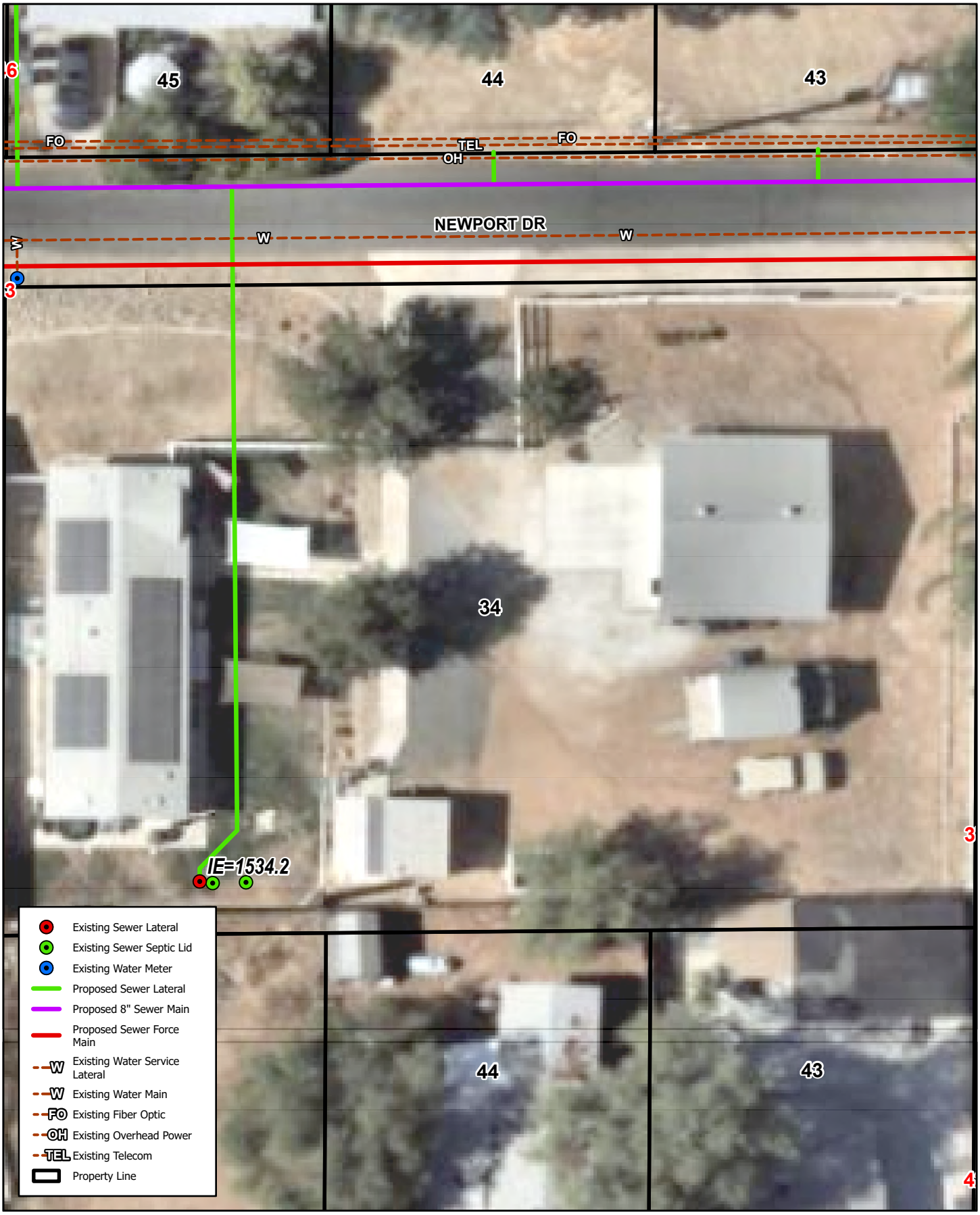

23807 NEWPORT DR, CANYON LAKE, CA 92587

LOT #34

Quail Valley - Subarea 4 Sewer Improvement Plans

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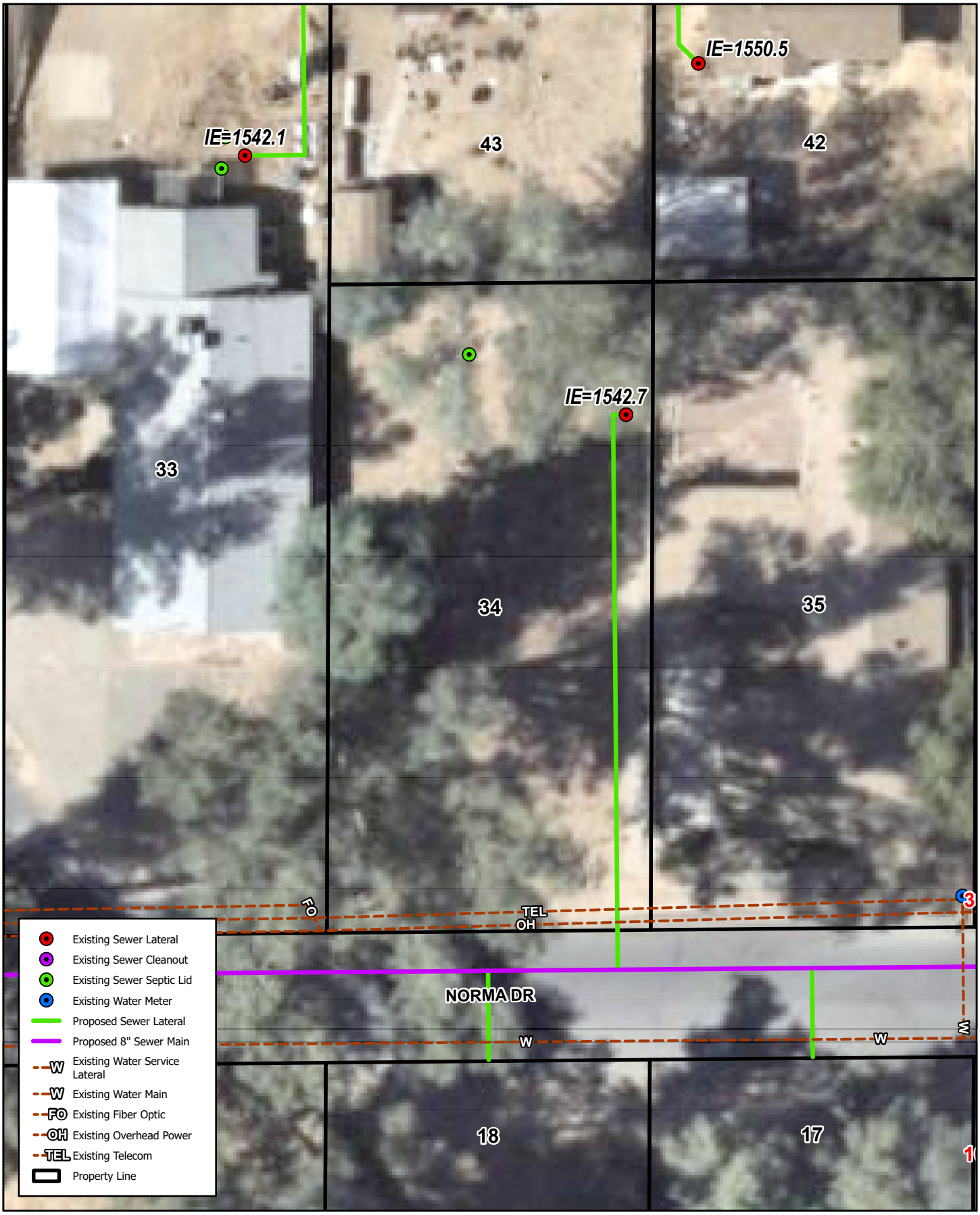

23950 NORMA DR, CANYON LAKE, CA 92587

LOT #34

Quail Valley - Subarea 4 Sewer Improvement Plans

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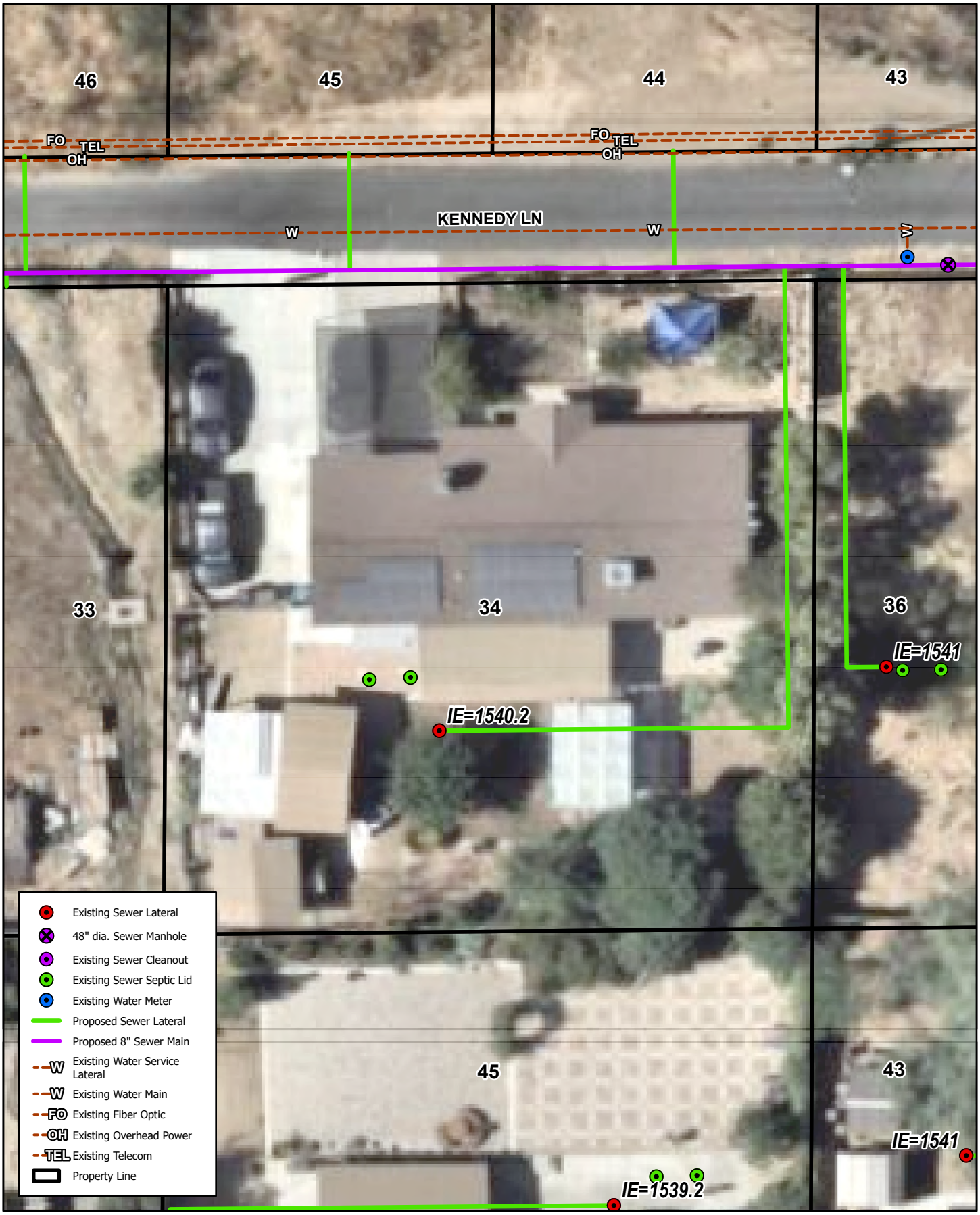

23811 KENNEDY LN, QUAIL VALLEY, CA 92587

LOT #34

Quail Valley - Subarea 4 Sewer Improvement Plans

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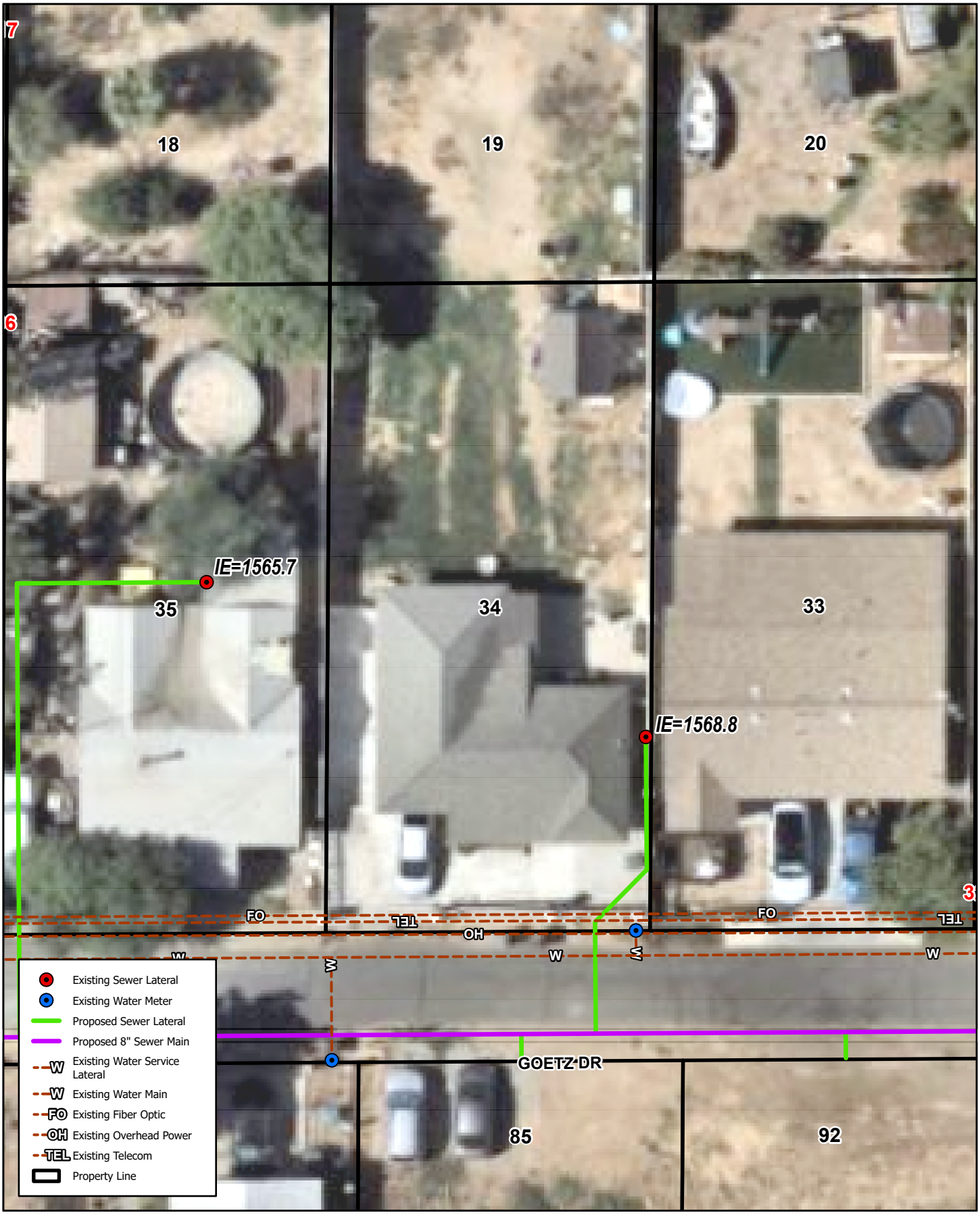

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LOT #34

Quail Valley - Subarea 4 Sewer Improvement Plans

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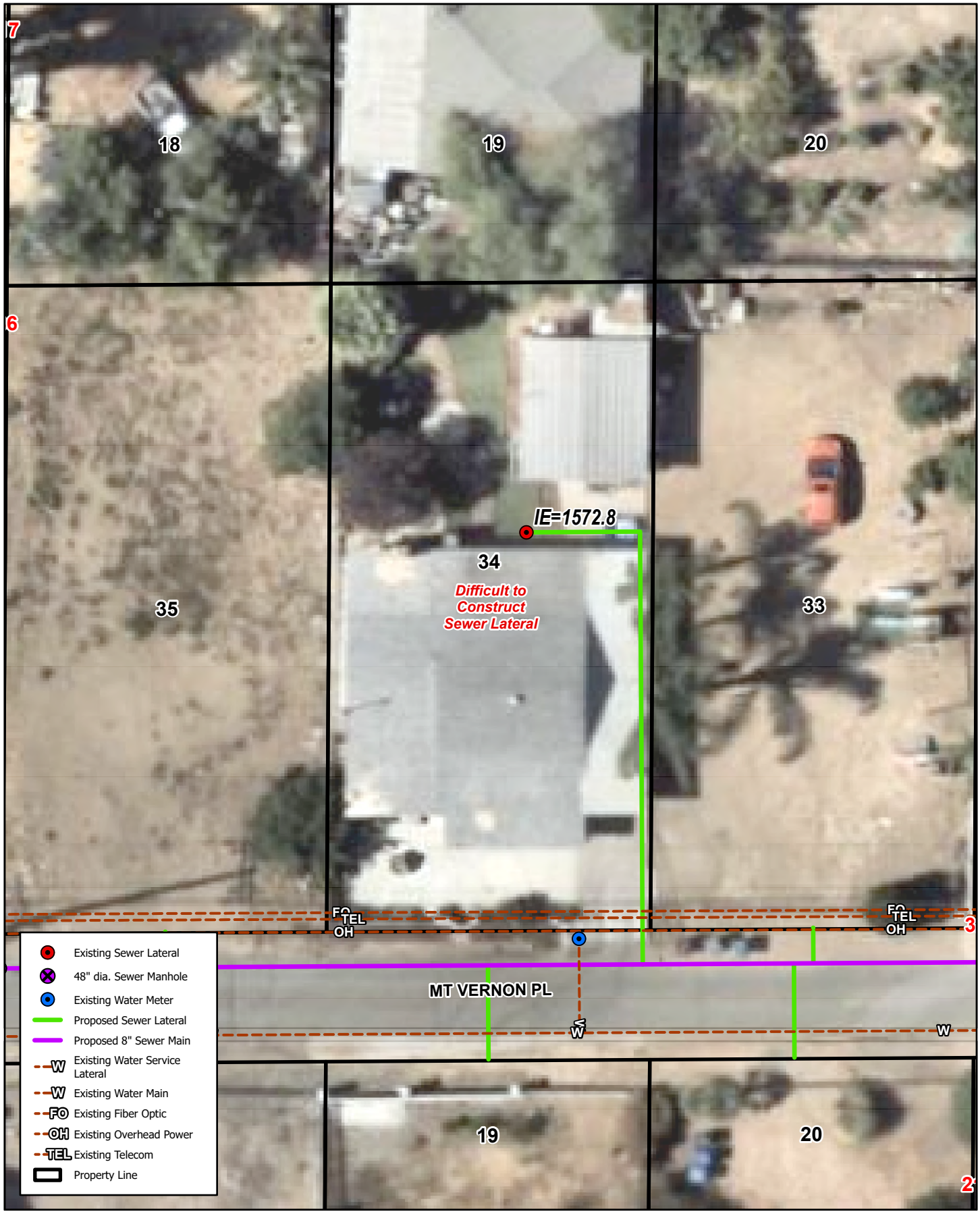
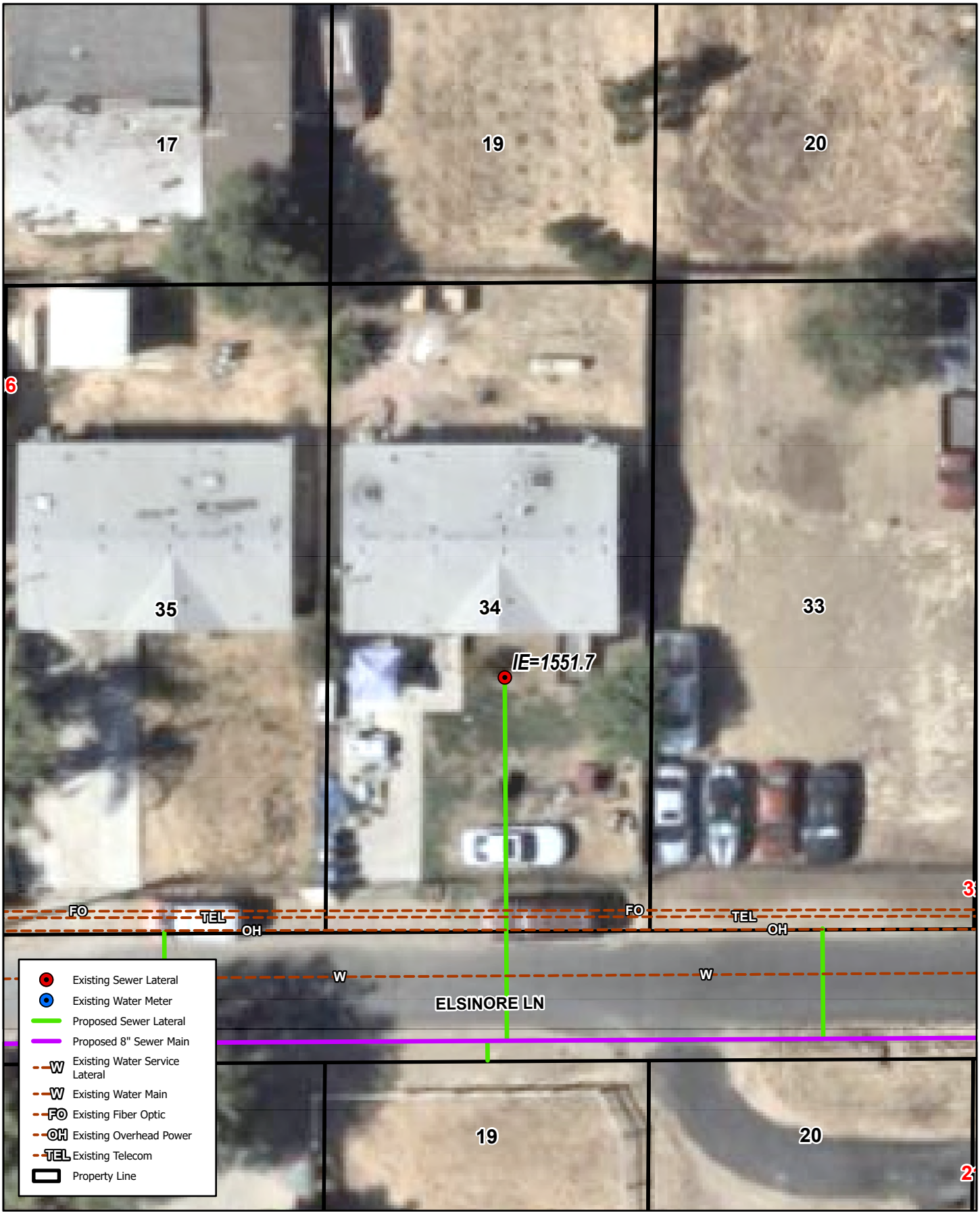


23936 MT VERNON PL, CANYON LAKE, CA 92587

LOT #34

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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Quail Valley - Subarea 4 Sewer Improvement Plans

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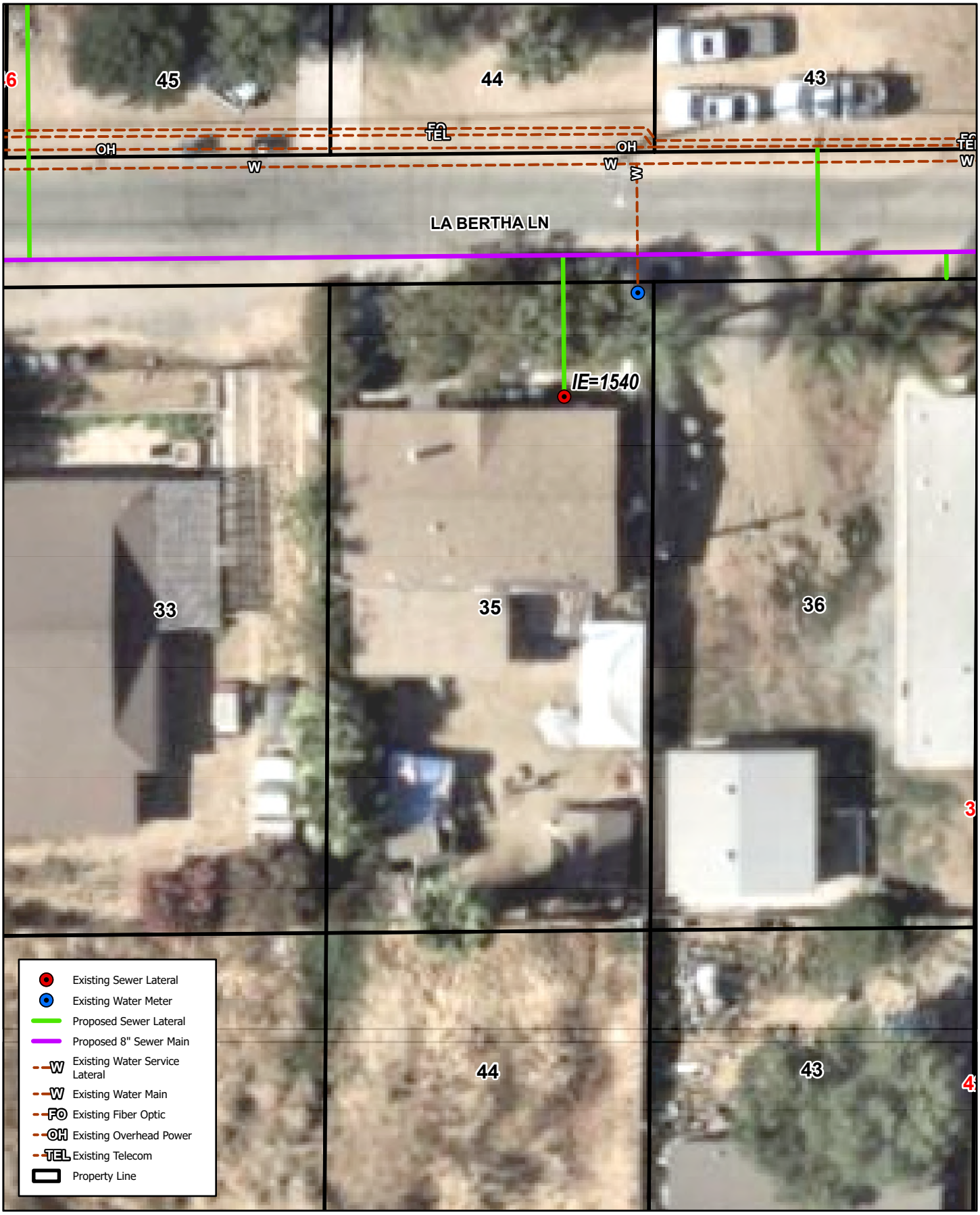

23807 LA BERTHA LN, QUAIL VALLEY, CA 92587

LOT #35

Quail Valley - Subarea 4 Sewer Improvement Plans

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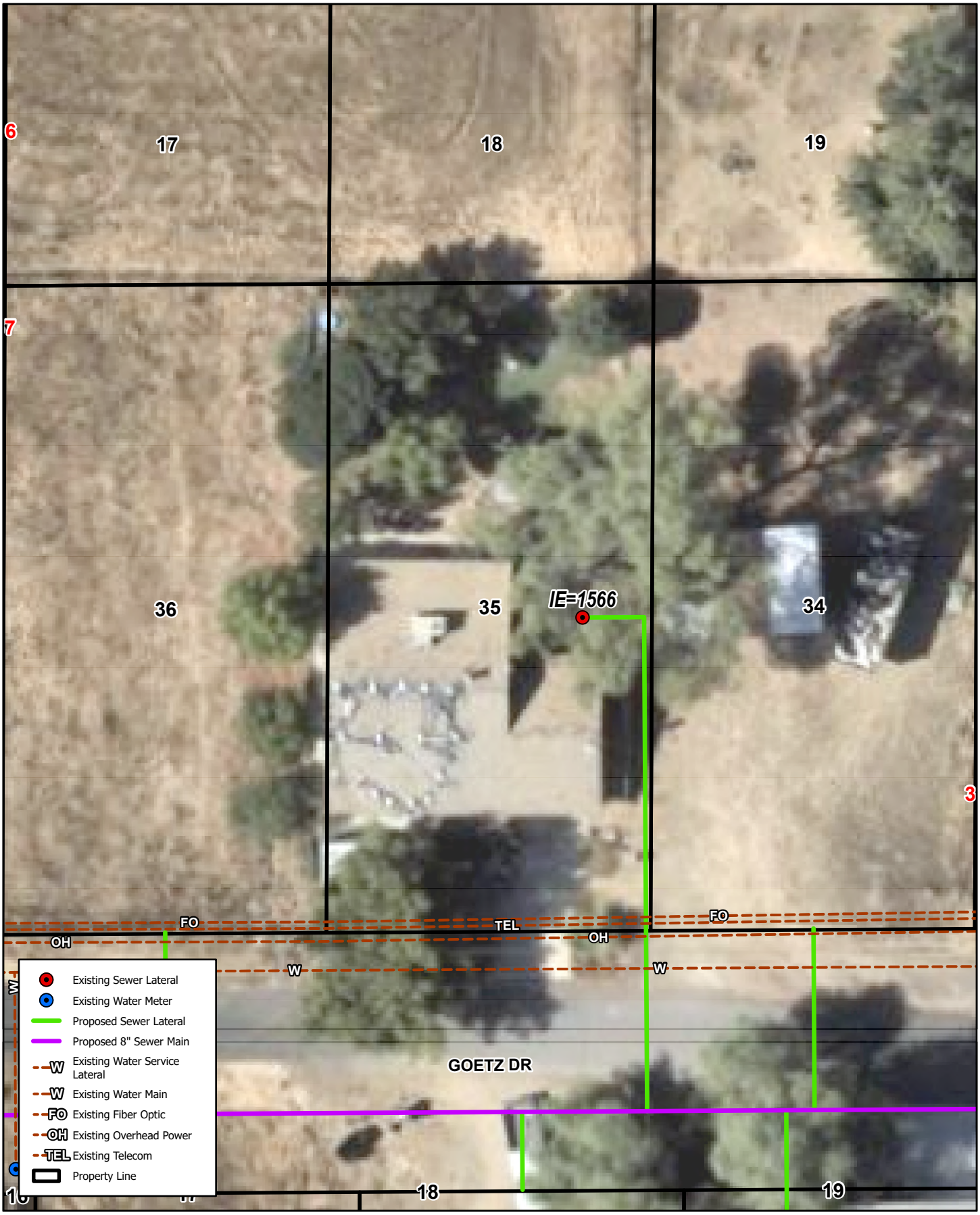

23670 GOETZ DR, CANYON LAKE, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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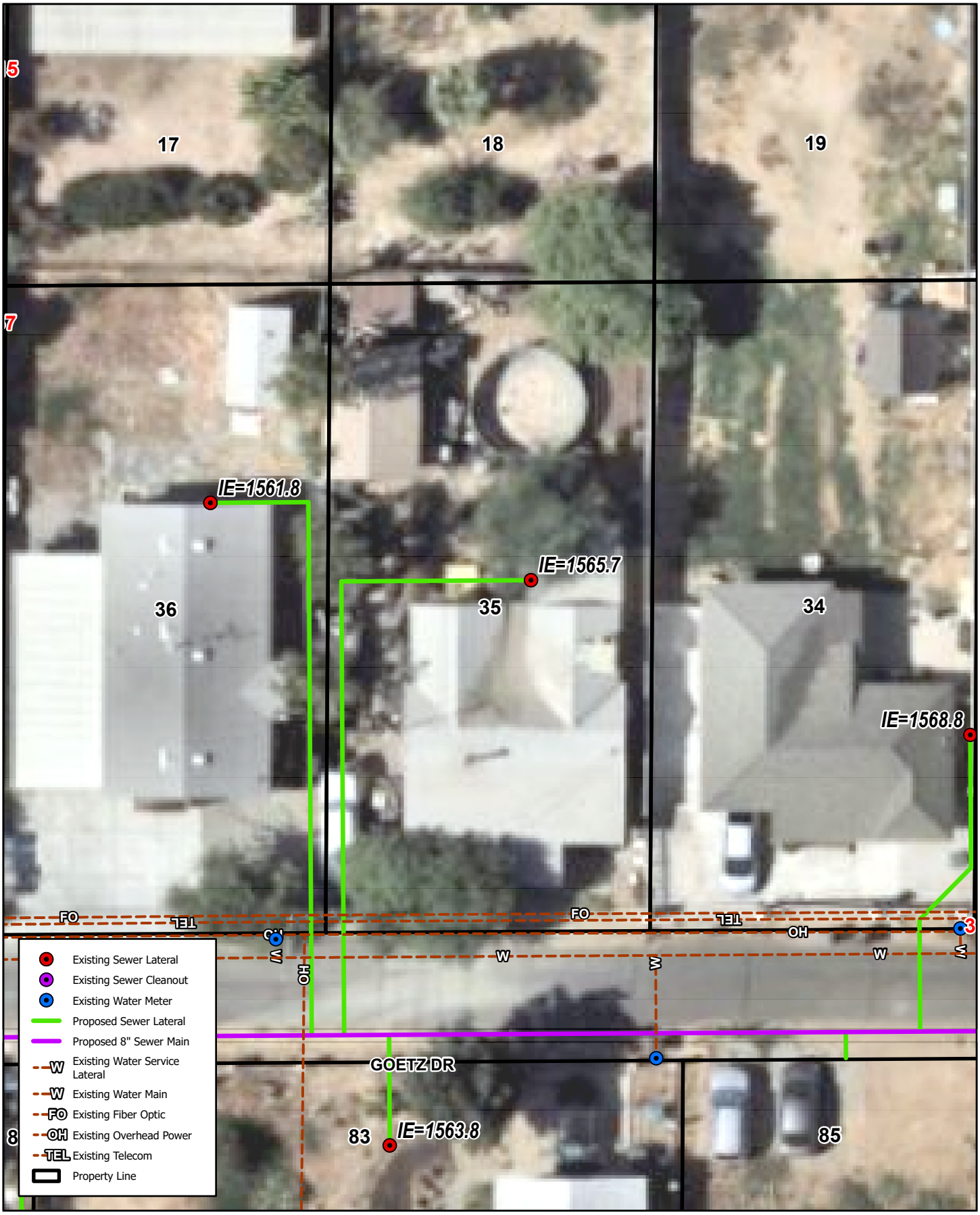


23916 GOETZ DR, QUAIL VALLEY, CA 92587

LOT #35

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

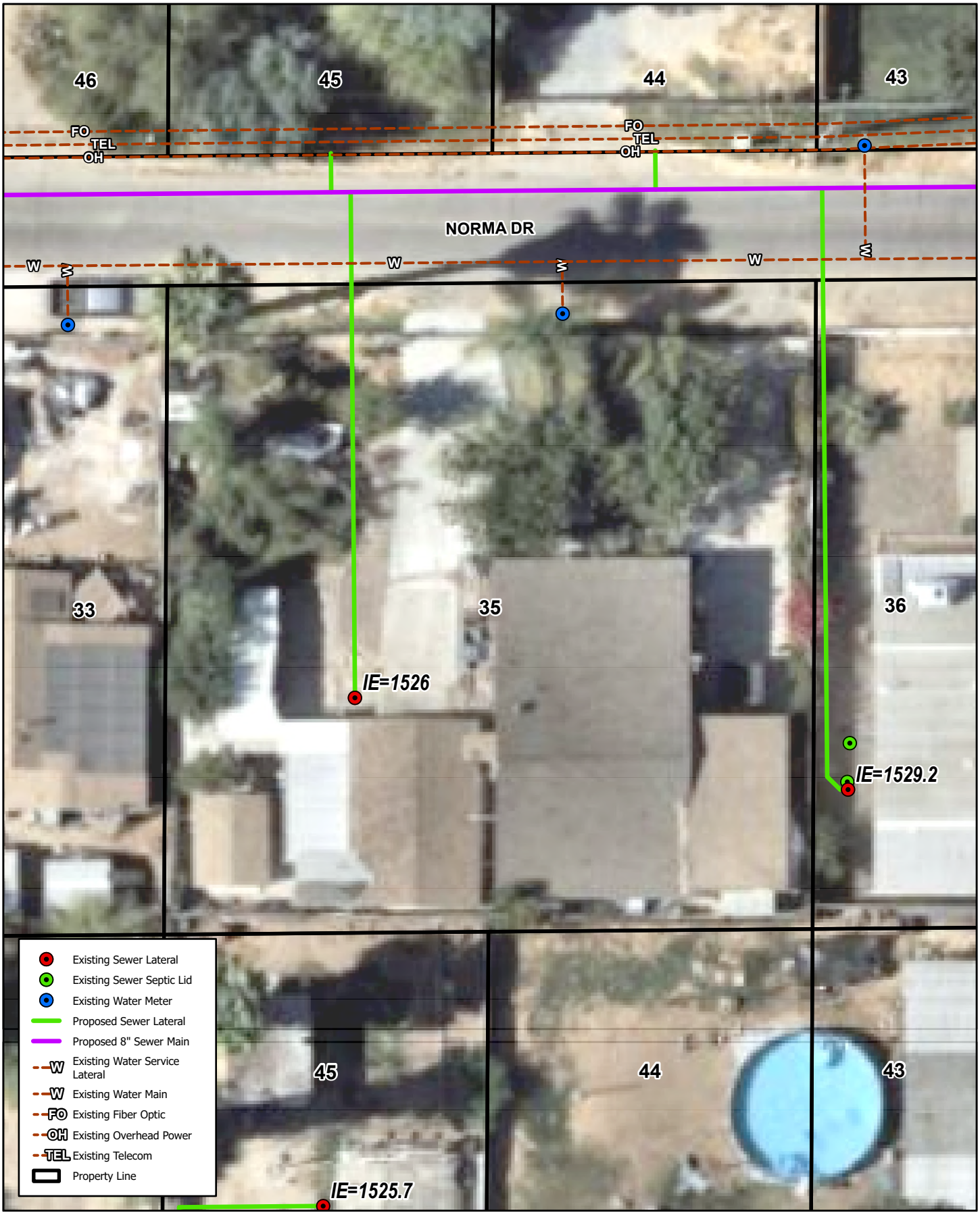


23922 ELSINORE LN, CANYON LAKE, CA 92587

LOT #35

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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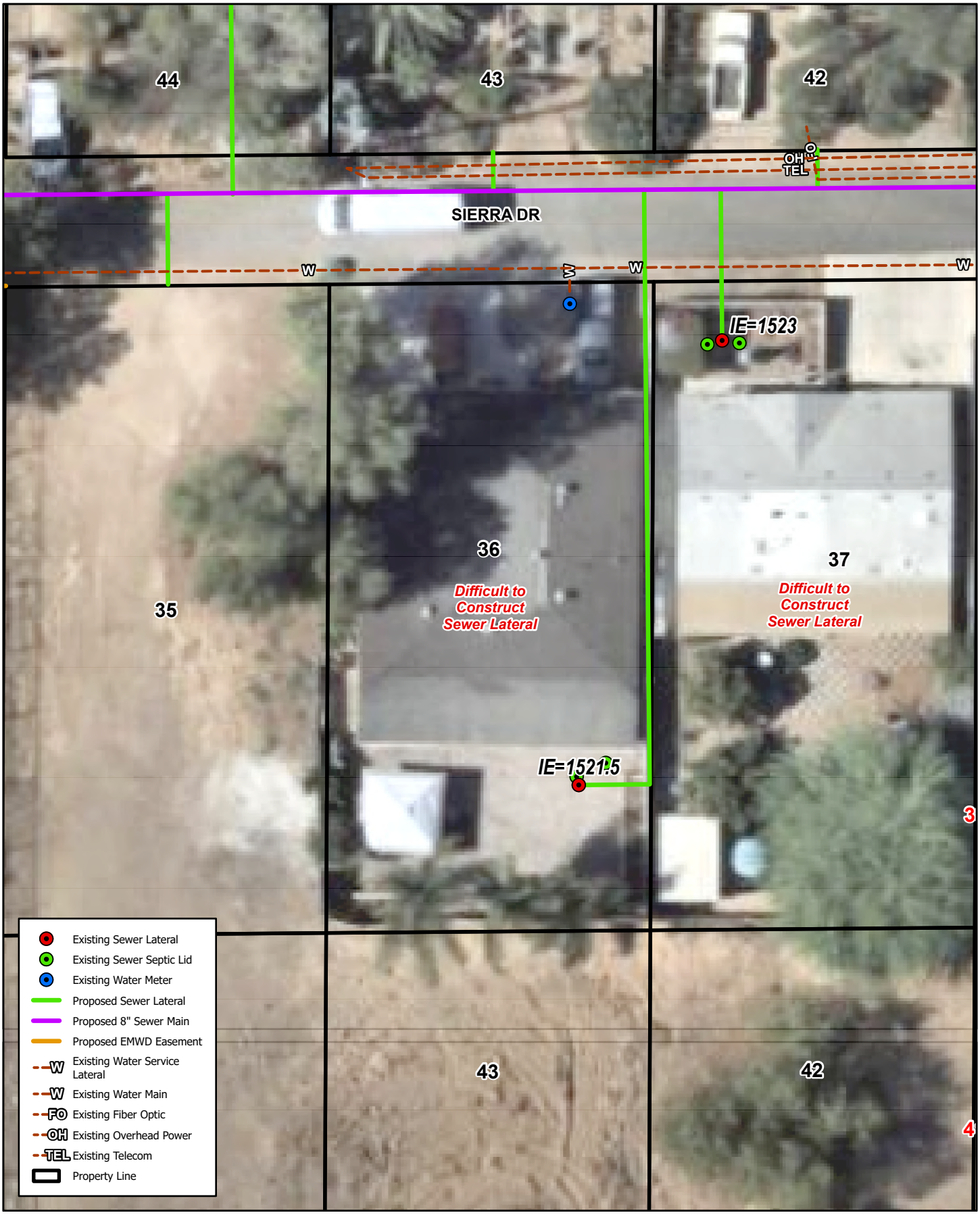
LOT #35

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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LOT #36

Quail Valley - Subarea 4 Sewer Improvement Plans

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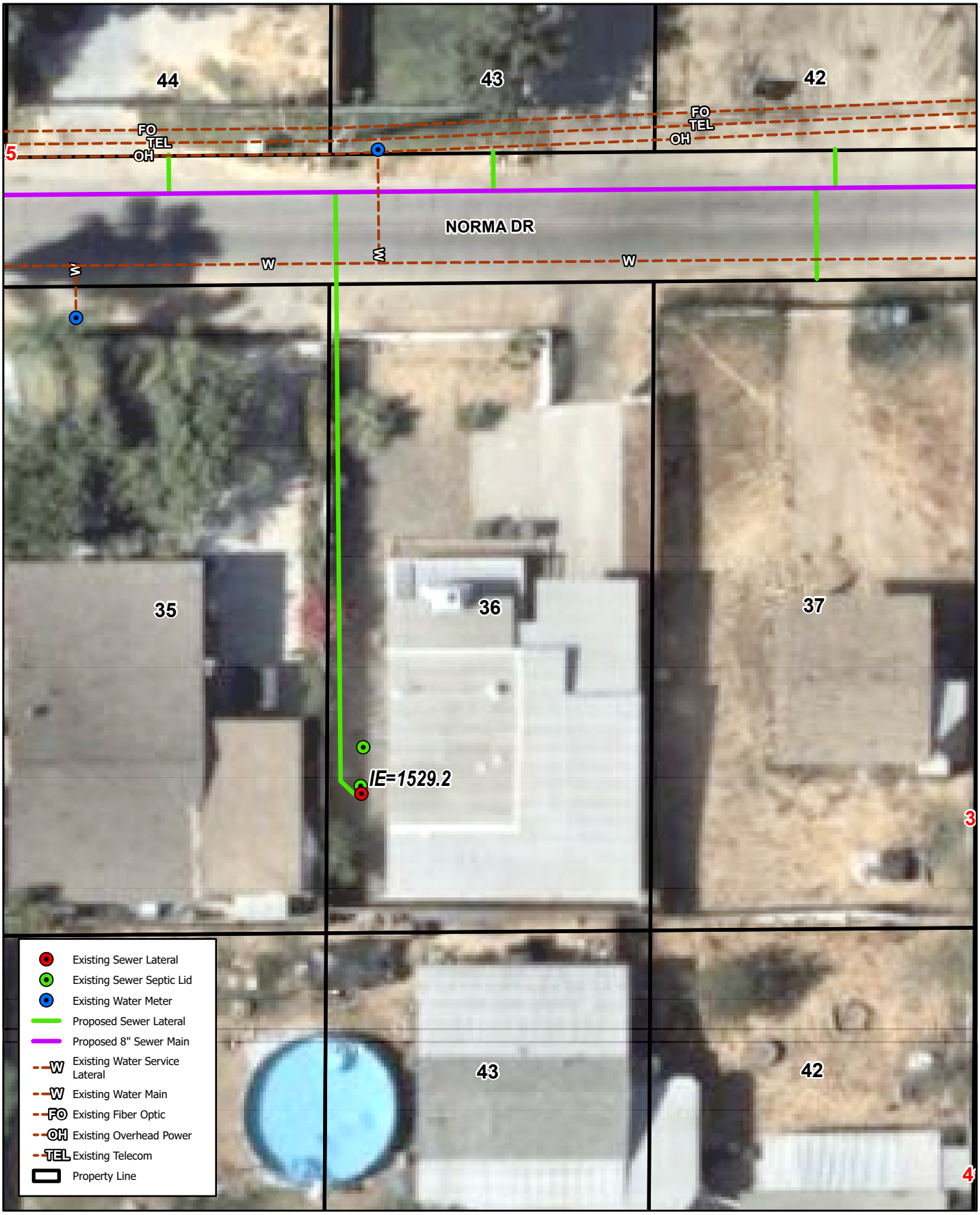

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Quail Valley - Subarea 4 Sewer Improvement Plans

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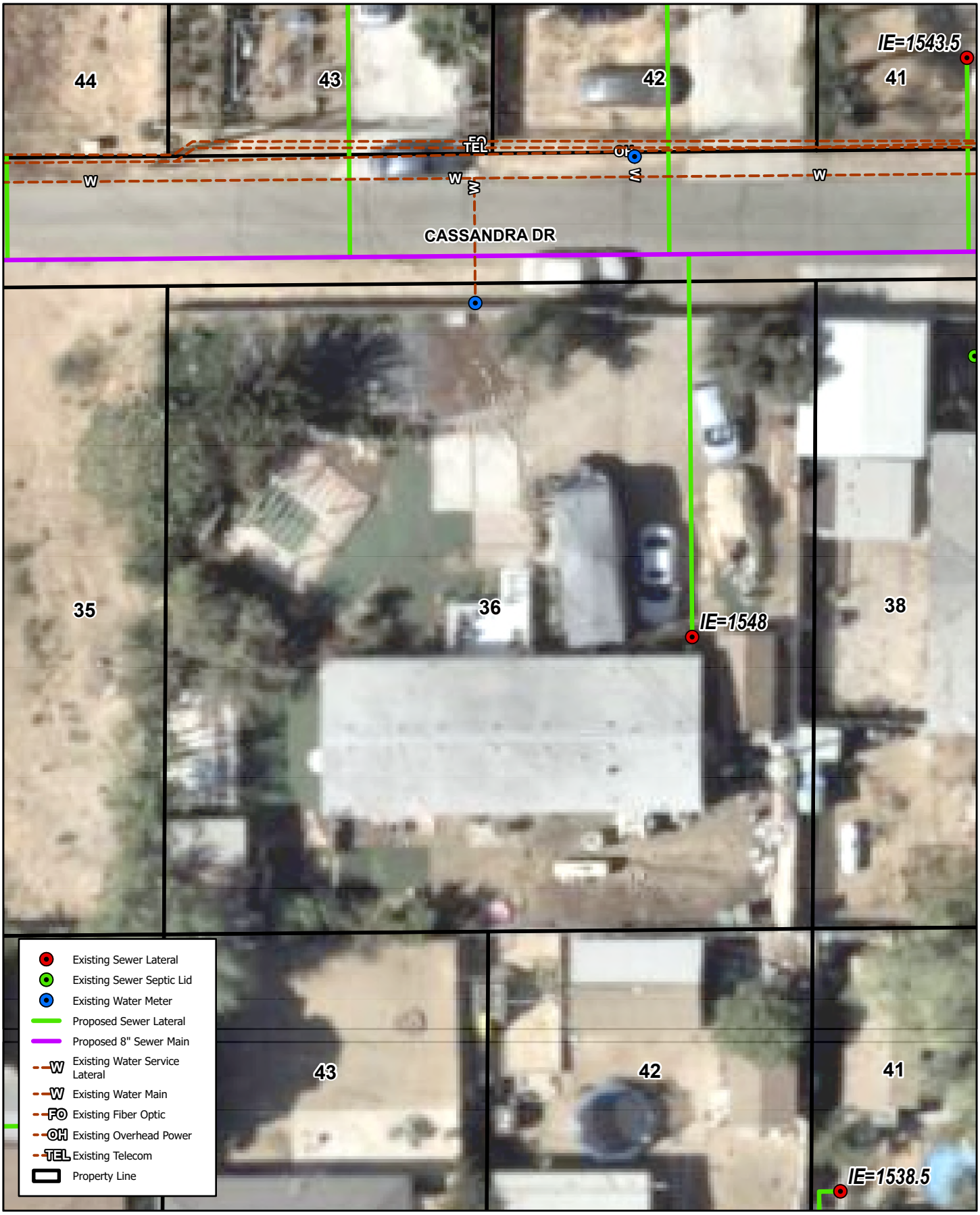

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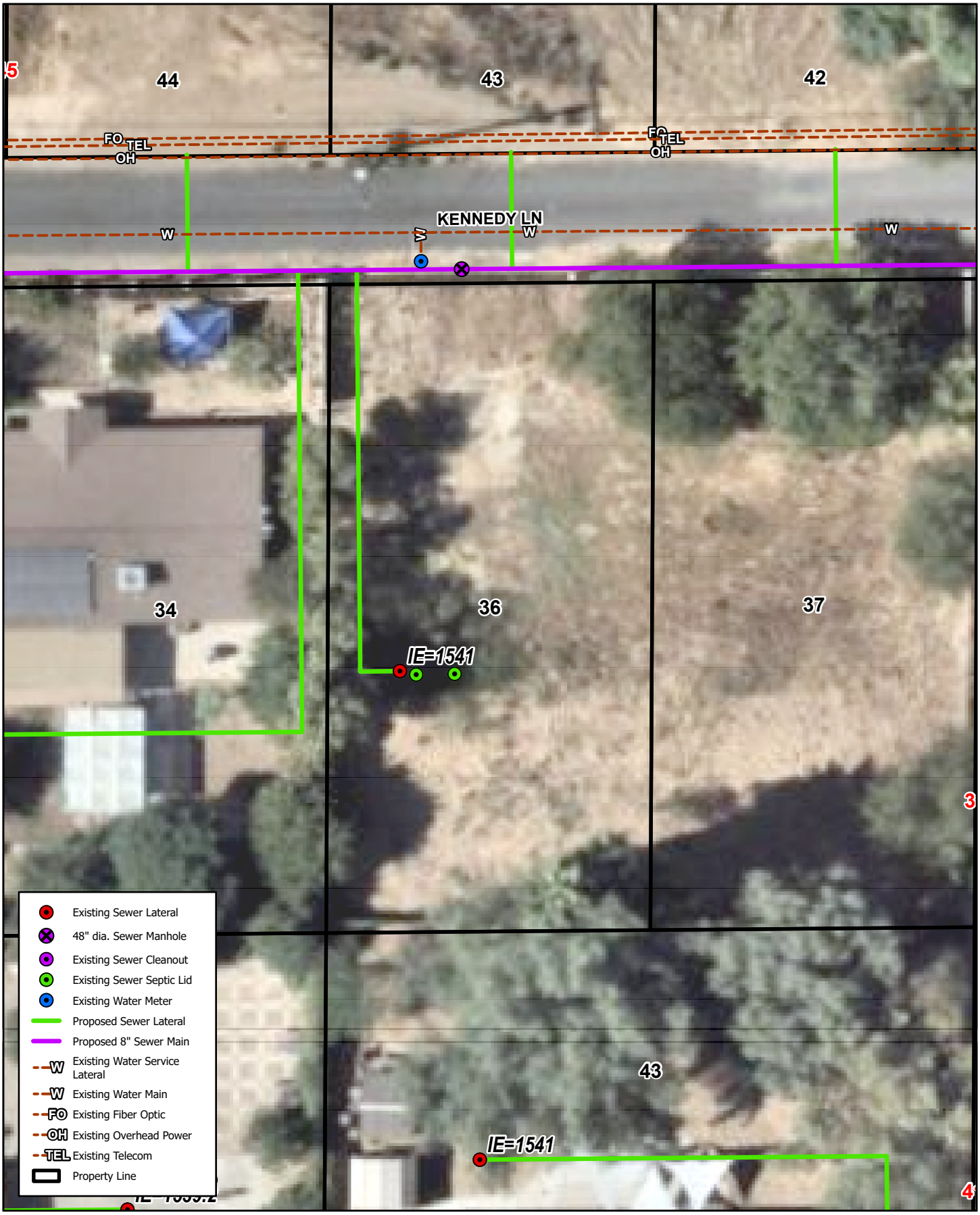

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Quail Valley - Subarea 4 Sewer Improvement Plans

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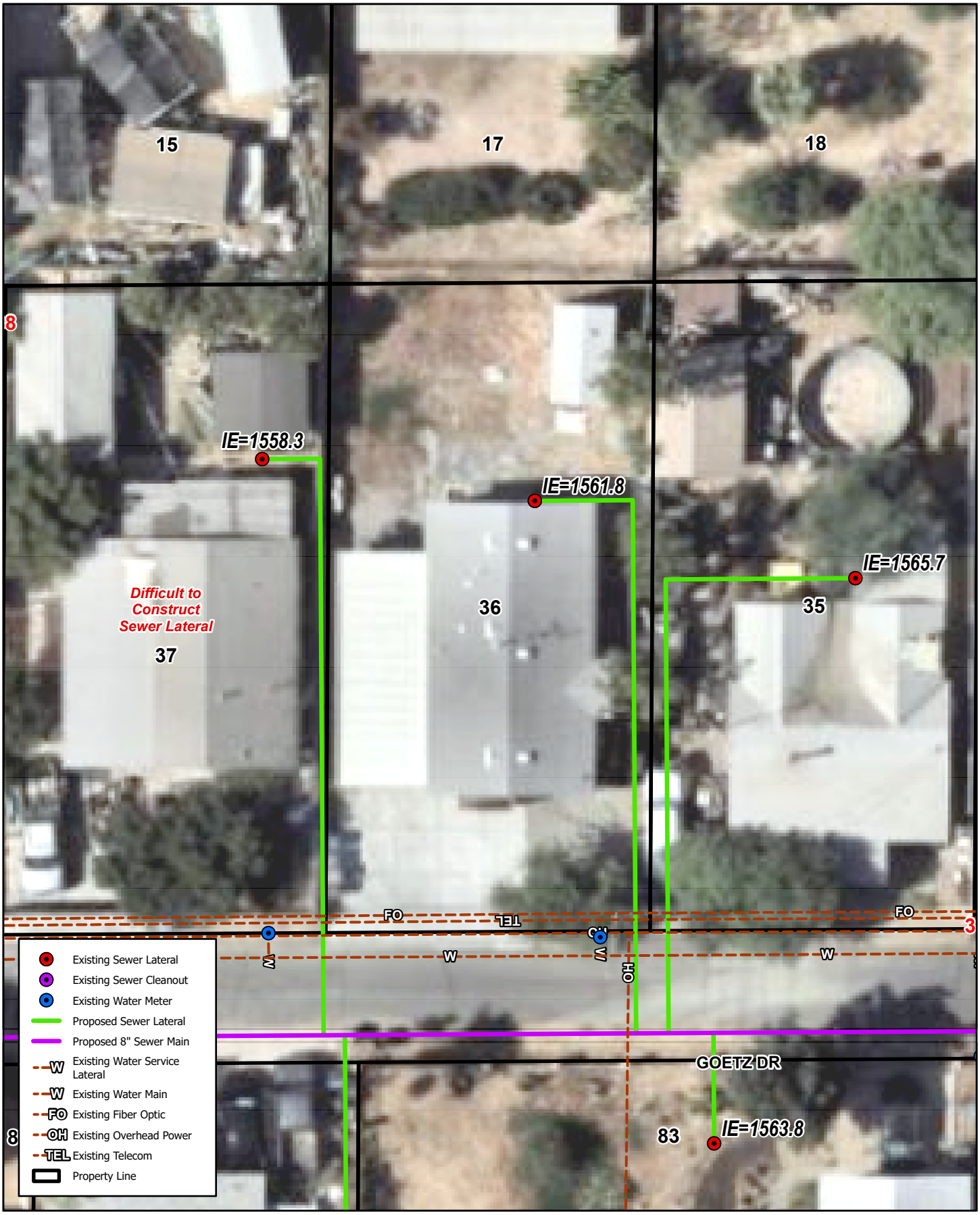


23900 GOETZ DR, CANYON LAKE, CA 92587

LOT #36

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23662 ELSINORE LN, CANYON LAKE, CA 92587

LOT #36

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

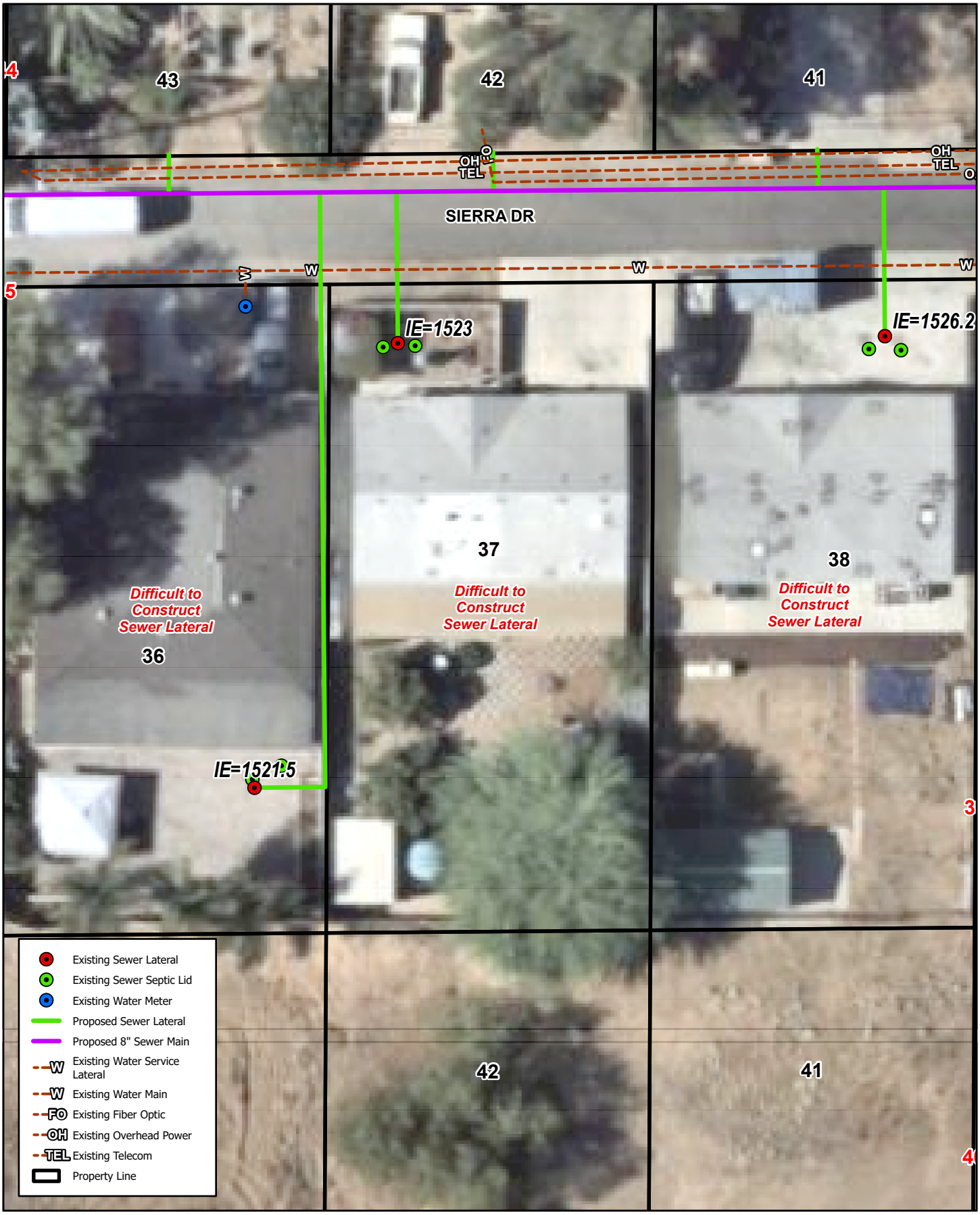


23912 ELSINORE LN, QUAIL VALLEY, CA 92587

LOT #36

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23837 SIERRA DR, QUAIL VALLEY, CA 92587

LOT #37

Michael Baker INTERNATIONAL

Quail Valley - Subarea 4 Sewer Improvement Plans

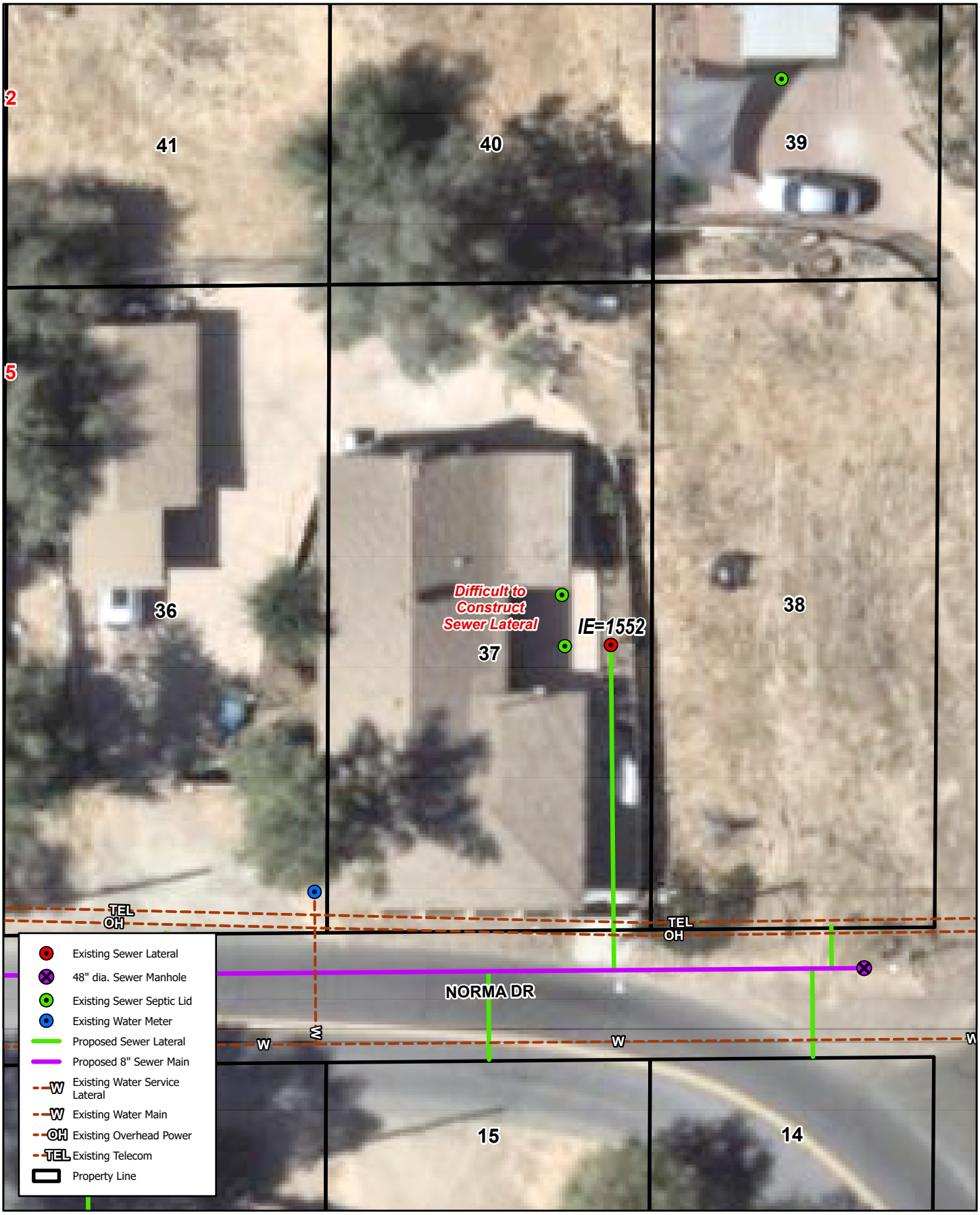


23835 NEWPORT DR, CANYON LAKE, CA 92587

LOT #37

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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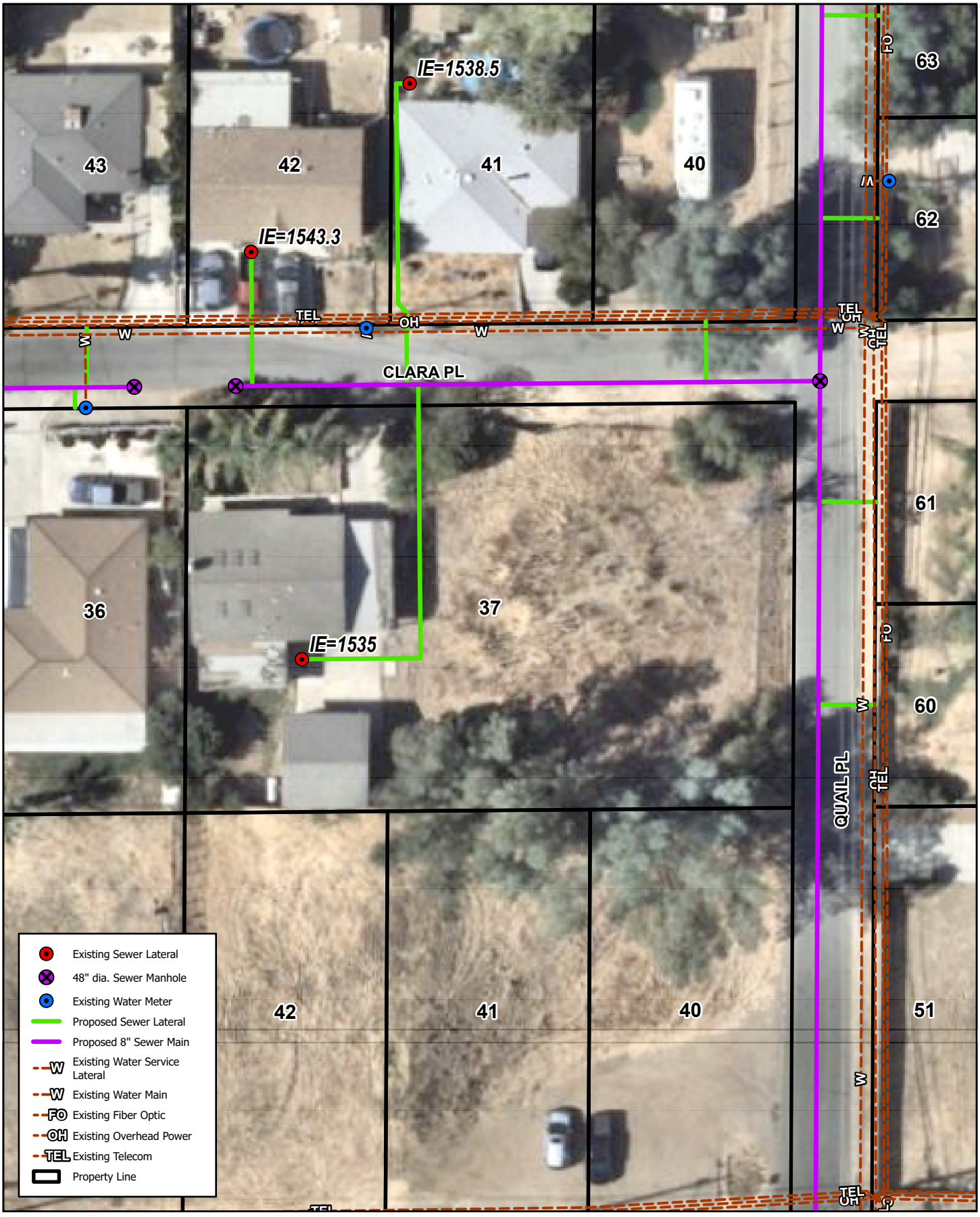
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23831 CLARA PL, CANYON LAKE, CA 92587

LOT #37

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23831 GOETZ DR, CANYON LAKE, CA 92587

LOT #37

Quail Valley - Subarea 4 Sewer Improvement Plans

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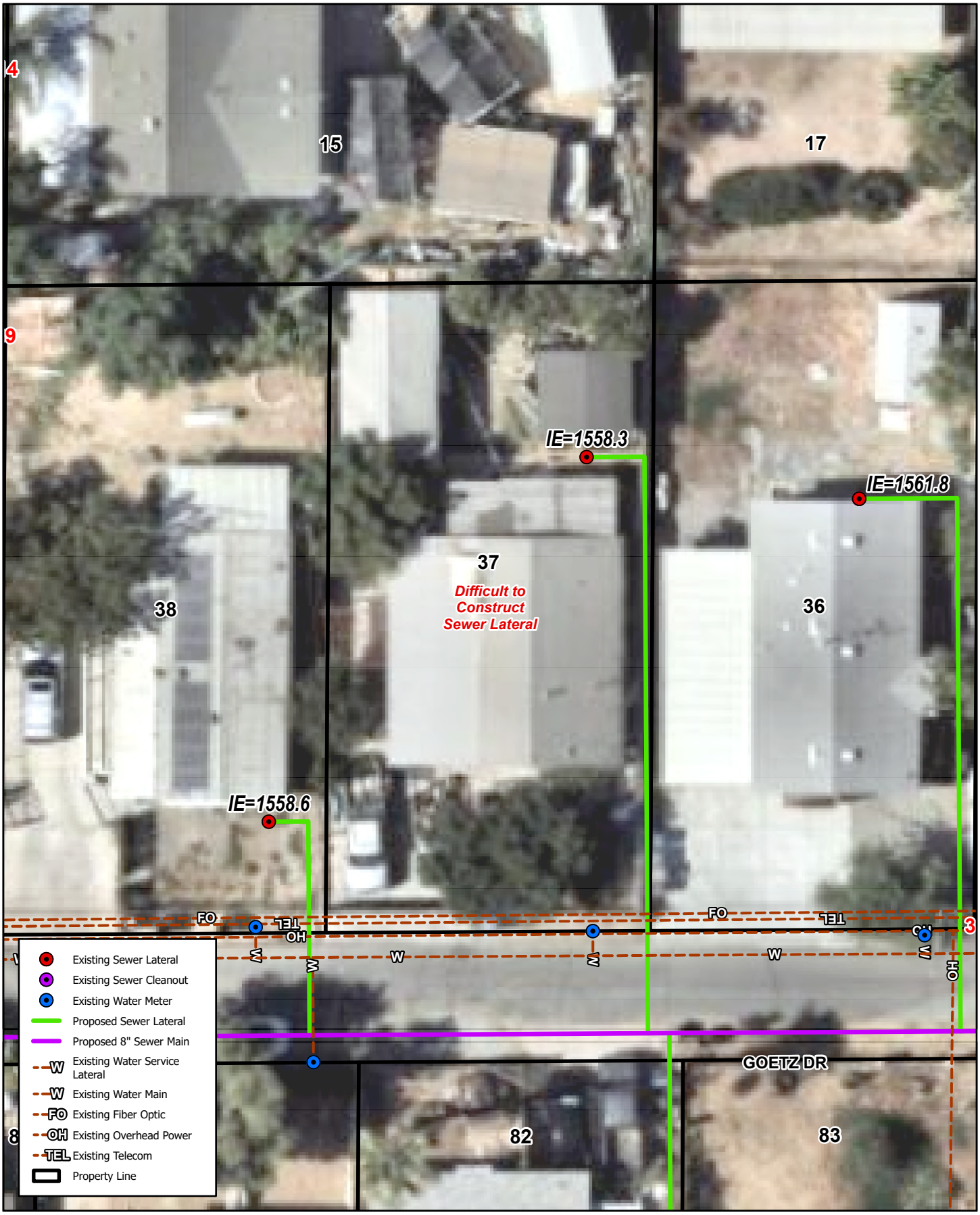

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Quail Valley - Subarea 4 Sewer Improvement Plans

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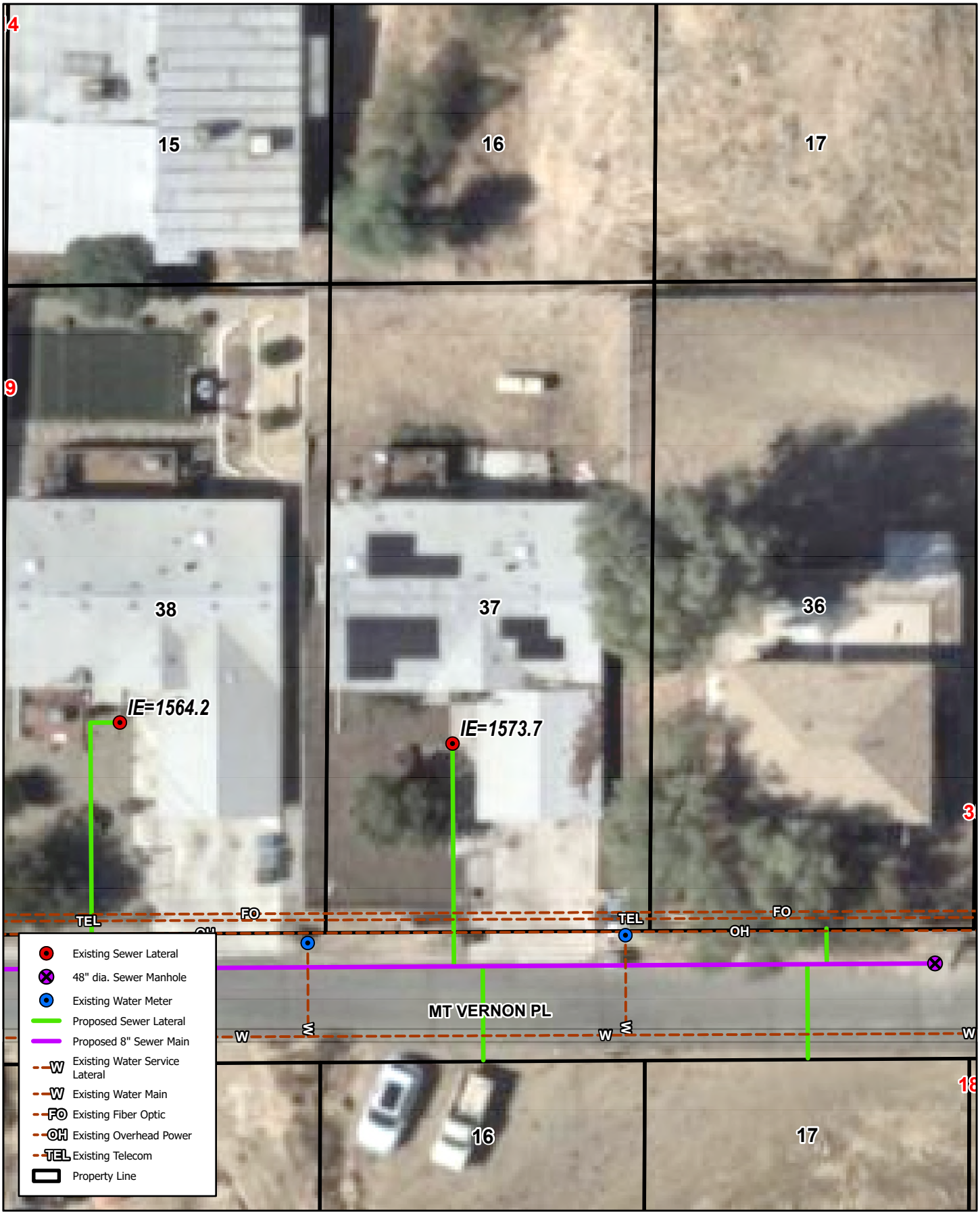

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LOT #37

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23666 LAKE DR, QUAIL VALLEY, CA 92587

LOT #37

Quail Valley - Subarea 4 Sewer Improvement Plans

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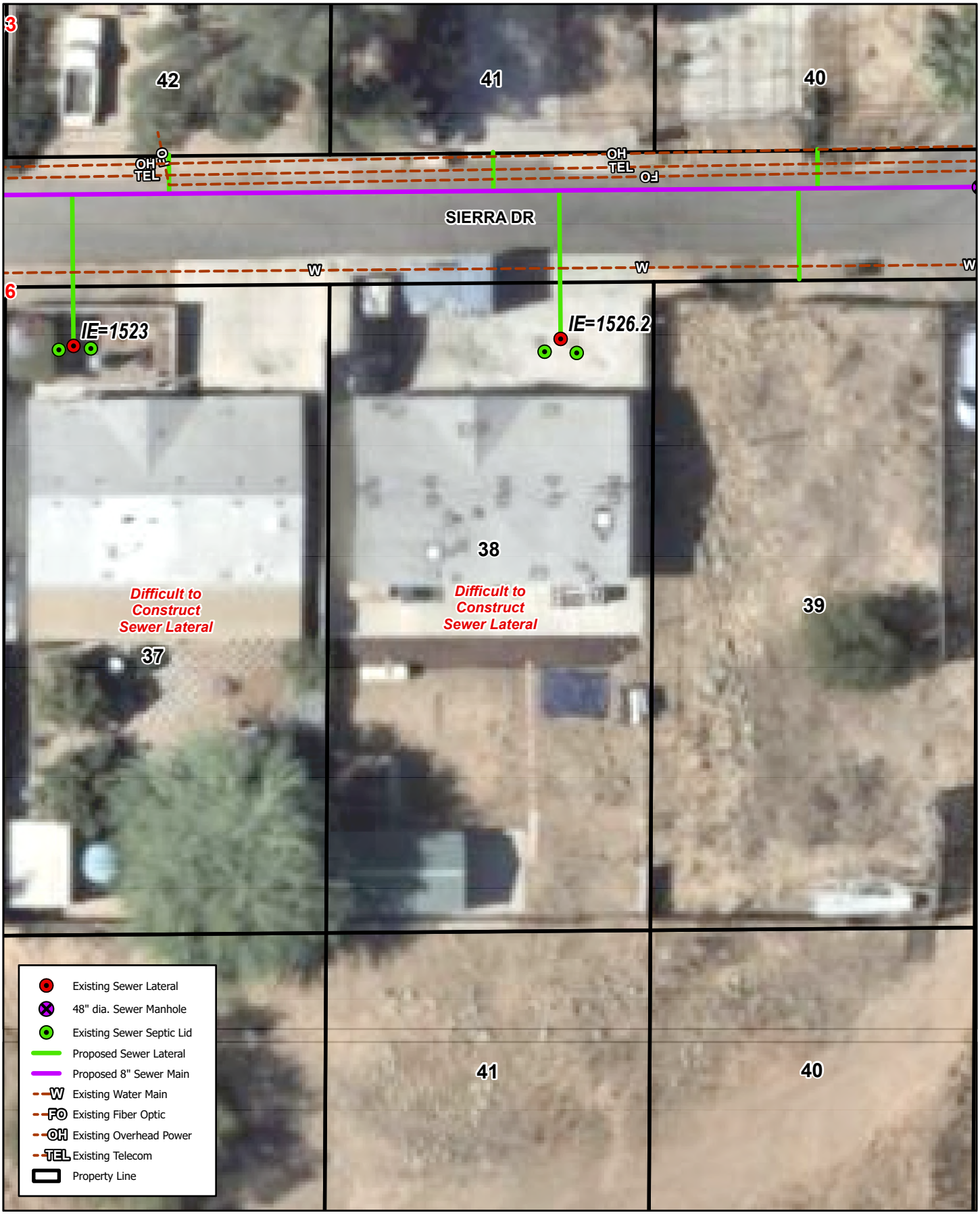
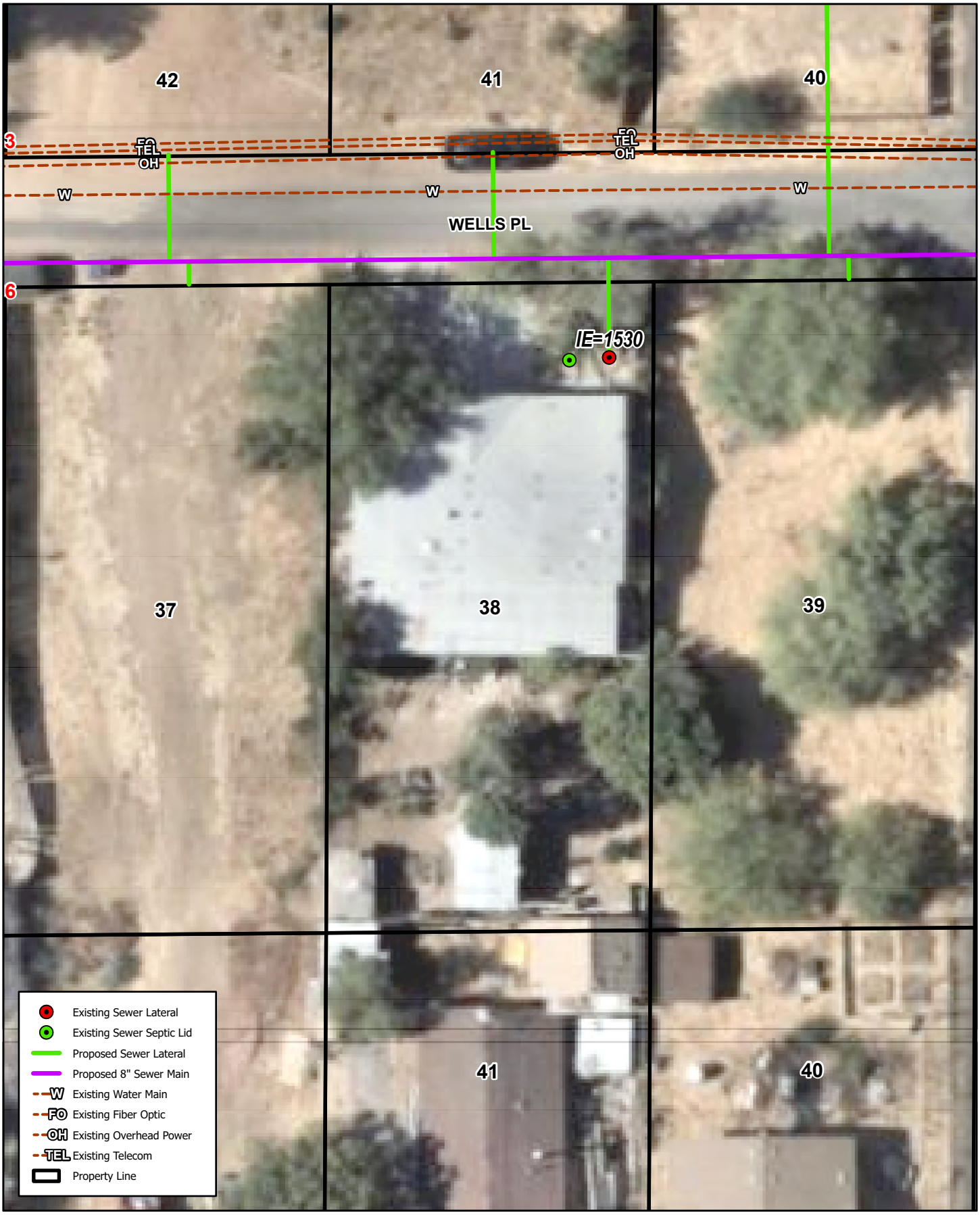


23843 SIERRA DR, CANYON LAKE, CA 92587

LOT #38

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

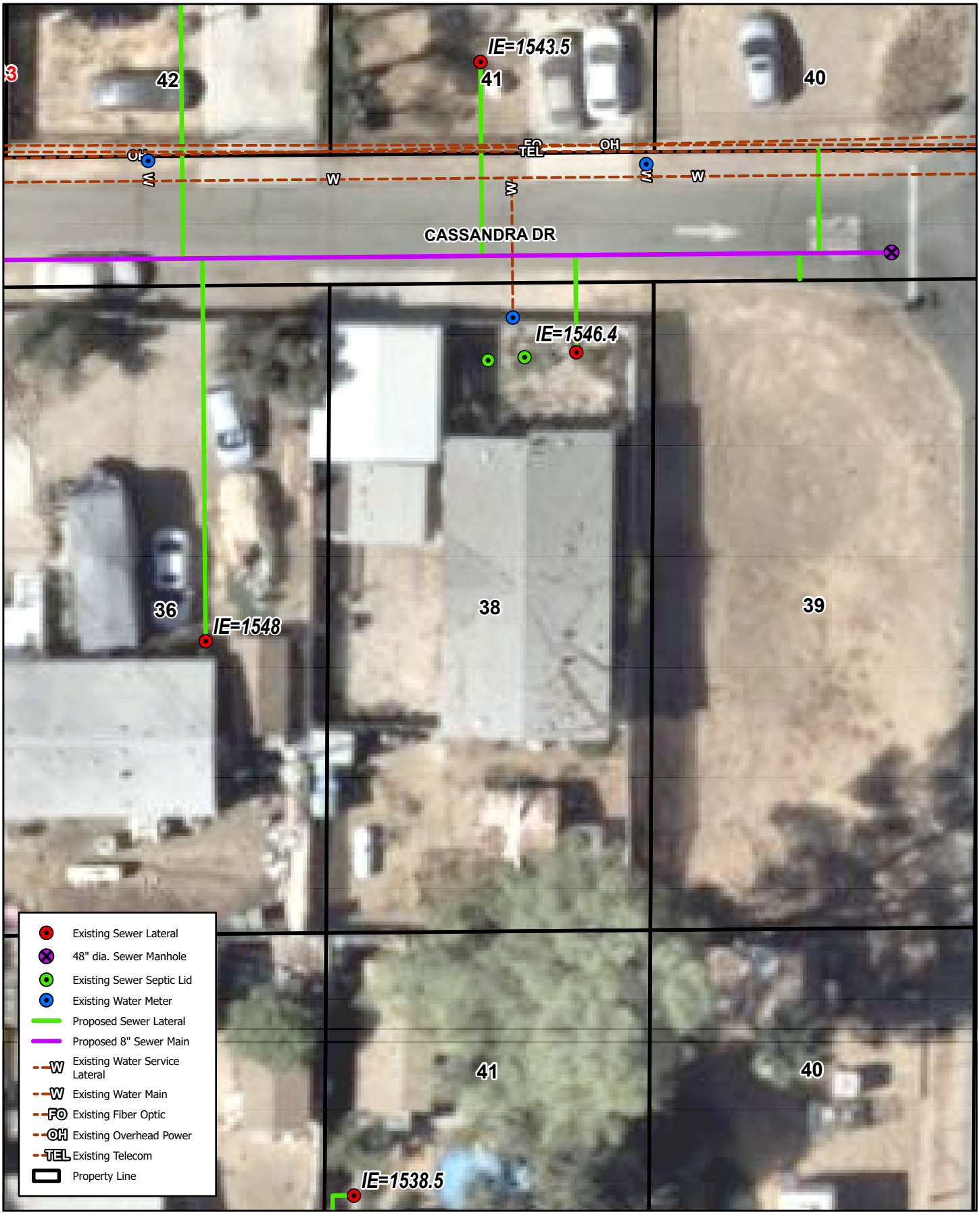


23845 WELLS PL, QUAIL VALLEY, CA 92587

LOT #38

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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LOT #38

Quail Valley - Subarea 4 Sewer Improvement Plans

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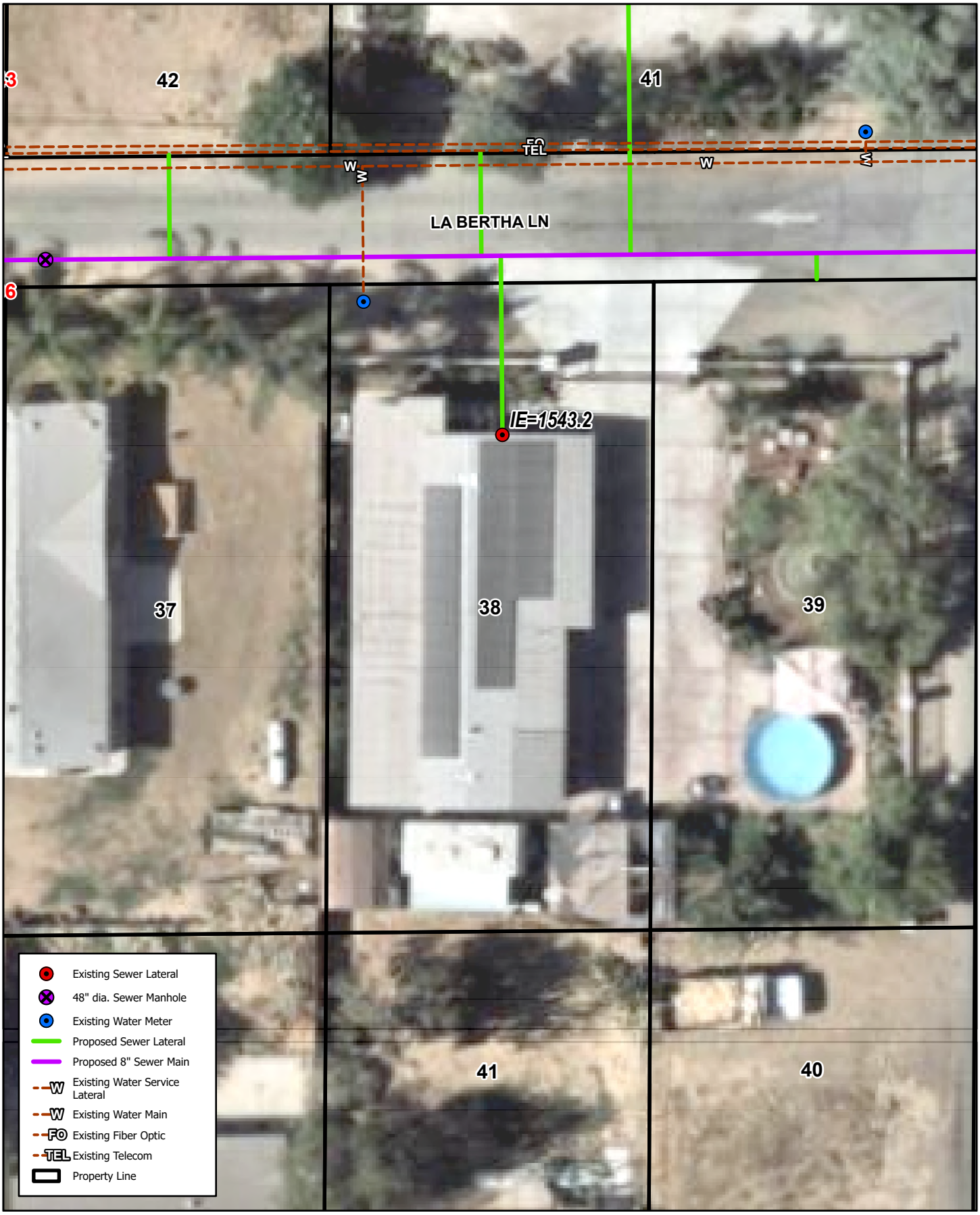

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LOT #38

Quail Valley - Subarea 4 Sewer Improvement Plans

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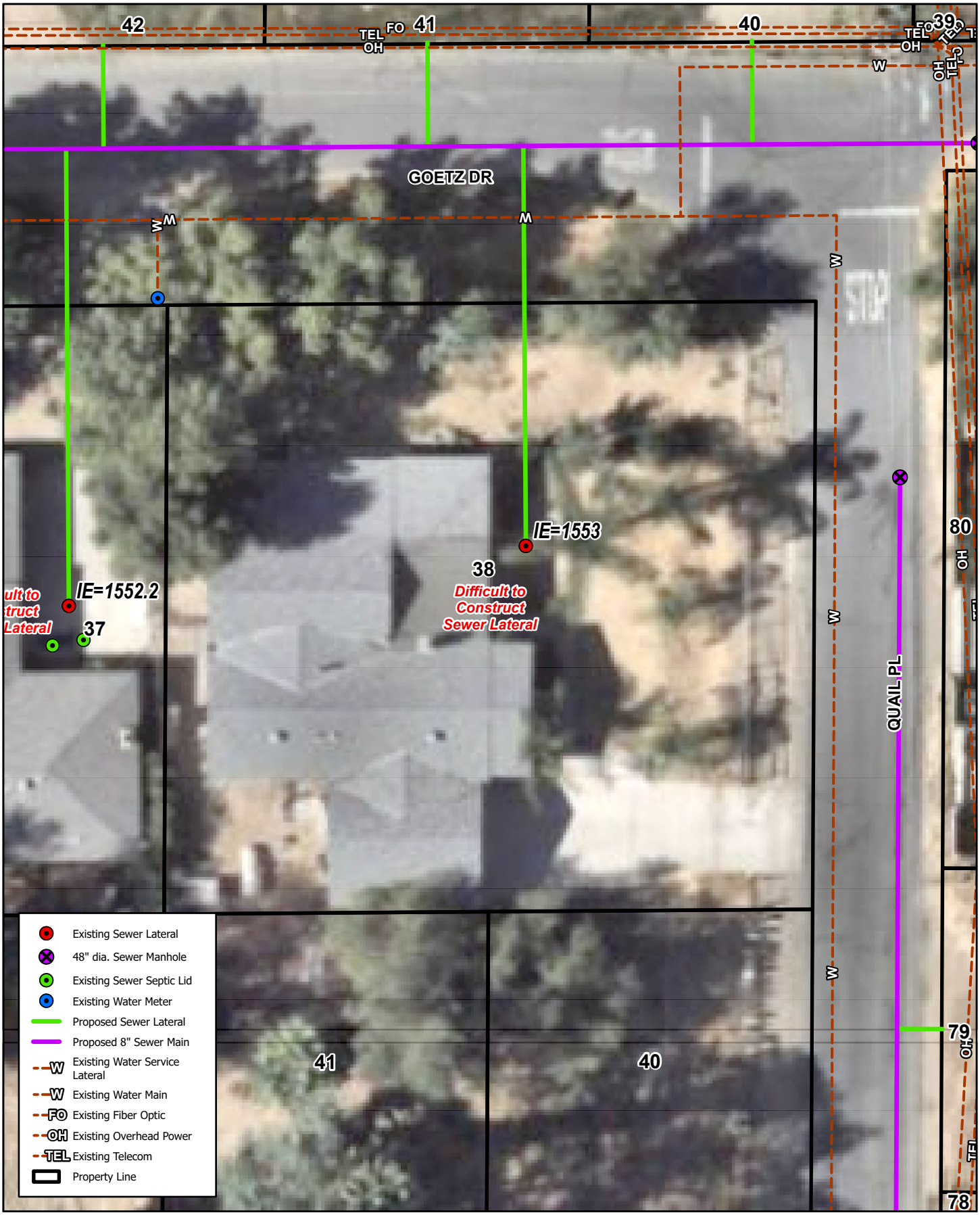

28515 QUAIL PL, CANYON LAKE, CA 92587

LOT #38

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23880 GOETZ DR, CANYON LAKE, CA 92587

LOT #38

Quail Valley - Subarea 4 Sewer Improvement Plans

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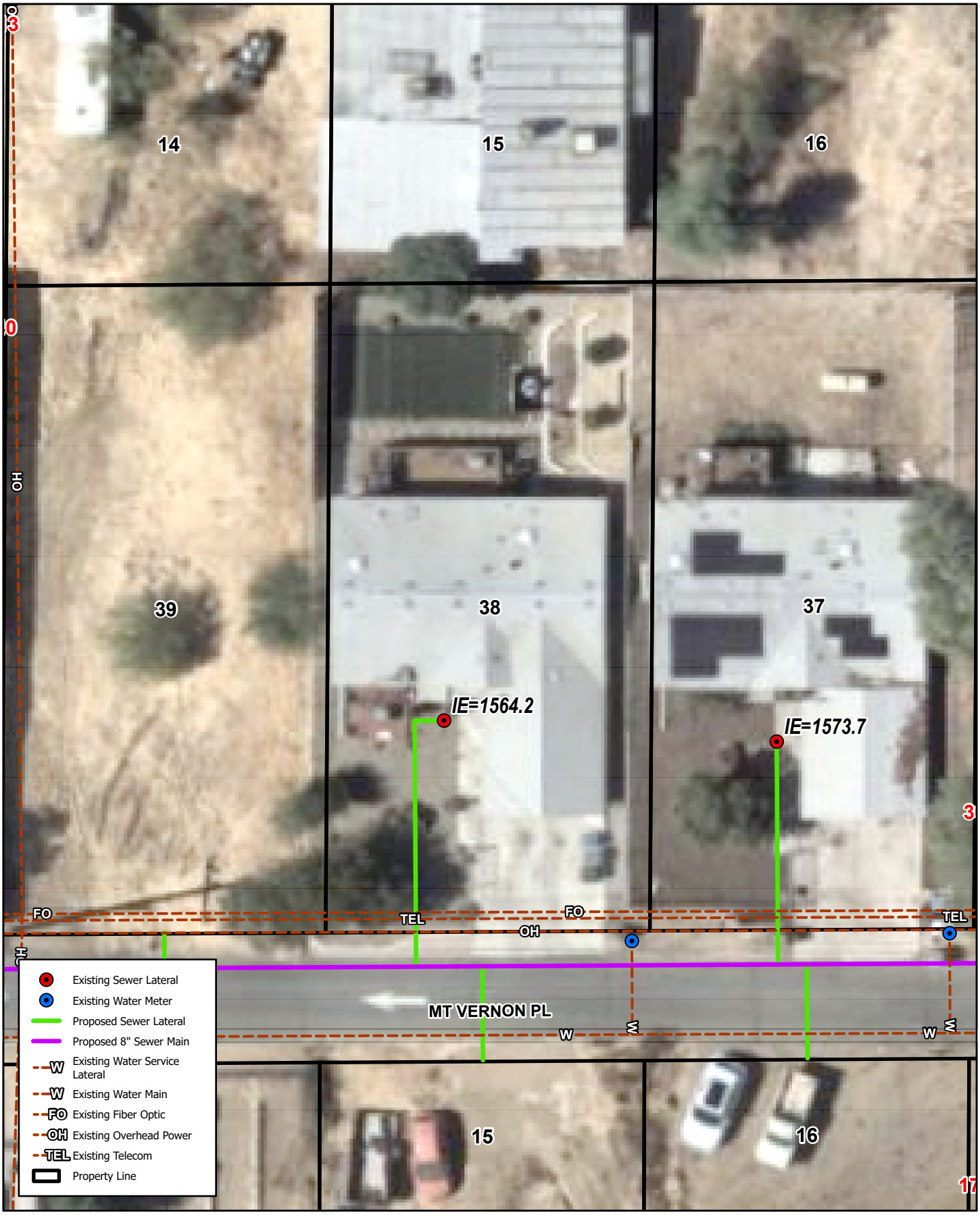


23664 MT VERNON PL, QUAIL VALLEY, CA 92587

LOT #38

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

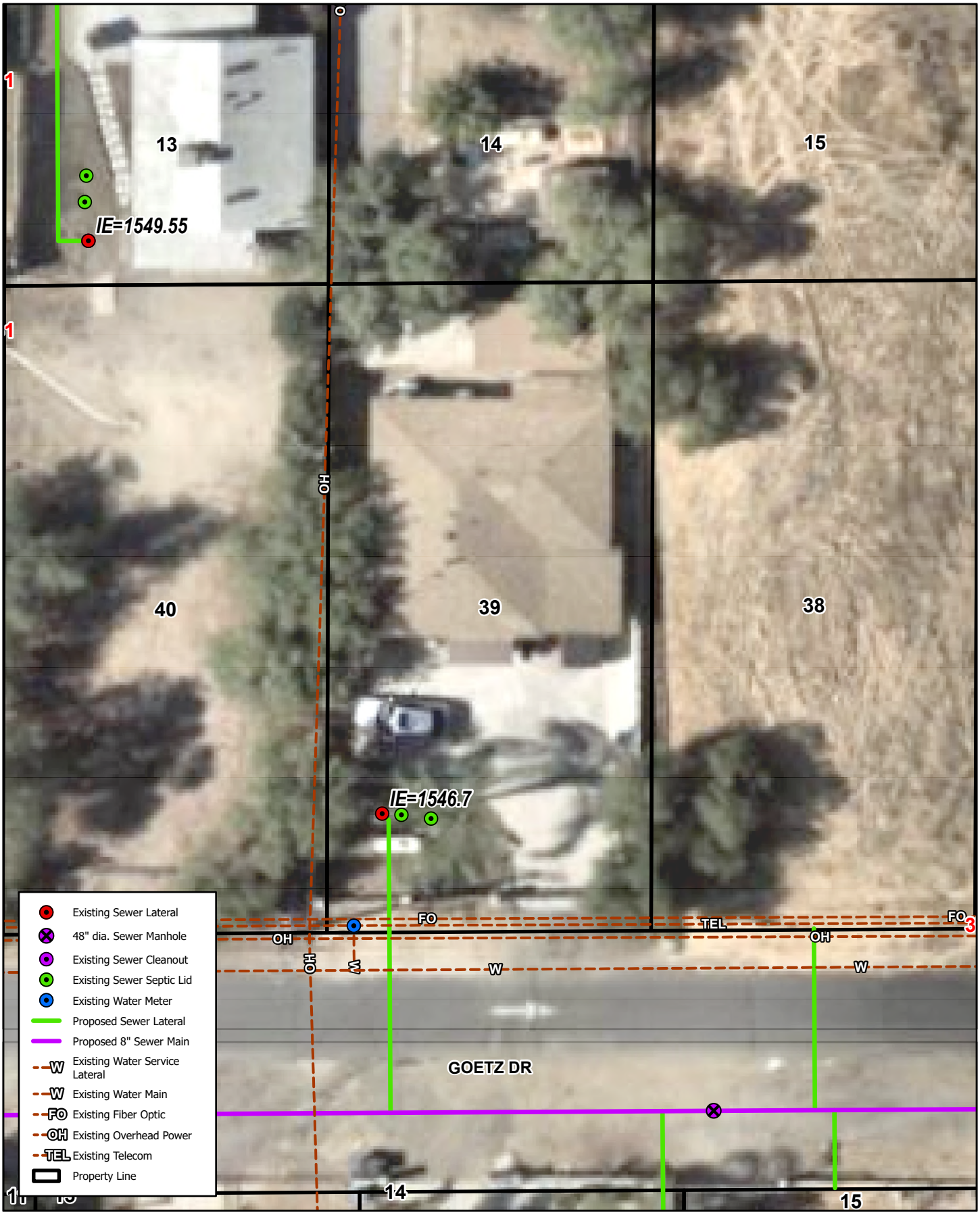


28767 LODGE DR, QUAIL VALLEY, CA 92587

LOT #39

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23632 GOETZ DR, CANYON LAKE, CA 92587

LOT #39

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

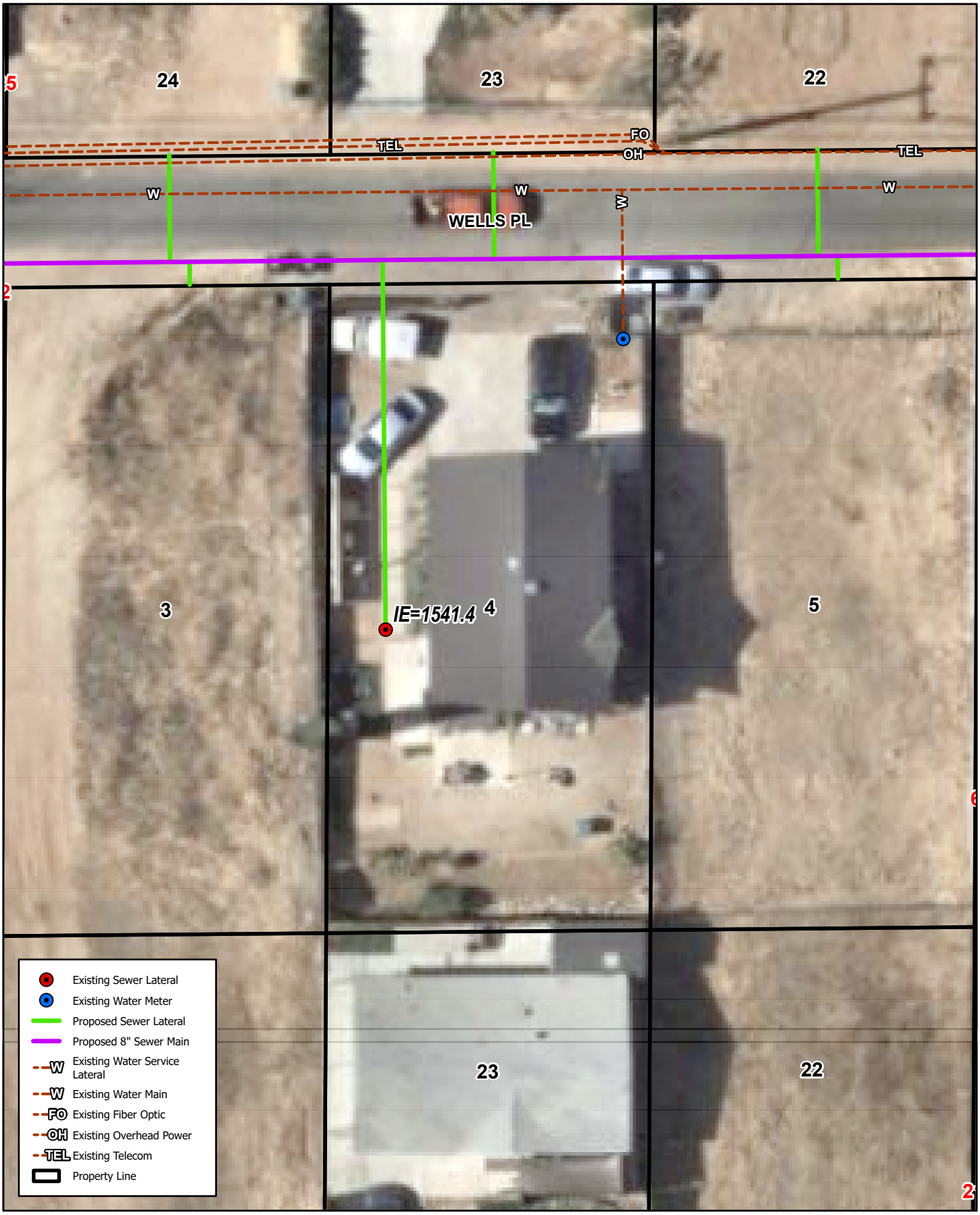


23640 LAKE DR, QUAIL VALLEY, CA 92587

LOT #39

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

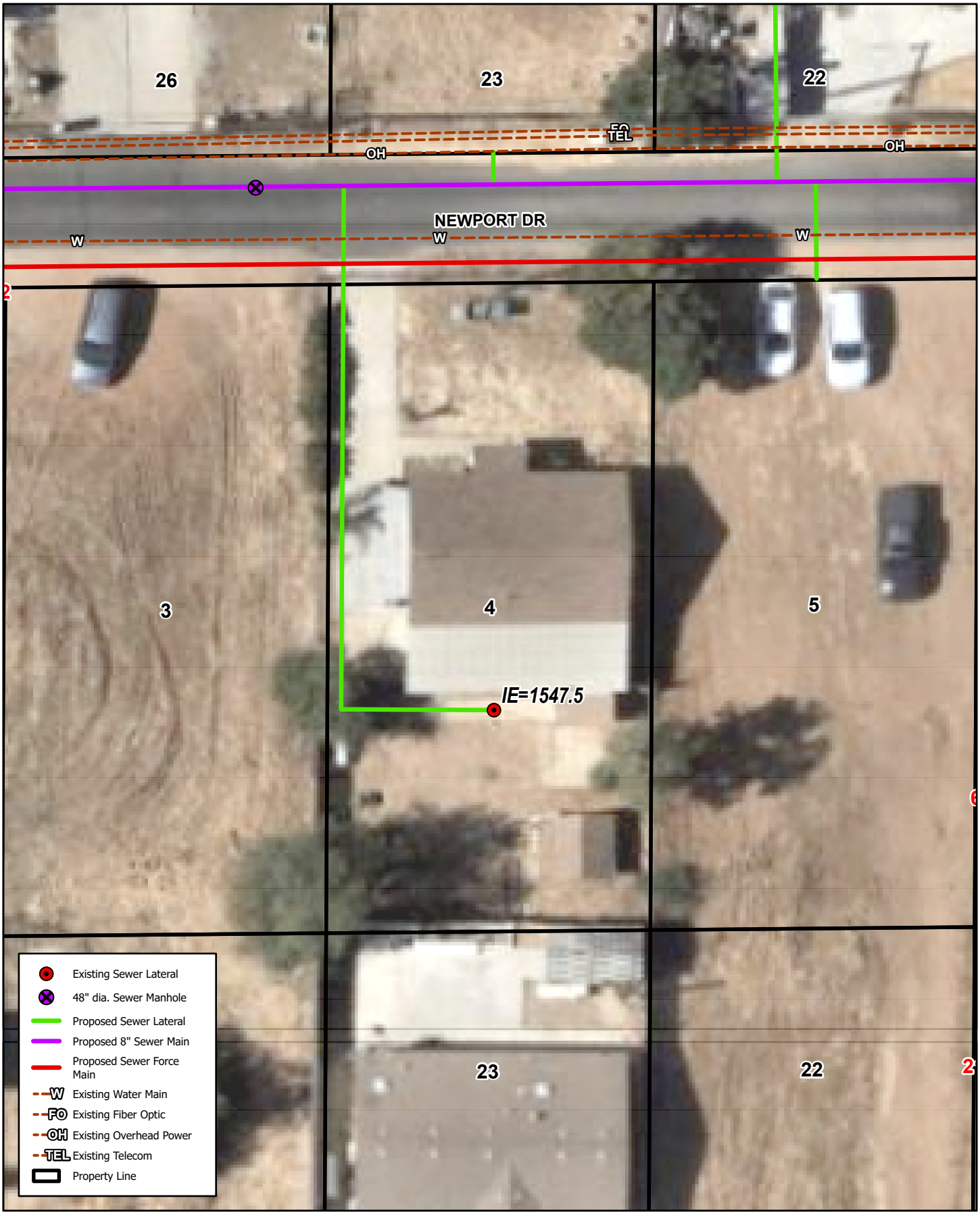


23893 WELLS PL, QUAIL VALLEY, CA 92587

LOT #4

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

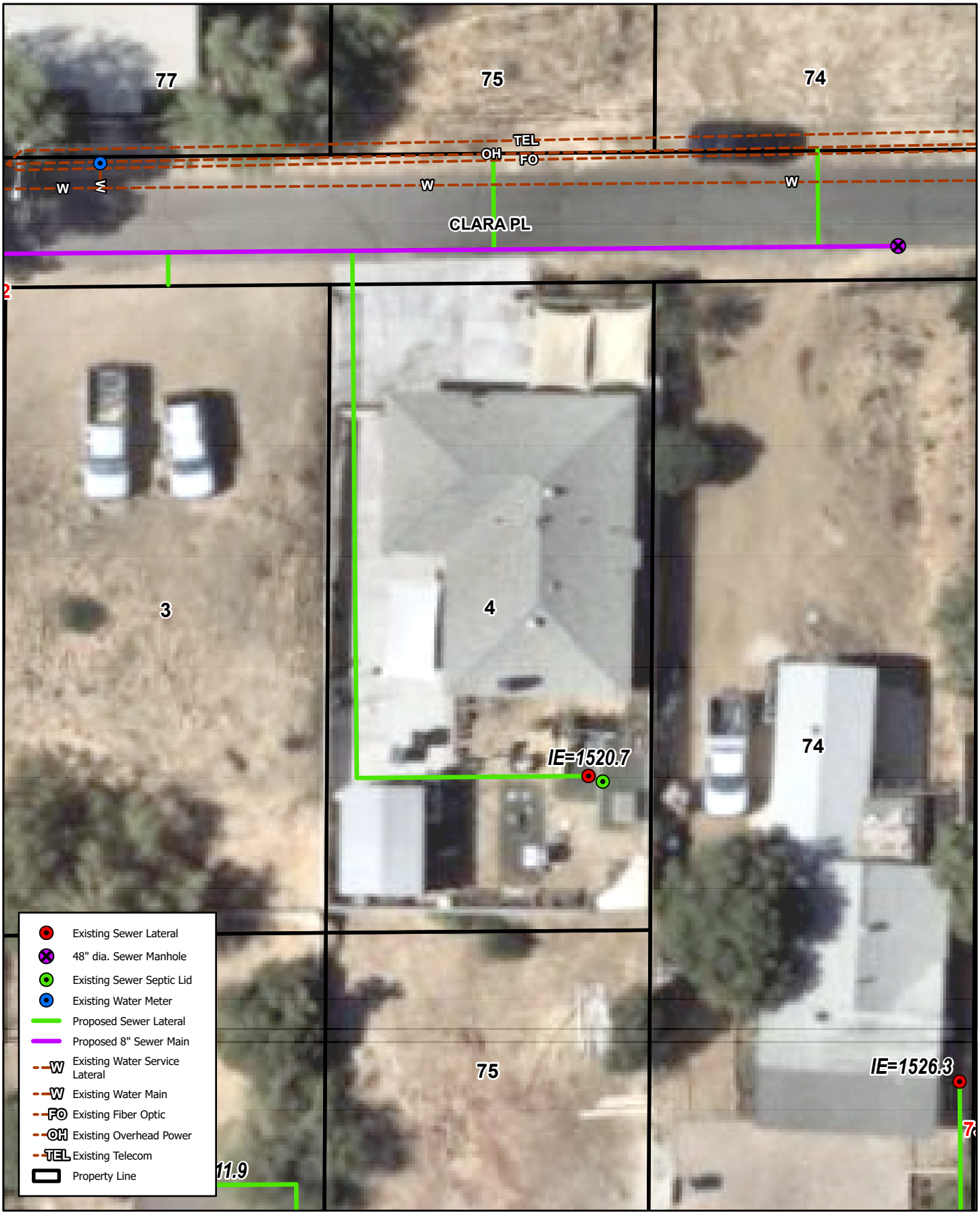


23895 NEWPORT DR, CANYON LAKE, CA 92587

LOT #4

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

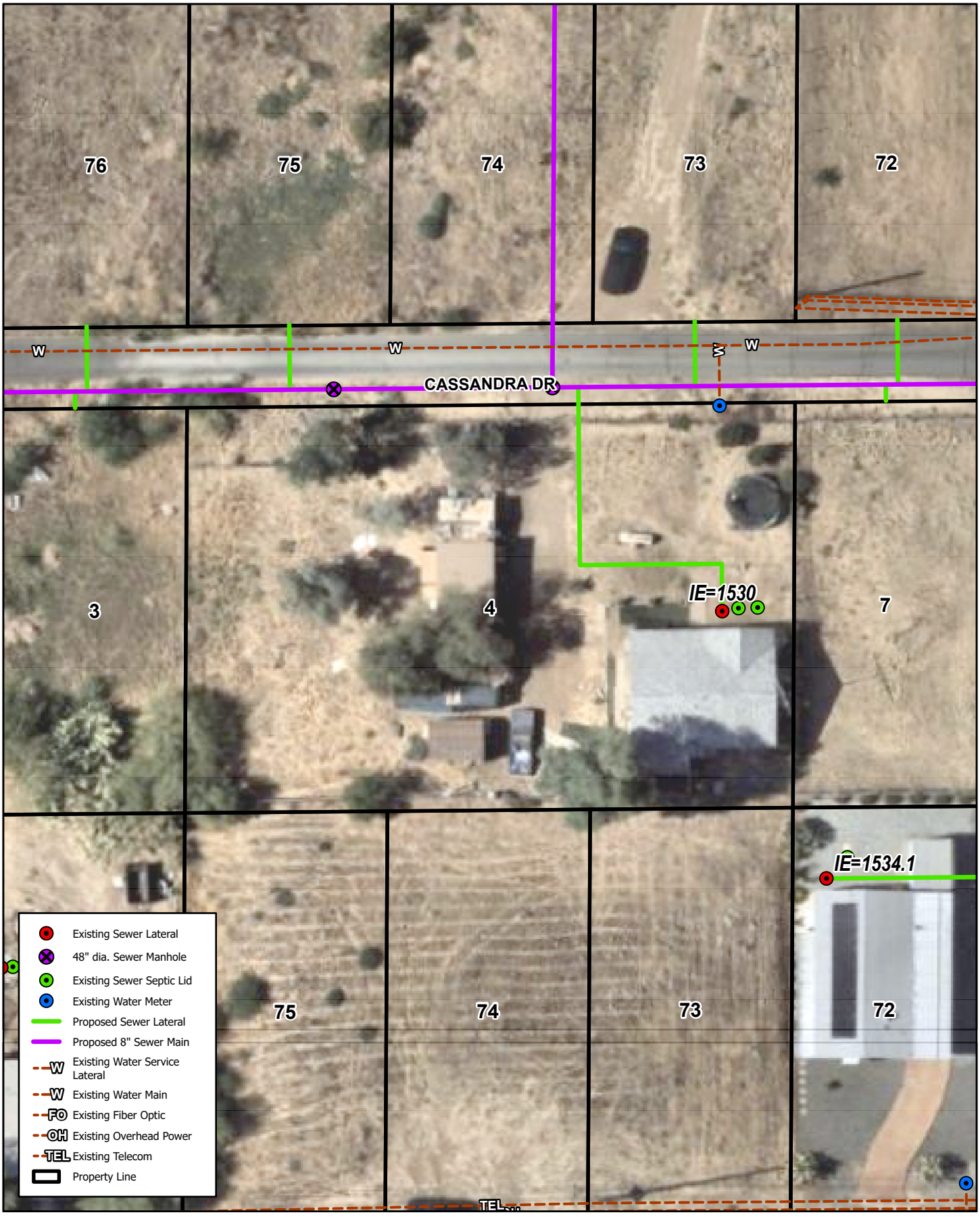


23531 CLARA PL, CANYON LAKE, CA 92587

LOT #4

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

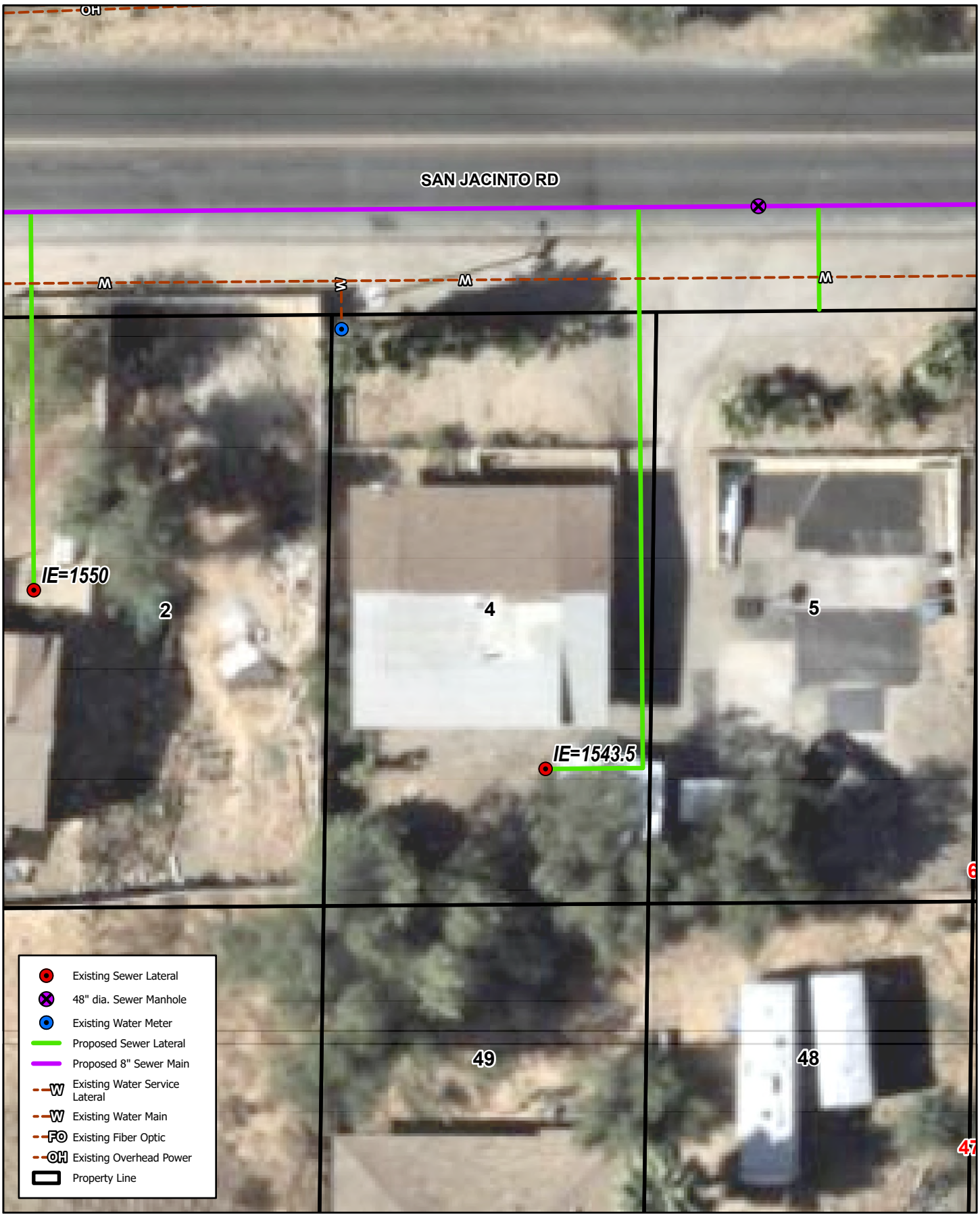


23559 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #4

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

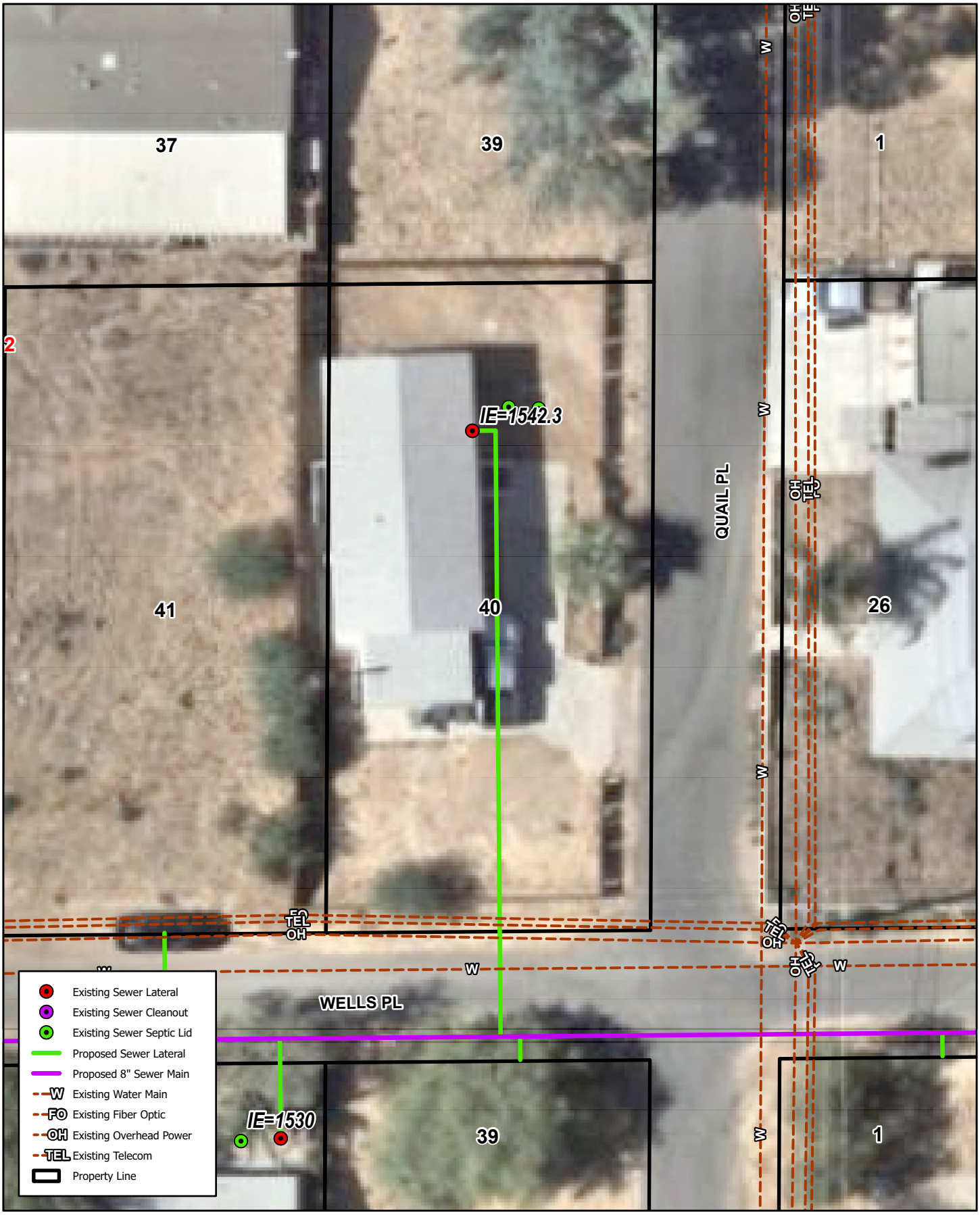


23545 SAN JACINTO RD, CANYON LAKE, CA 92587

LOT #4

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

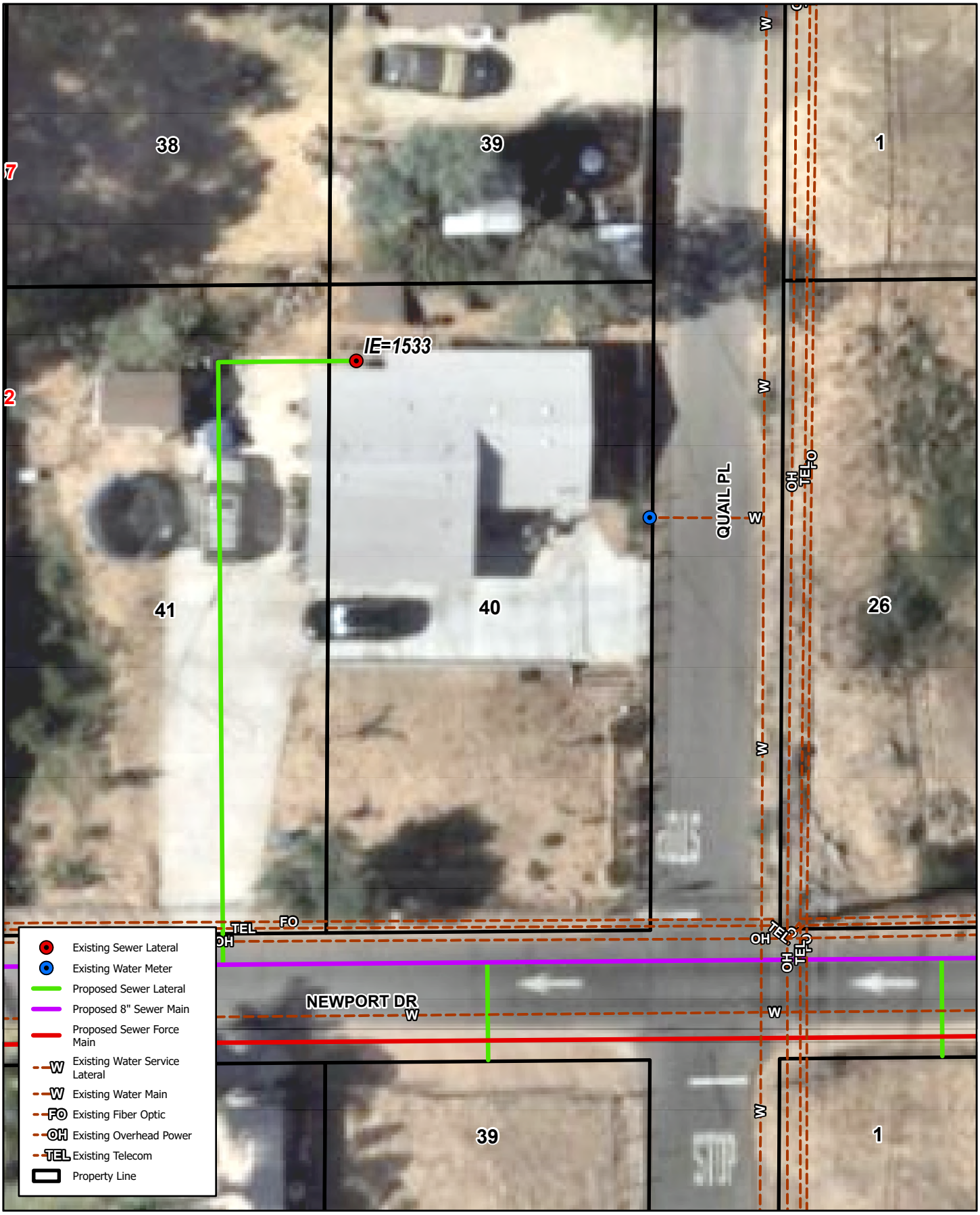


28895 QUAIL PL, MENIFEE, CA 92587

LOT #40

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



28863 QUAIL PL, CANYON LAKE, CA 92587

LOT #40

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

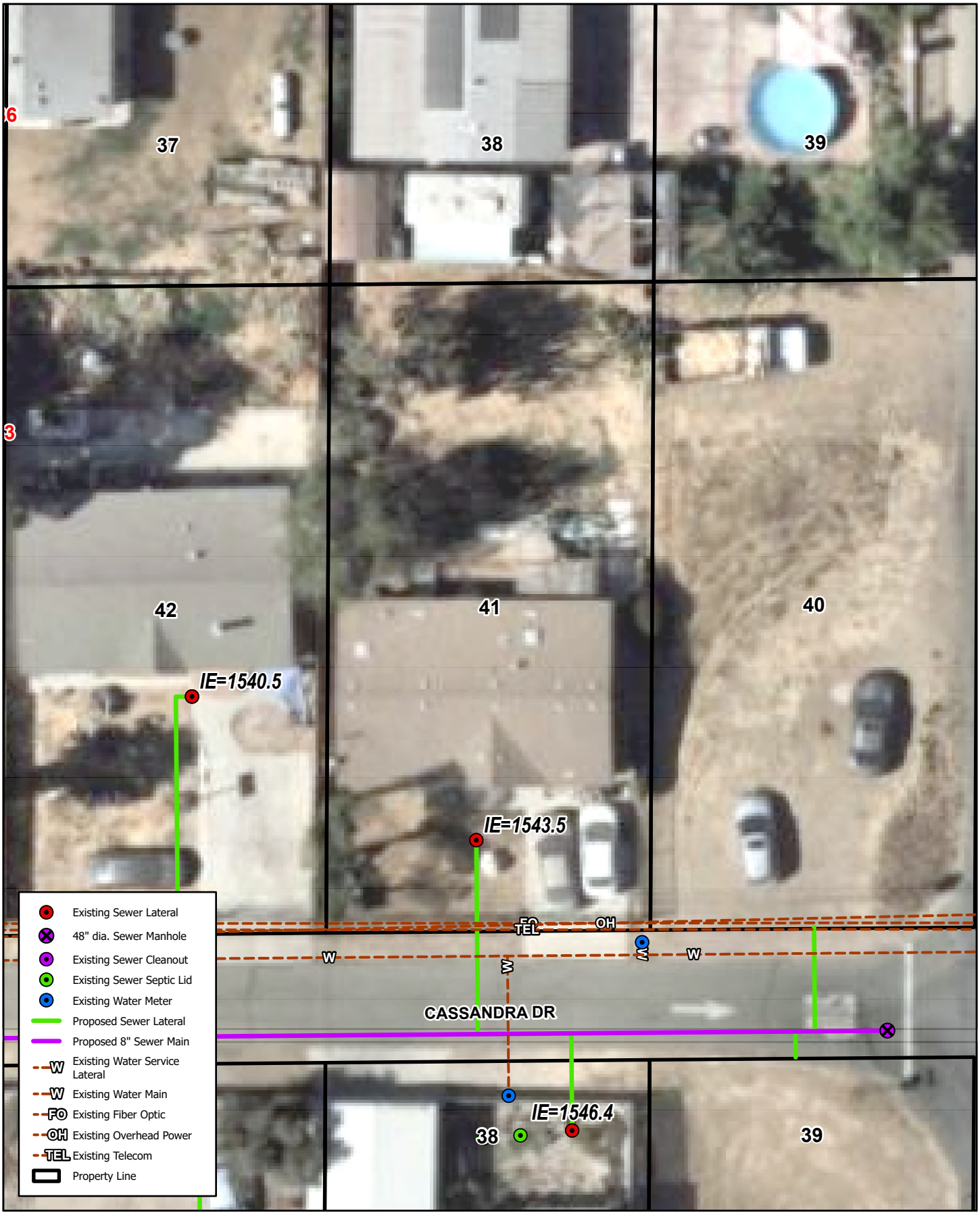


23840 CLARA PL, CANYON LAKE, CA 92587

LOT #41

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

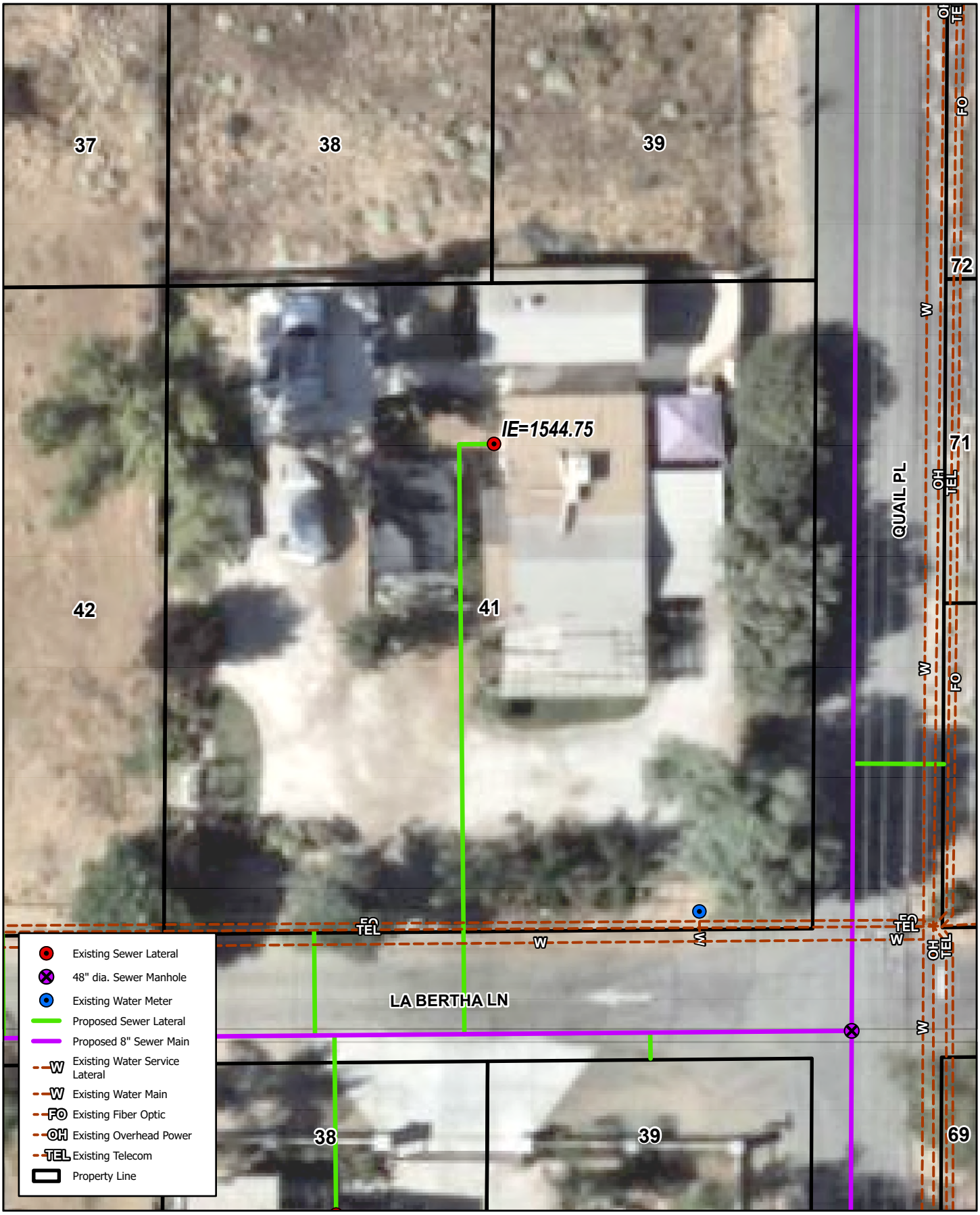


23834 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #41

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

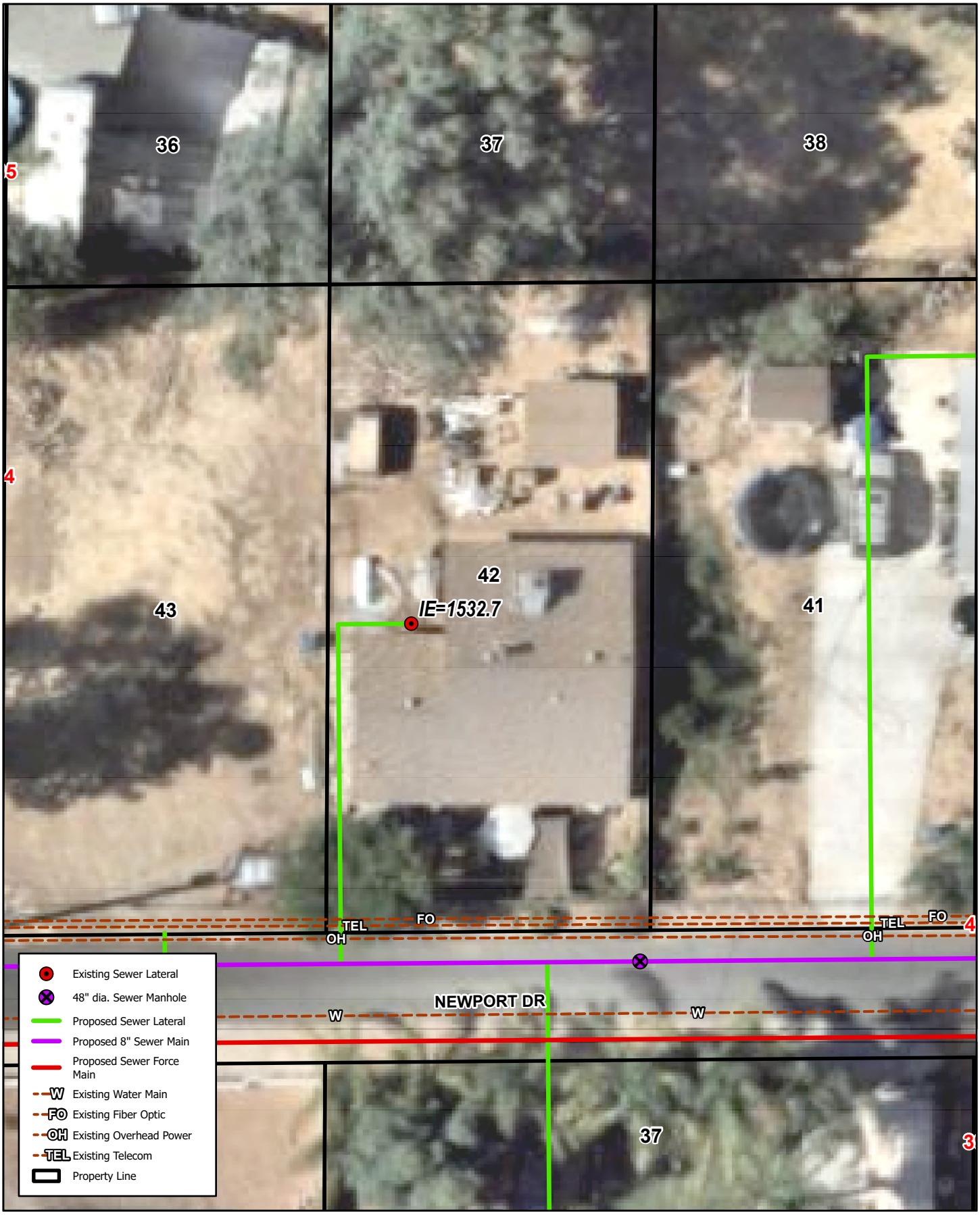


23842 LA BERTHA LN, QUAIL VALLEY, CA 92587

LOT #41

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

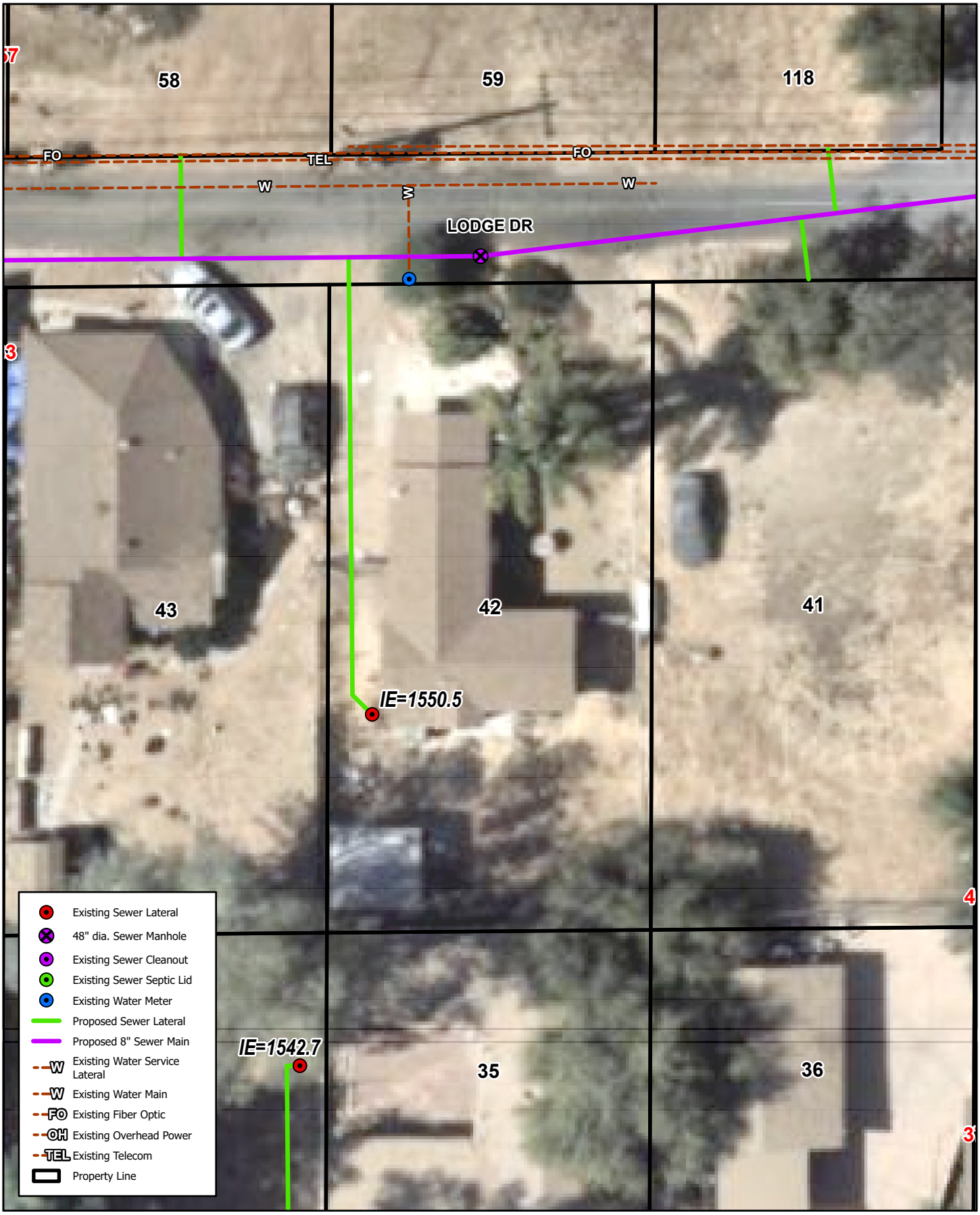


23832 NEWPORT DR, CANYON LAKE, CA 92587

LOT #42

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

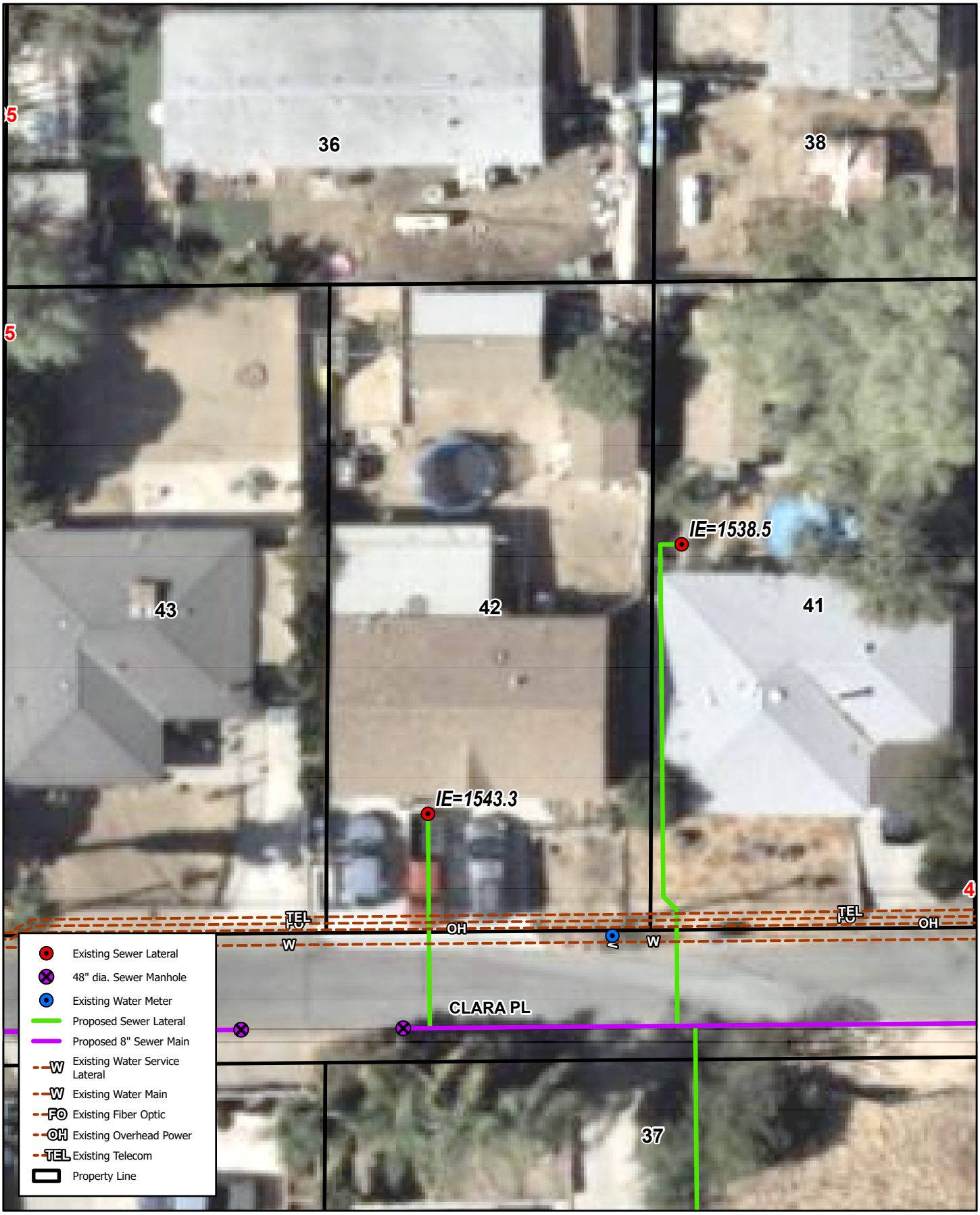


23963 LODGE DR, CANYON LAKE, CA 92587

LOT #42

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23830 CLARA PL, CANYON LAKE, CA 92587

LOT #42

Quail Valley - Subarea 4 Sewer Improvement Plans

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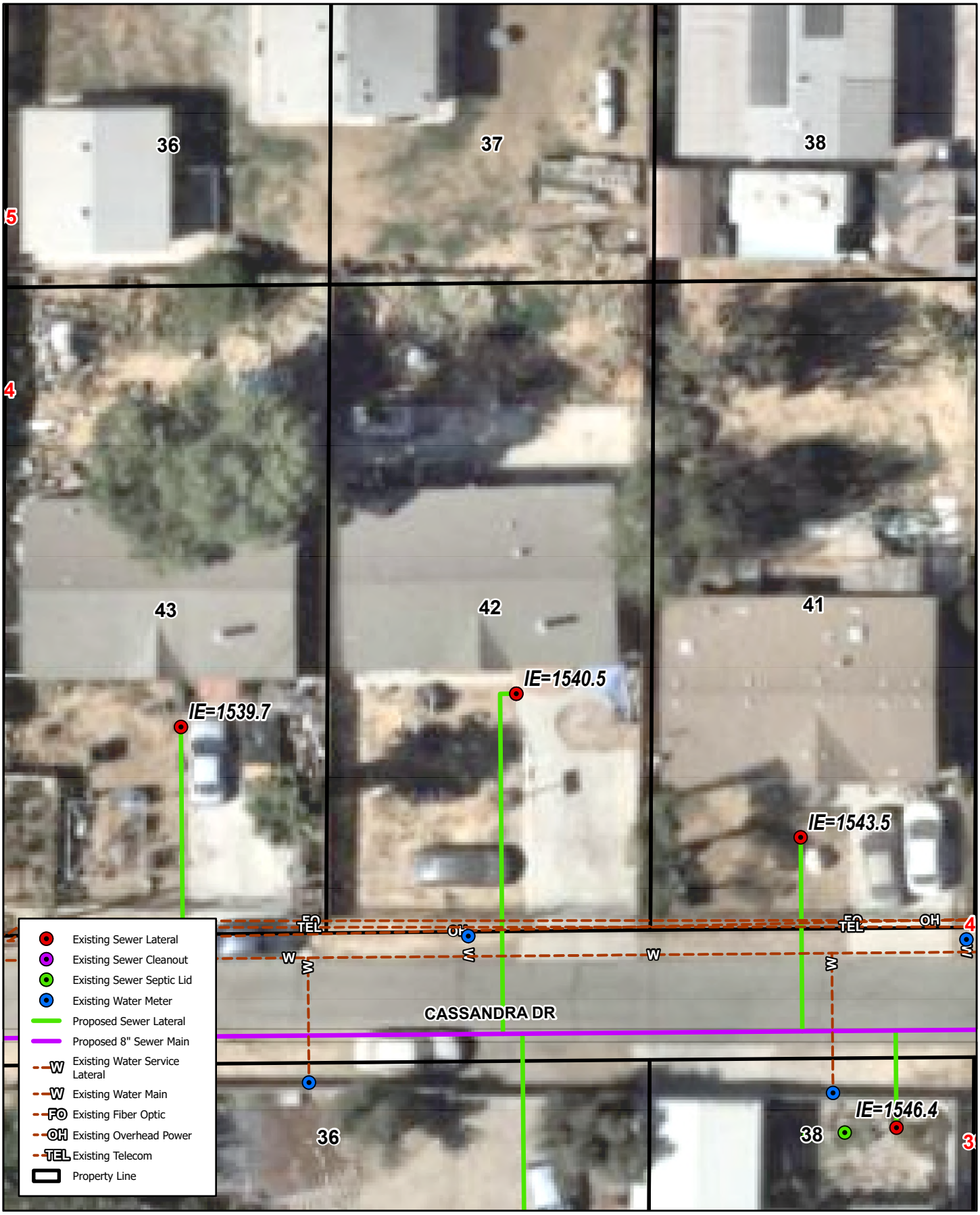


23830 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #42

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

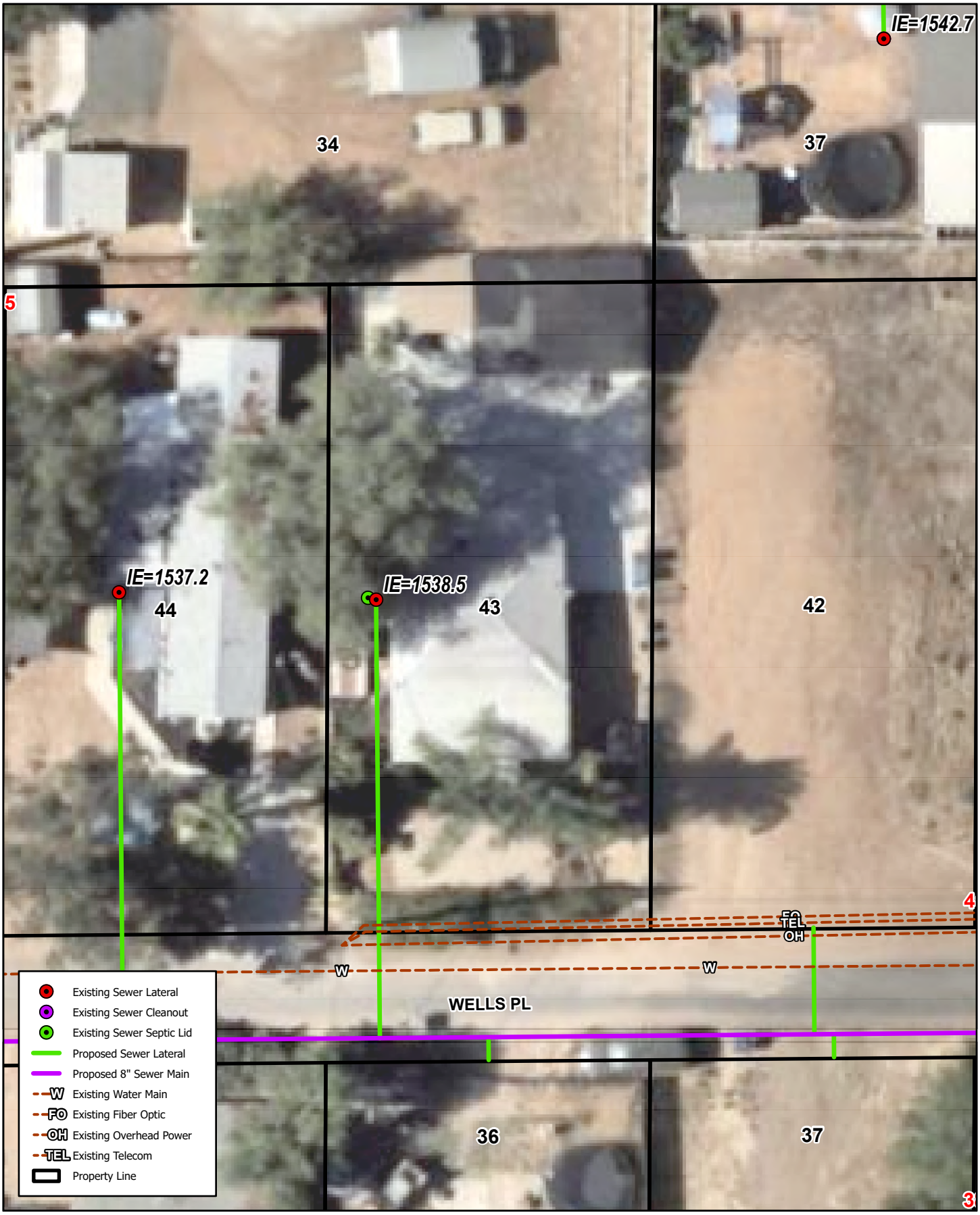


23620 ELSINORE LN, CANYON LAKE, CA 92587

LOT #42

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

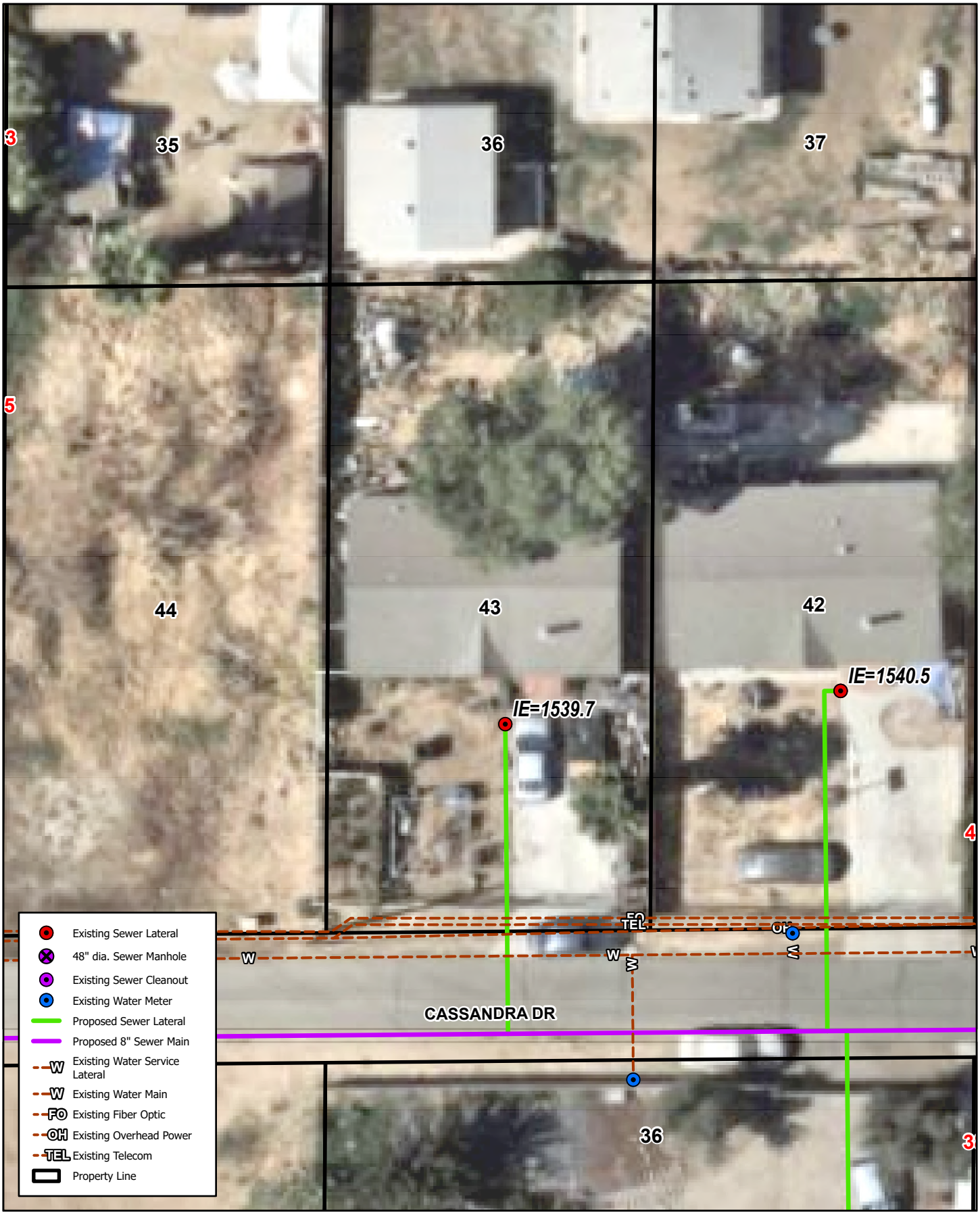


23824 WELLS PL, QUAIL VALLEY, CA 92587

LOT #43

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23812 CASSANDRA DR, QUAIL VALLEY, CA 92587

LOT #43

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23820 SHREEDER PL, QUAIL VALLEY, CA 92587

LOT #43

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

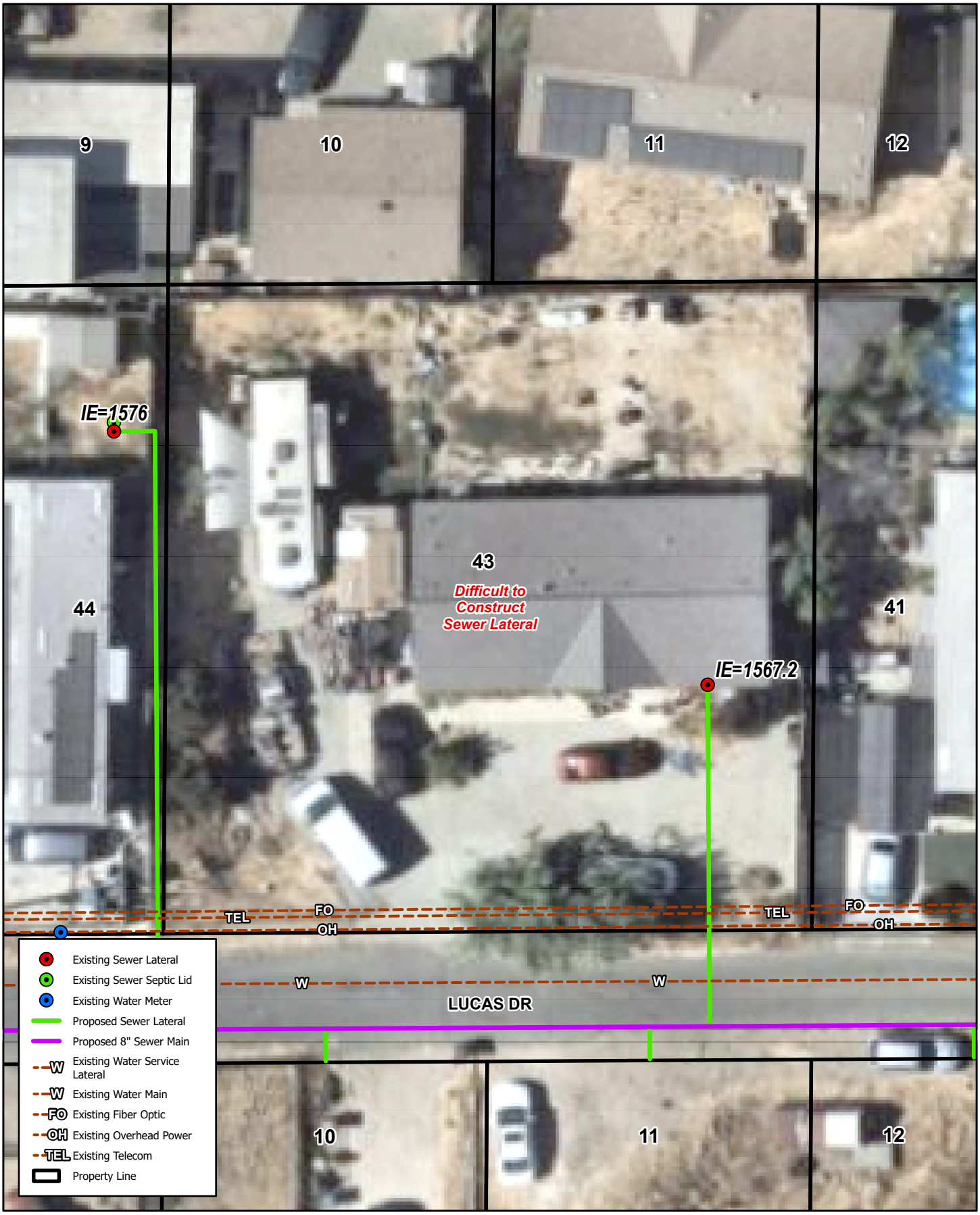


23834 LAKE DR, CANYON LAKE, CA 92587

LOT #43

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

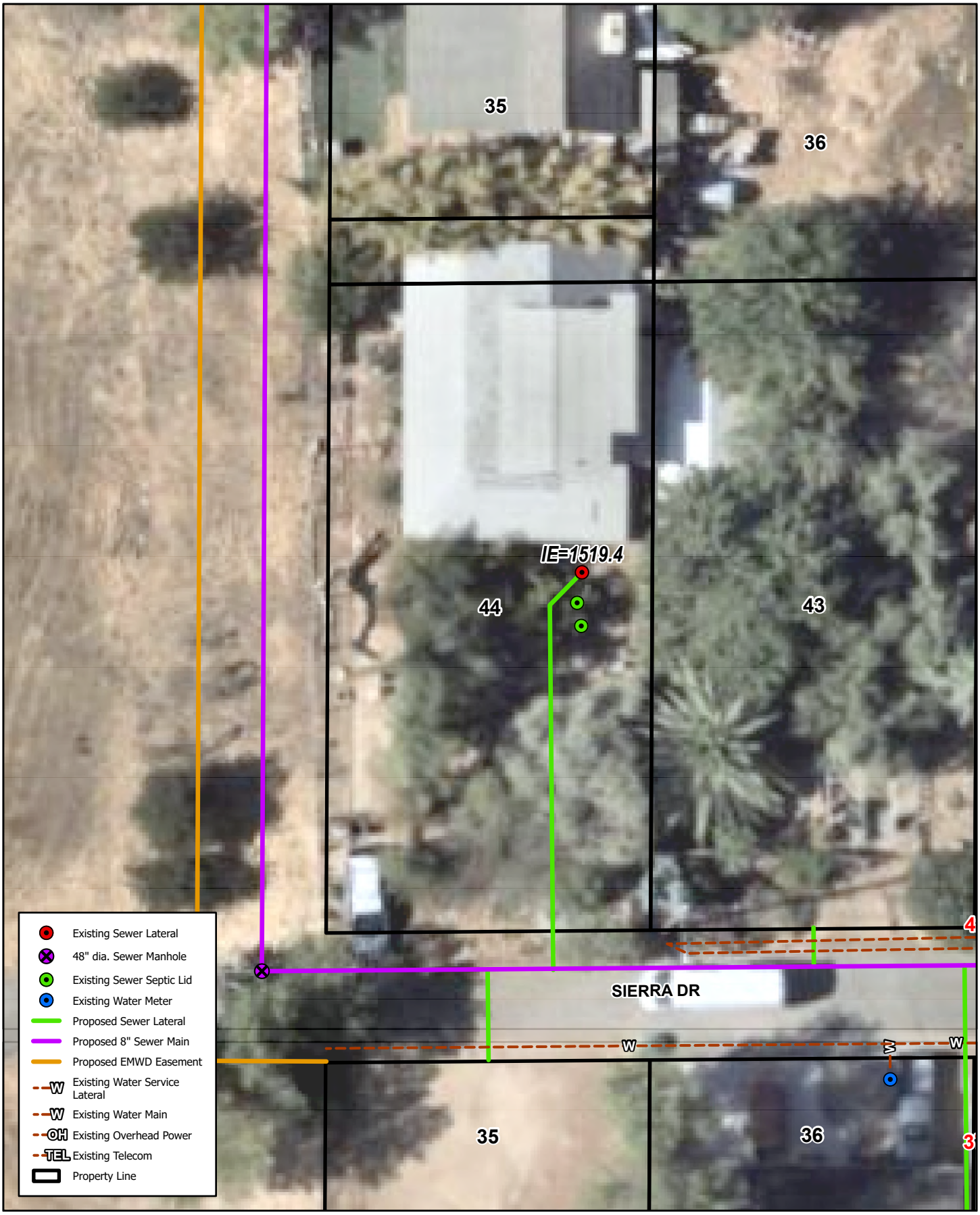


23590 LUCAS DR, CANYON LAKE, CA 92587

LOT #43

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

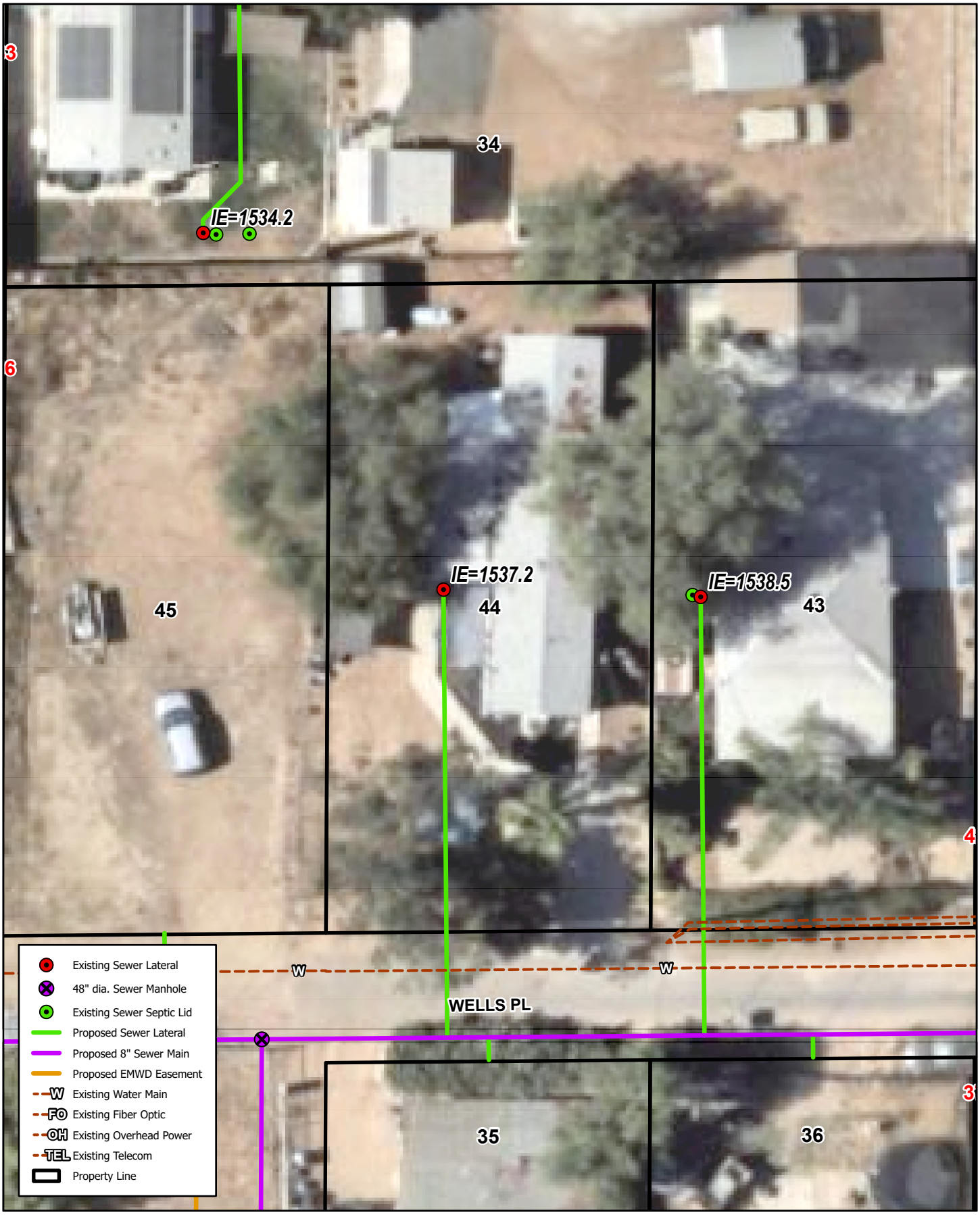


23818 SIERRA DR, CANYON LAKE, CA 92587

LOT #44

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

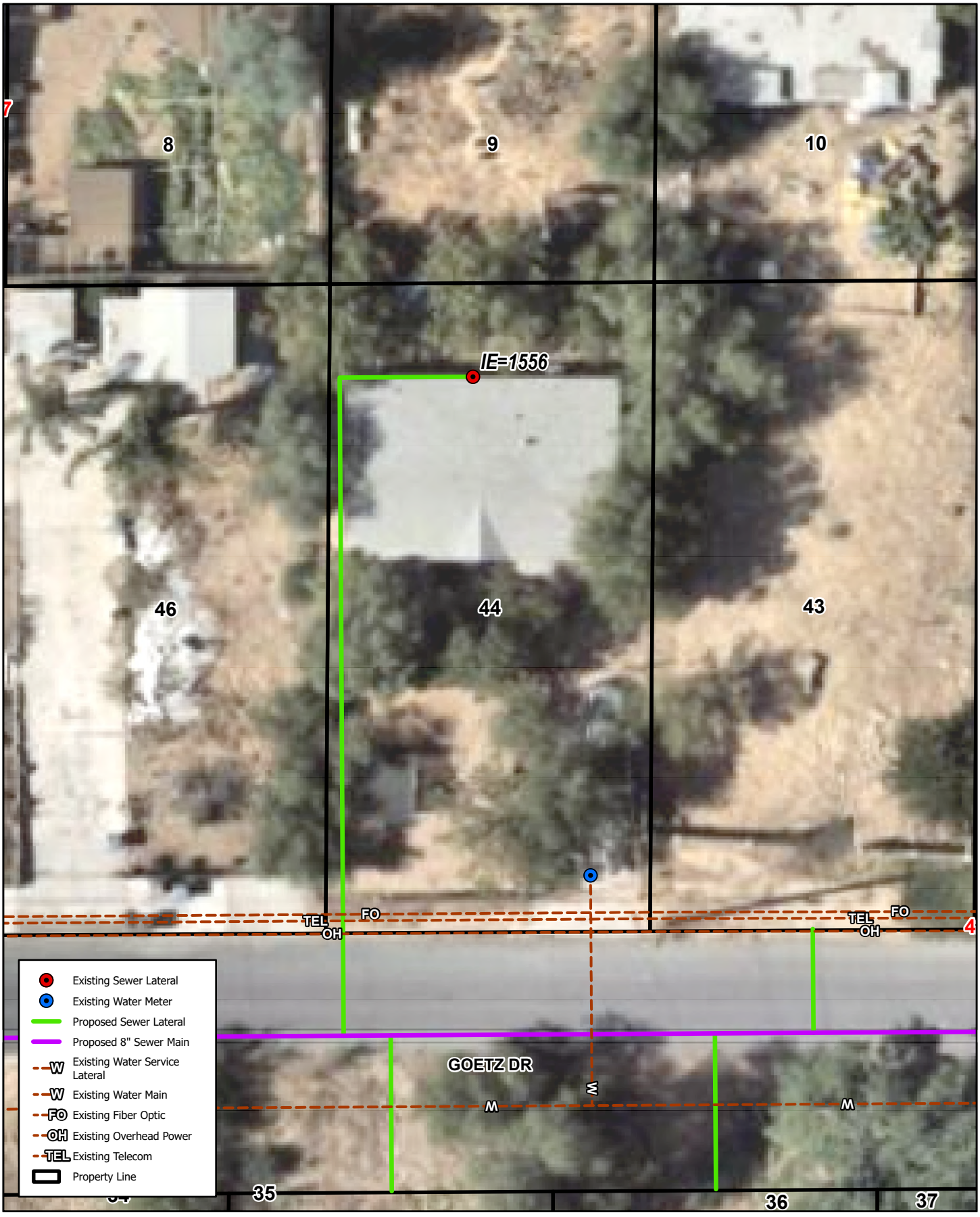


23816 WELLS PL, QUAIL VALLEY, CA 92587

LOT #44

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23830 GOETZ DR, CANYON LAKE, CA 92587

LOT #44

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

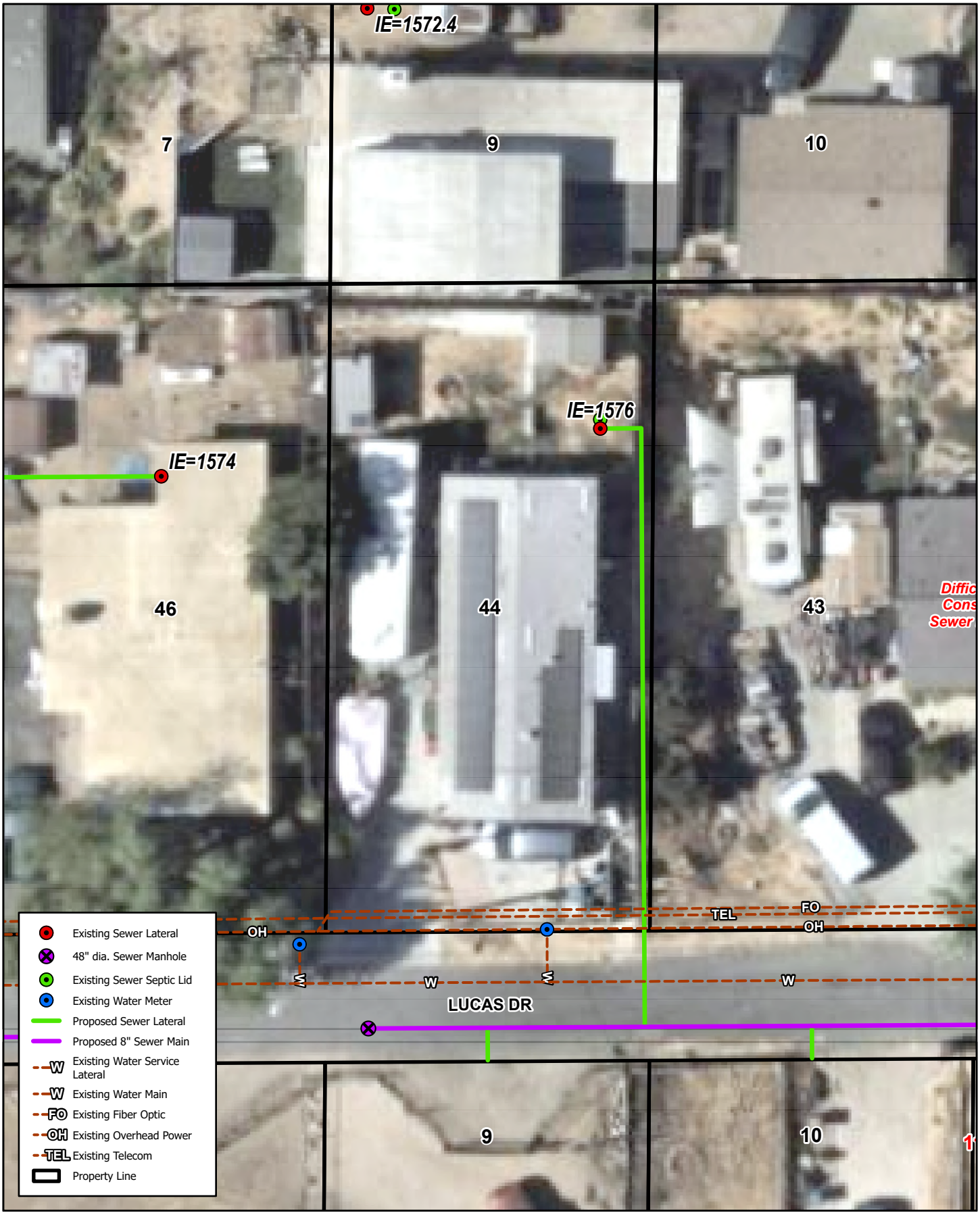


23580 LAKE DR, QUAIL VALLEY, CA 92587

LOT #44

Michael Baker INTERNATIONAL

Quail Valley - Subarea 4 Sewer Improvement Plans



23580 LUCAS DR, CANYON LAKE, CA 92587

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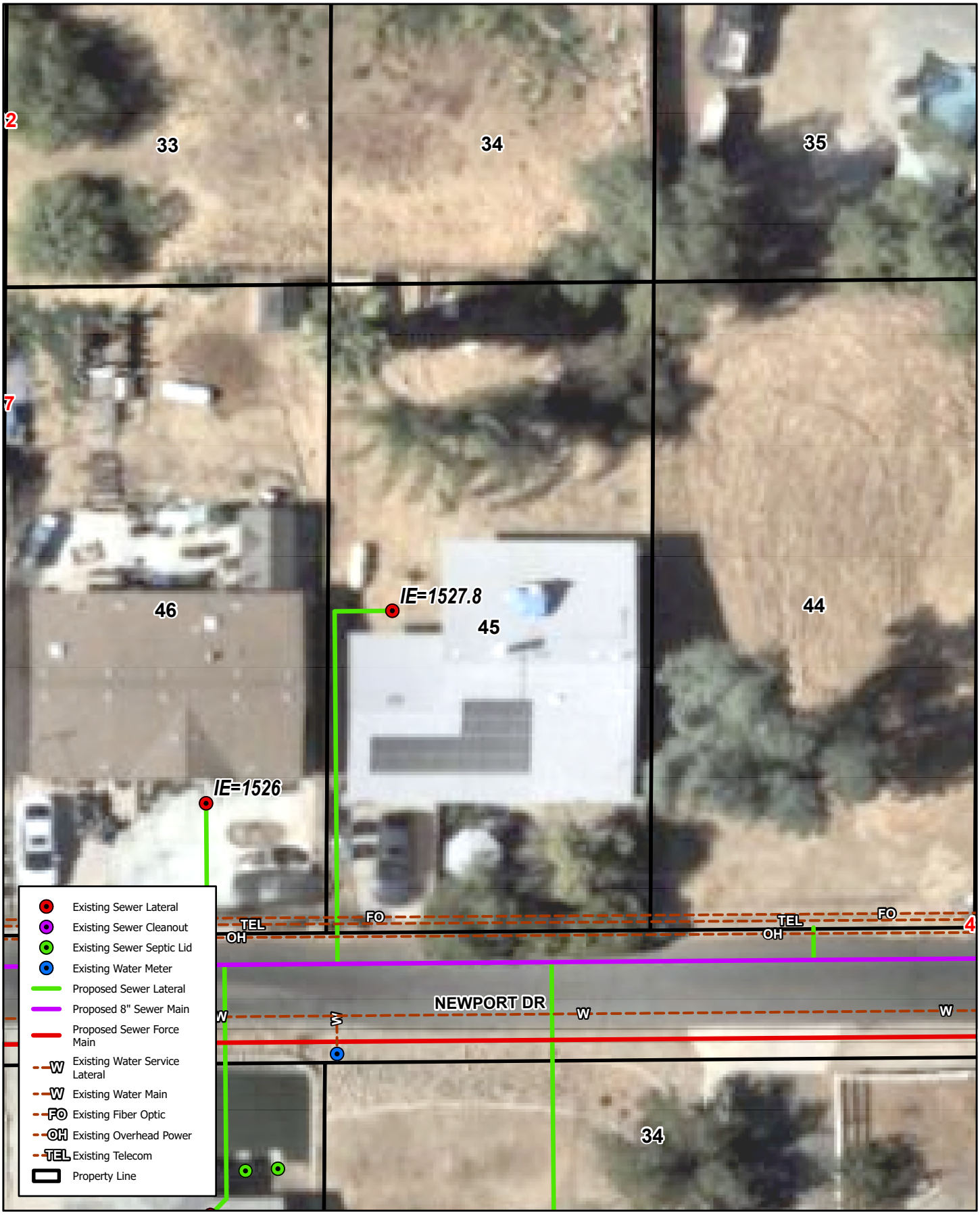
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

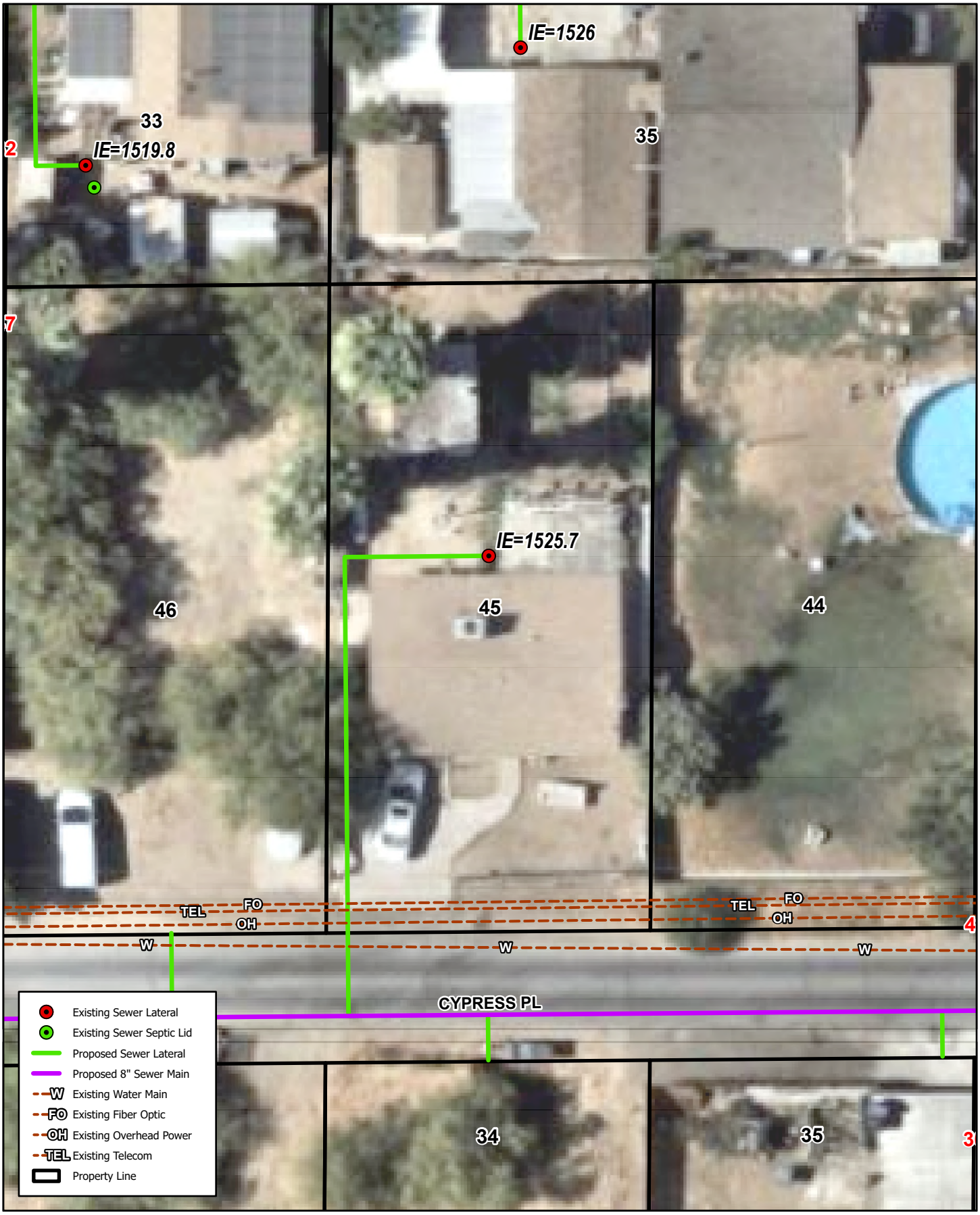


23806 NEWPORT DR, CANYON LAKE, CA 92587

LOT #45

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23808 CYPRESS PL, CANYON LAKE, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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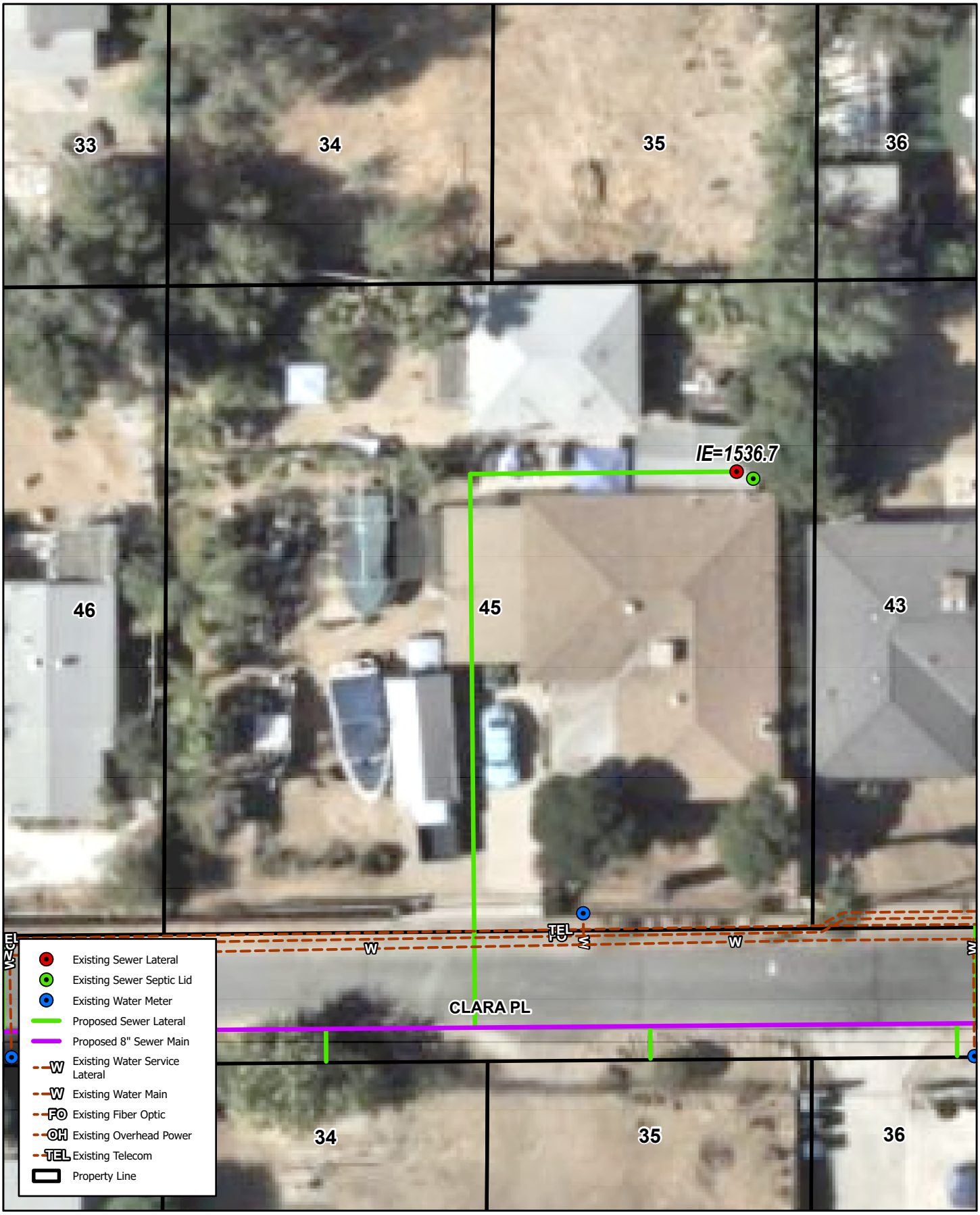

23810 CLARA PL, CANYON LAKE, CA 92587

LOT #45

Quail Valley - Subarea 4 Sewer Improvement Plans

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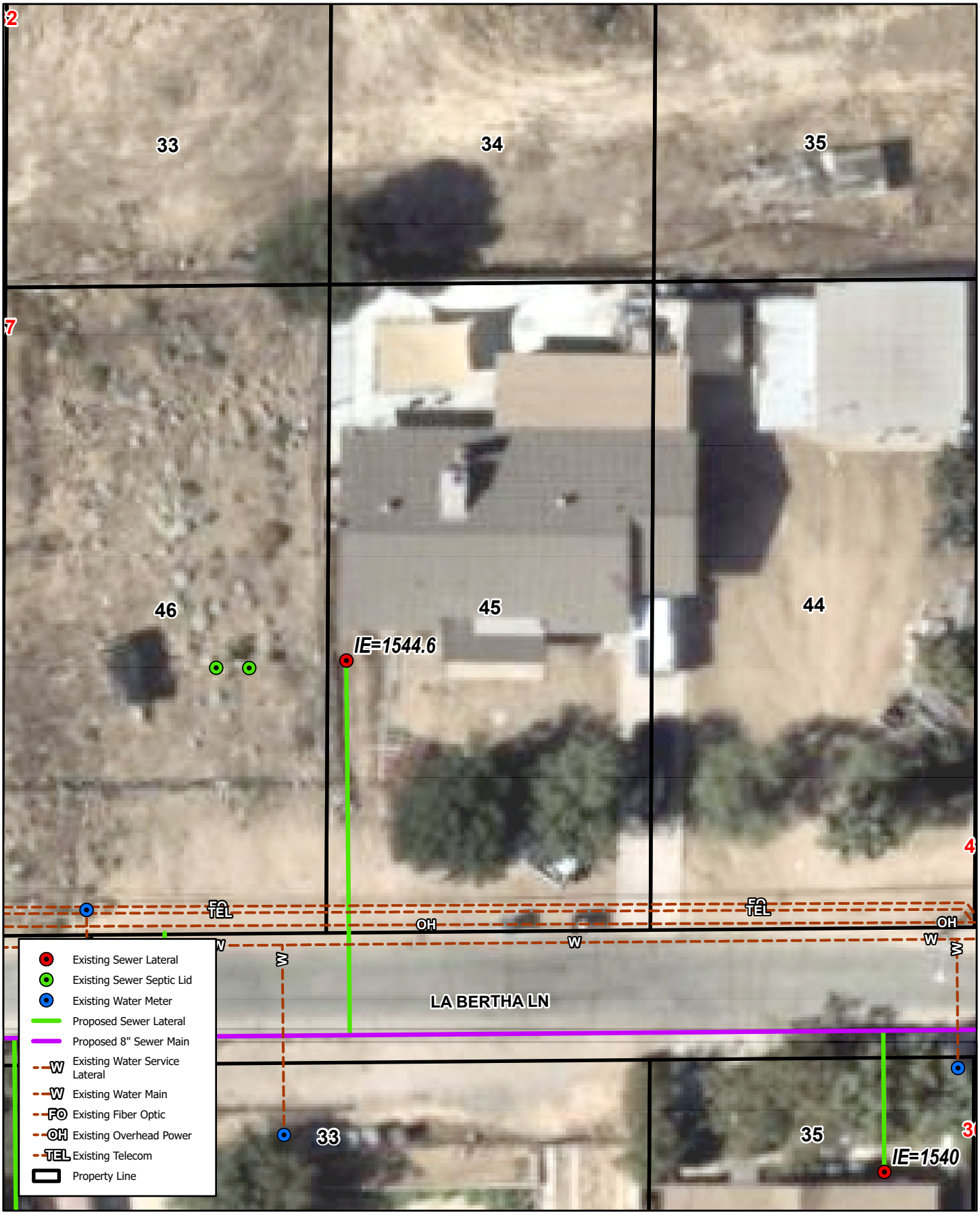

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LOT #45

Quail Valley - Subarea 4 Sewer Improvement Plans

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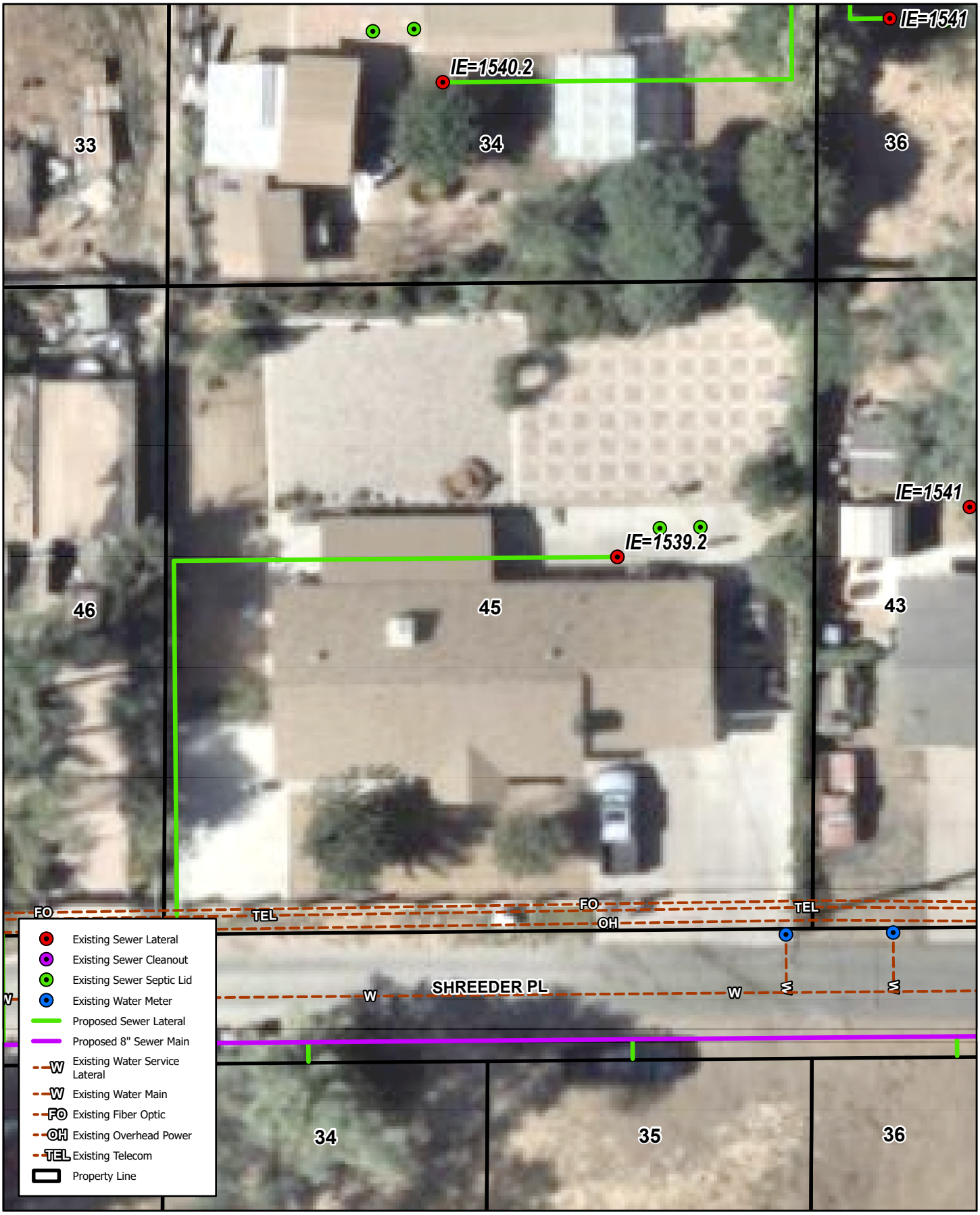

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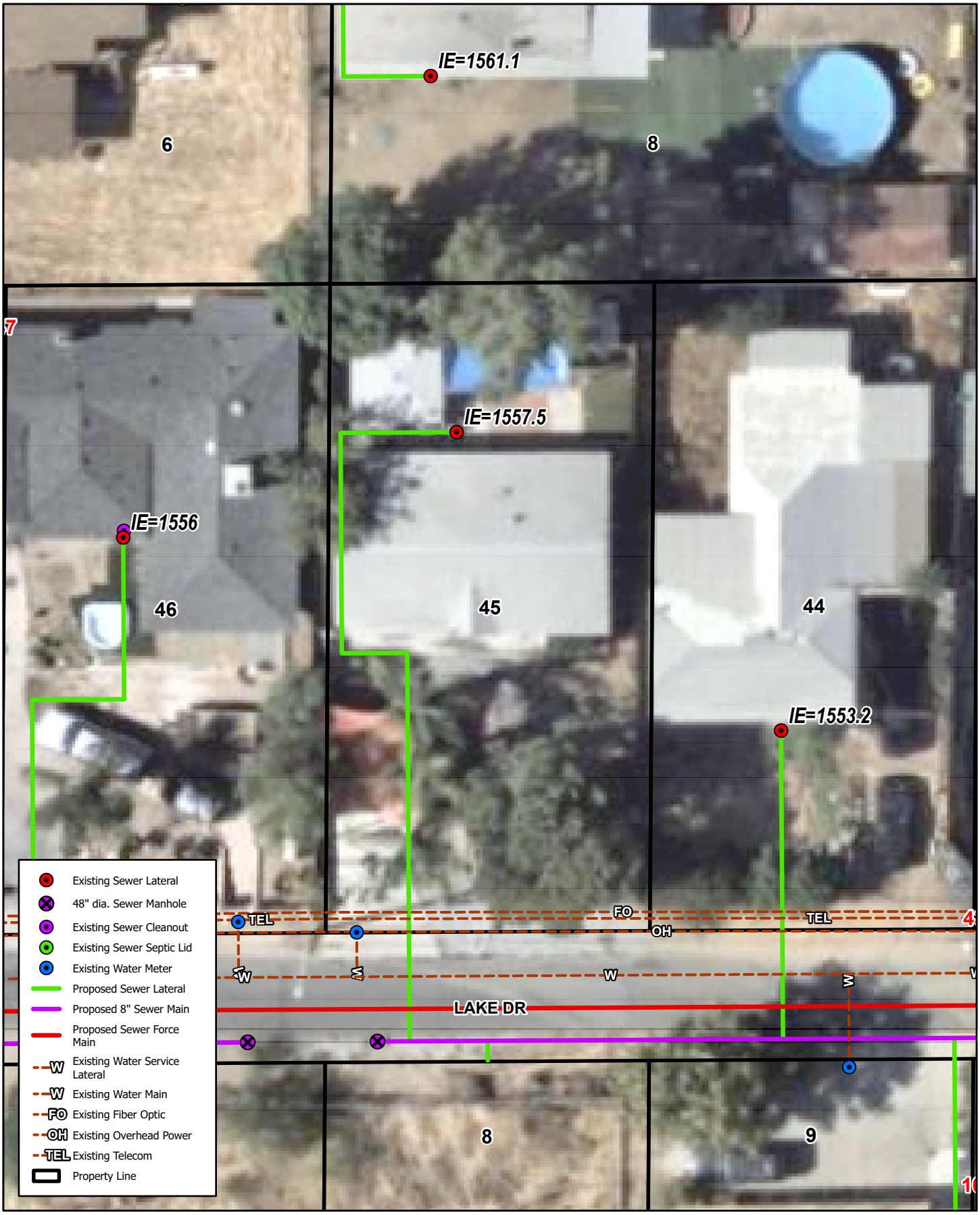
LOT #45

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

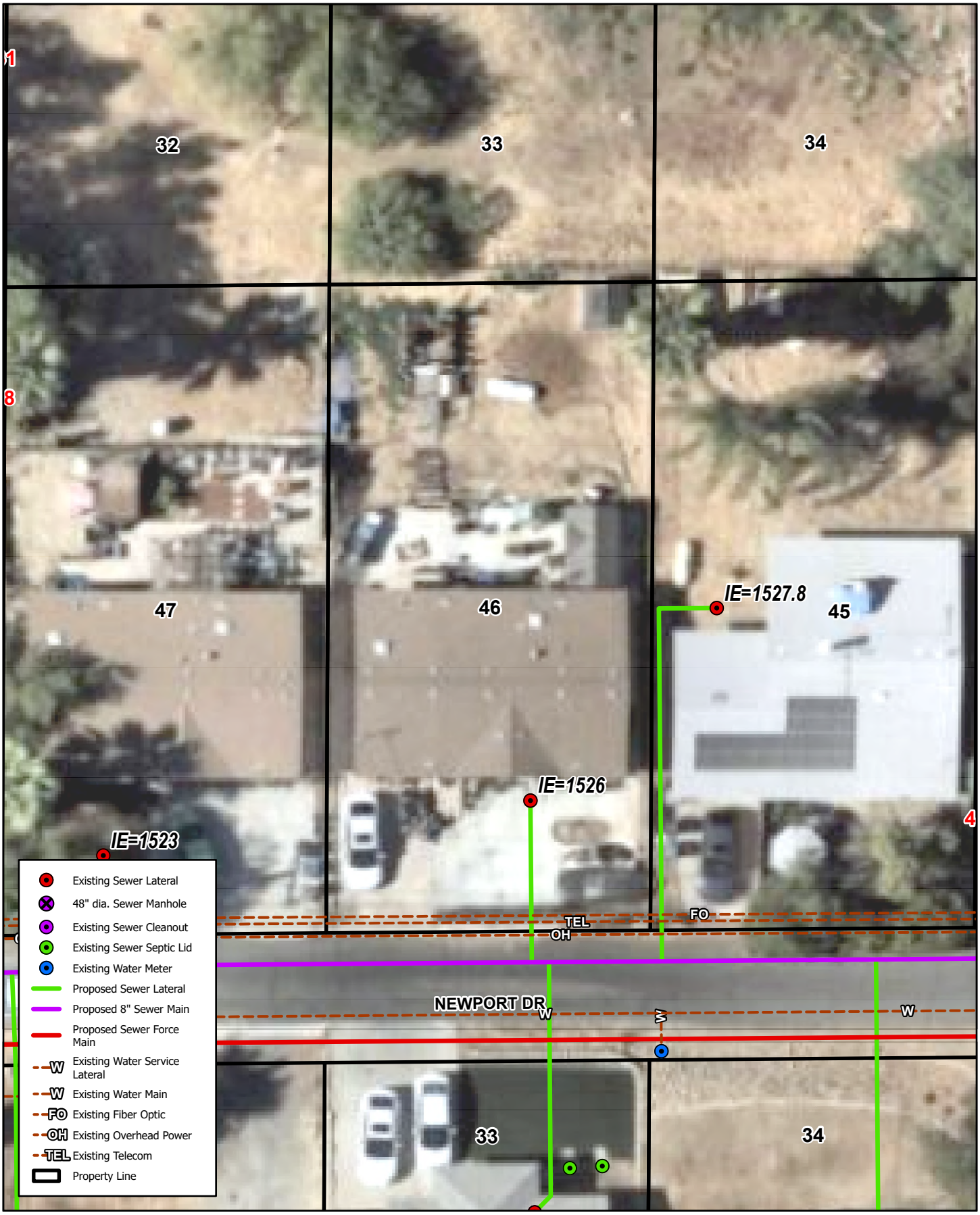


23570 LAKE DR, QUAIL VALLEY, CA 92587

LOT #45

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

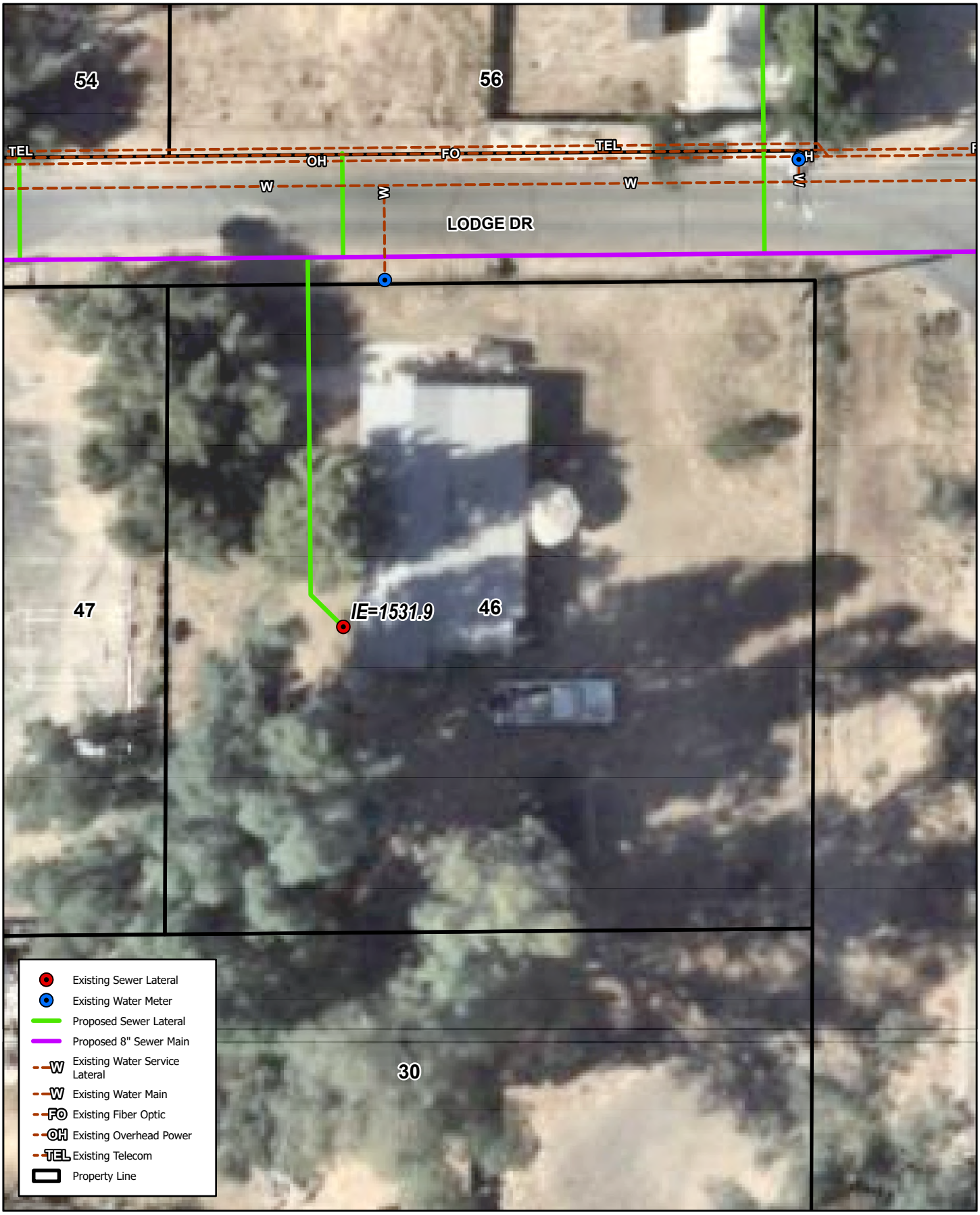


23798 NEWPORT DR, CANYON LAKE, CA 92587

LOT #46

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

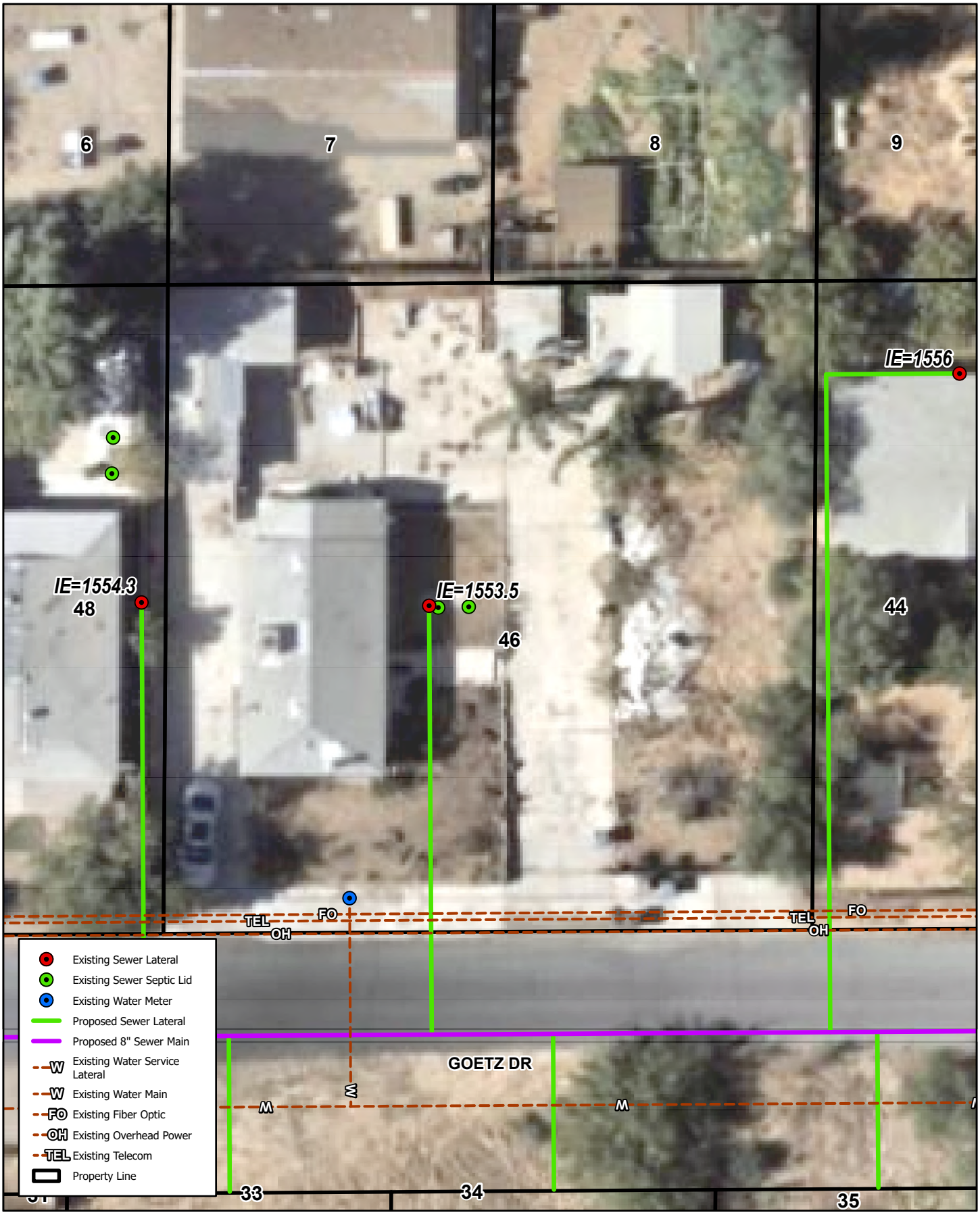


23905 LODGE DR, QUAIL VALLEY, CA 92587

LOT #46

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23810 GOETZ DR, CANYON LAKE, CA 92587

LOT #46

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23560 LAKE DR, CANYON LAKE, CA 92587

LOT #46

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

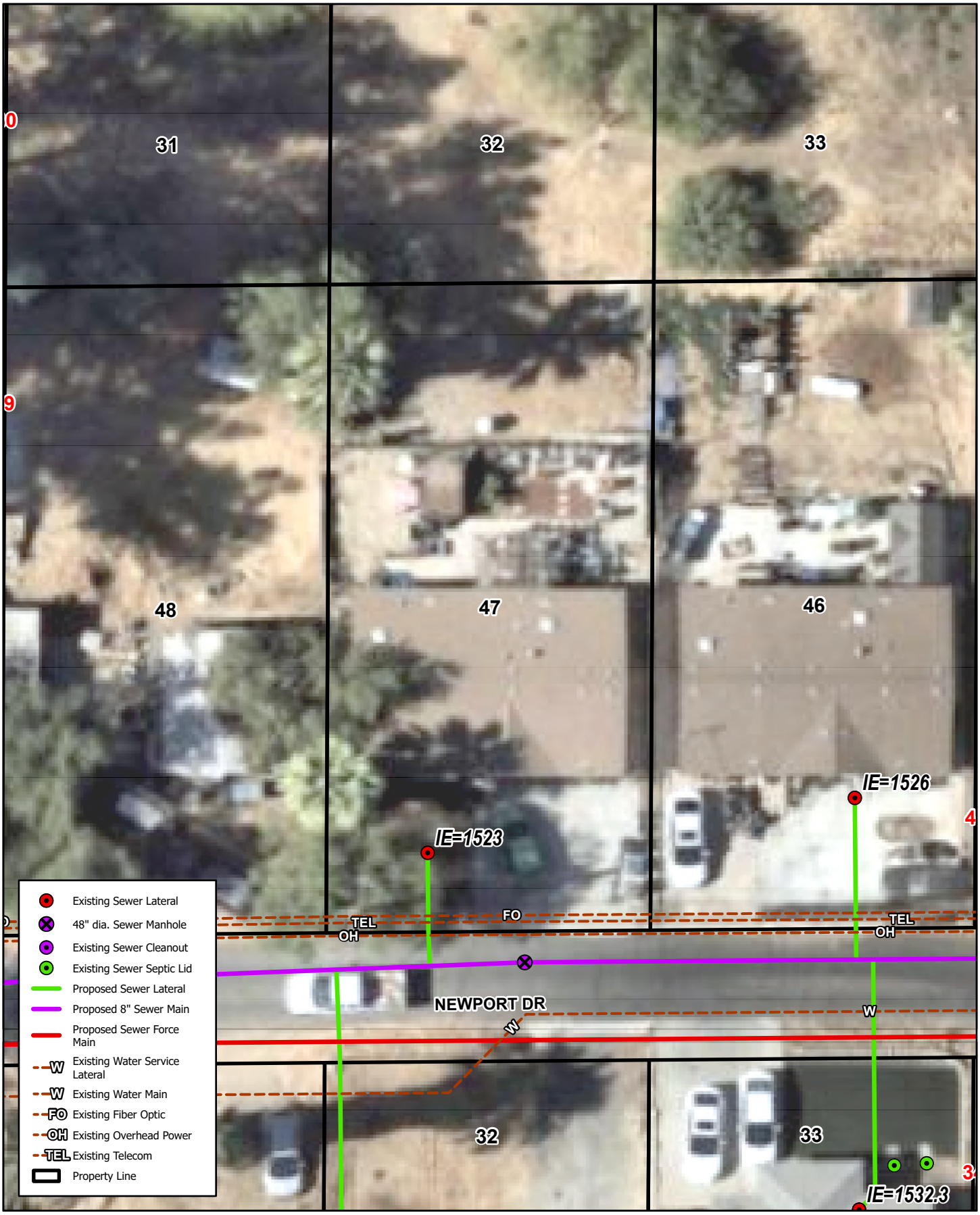


23570 LUCAS DR, CANYON LAKE, CA 92587

LOT #46

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

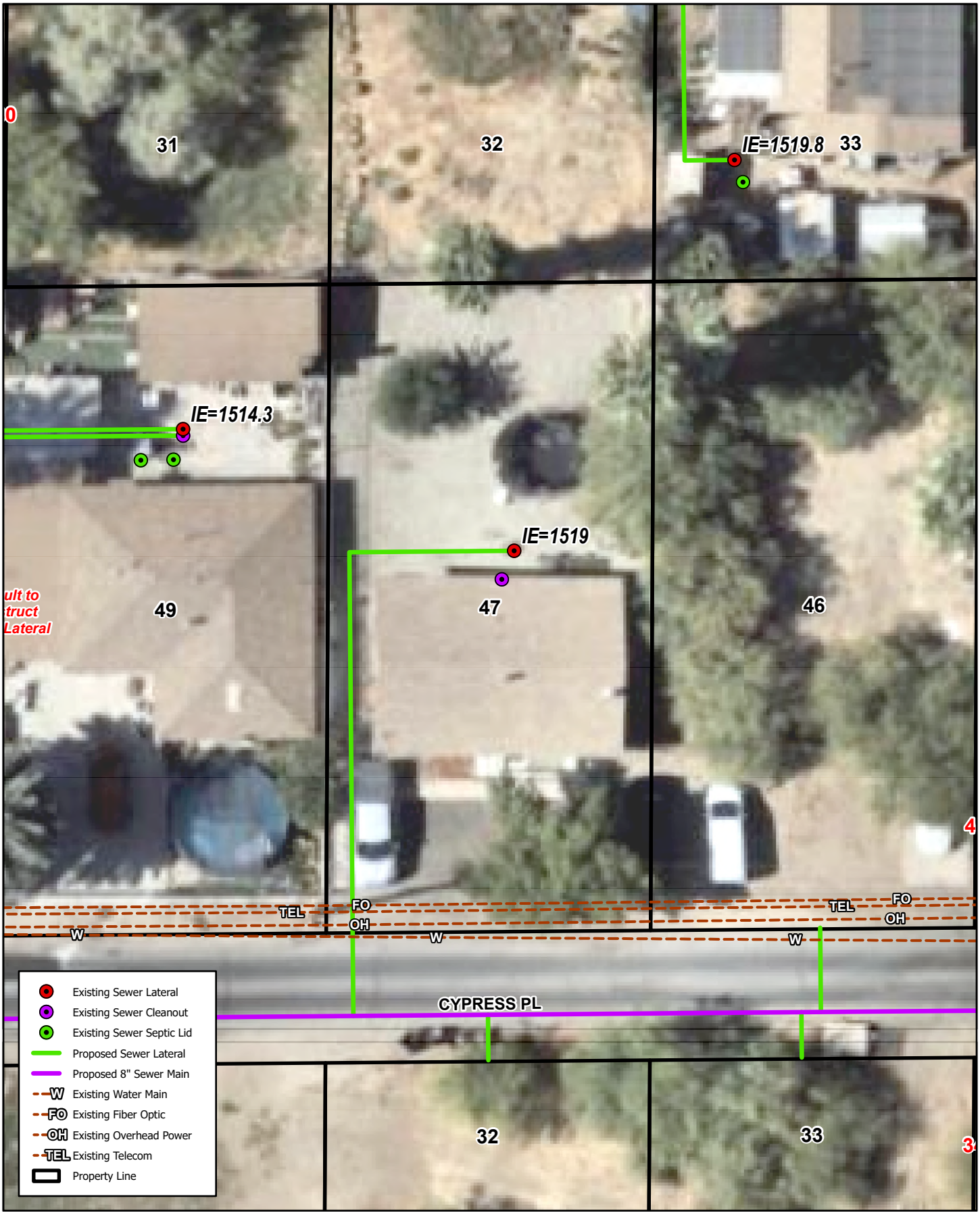


23792 NEWPORT DR, QUAIL VALLEY, CA 92587

LOT #47

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23790 CYPRESS PL, CANYON LAKE, CA 92587

LOT #47

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

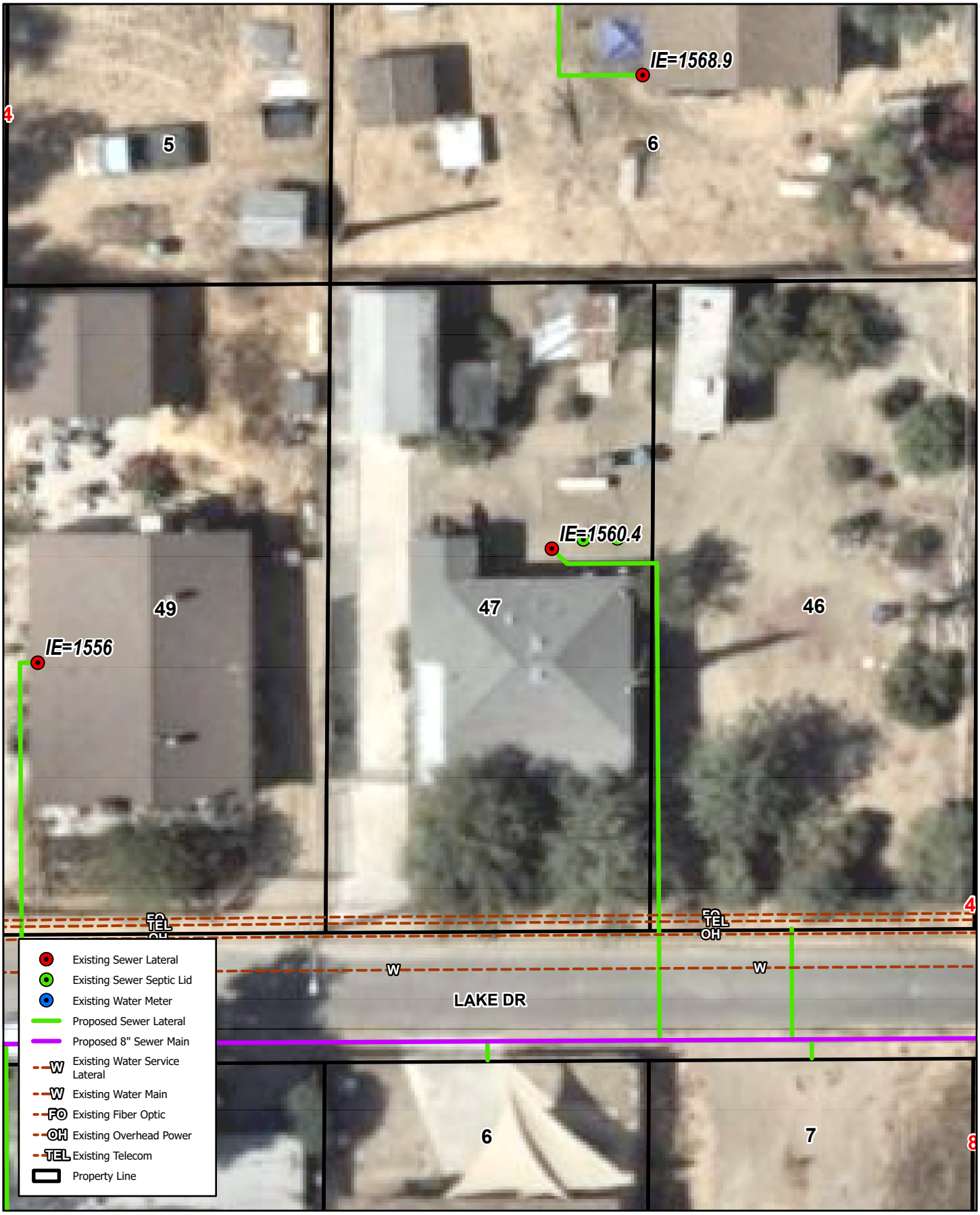


23780 LODGE DR, CANYON LAKE, CA 92587

LOT #47

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23802 LAKE DR, CANYON LAKE, CA 92587

LOT #47

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

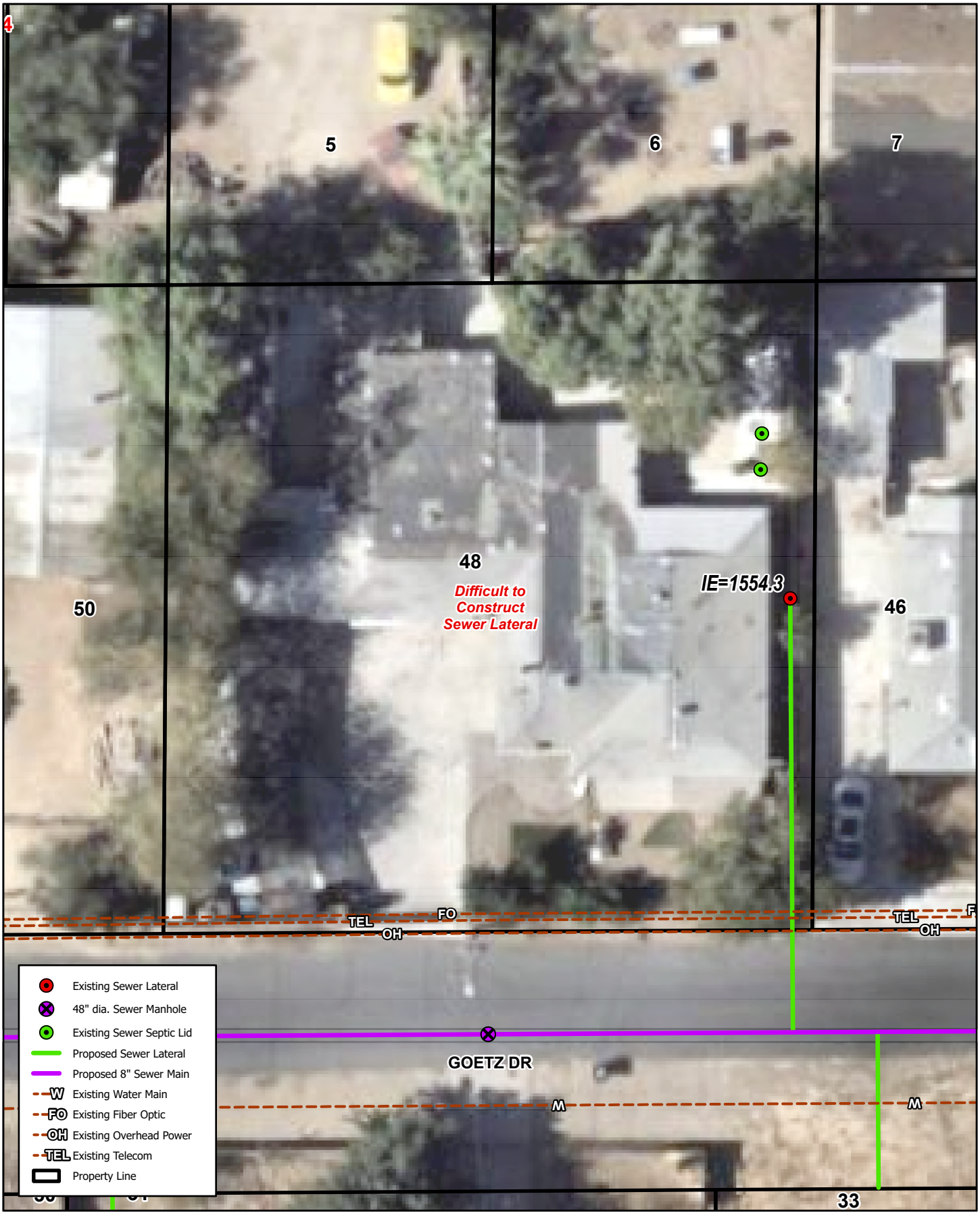


23768 CLARA PL, QUAIL VALLEY, CA 92587

LOT #48

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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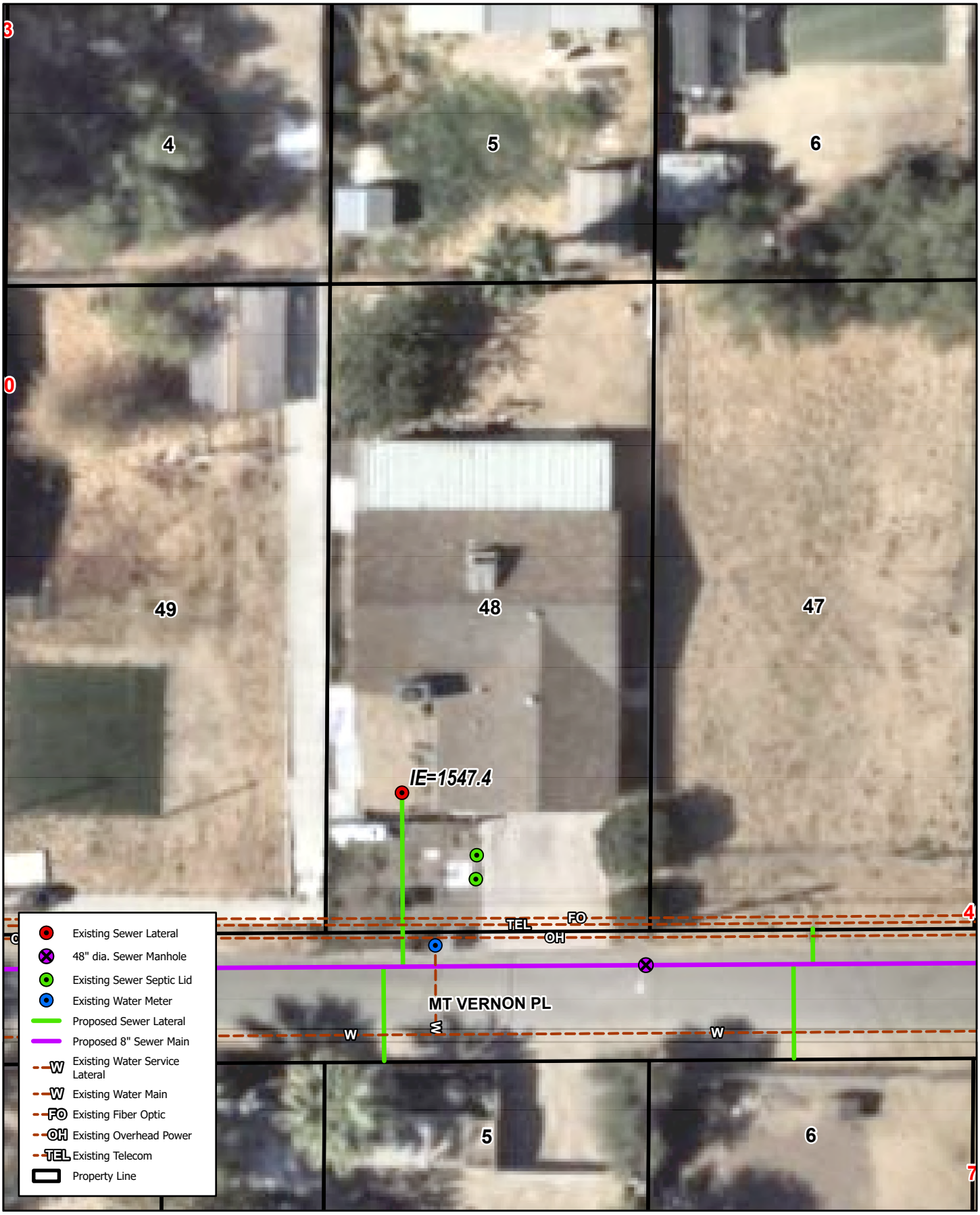
LOT #48

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23792 MT VERNON PL, MENIFEE, CA 92587

LOT #48

Quail Valley - Subarea 4 Sewer Improvement Plans

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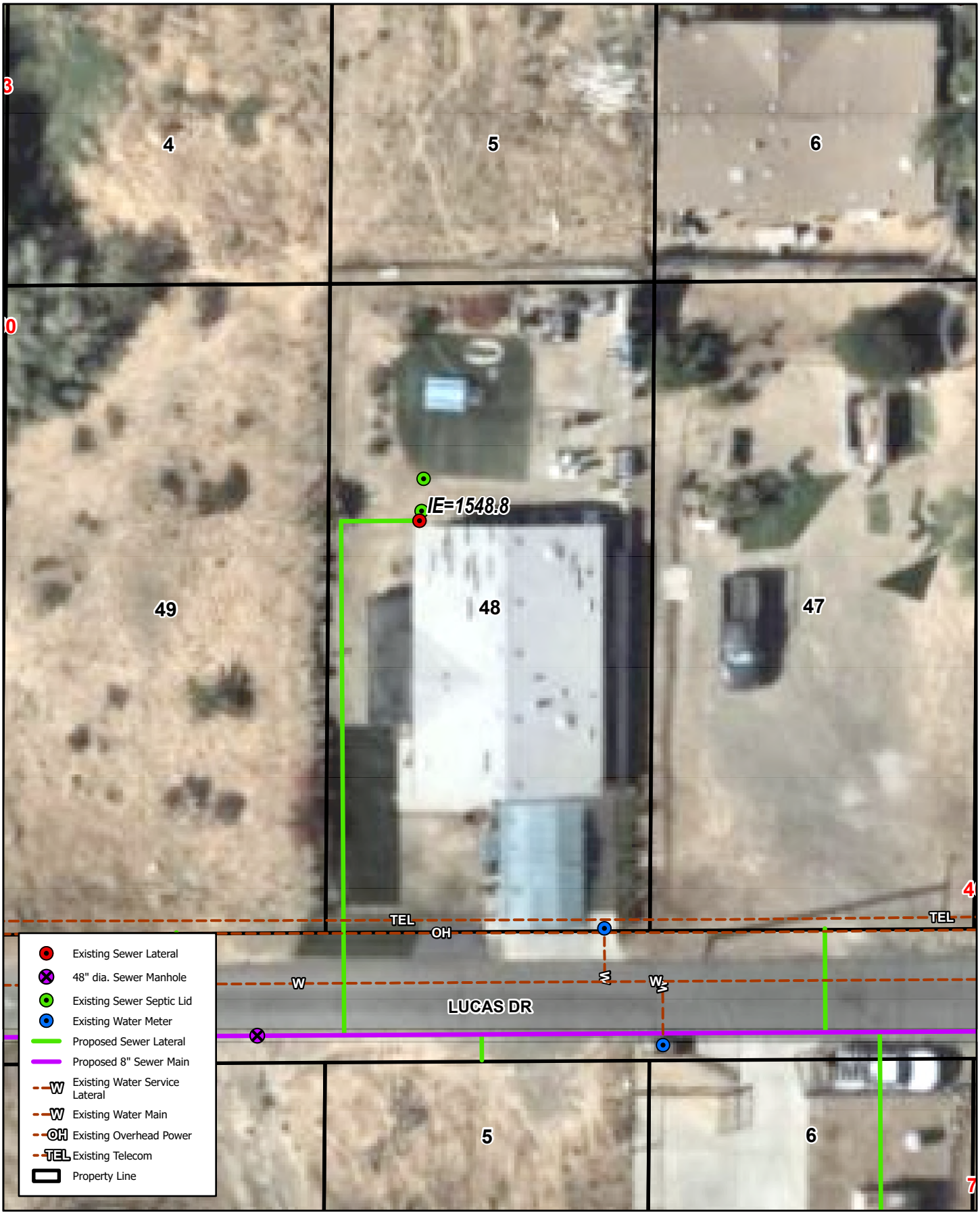
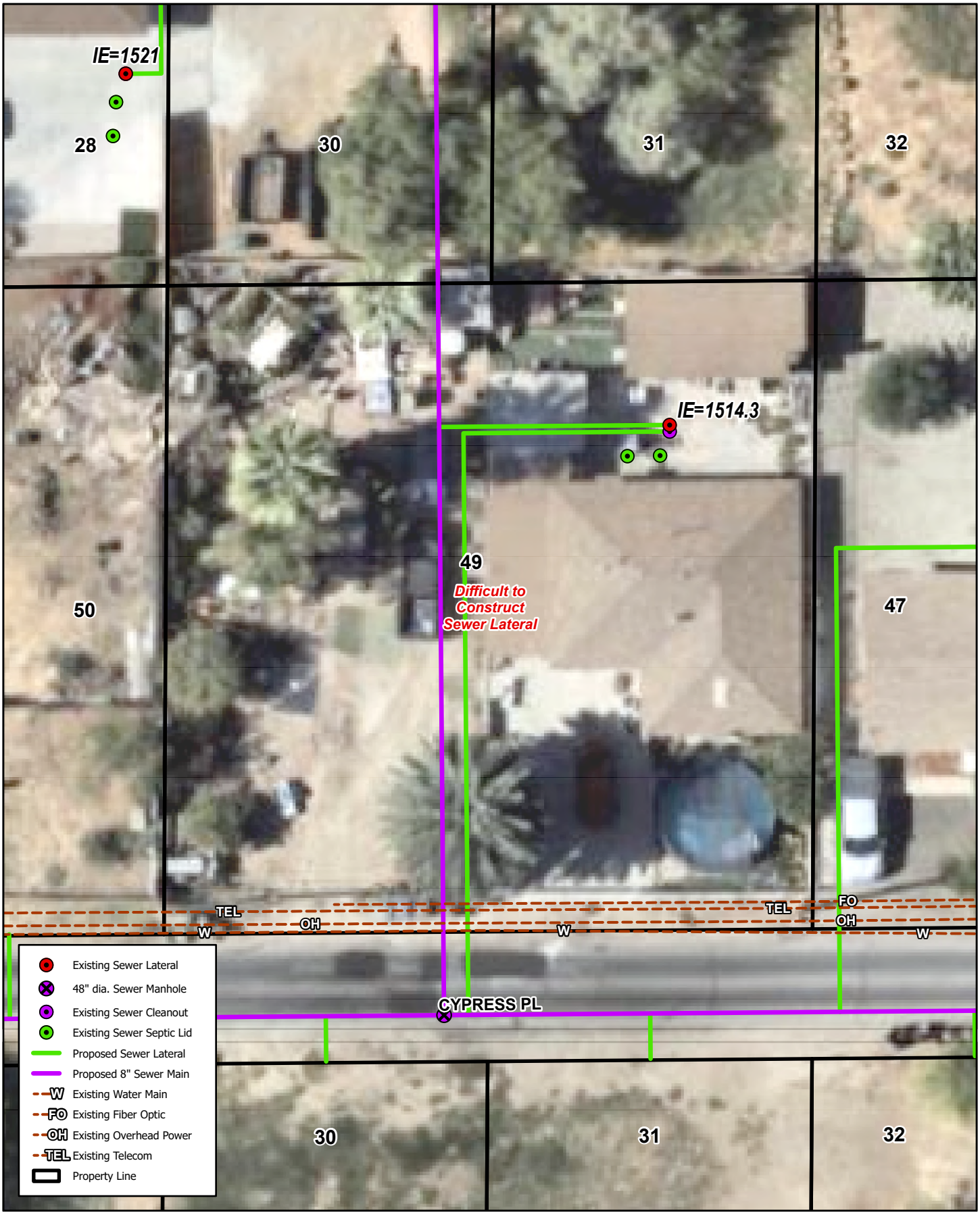


23550 LUCAS DR, QUAIL VALLEY, CA 92587

LOT #48

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

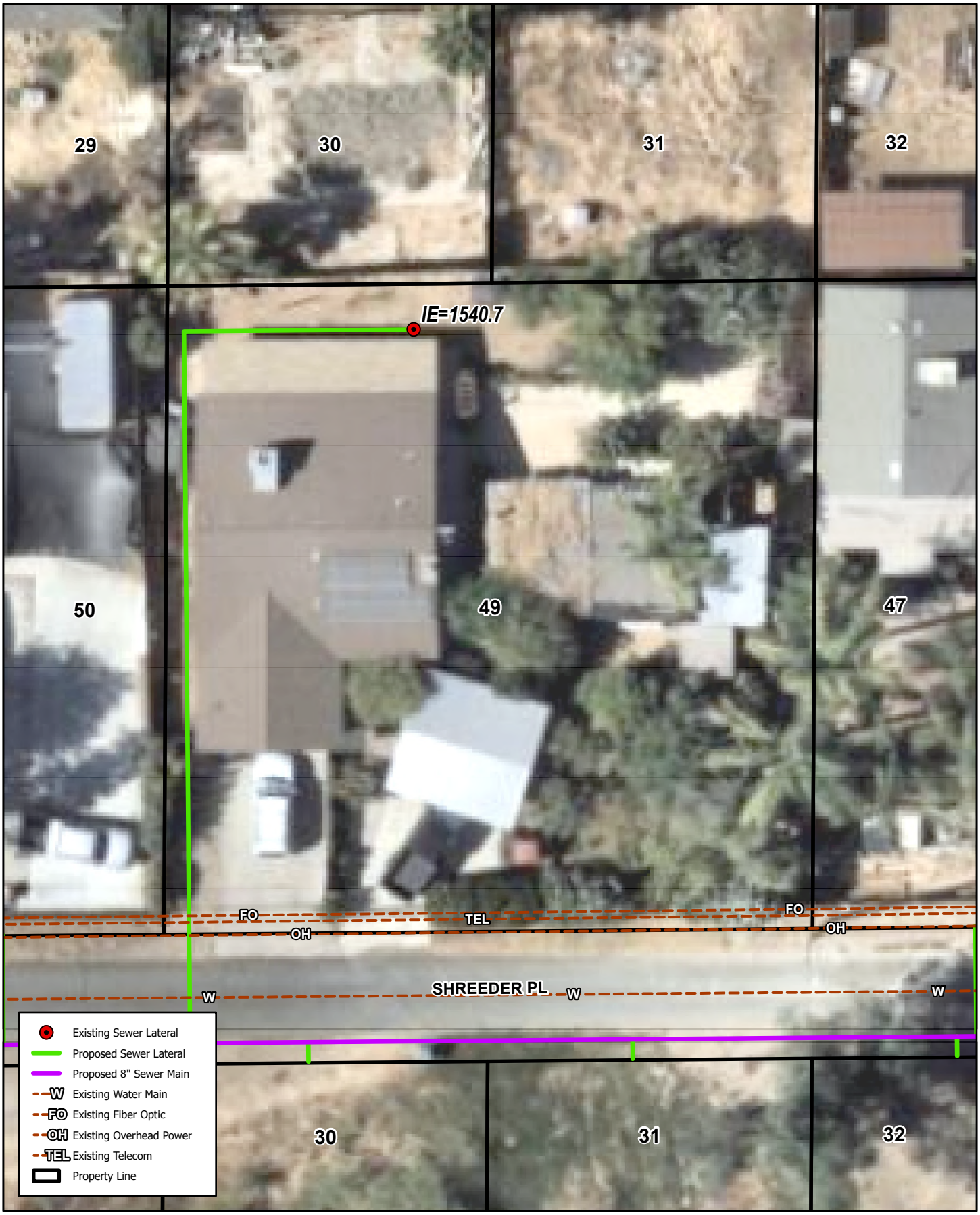


23780 CYPRESS PL, CANYON LAKE, CA 92587

LOT #49

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

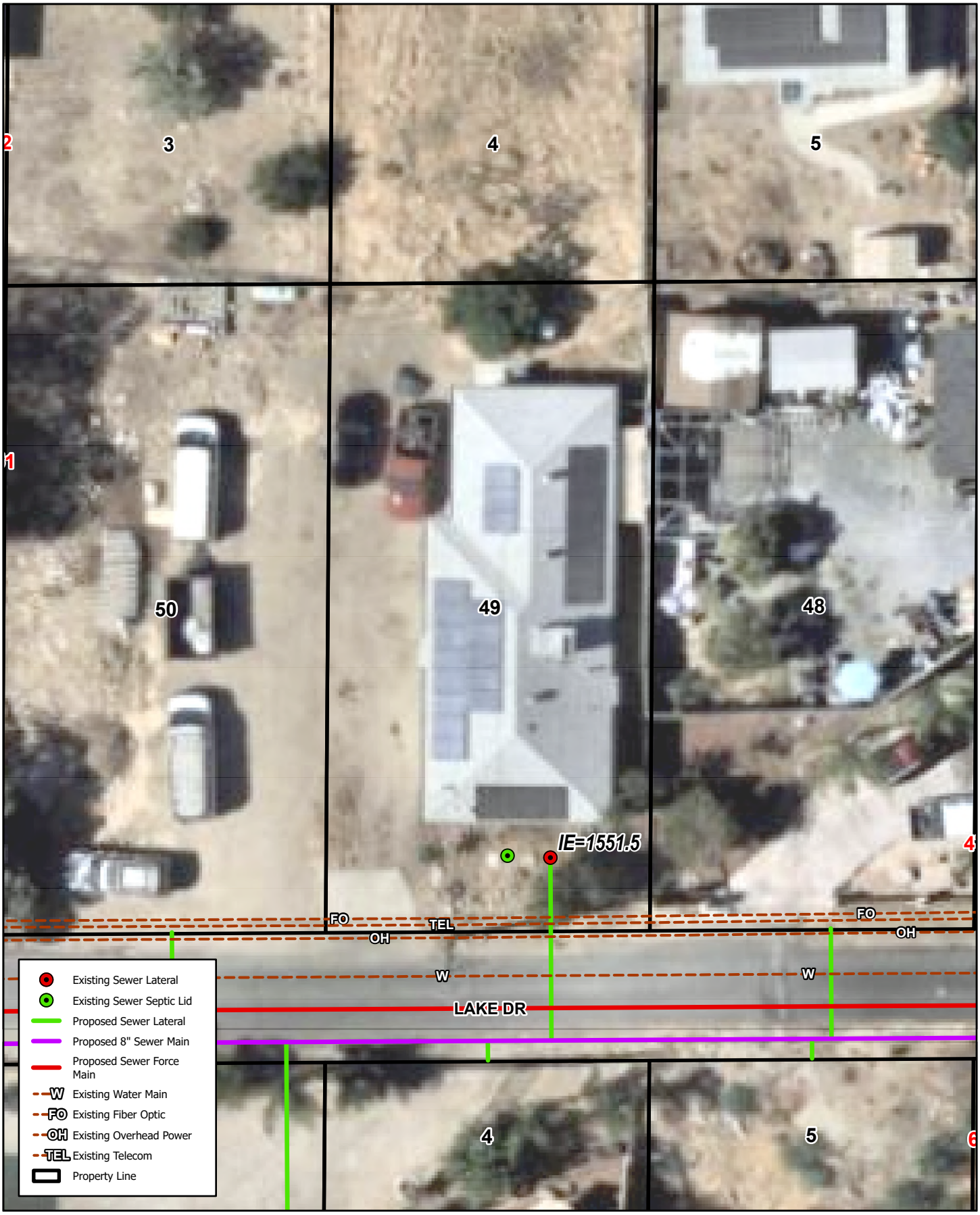


23770 SHREEDER PL, CANYON LAKE, CA 92587

LOT #49

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

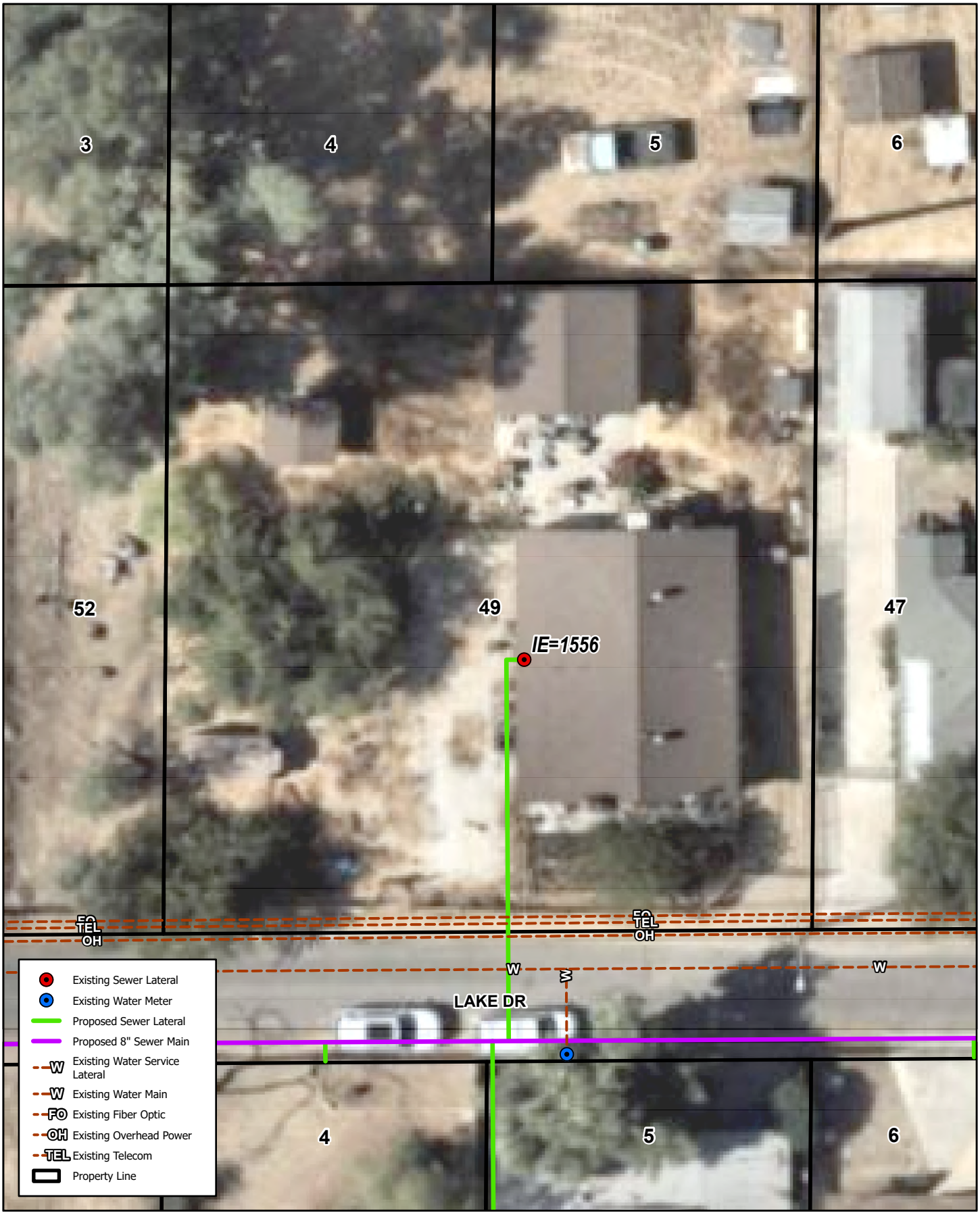


23530 LAKE DR, QUAIL VALLEY, CA 92587

LOT #49

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

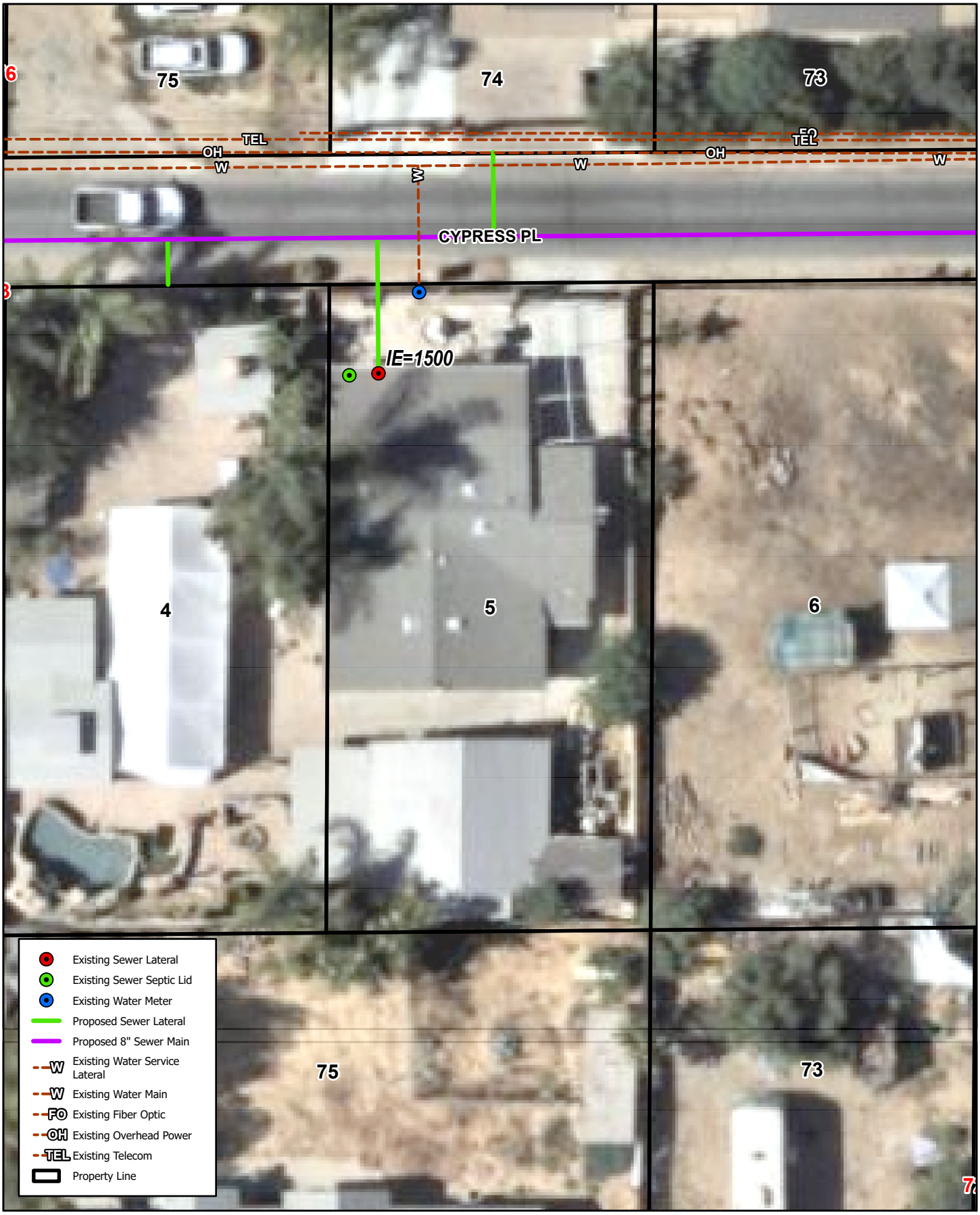


23790 LAKE DR, CANYON LAKE, CA 92587

LOT #49

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23545 CYPRESS PL, QUAIL VALLEY, CA 92587

LOT #5

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

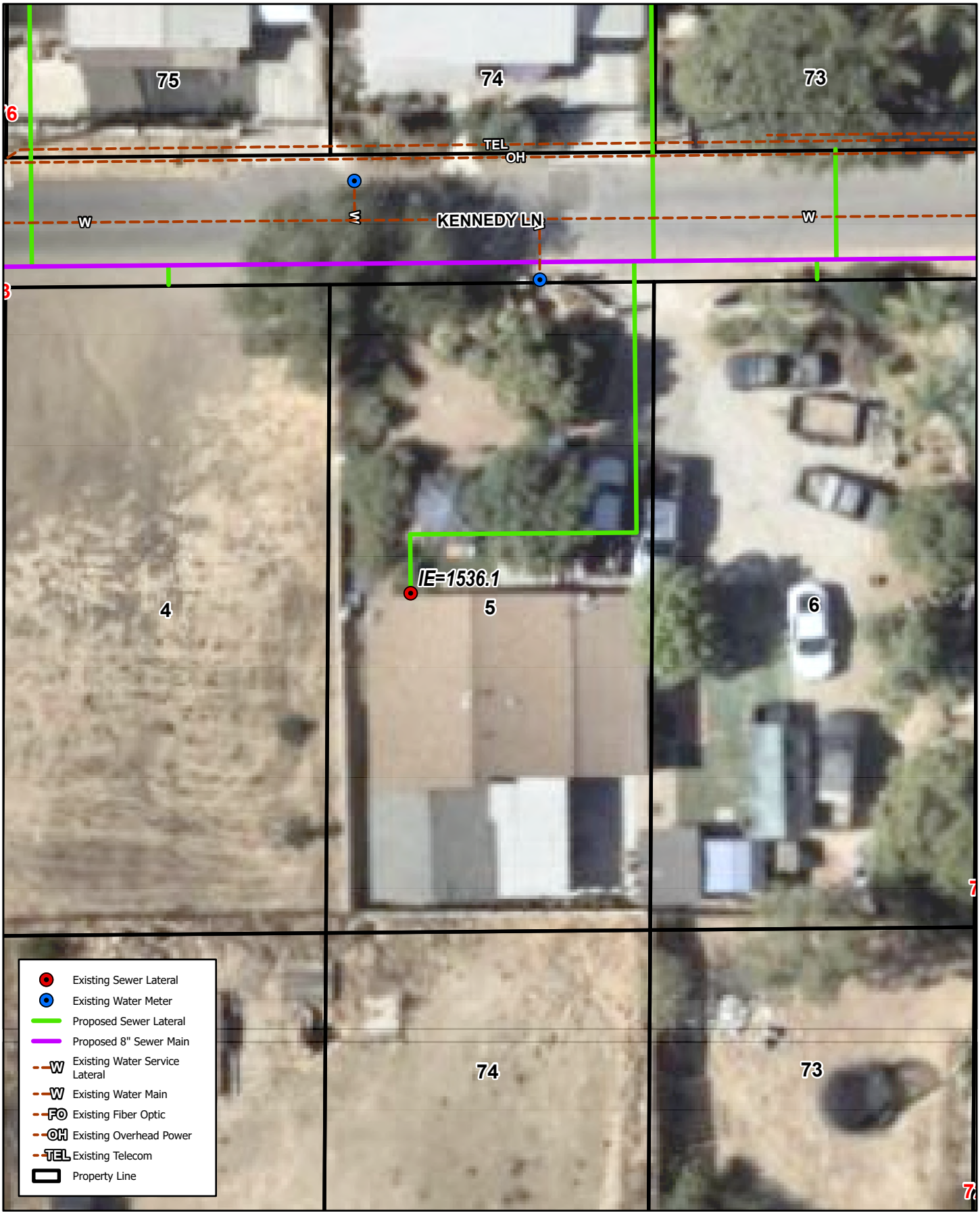


23908 CYPRESS PL, CANYON LAKE, CA 92587

LOT #5

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

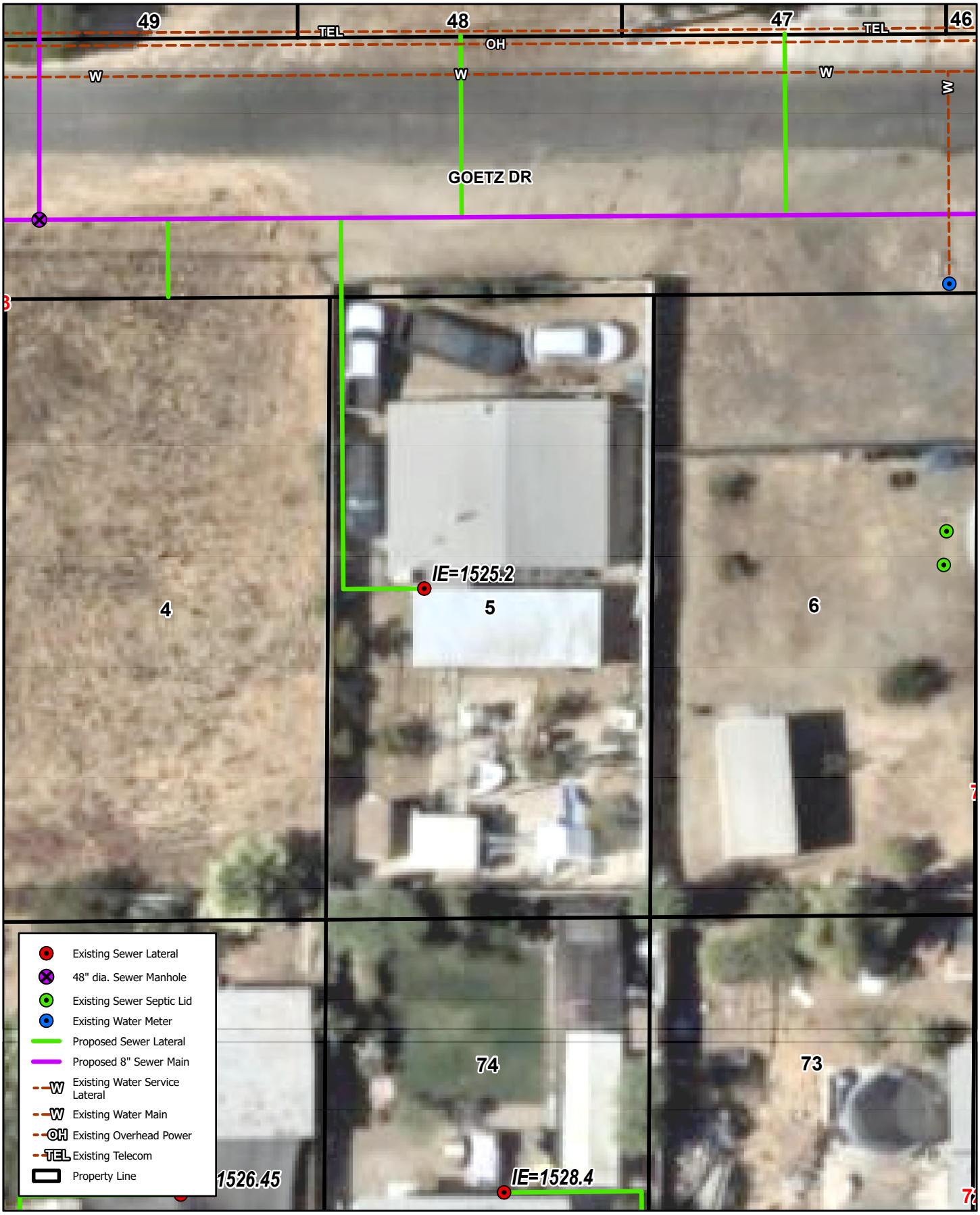


23541 KENNEDY LN, CANYON LAKE, CA 92587

LOT #5

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23541 GOETZ DR, QUAIL VALLEY, CA 92587

LOT #5

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

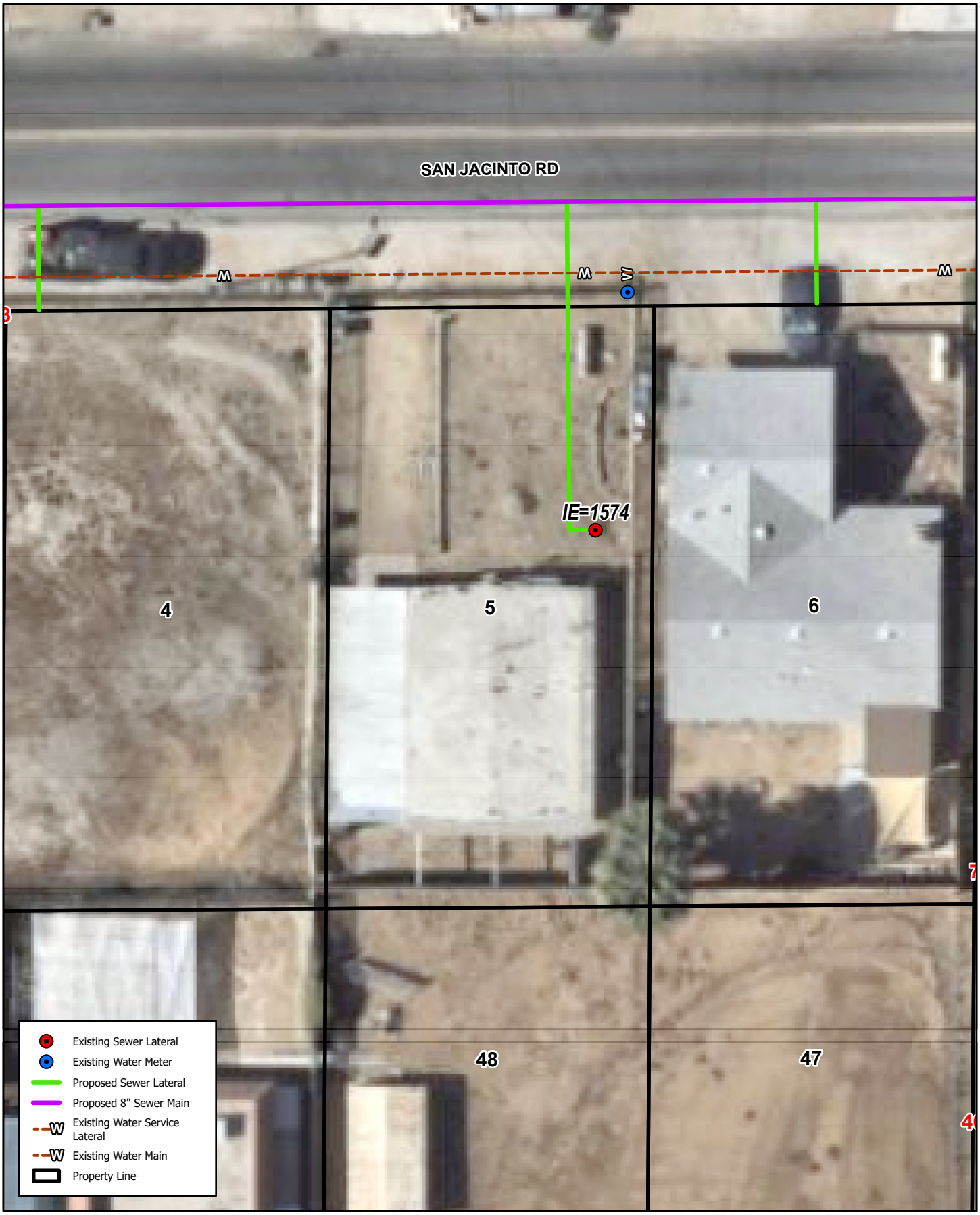


23791 LAKE DR, CANYON LAKE, CA 92587

LOT #5

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

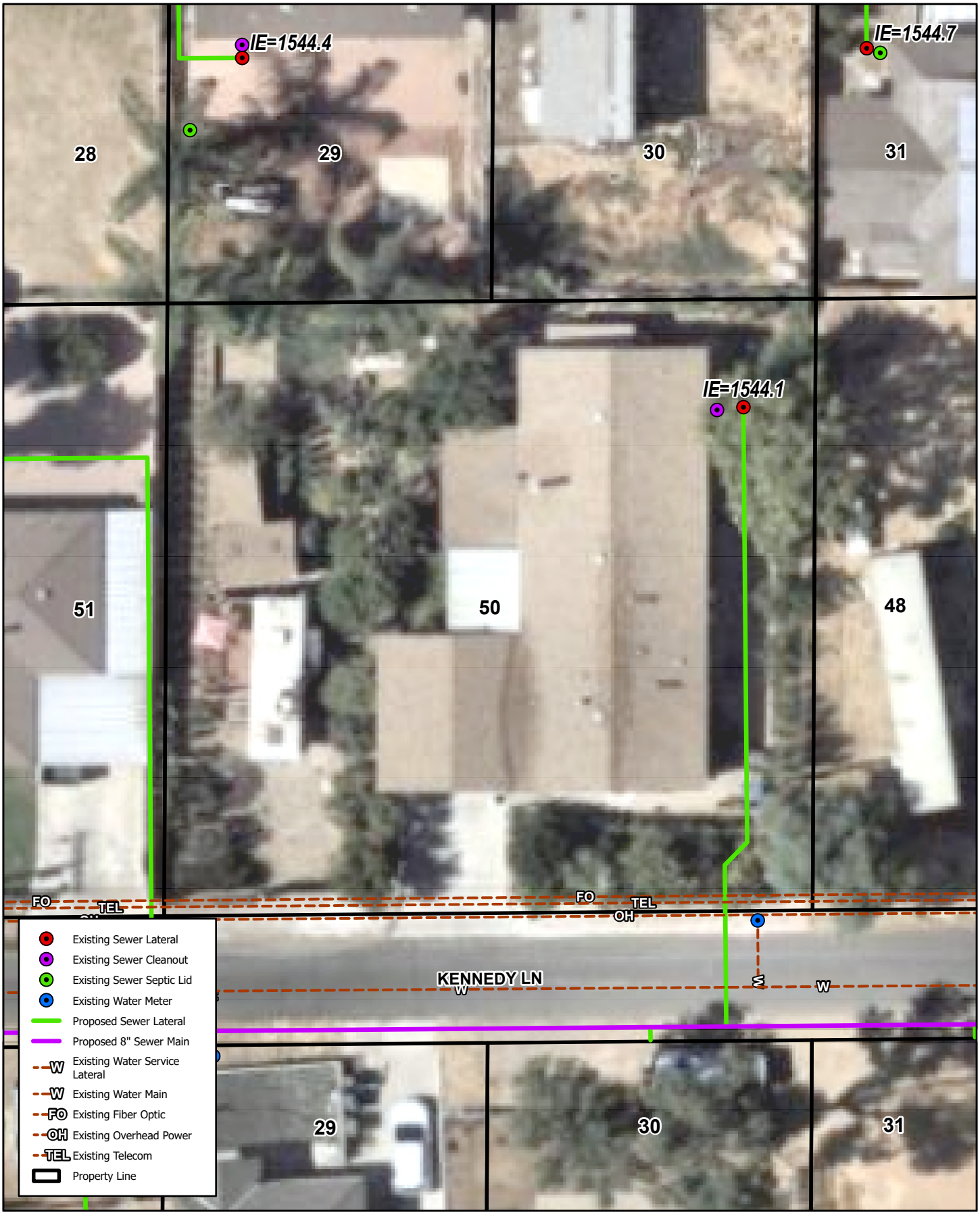


23791 SAN JACINTO RD, CANYON LAKE, CA 92587

LOT #5

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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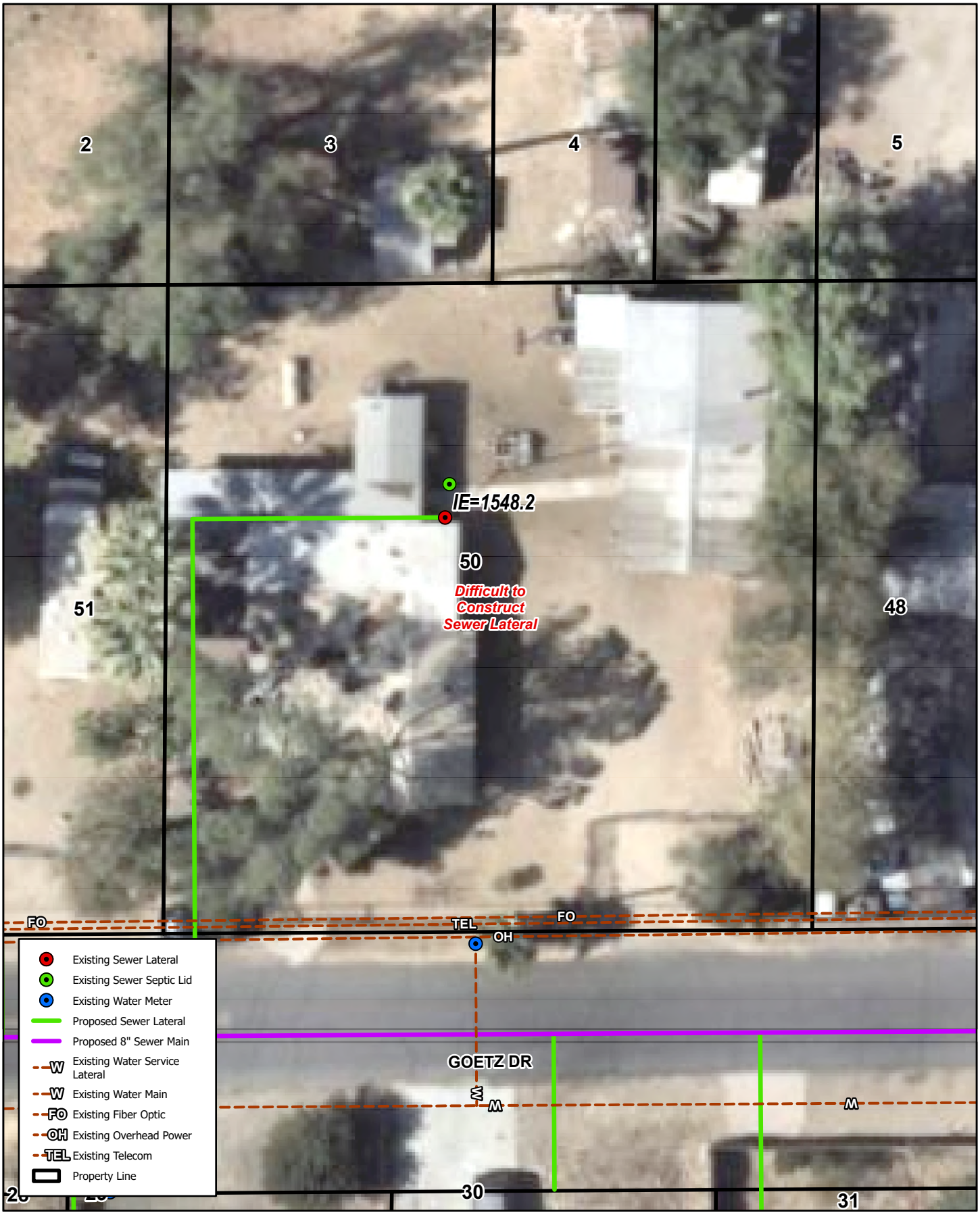
LOT #50

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

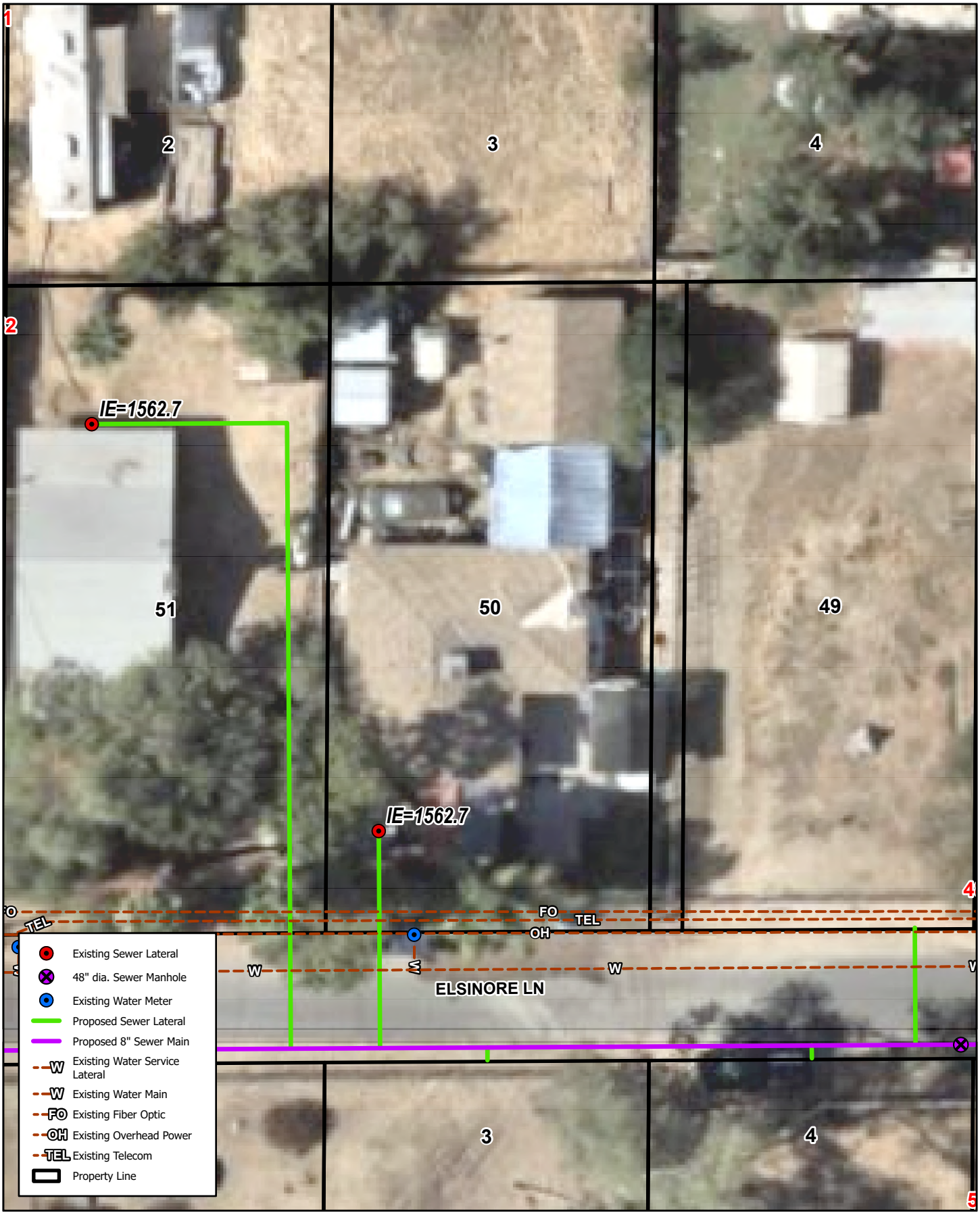


23760 GOETZ DR, CANYON LAKE, CA 92587

LOT #50

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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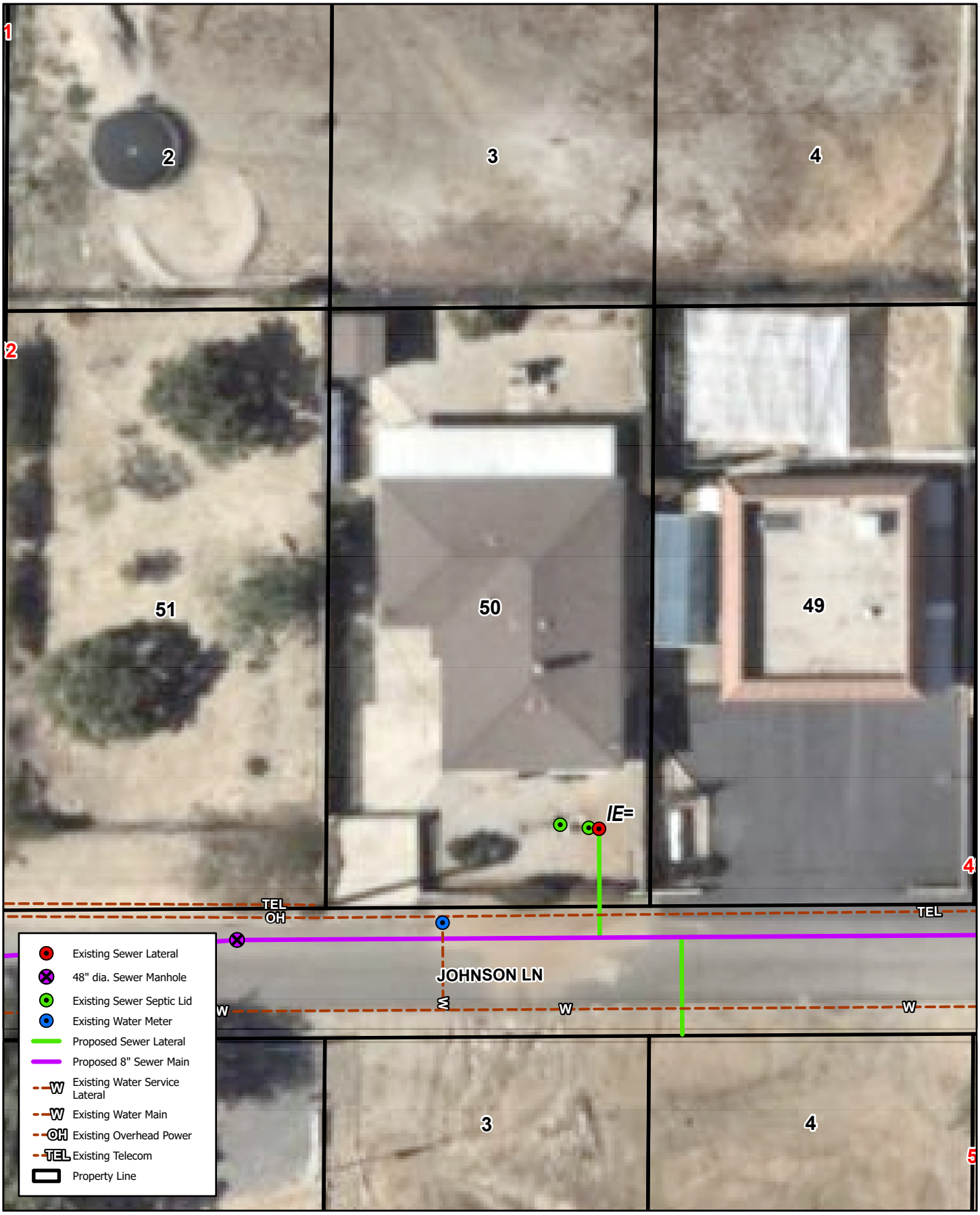
LOT #50

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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LOT #50

Quail Valley - Subarea 4 Sewer Improvement Plans

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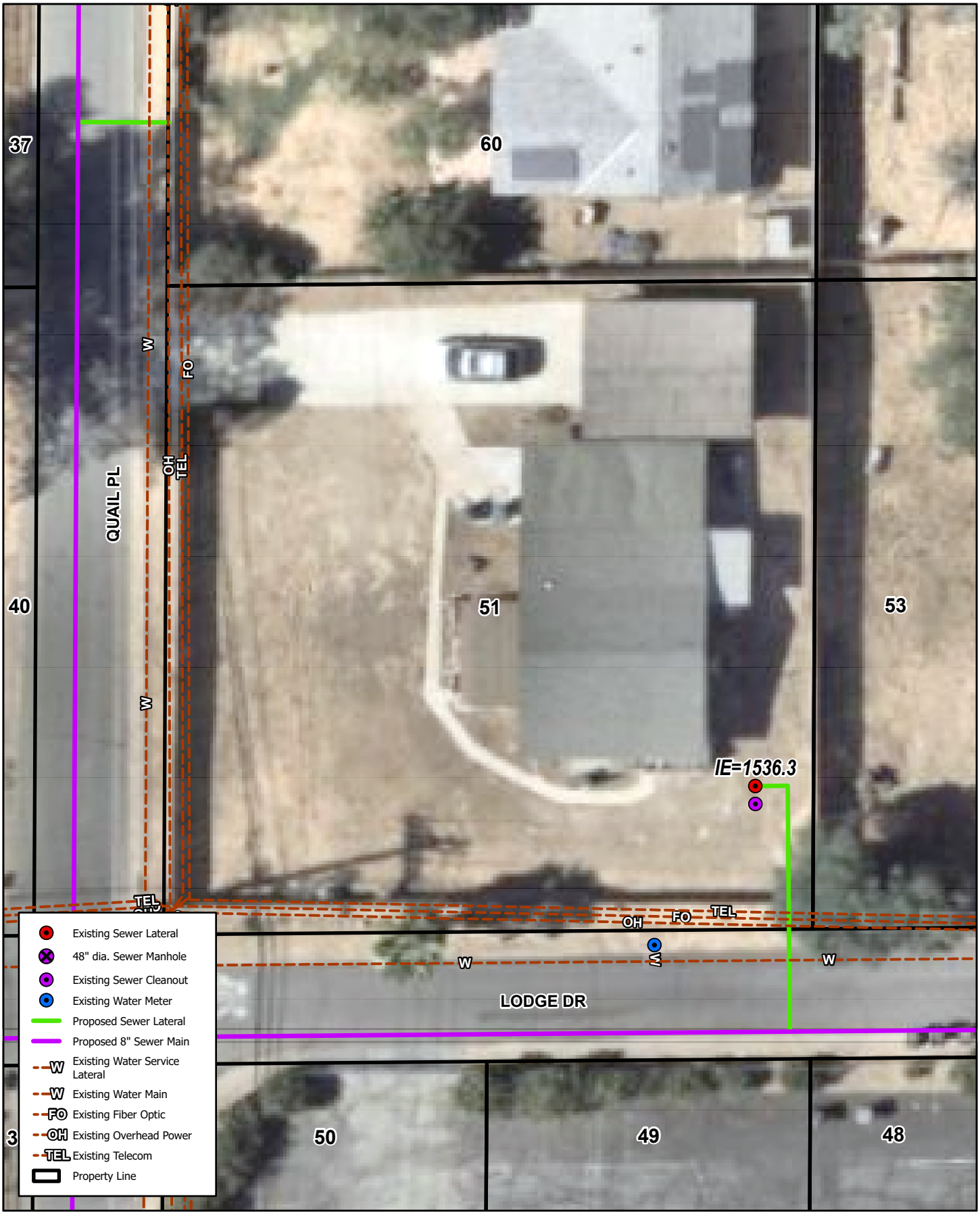
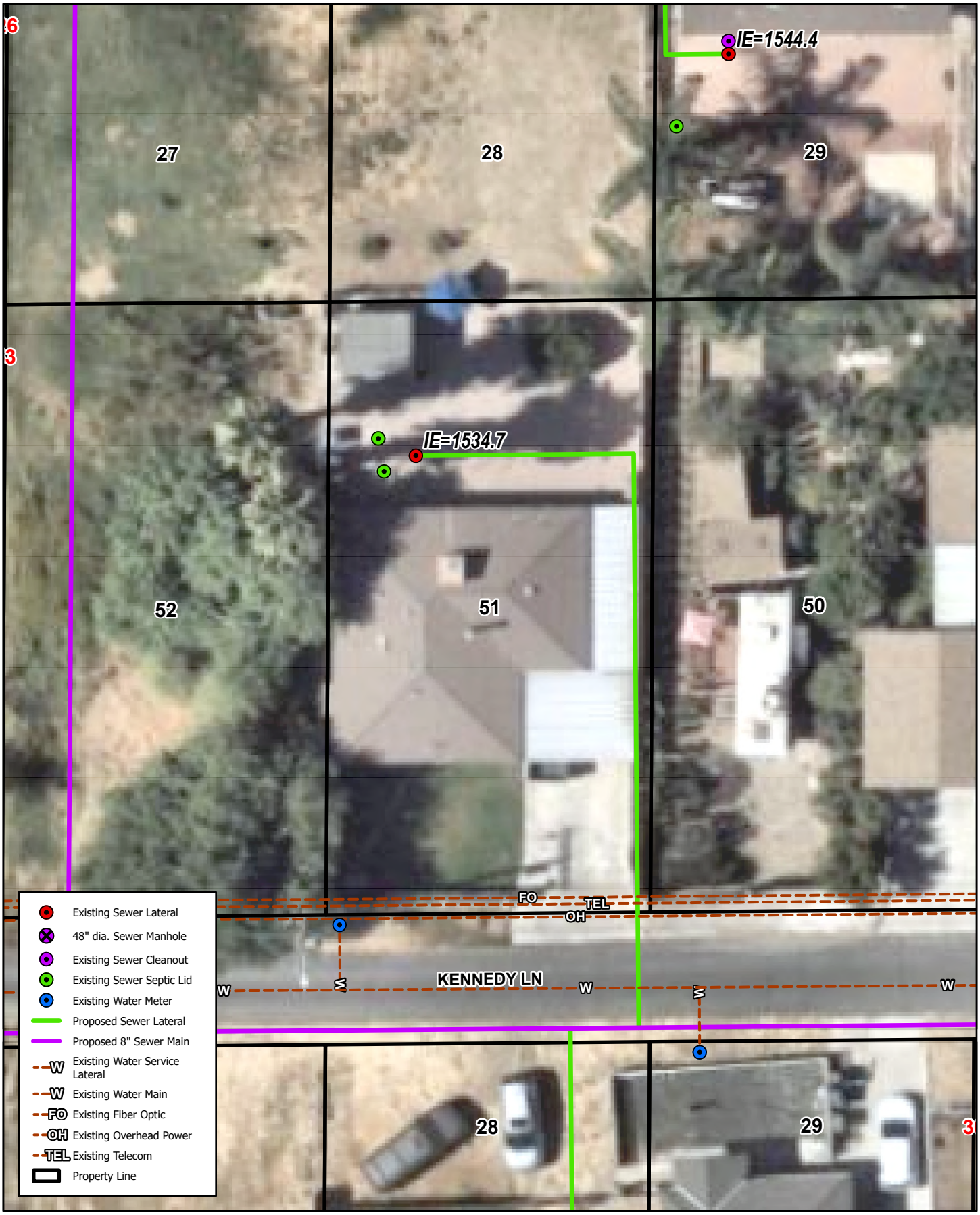


23870 LODGE DR, CANYON LAKE, CA 92587

LOT #51

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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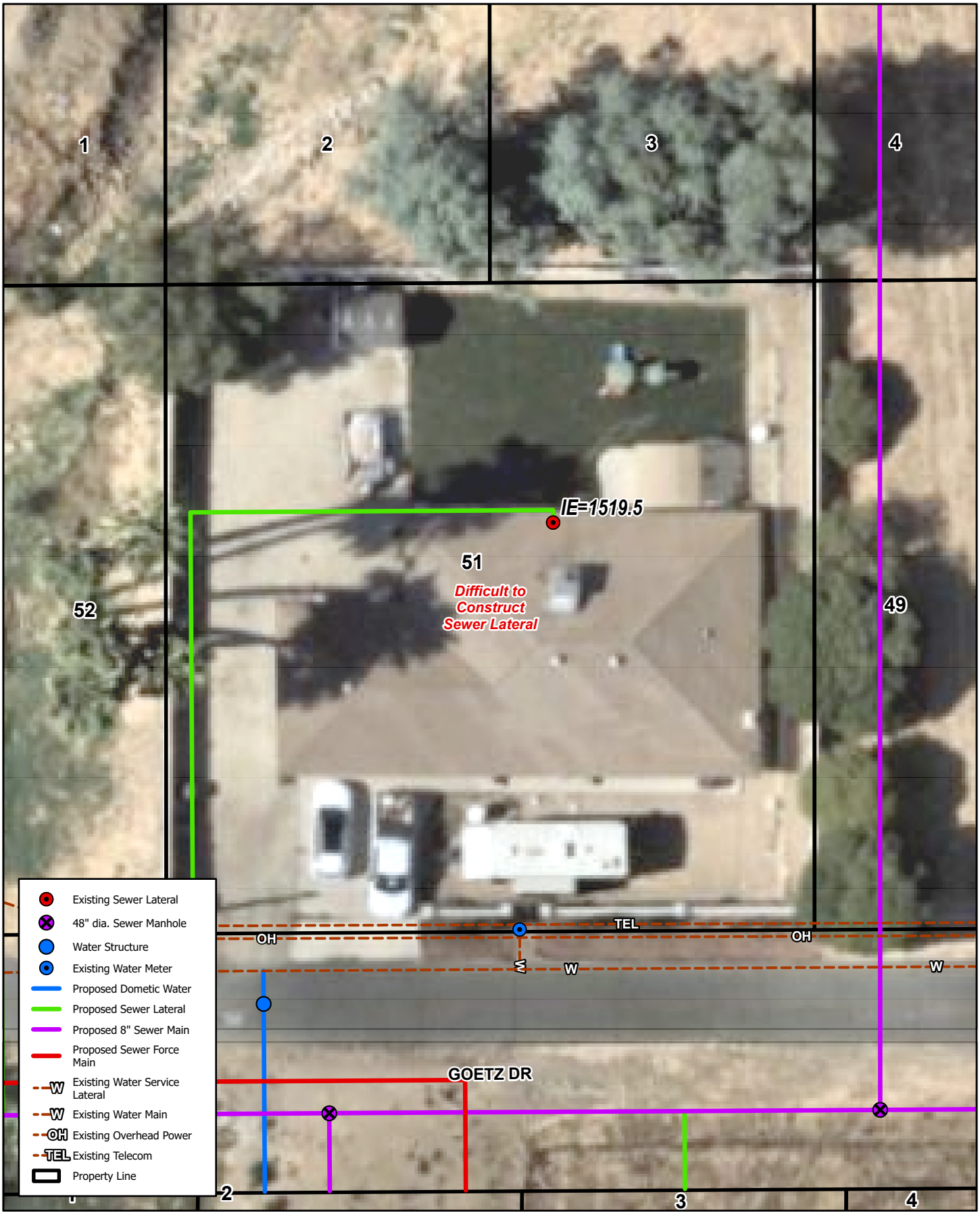
LOT #51

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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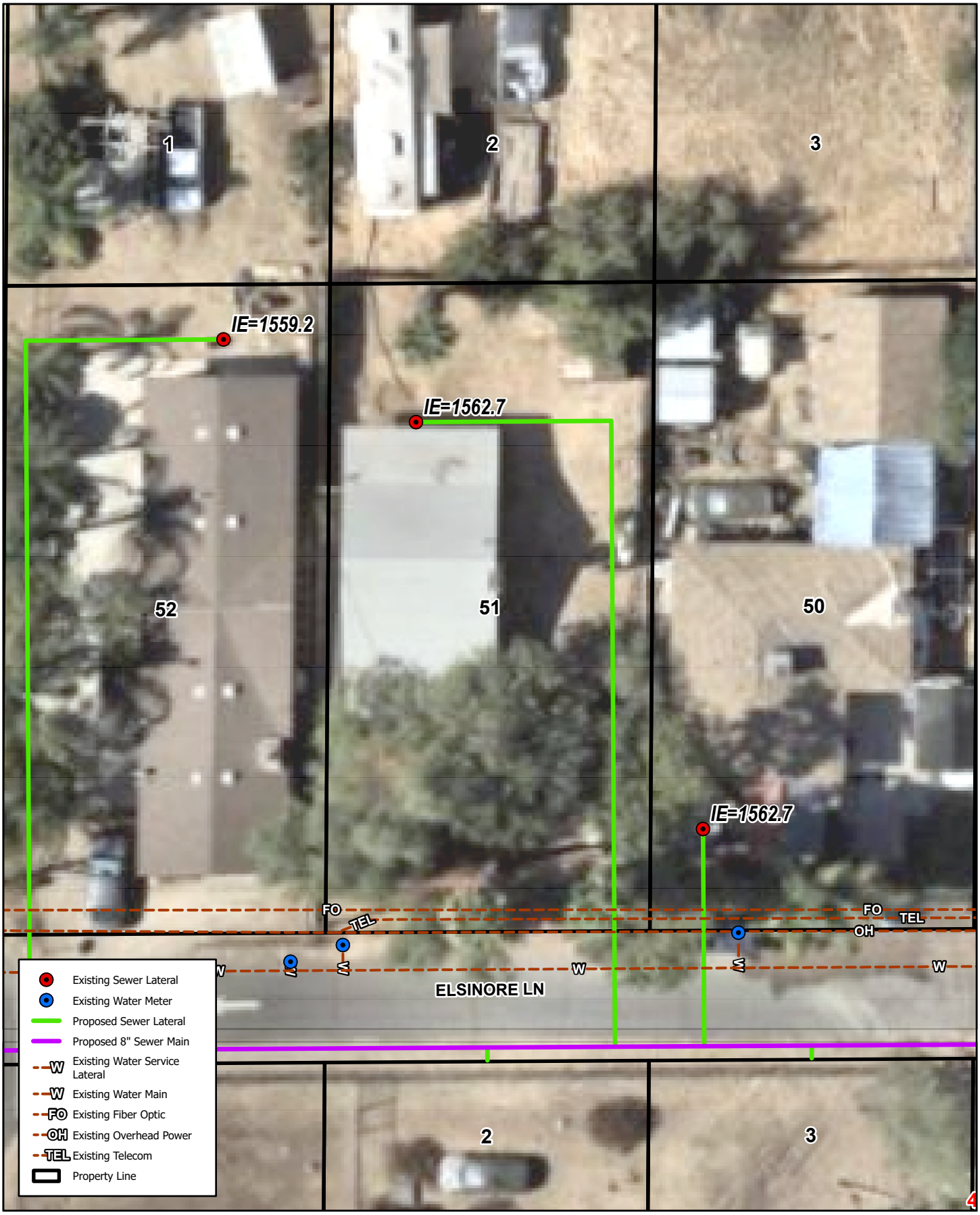
LOT #51

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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LOT #51

Quail Valley - Subarea 4 Sewer Improvement Plans

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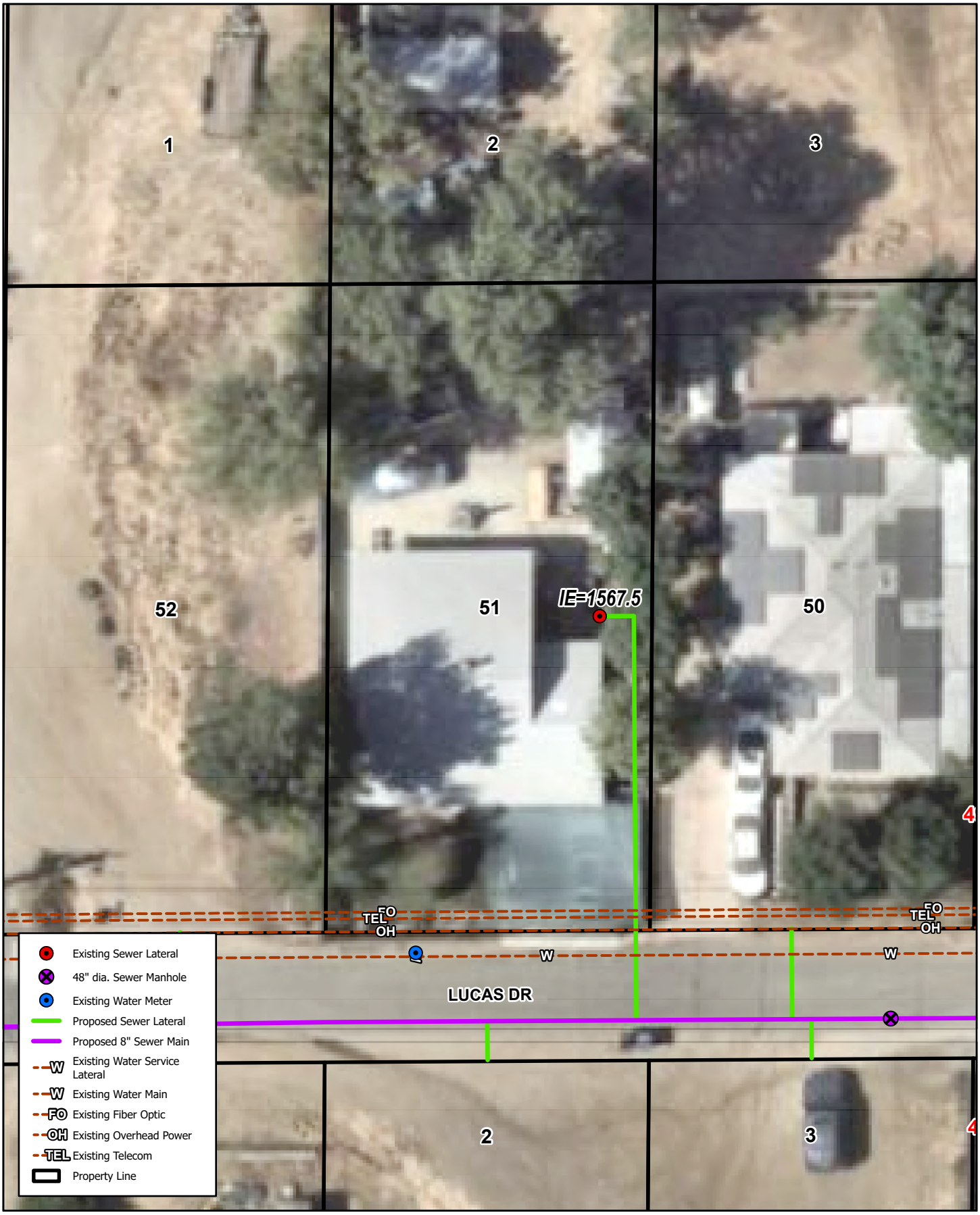
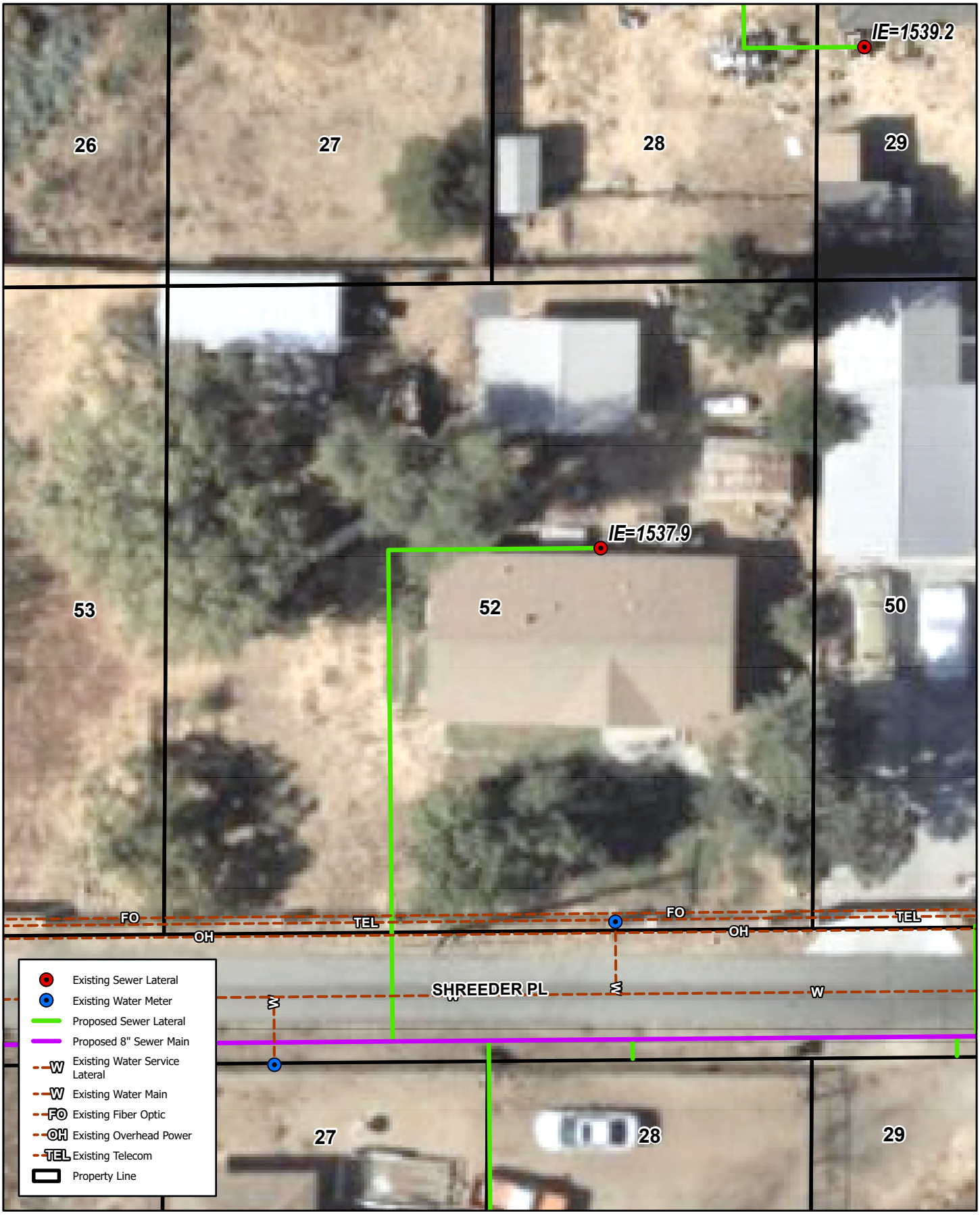


23760 LUCAS DR, QUAIL VALLEY, CA 92587

LOT #51

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23736 SHREEDER PL, QUAIL VALLEY, CA 92587

LOT #52

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

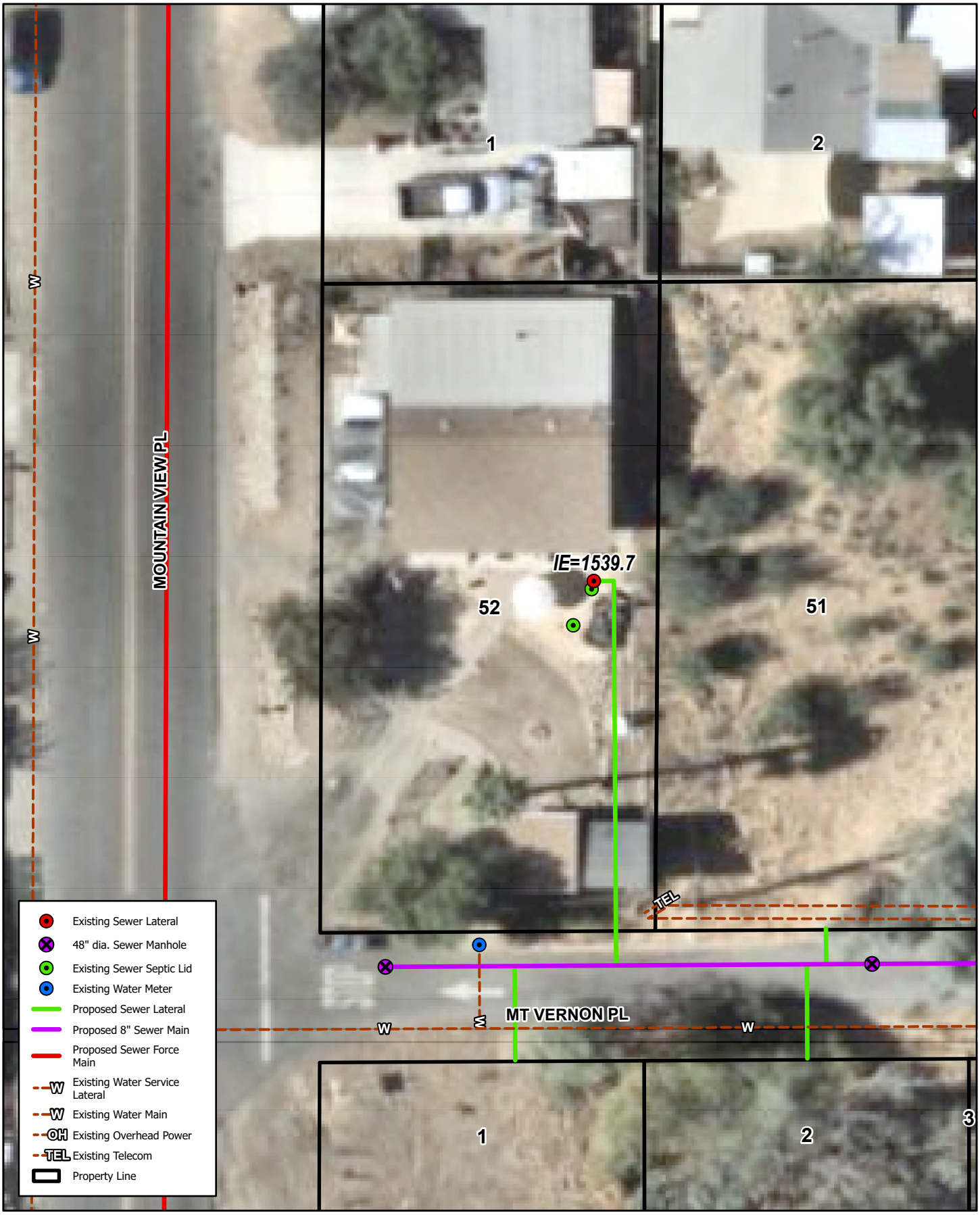


23750 GOETZ DR, QUAIL VALLEY, CA 92587

LOT #52

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23508 MT VERNON PL, CANYON LAKE, CA 92587

LOT #52

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

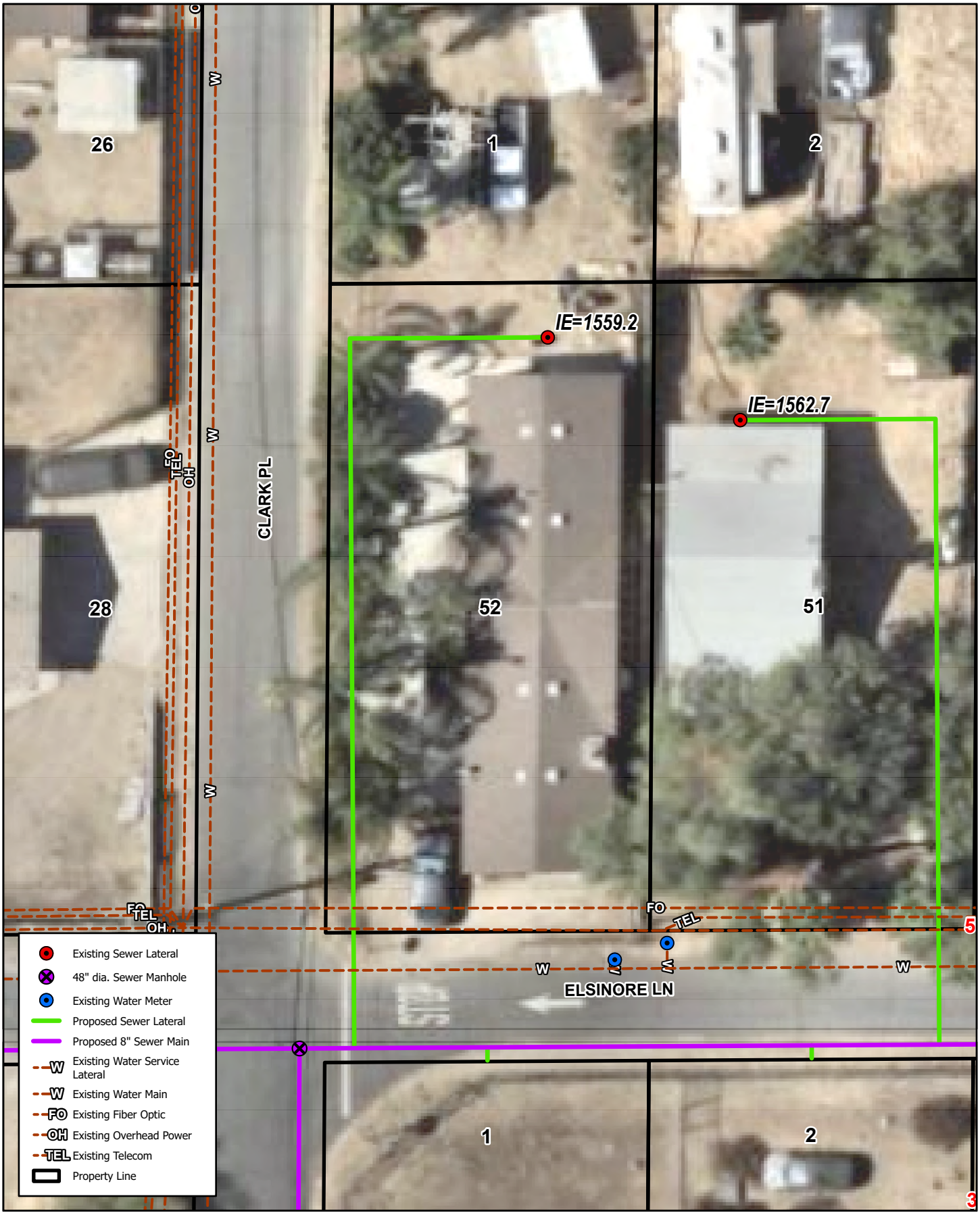


28394 CLARK PL, CANYON LAKE, CA 92587

LOT #52

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23760 ELSINORE LN, CANYON LAKE, CA 92587

LOT #52

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



26300 MOUNTAIN VIEW PL, QUAIL VALLEY, CA 92587

LOT #52

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

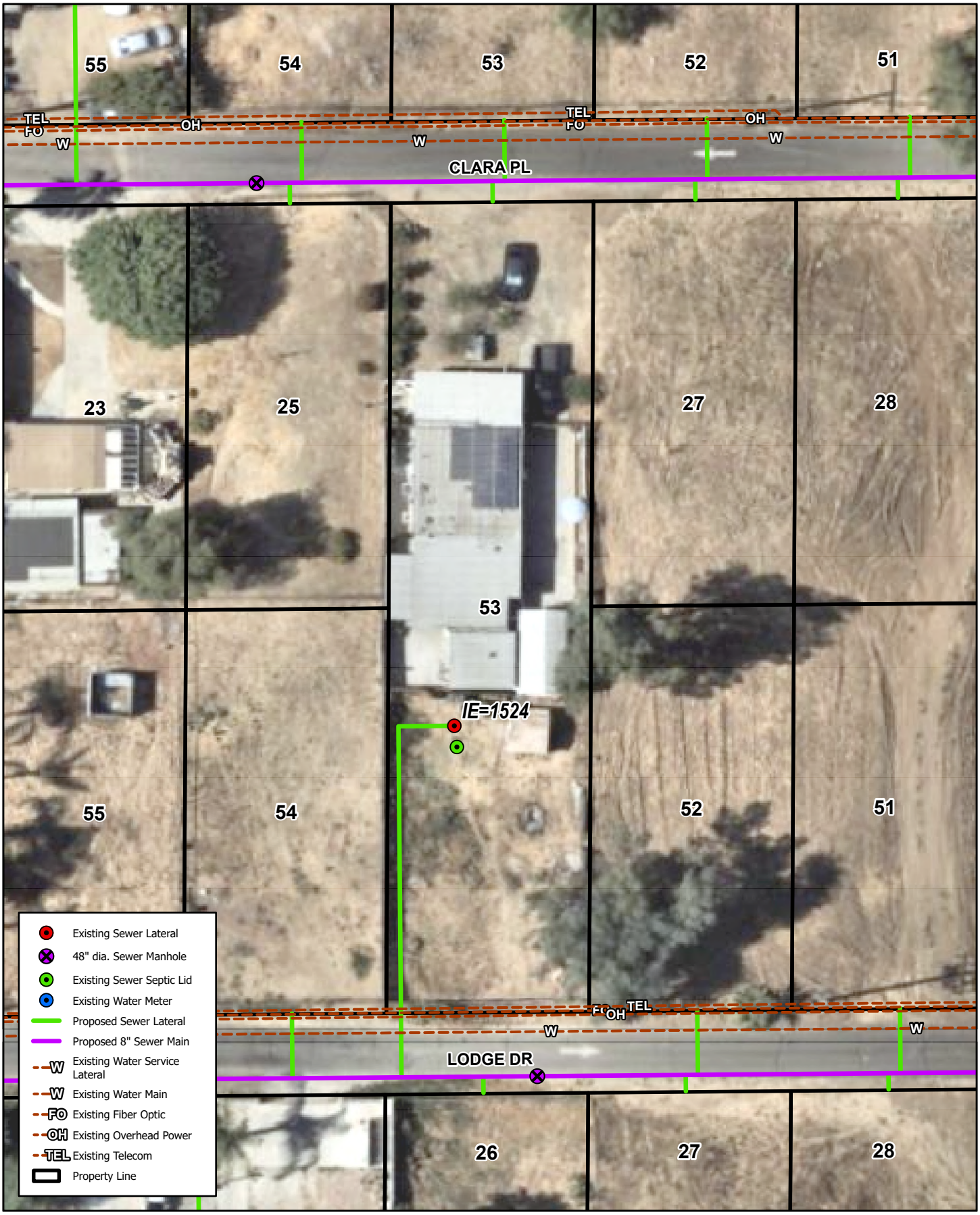


23748 CYPRESS ST, CANYON LAKE, CA 92587

LOT #53

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23717 CLARA PL, QUAIL VALLEY, CA 92587

LOT #53

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

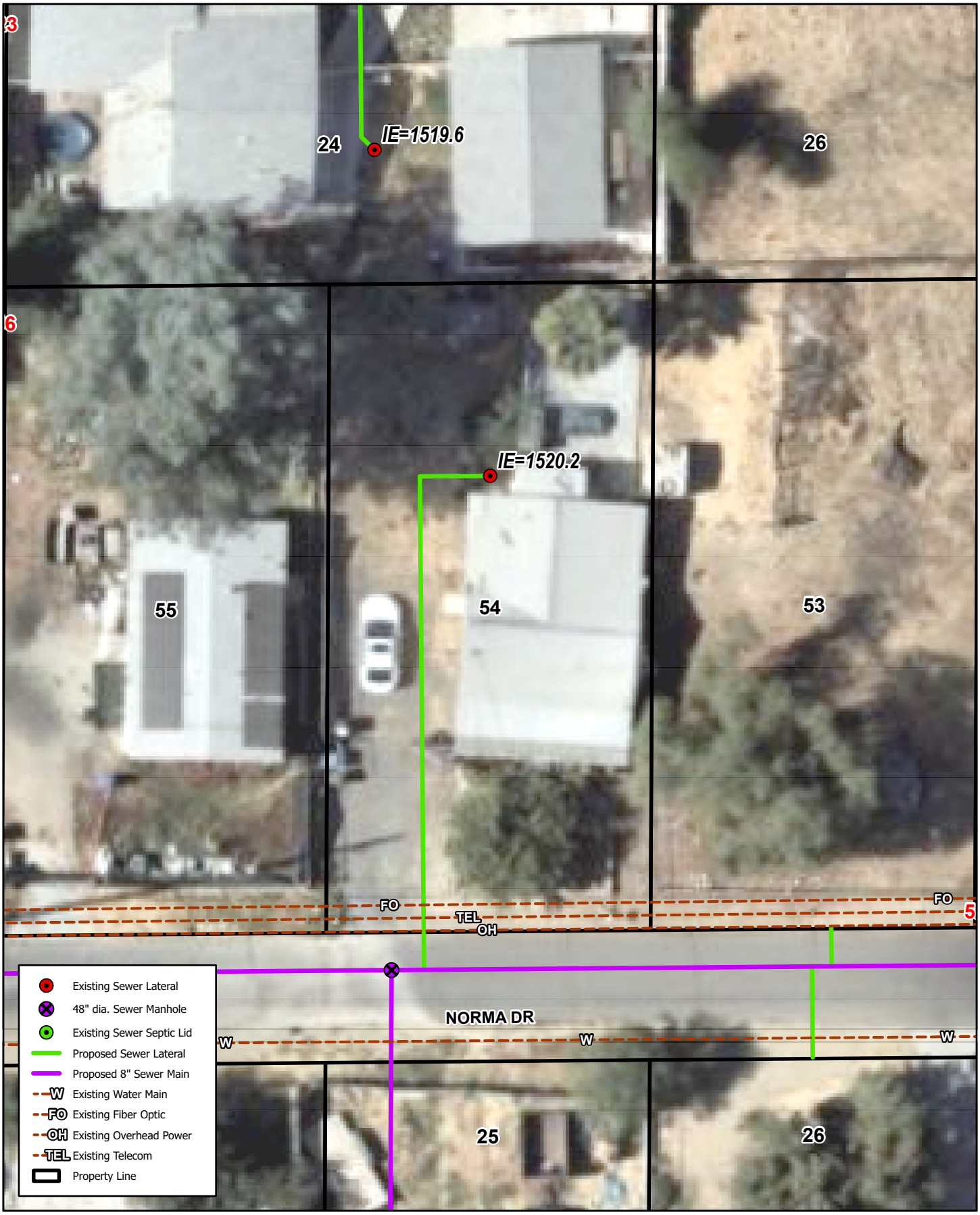


23752 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #53

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23746 NORMA DR, CANYON LAKE, CA 92587

LOT #54

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

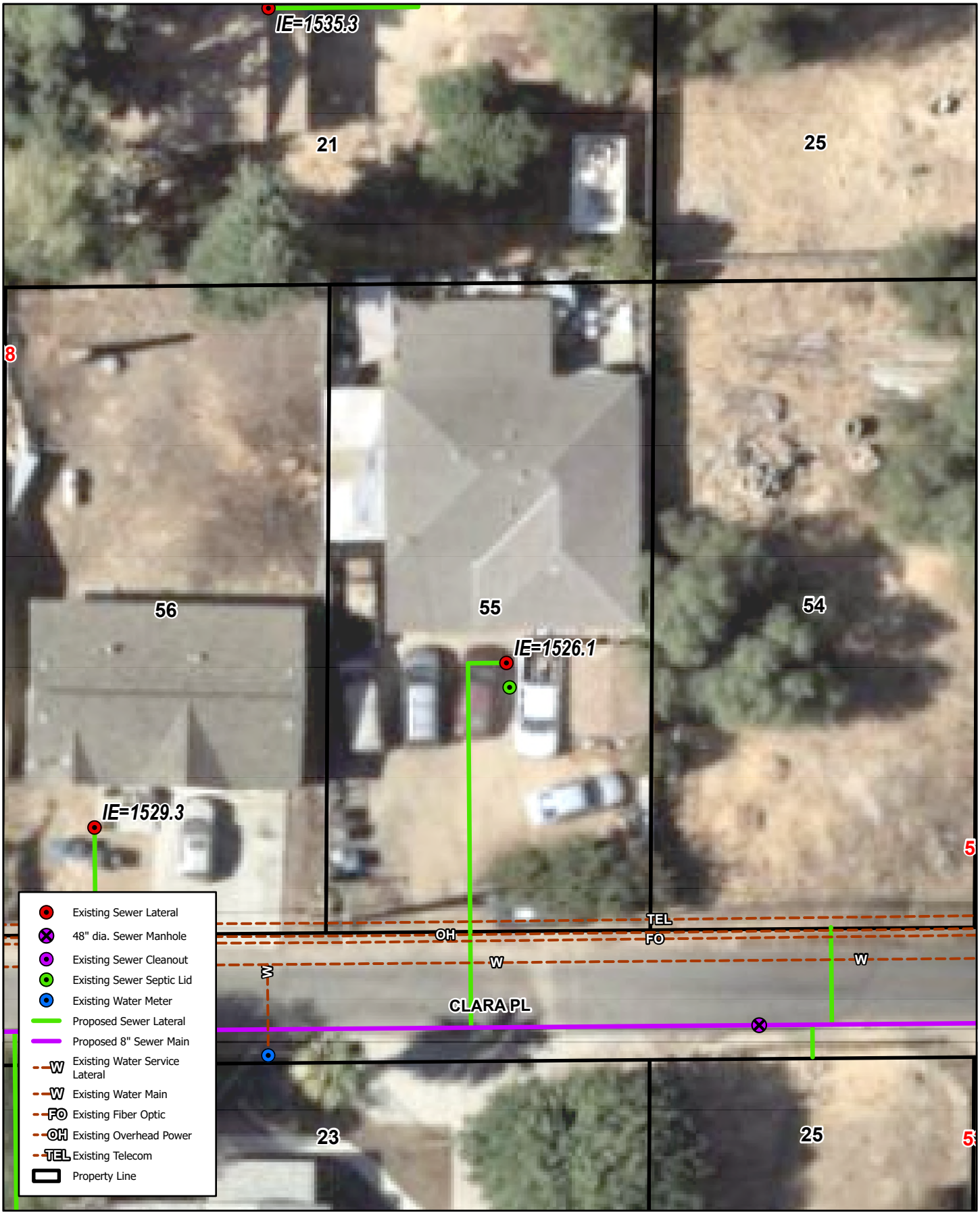


23722 LA BERTHA LN, CANYON LAKE, CA 92587

LOT #54

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23700 CLARA PL, QUAIL VALLEY, CA 92587

LOT #55

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

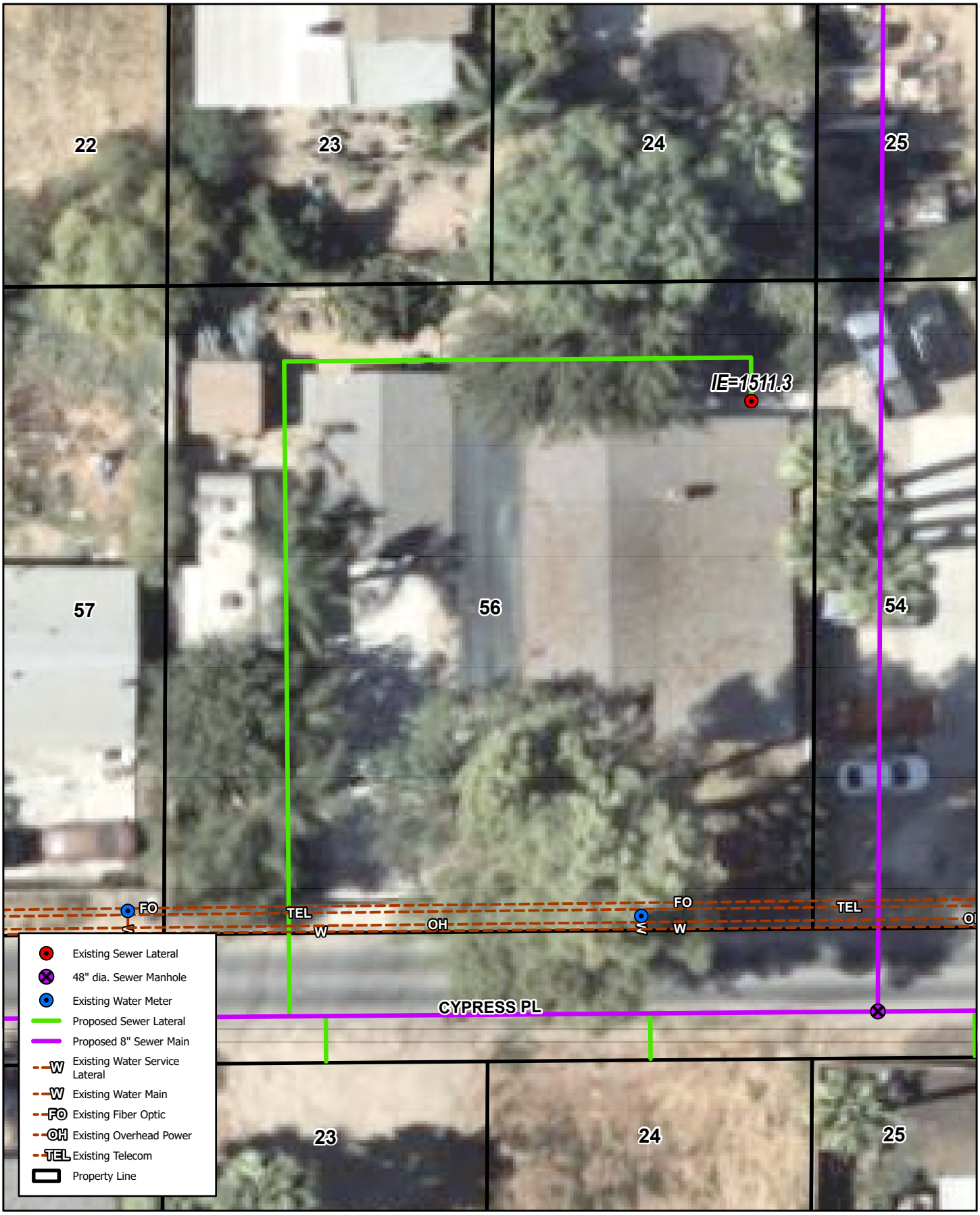


23720 CASSANDRA DR, QUAIL VALLEY, CA 92587

LOT #55

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

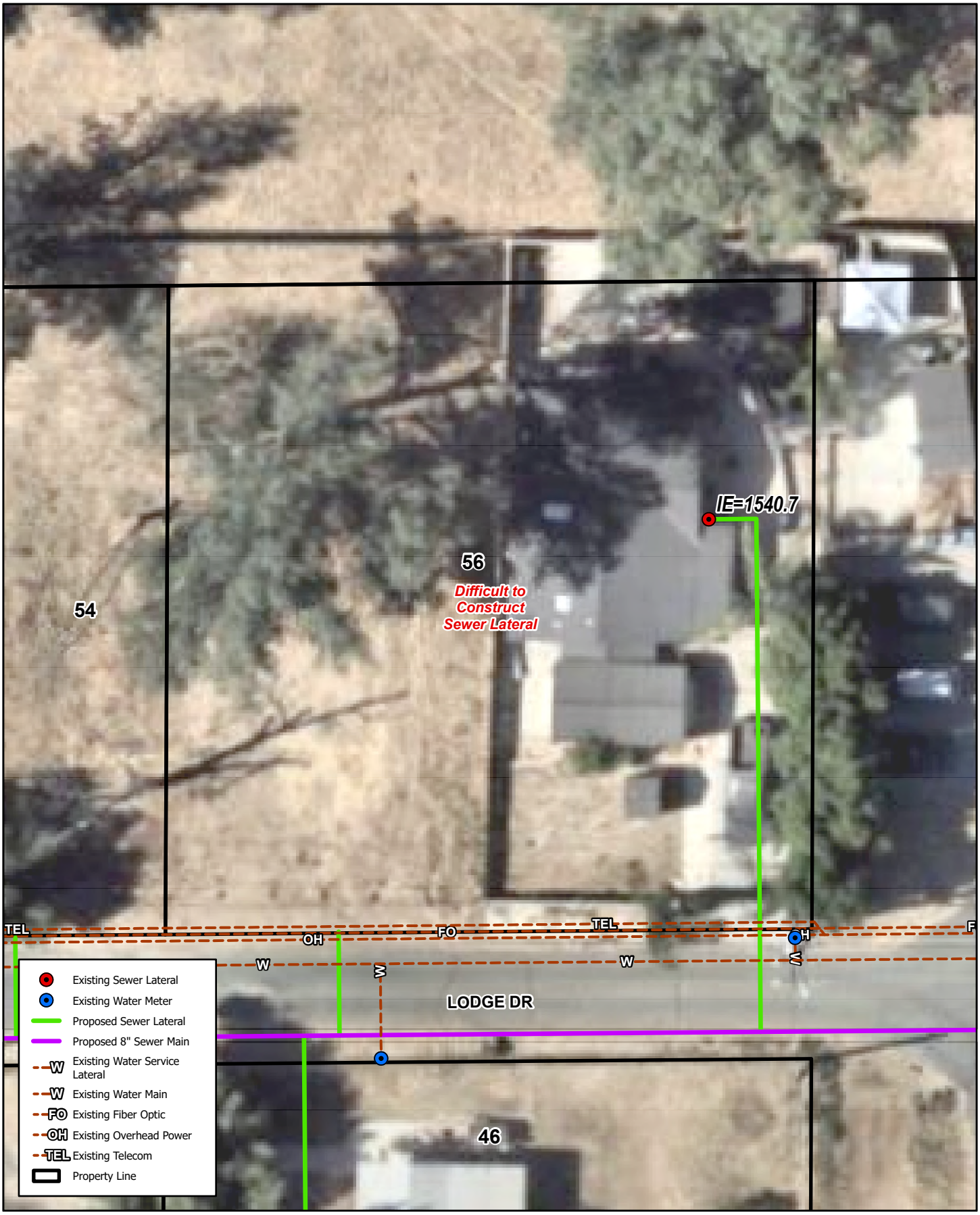


23740 CYPRESS PL, CANYON LAKE, CA 92587

LOT #56

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

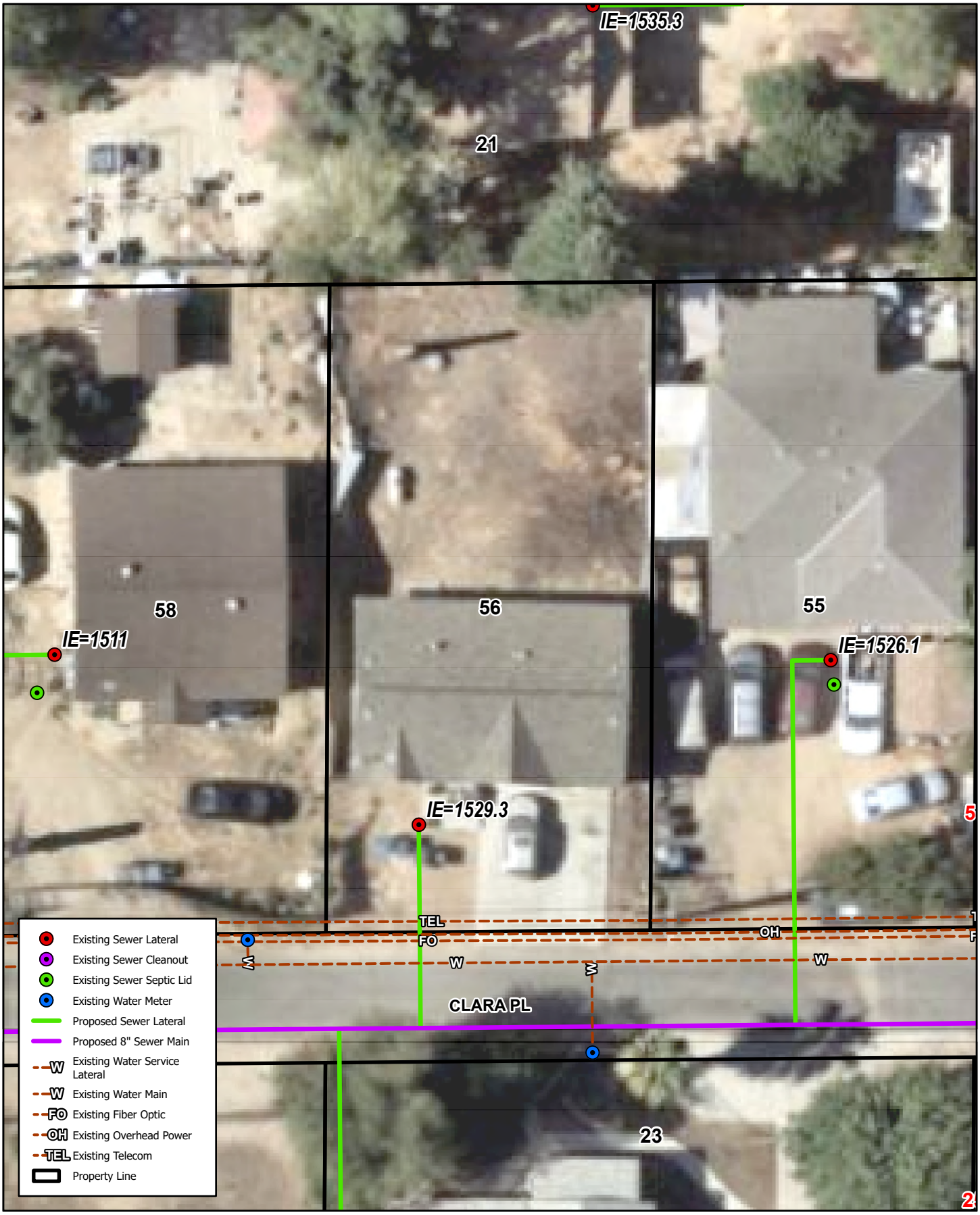


23910 LODGE DR, QUAIL VALLEY, CA 92587

LOT #56

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

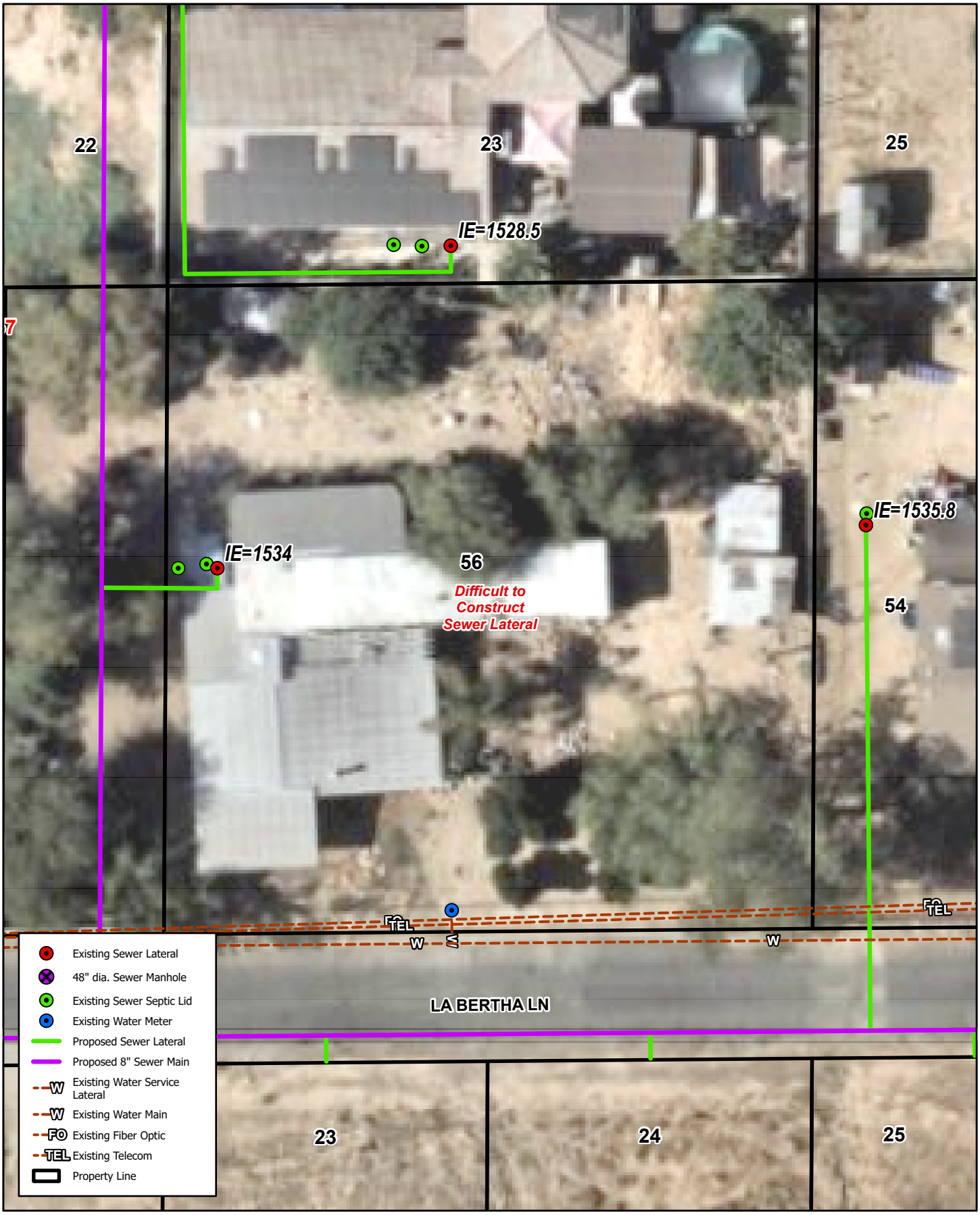


23692 CLARA PL, CANYON LAKE, CA 92587

LOT #56

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

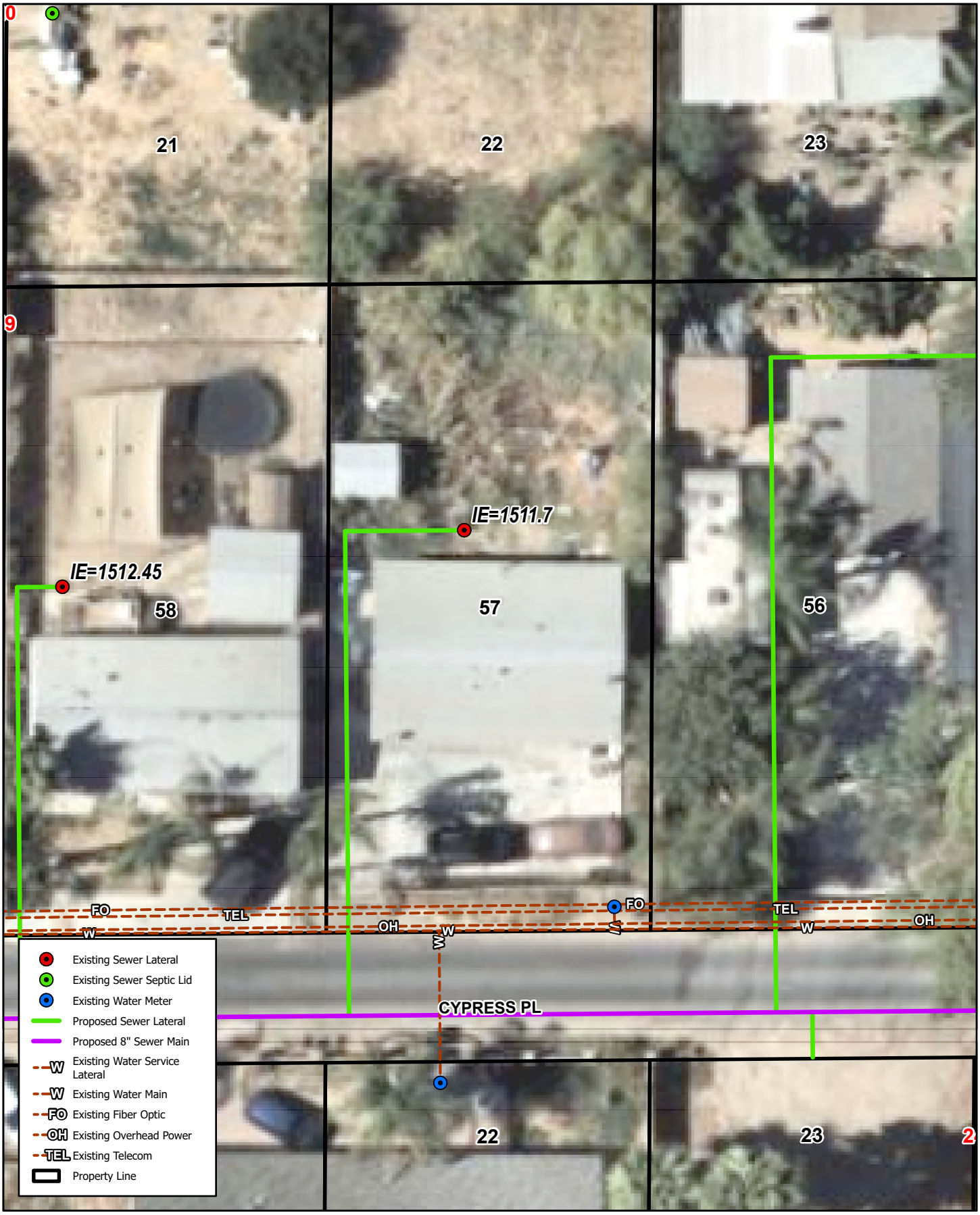


23690 LA BERTHA LN, CANYON LAKE, CA 92587

LOT #56

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

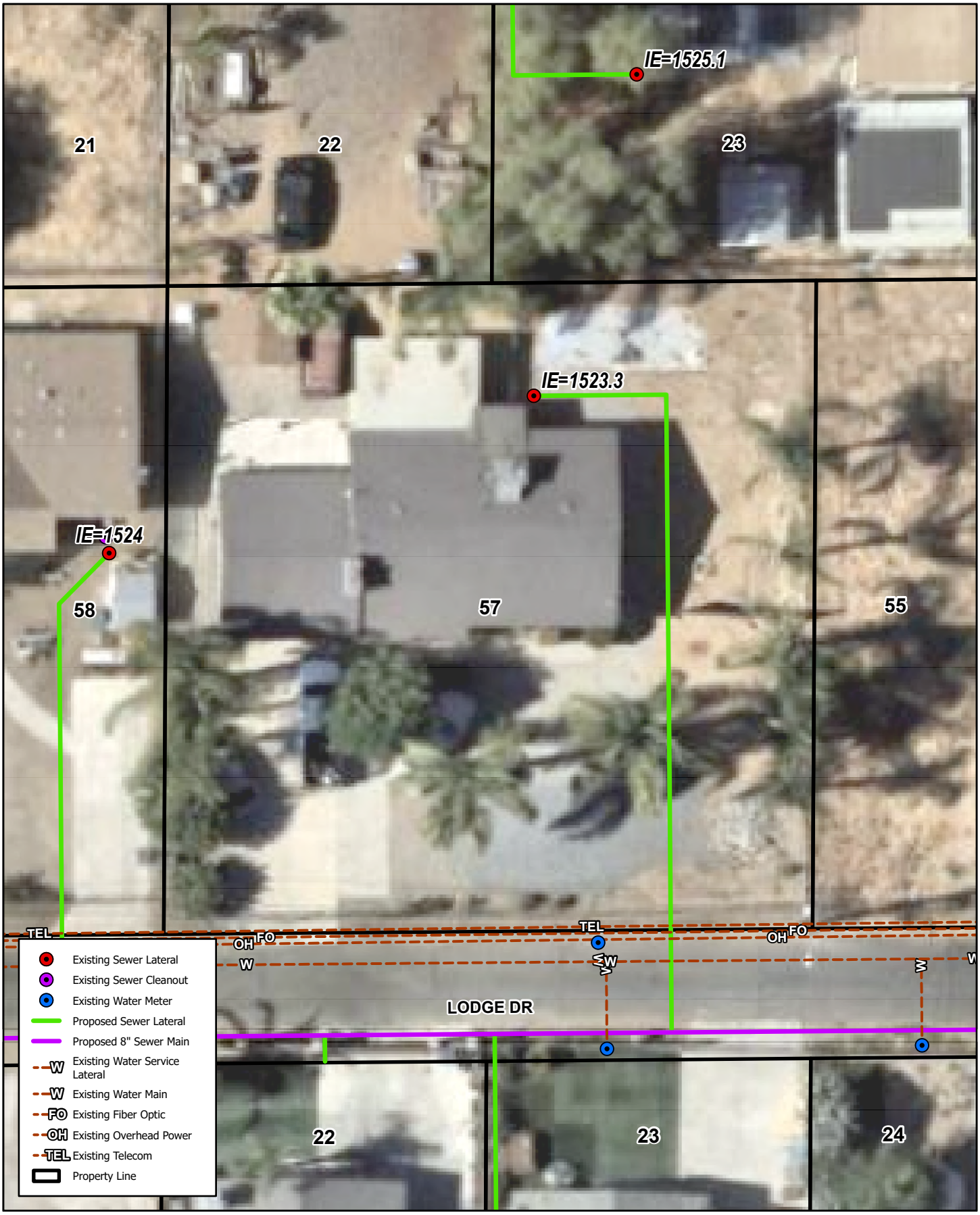


23710 CYPRESS PL, CANYON LAKE, CA 92587

LOT #57

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

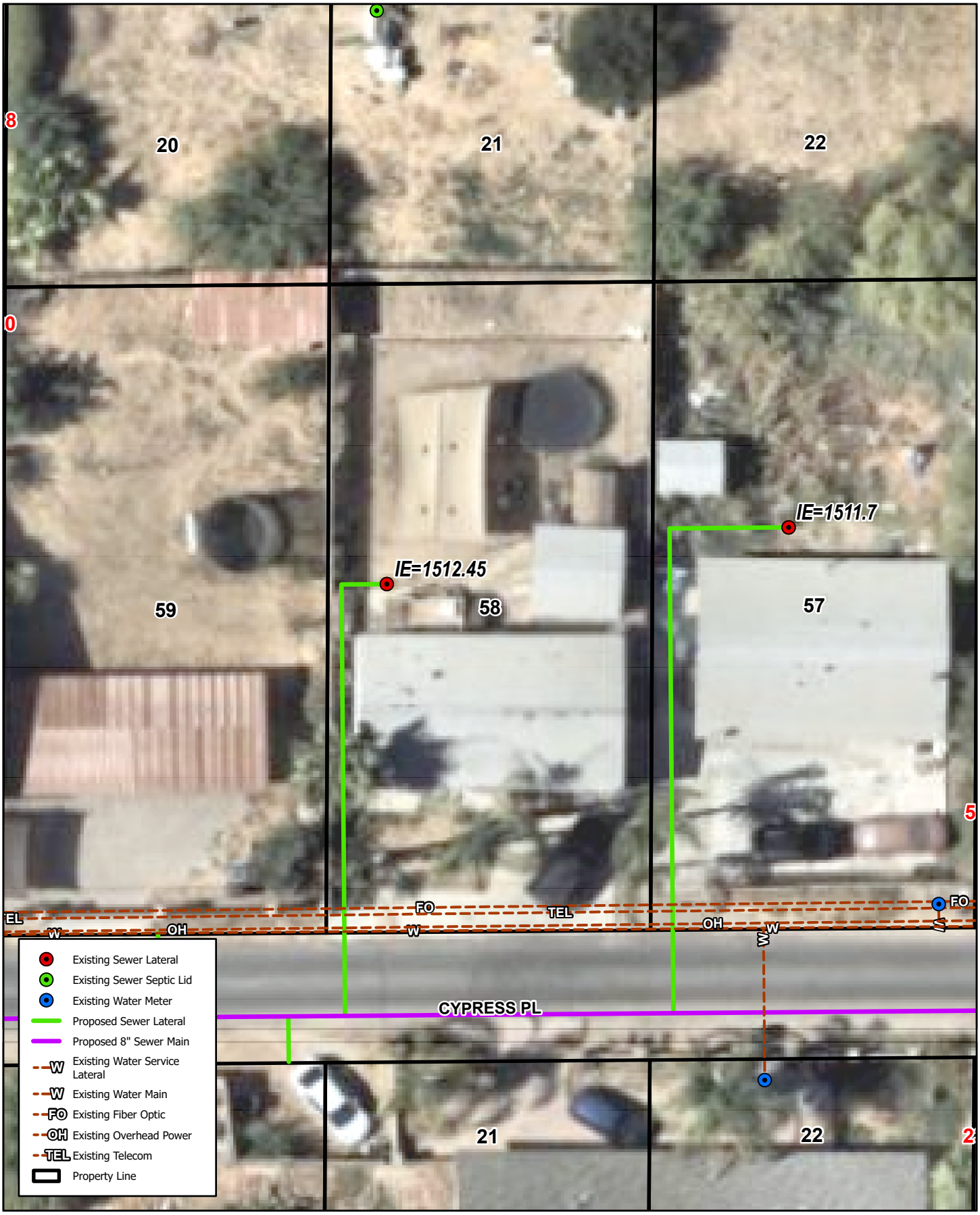


23684 LODGE DR, CANYON LAKE, CA 92587

LOT #57

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23706 CYPRESS PL, CANYON LAKE, CA 92587

LOT #58

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

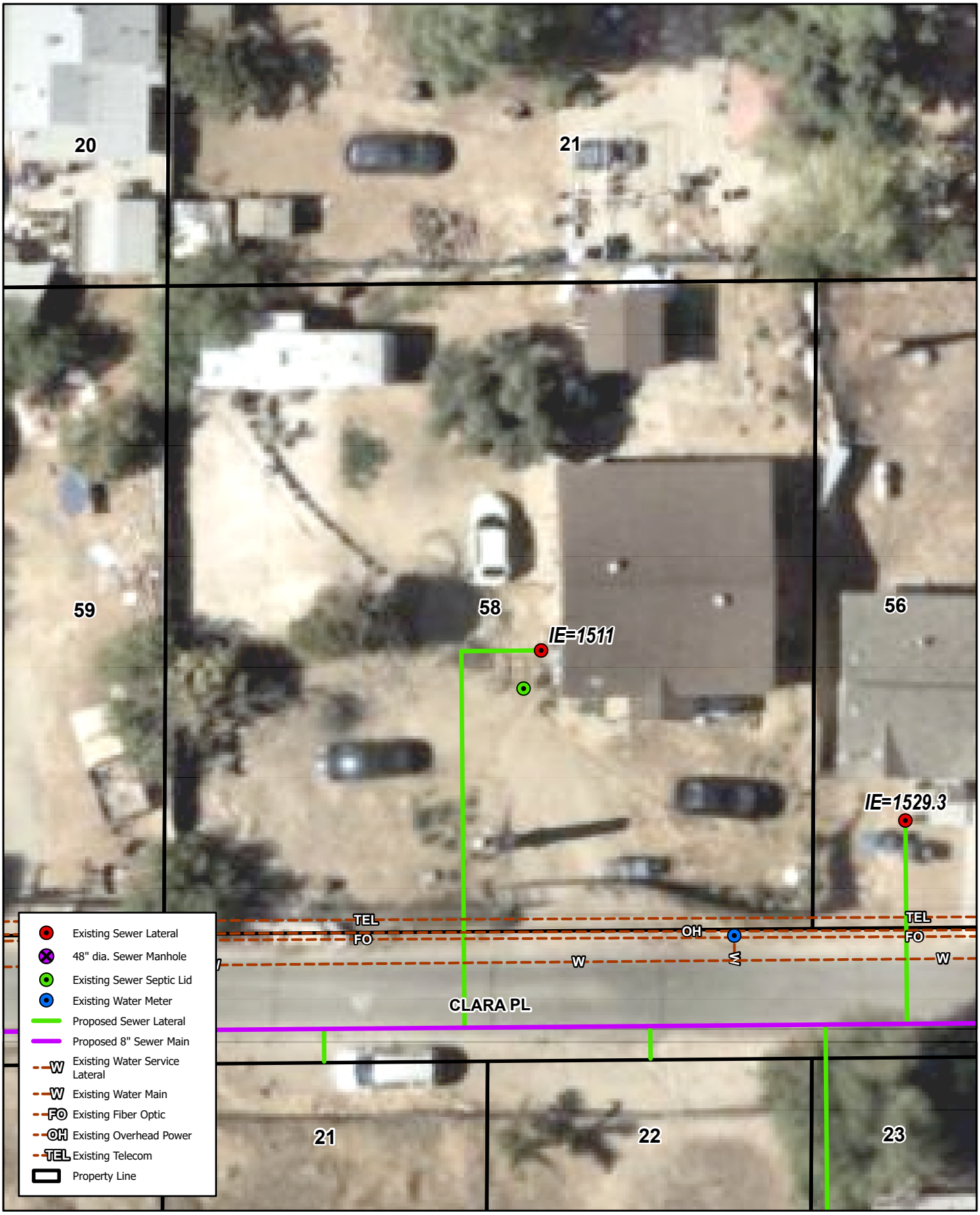


23694 LODGE DR, CANYON LAKE, CA 92587

LOT #58

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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LOT #58

Quail Valley - Subarea 4 Sewer Improvement Plans

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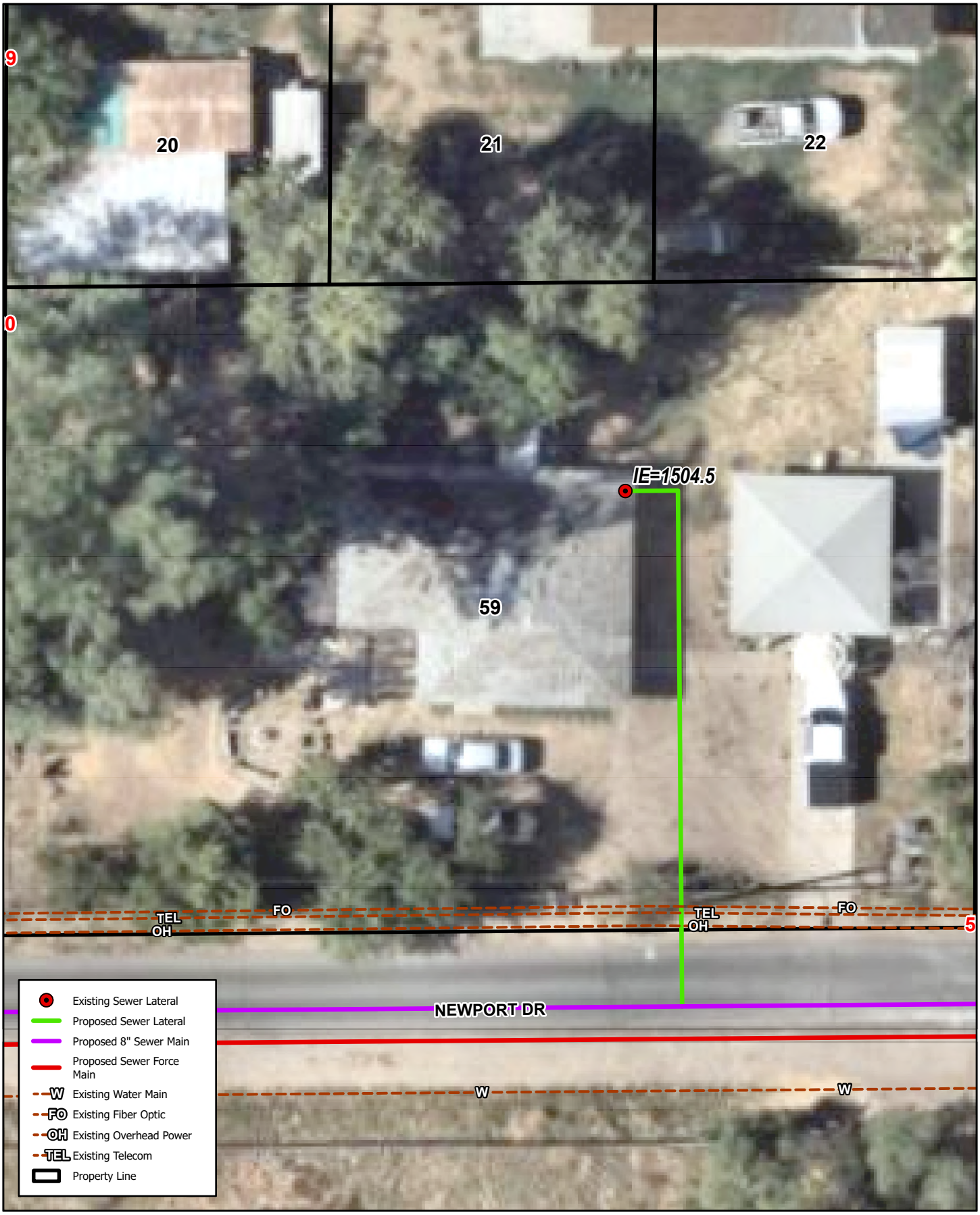

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LOT #59

Quail Valley - Subarea 4 Sewer Improvement Plans

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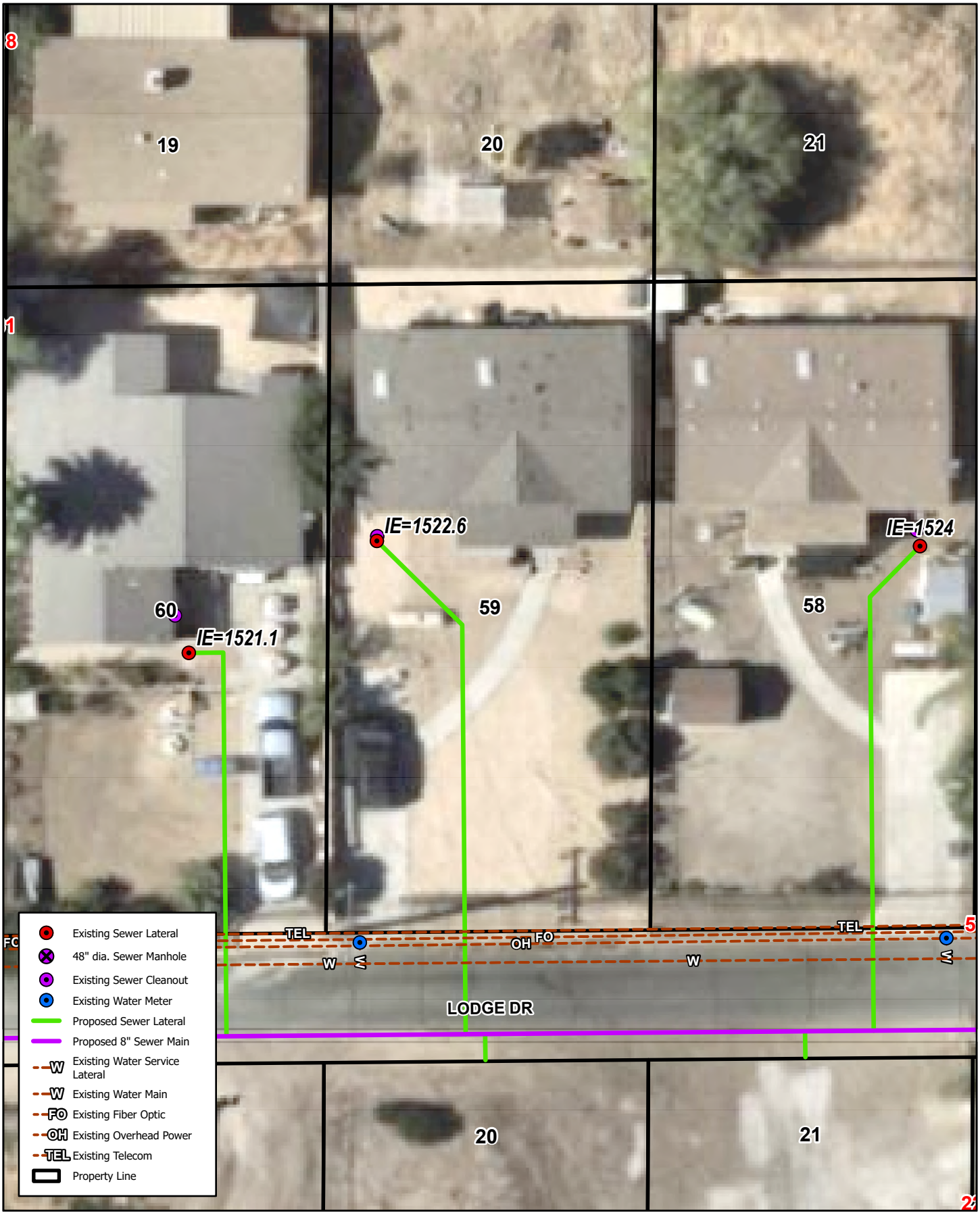


23686 LODGE DR, CANYON LAKE, CA 92587

LOT #59

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

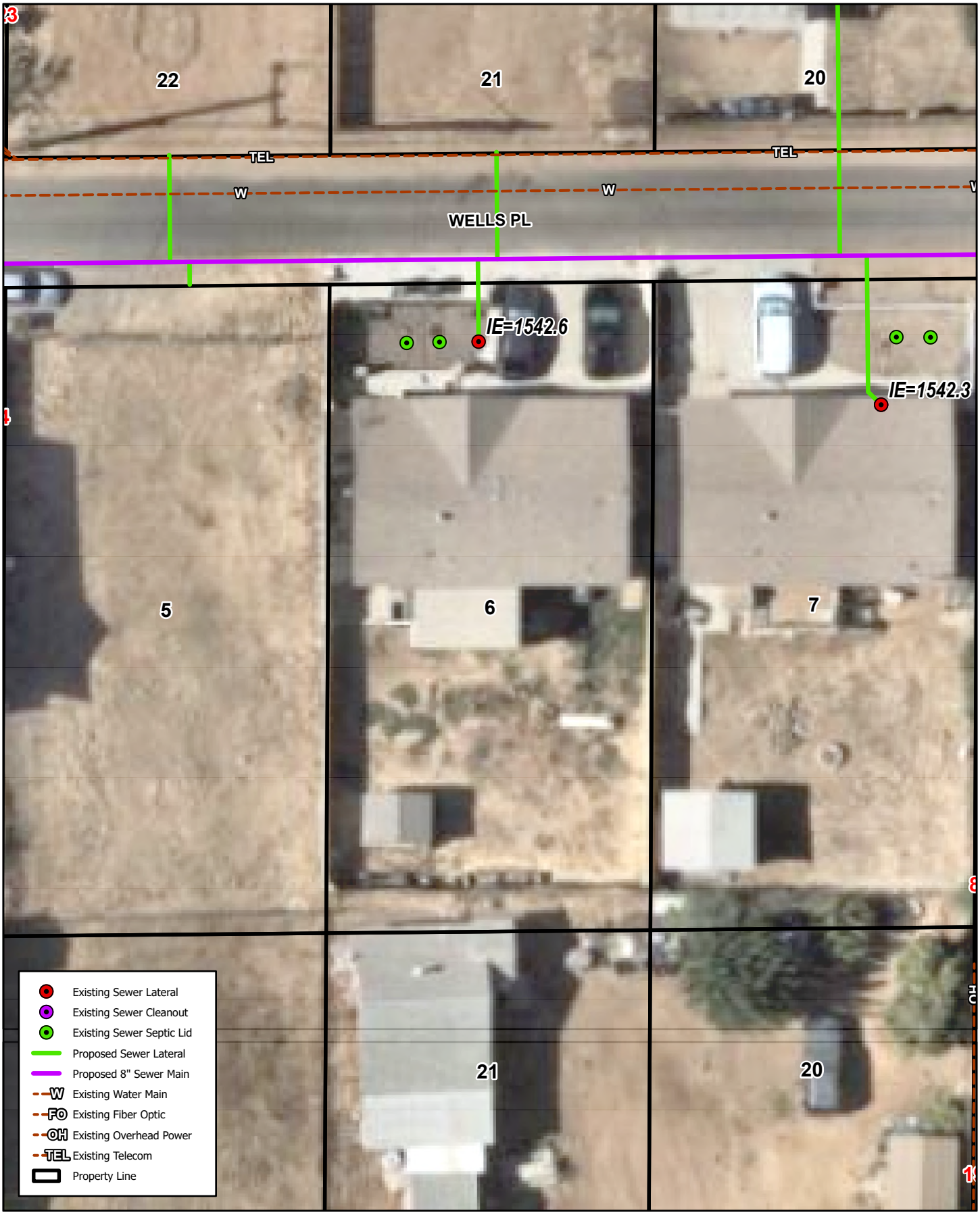


23670 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #59

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23925 WELLS PL, CANYON LAKE, CA 92587

LOT #6

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

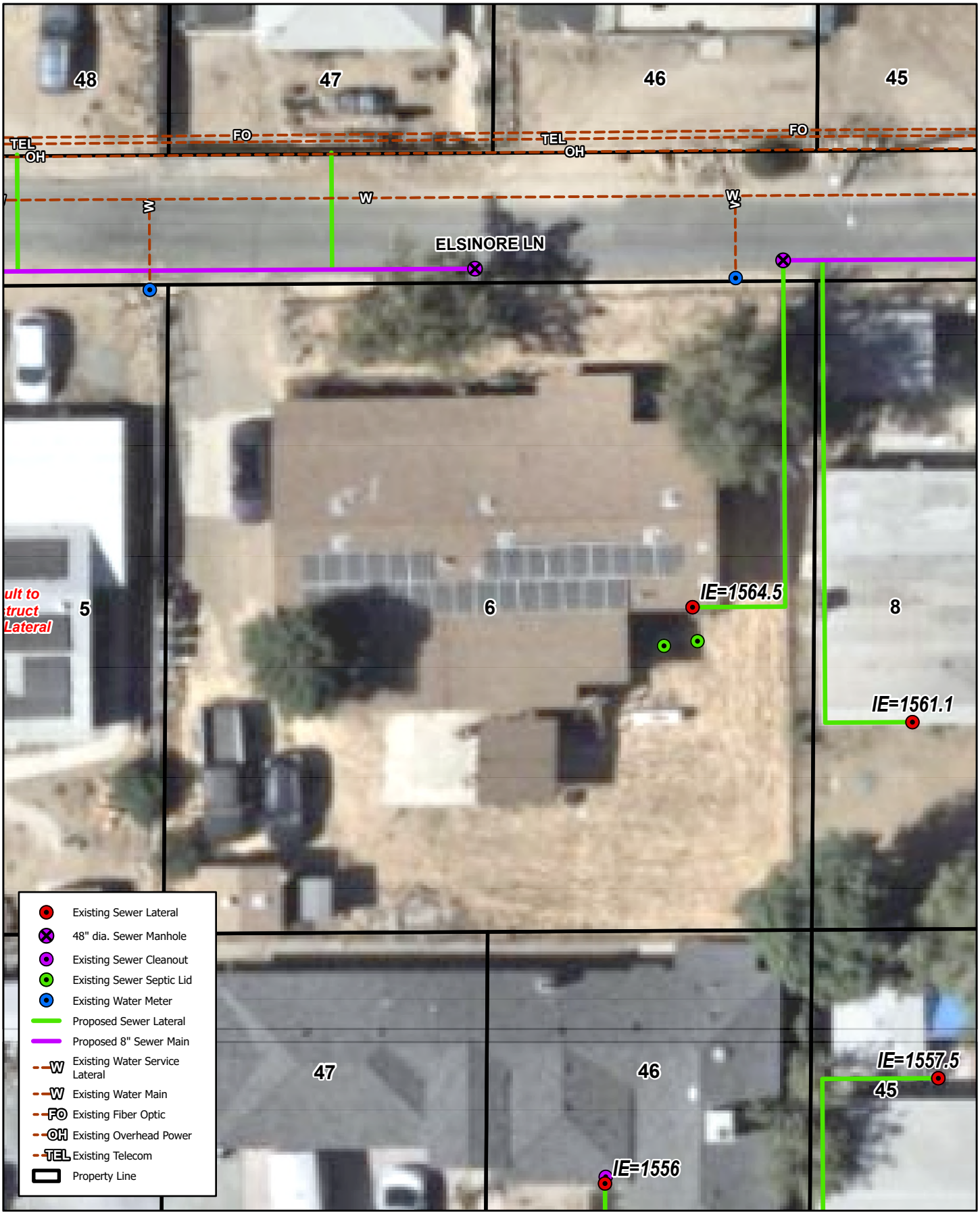


23565 CYPRESS PL, CANYON LAKE, CA 92587

LOT #6

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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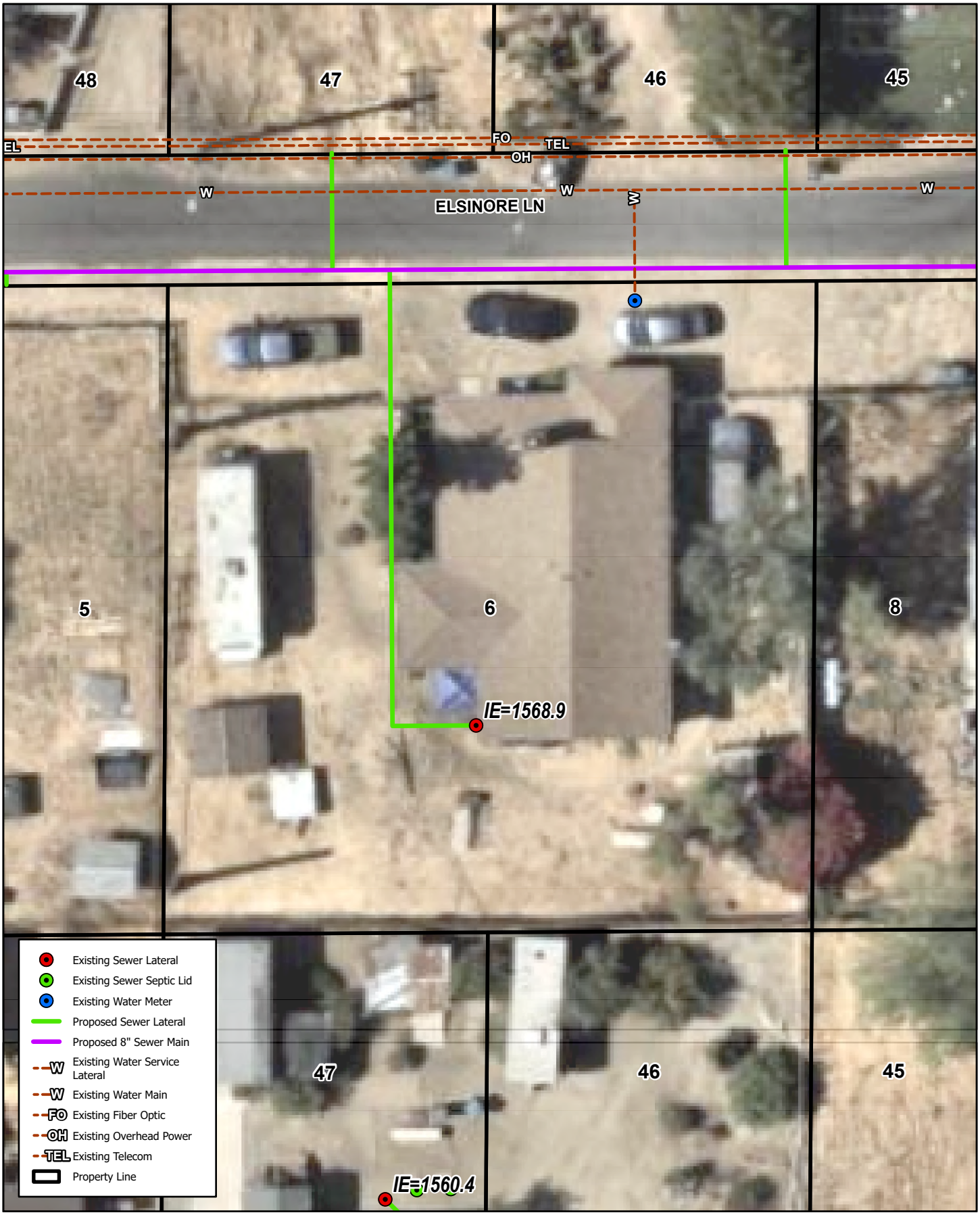
LOT #6

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

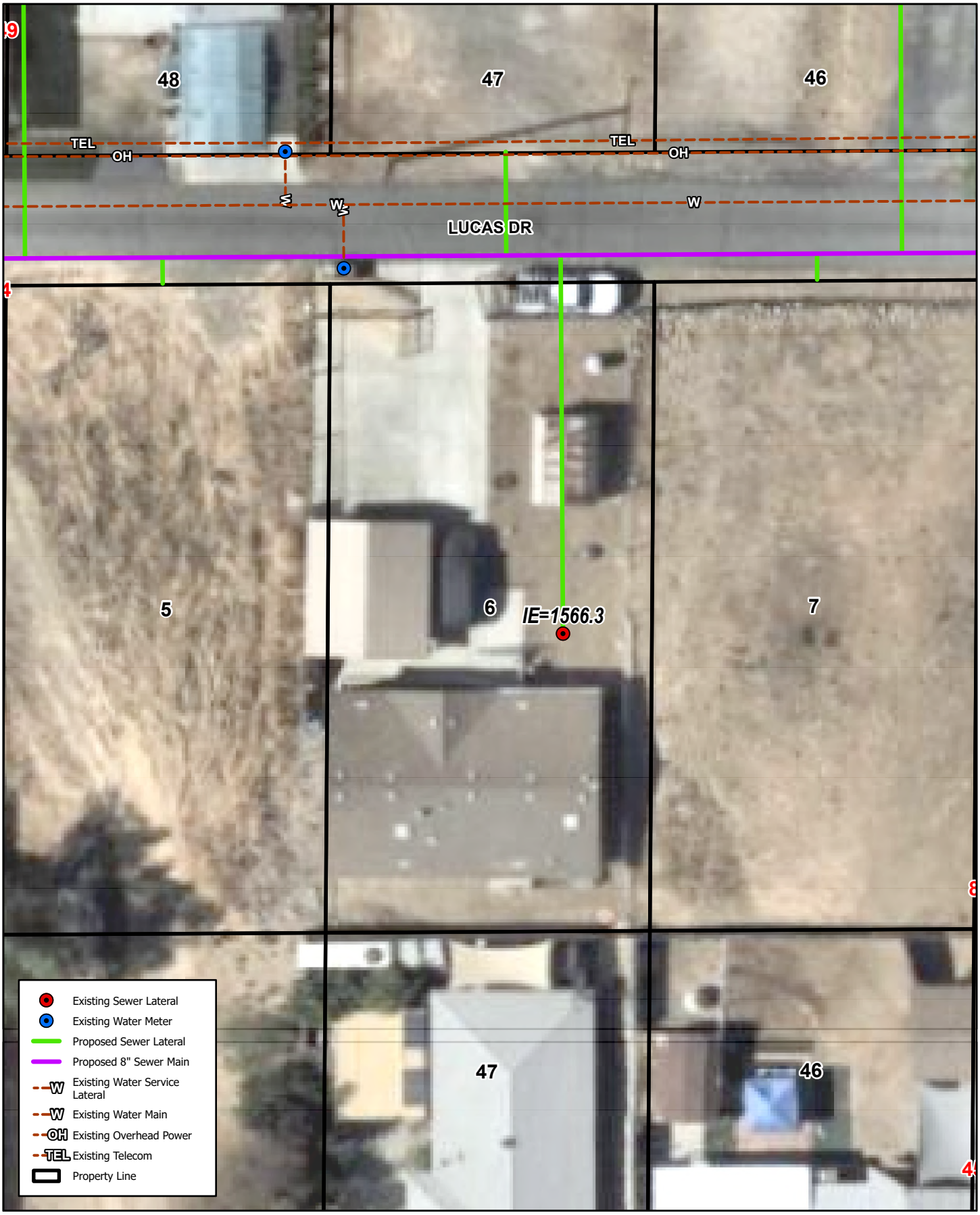


23821 ELSINORE LN, QUAIL VALLEY, CA 92587

LOT #6

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23553 LUCAS DR, QUAIL VALLEY, CA 92587

LOT #6

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

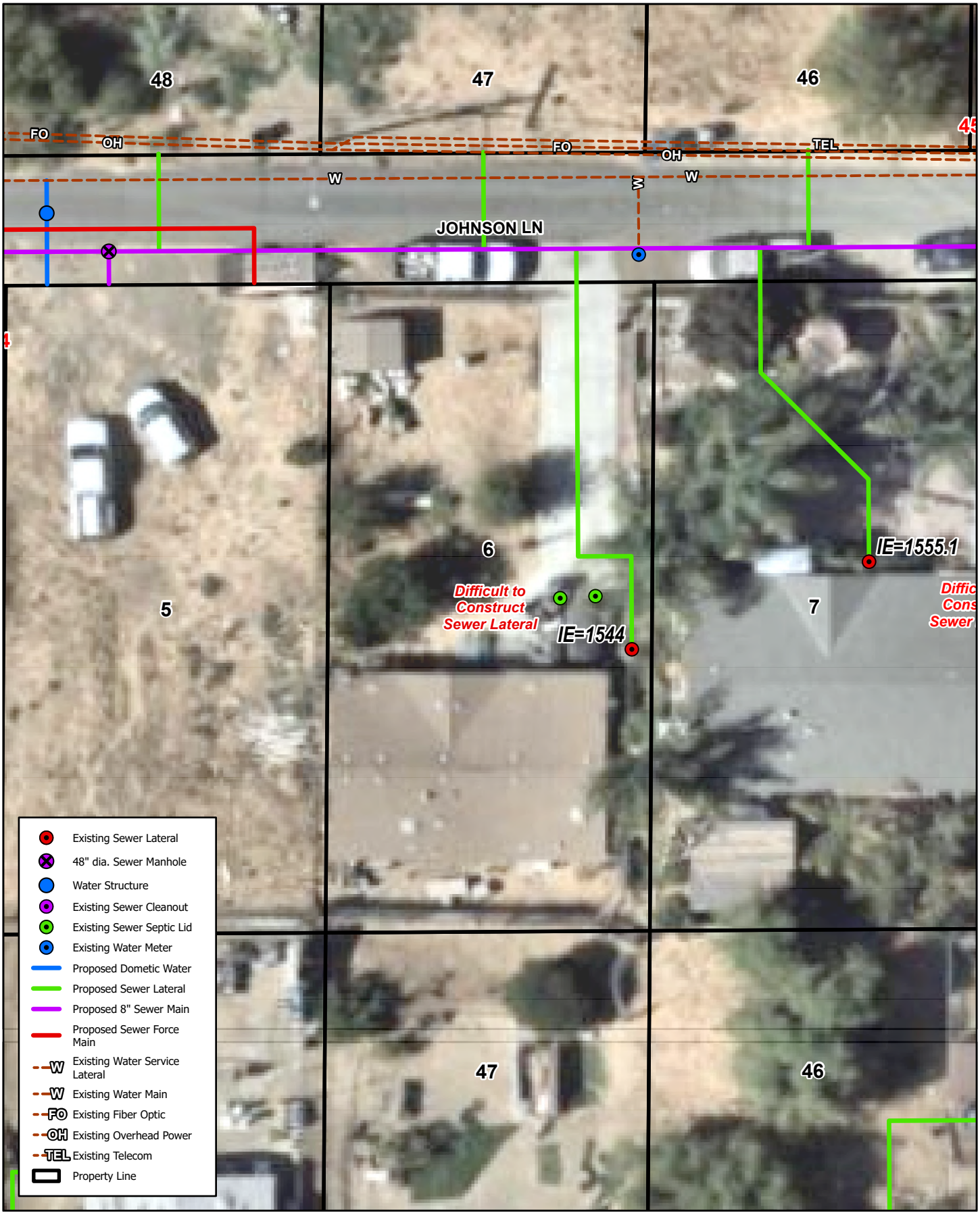


23803 LUCAS DR, CANYON LAKE, CA 92587

LOT #6

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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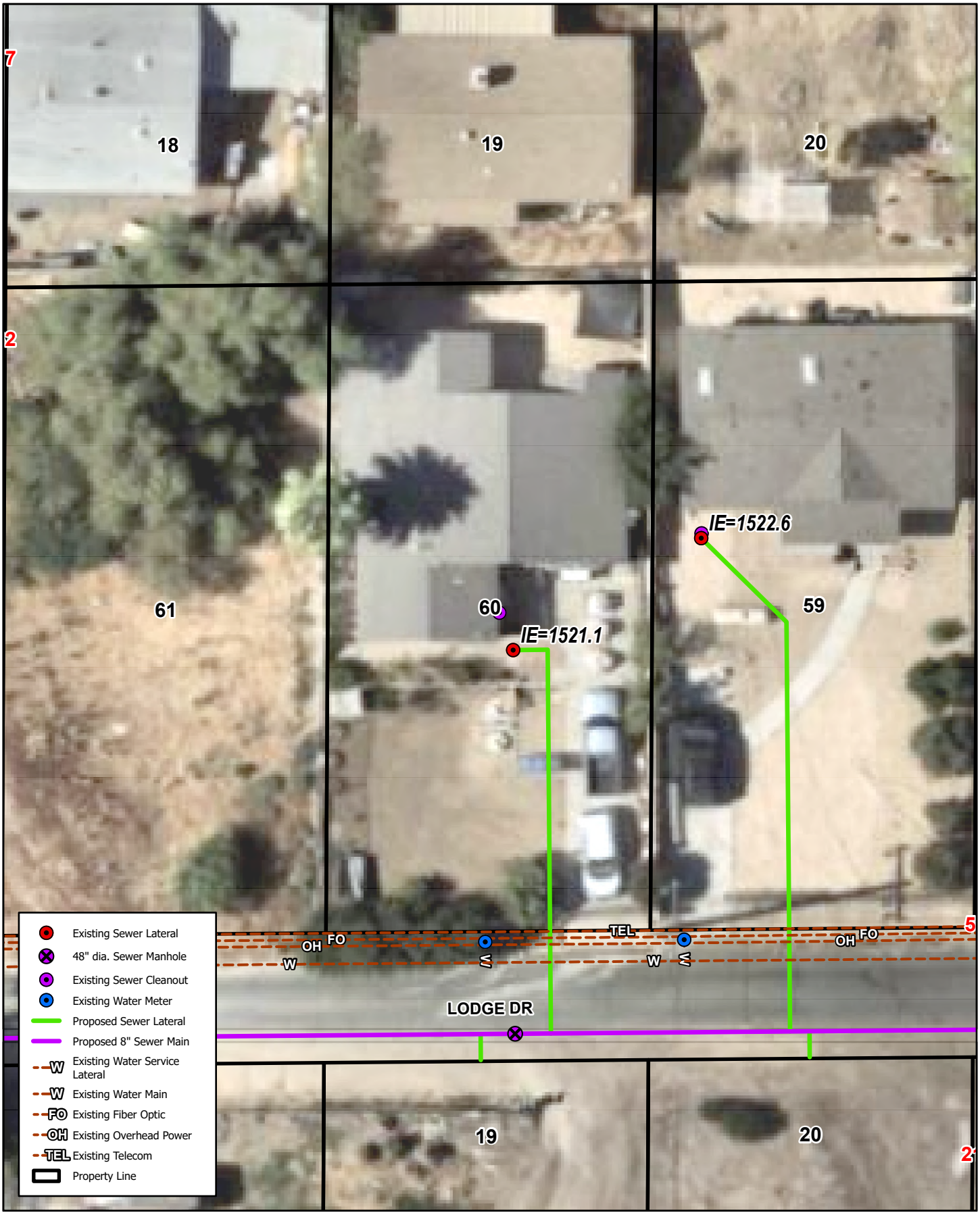
LOT #6

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23680 LODGE DR, CANYON LAKE, CA 92587

LOT #60

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

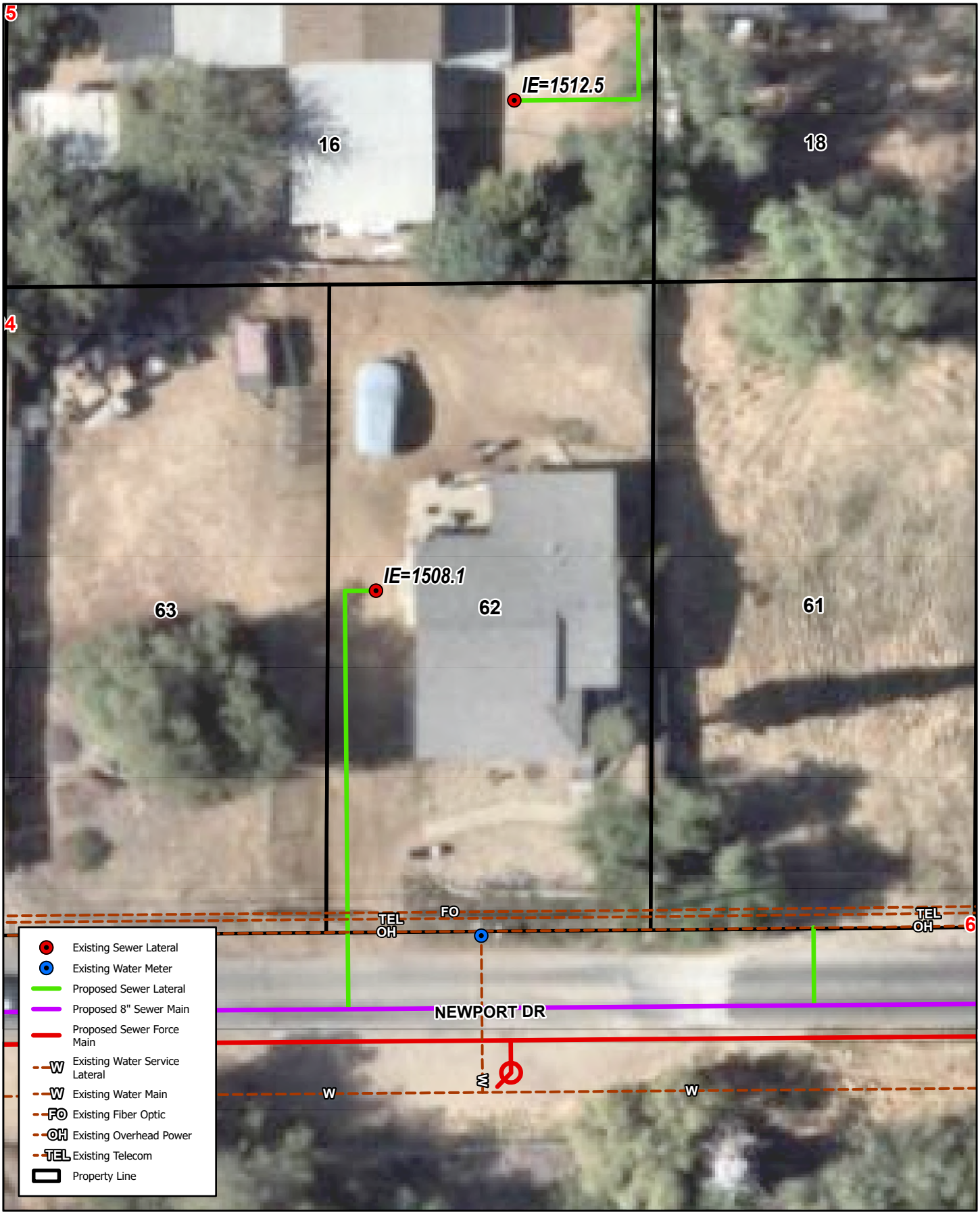


23670 KENNEDY LN, CANYON LAKE, CA 92587

LOT #61

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

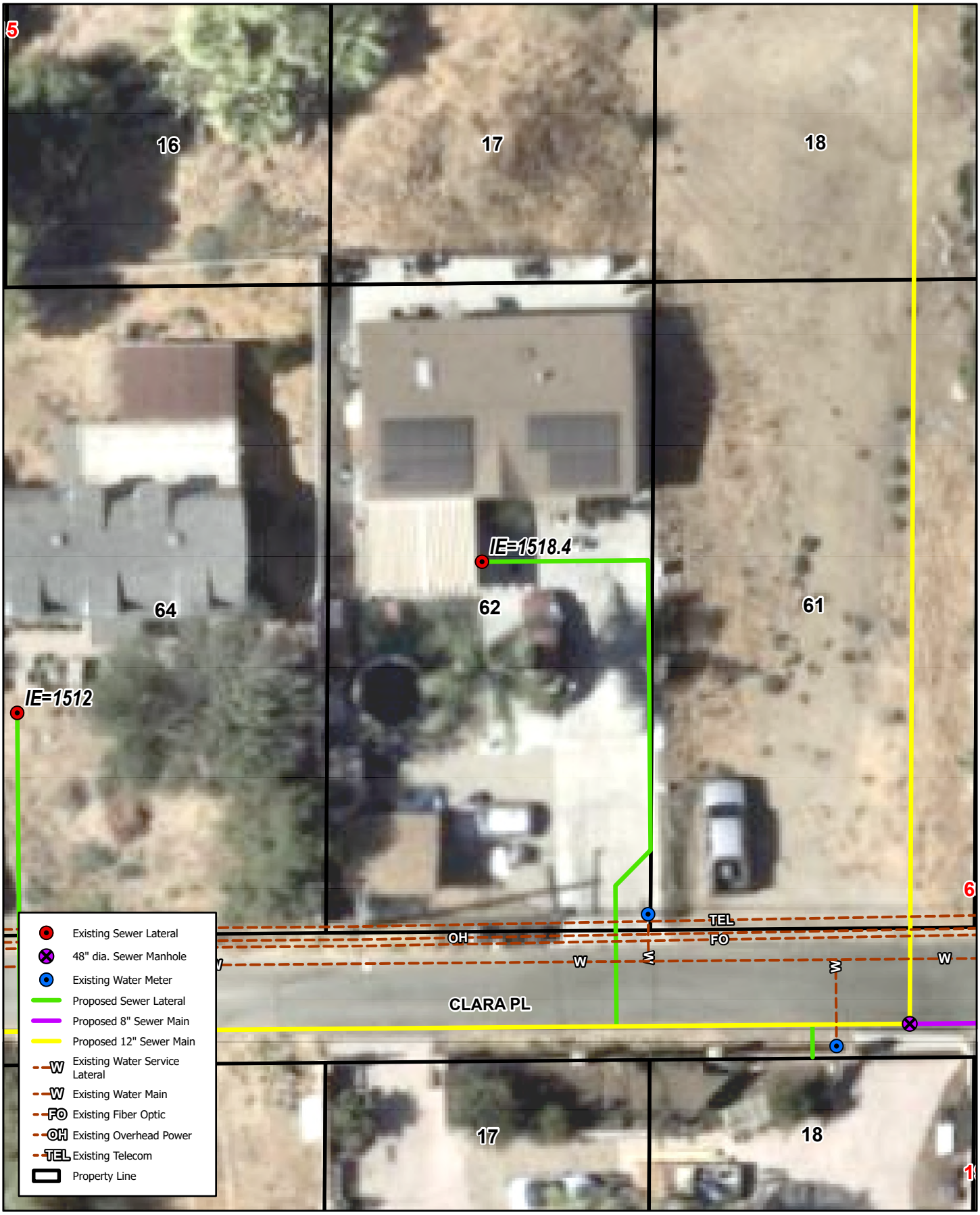


23666 NEWPORT DR, CANYON LAKE, CA 92587

LOT #62

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

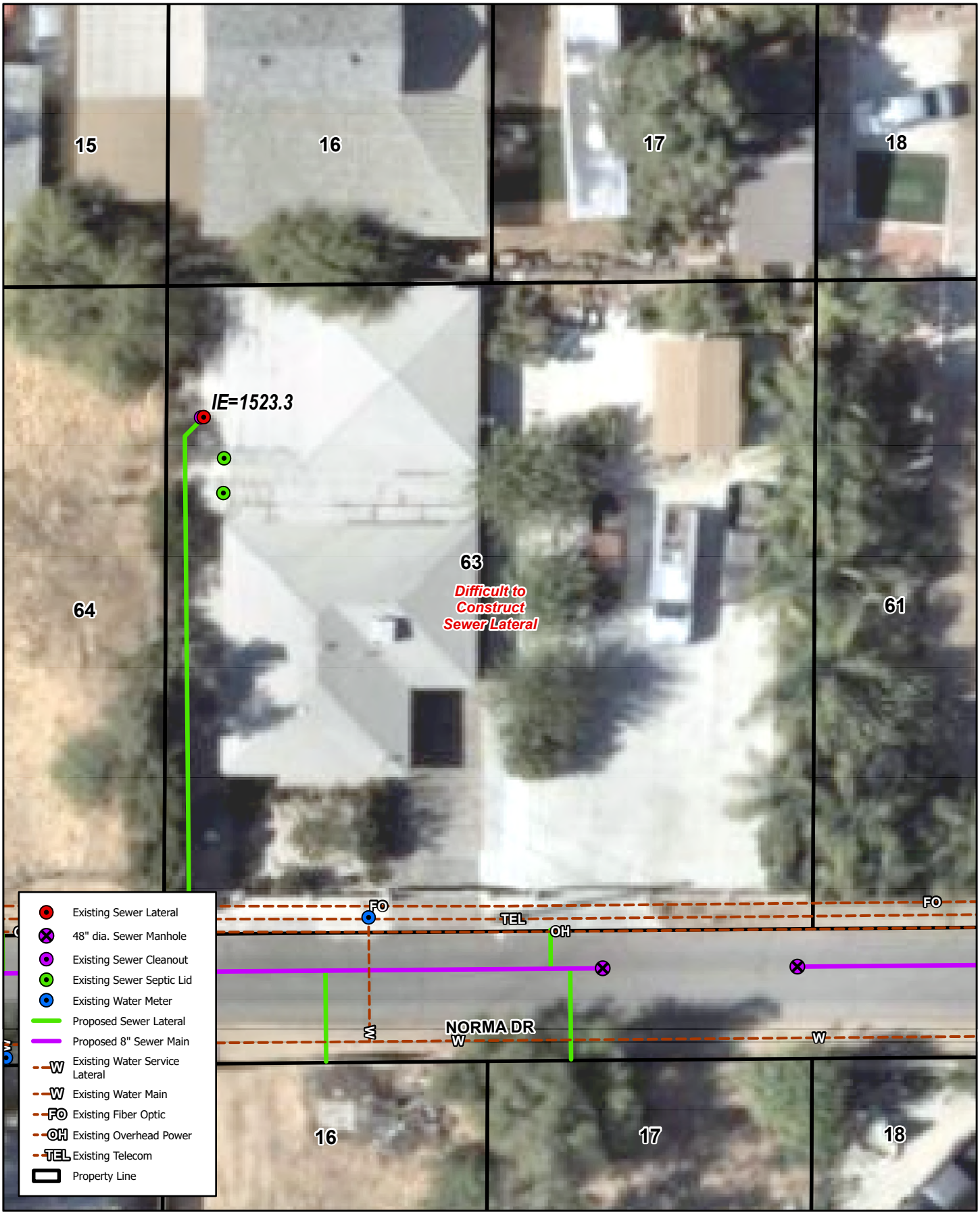


23636 CLARA PL, CANYON LAKE, CA 92587

LOT #62

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

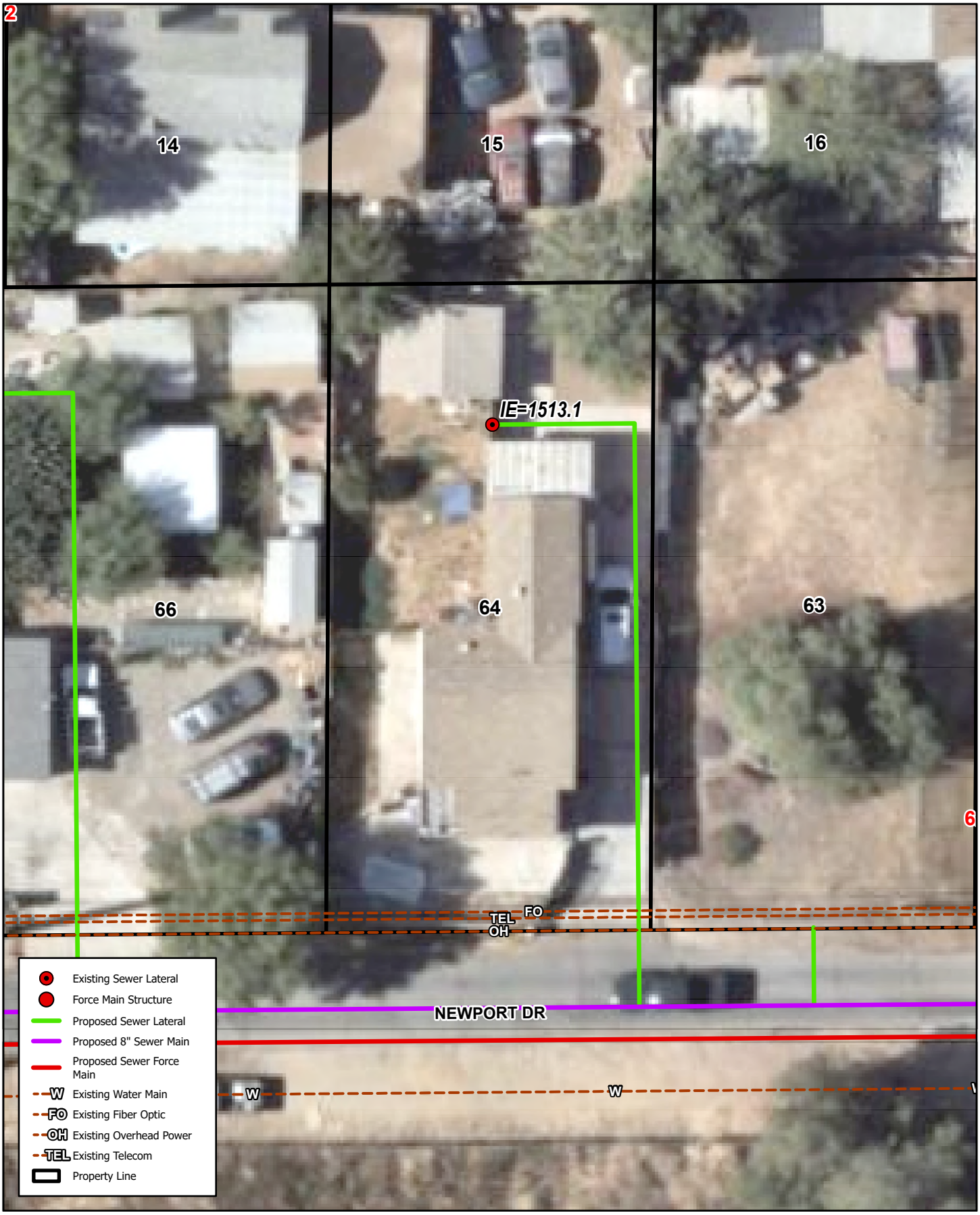


23658 NORMA DR, CANYON LAKE, CA 92587

LOT #63

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23646 NEWPORT DR, CANYON LAKE, CA 92587

LOT #64

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

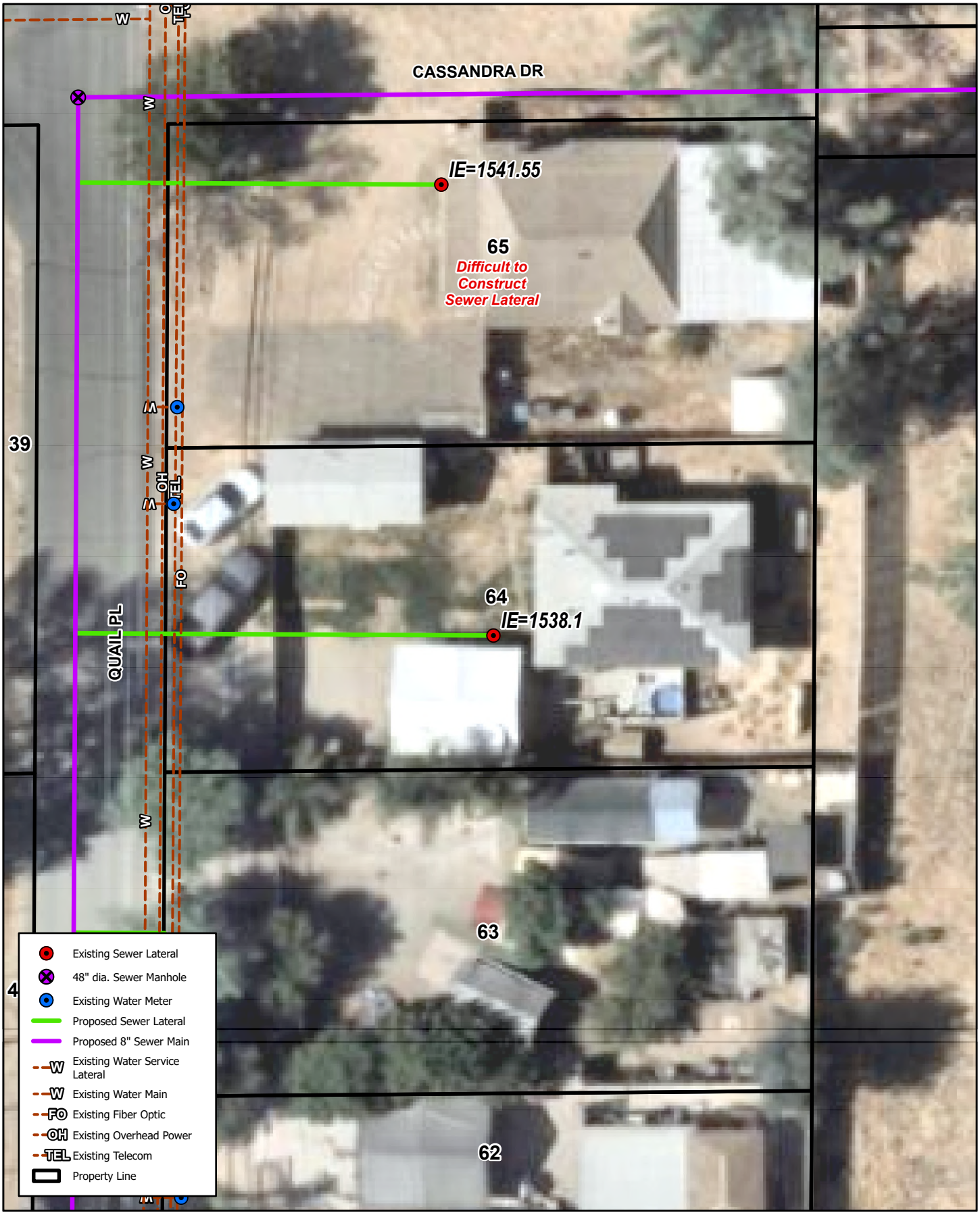


23626 CLARA PL, CANYON LAKE, CA 92587

LOT #64

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

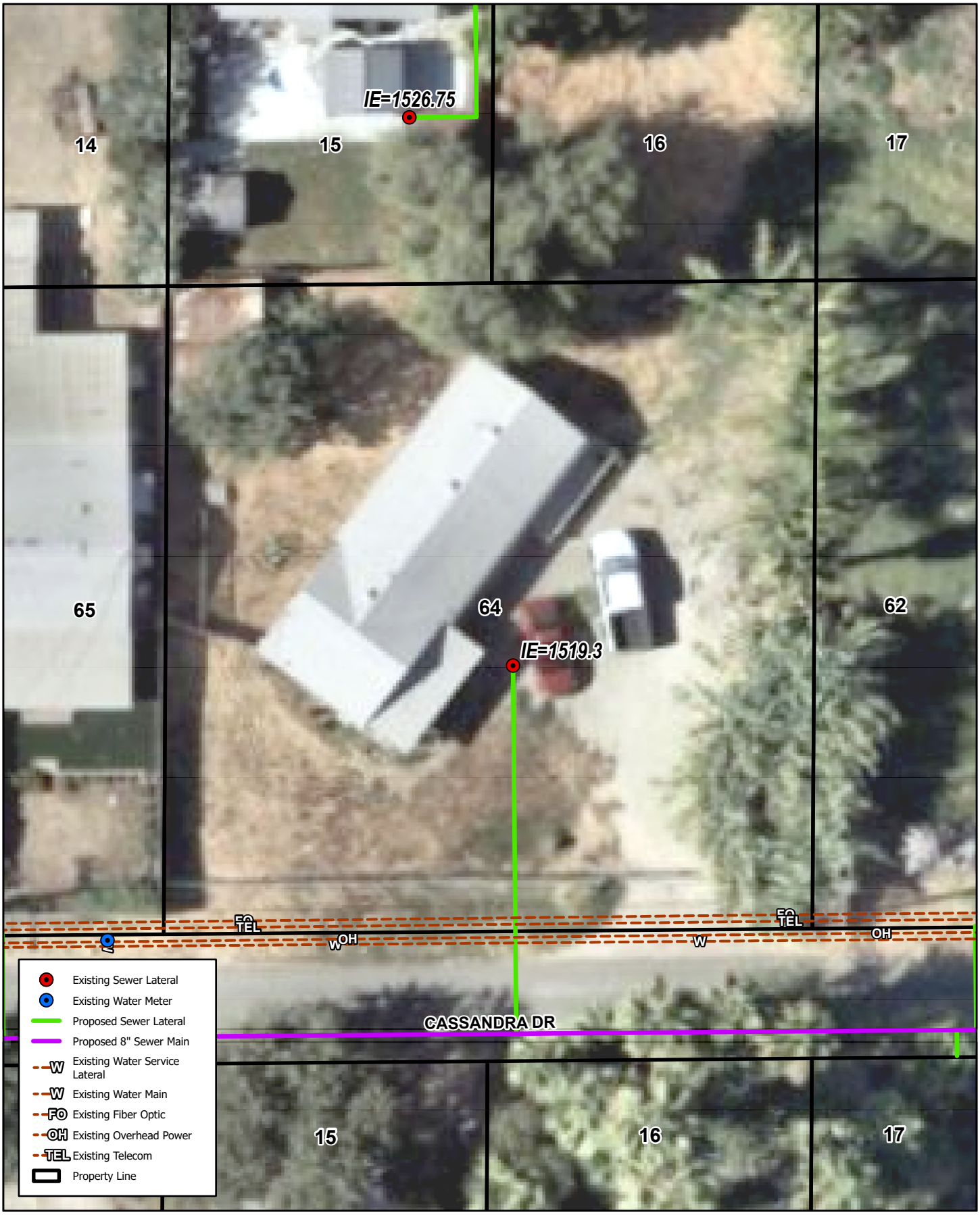


28674 QUAIL PL, CANYON LAKE, CA 92587

LOT #64

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

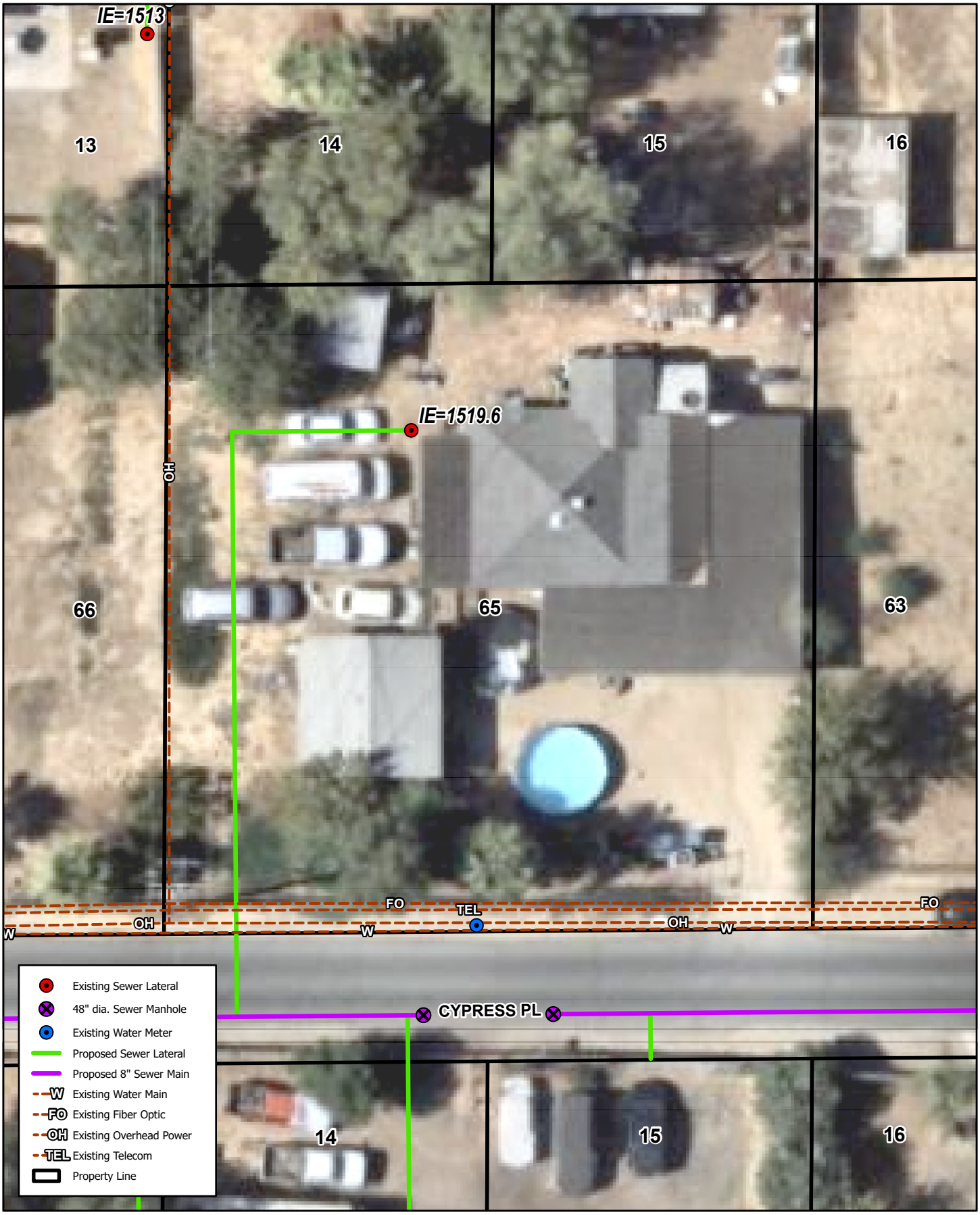


23602 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #64

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

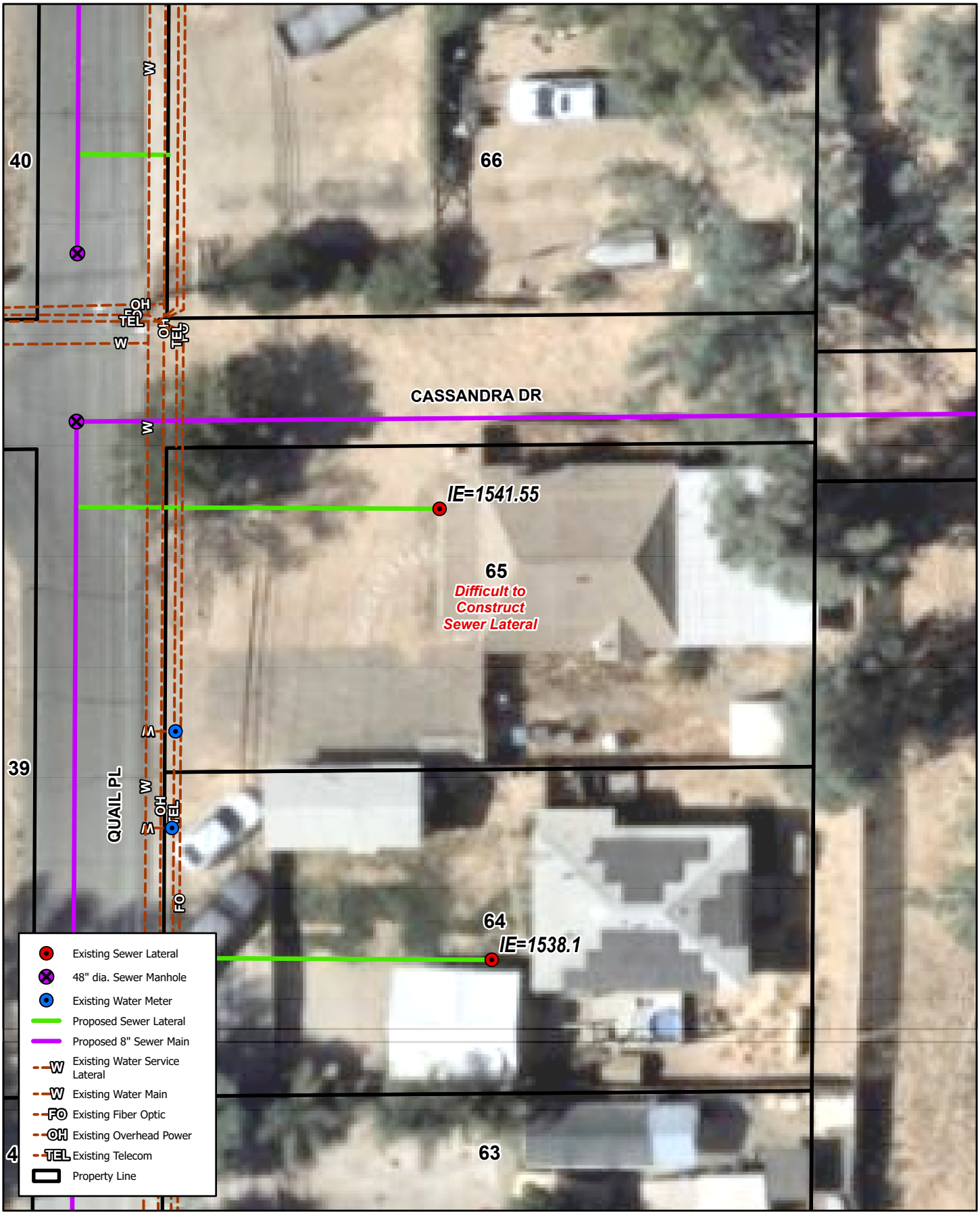


23644 CYPRESS PL, CANYON LAKE, CA 92587

LOT #65

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

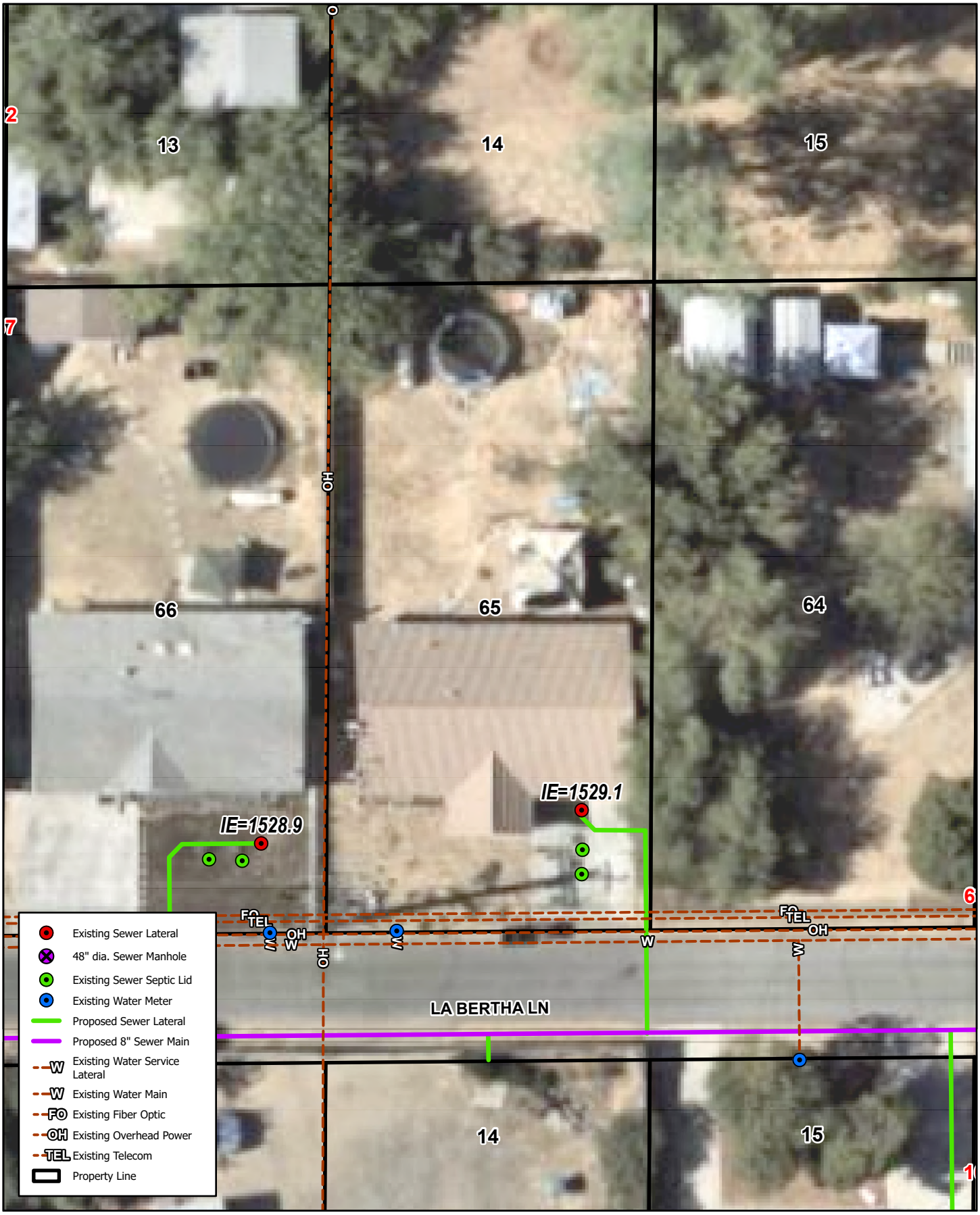


28666 QUAIL PL, QUAIL VALLEY, CA 92587

LOT #65

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

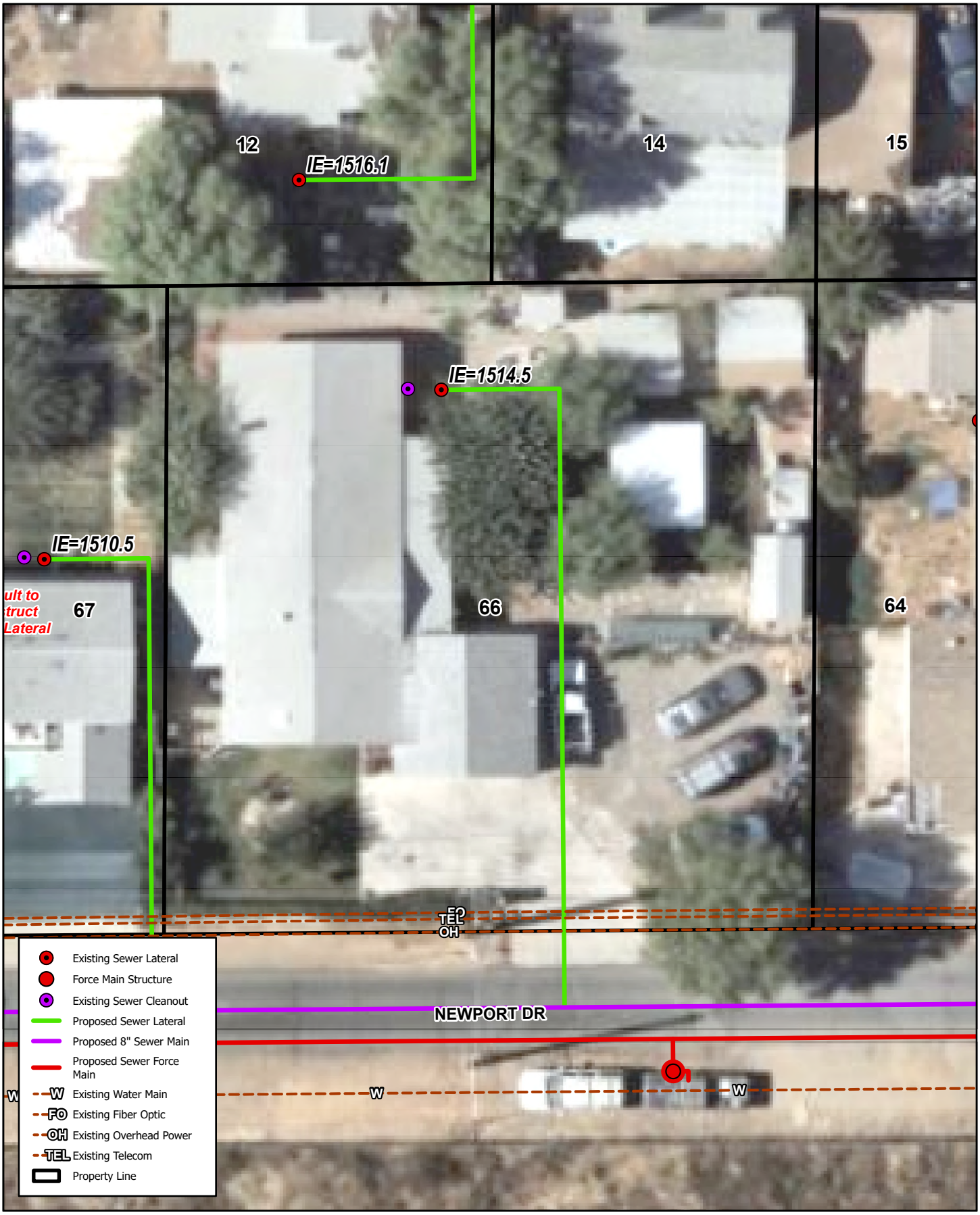


23620 LA BERTHA LN, CANYON LAKE, CA 92587

LOT #65

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

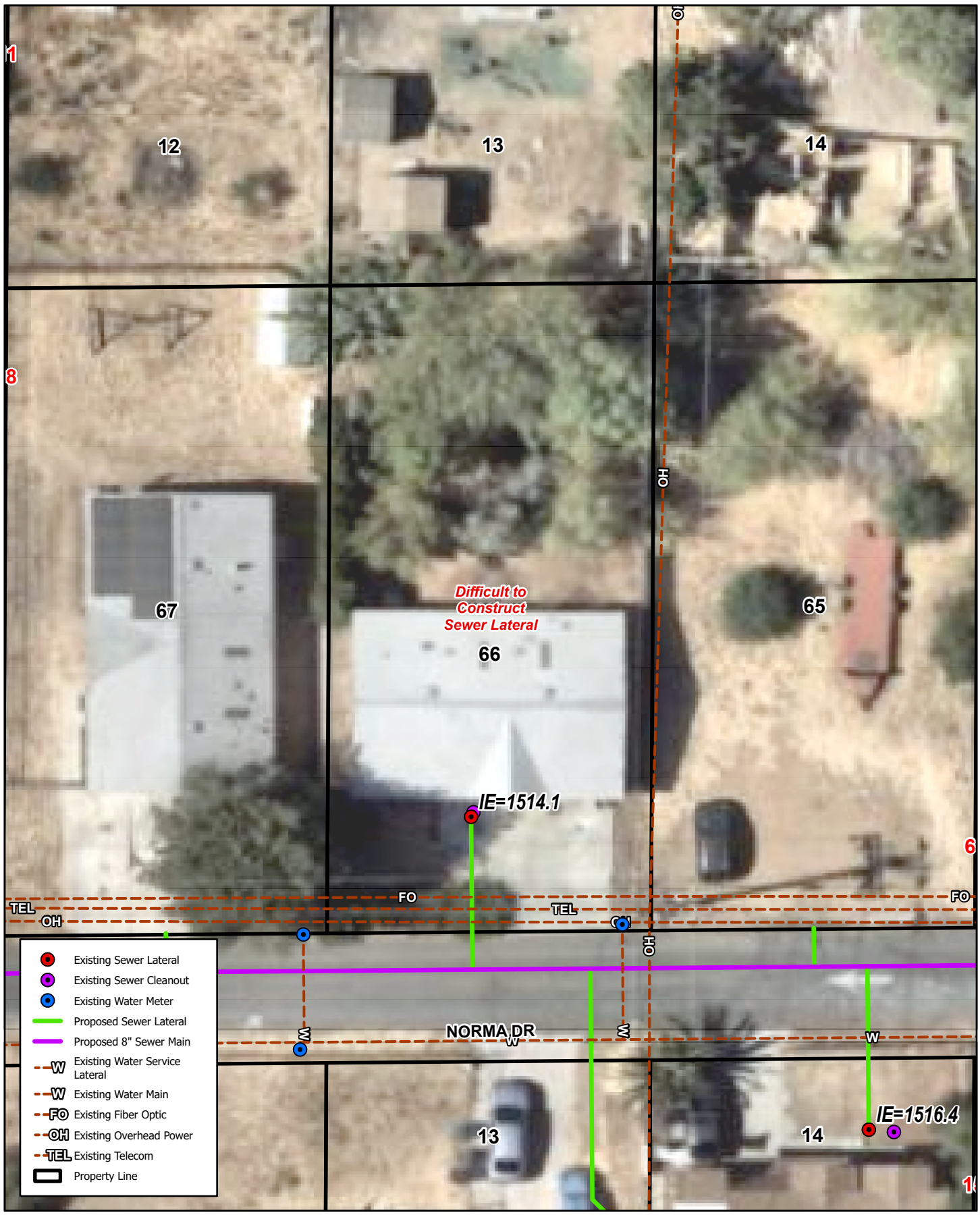


23626 NEWPORT DR, CANYON LAKE, CA 92587

LOT #66

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23628 NORMA DR, QUAIL VALLEY, CA 92587

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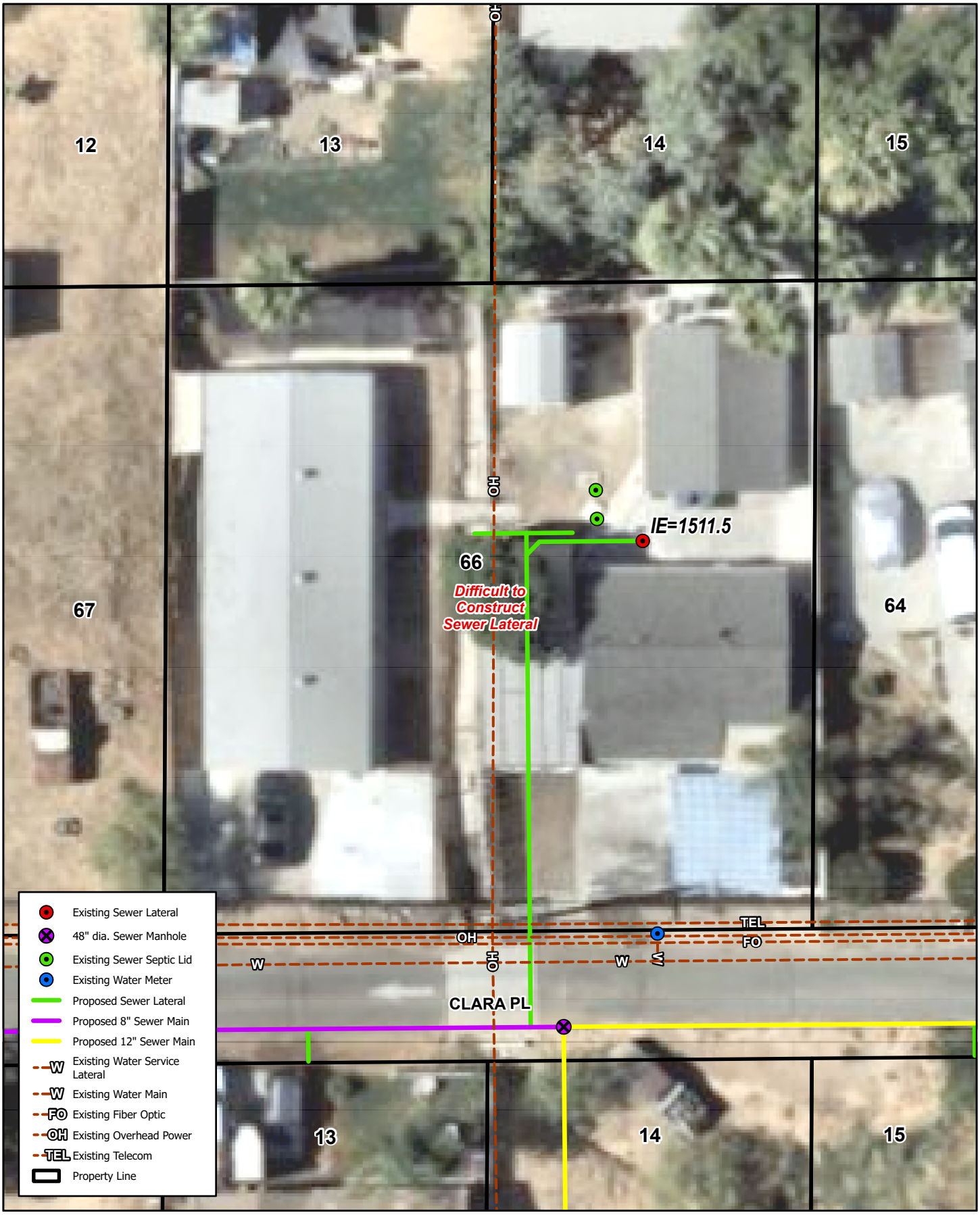
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

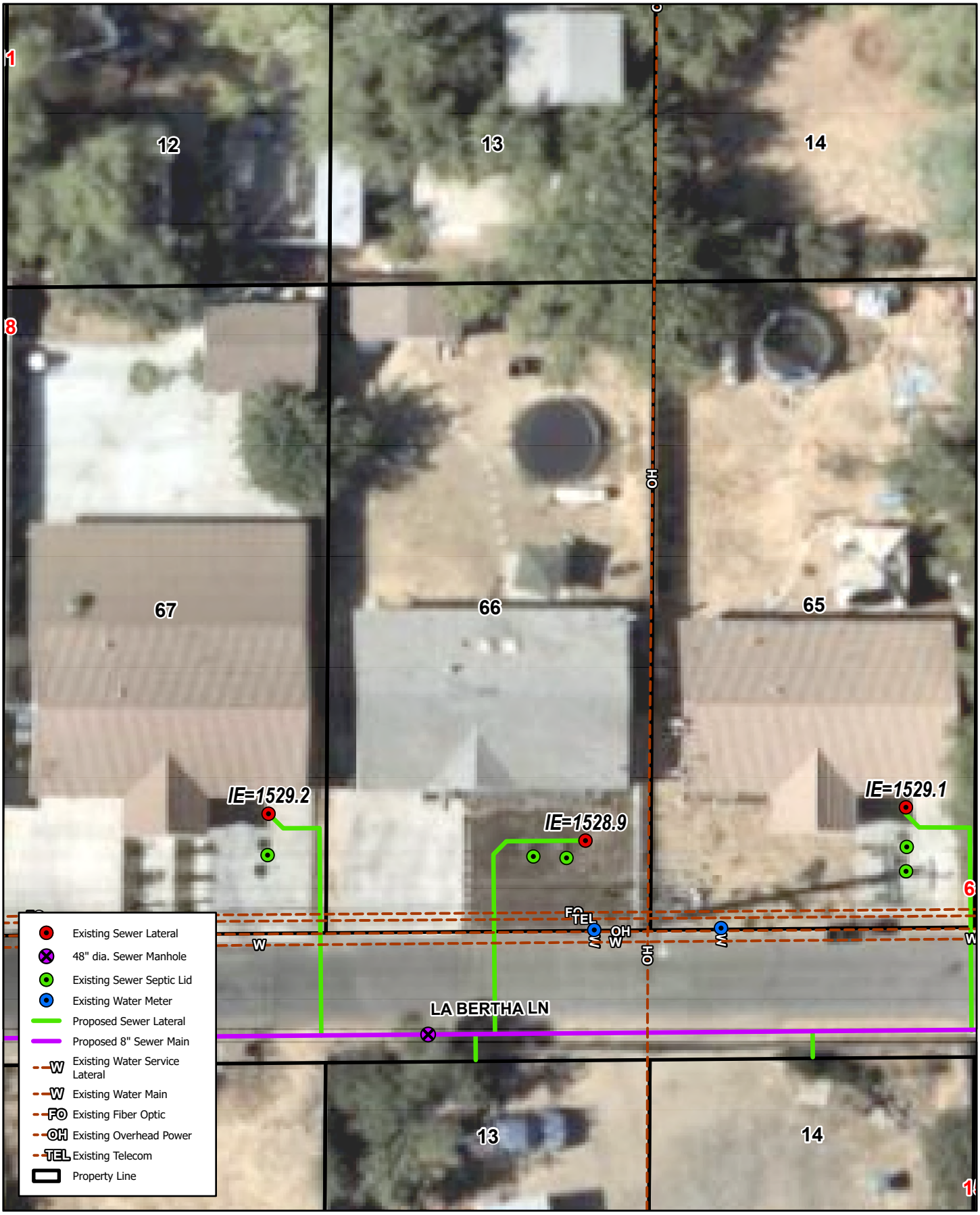


23596 CLARA PL, CANYON LAKE, CA 92587

LOT #66

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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Quail Valley - Subarea 4 Sewer Improvement Plans

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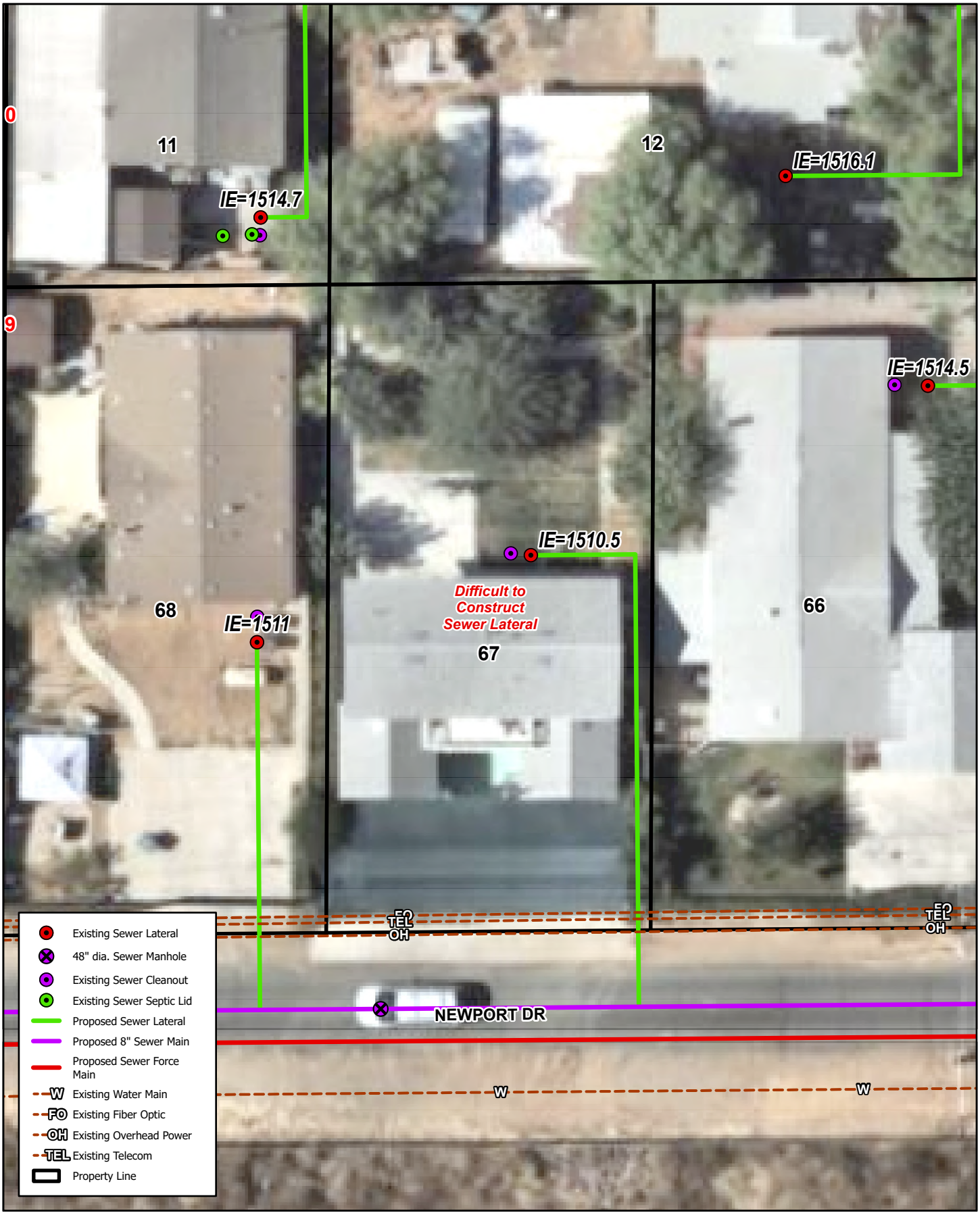
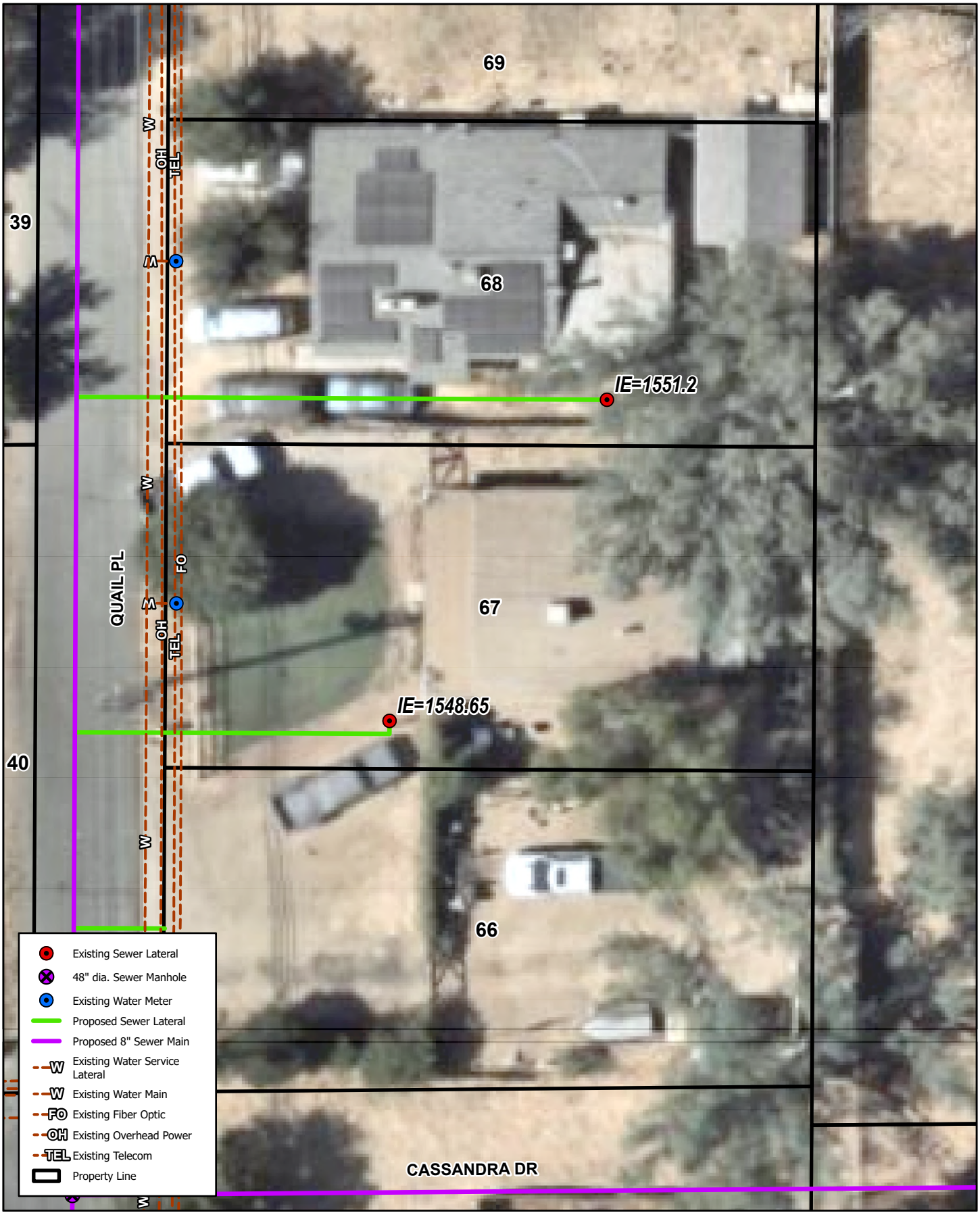


23610 NEWPORT RD, CANYON LAKE, CA 92587

LOT #67

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

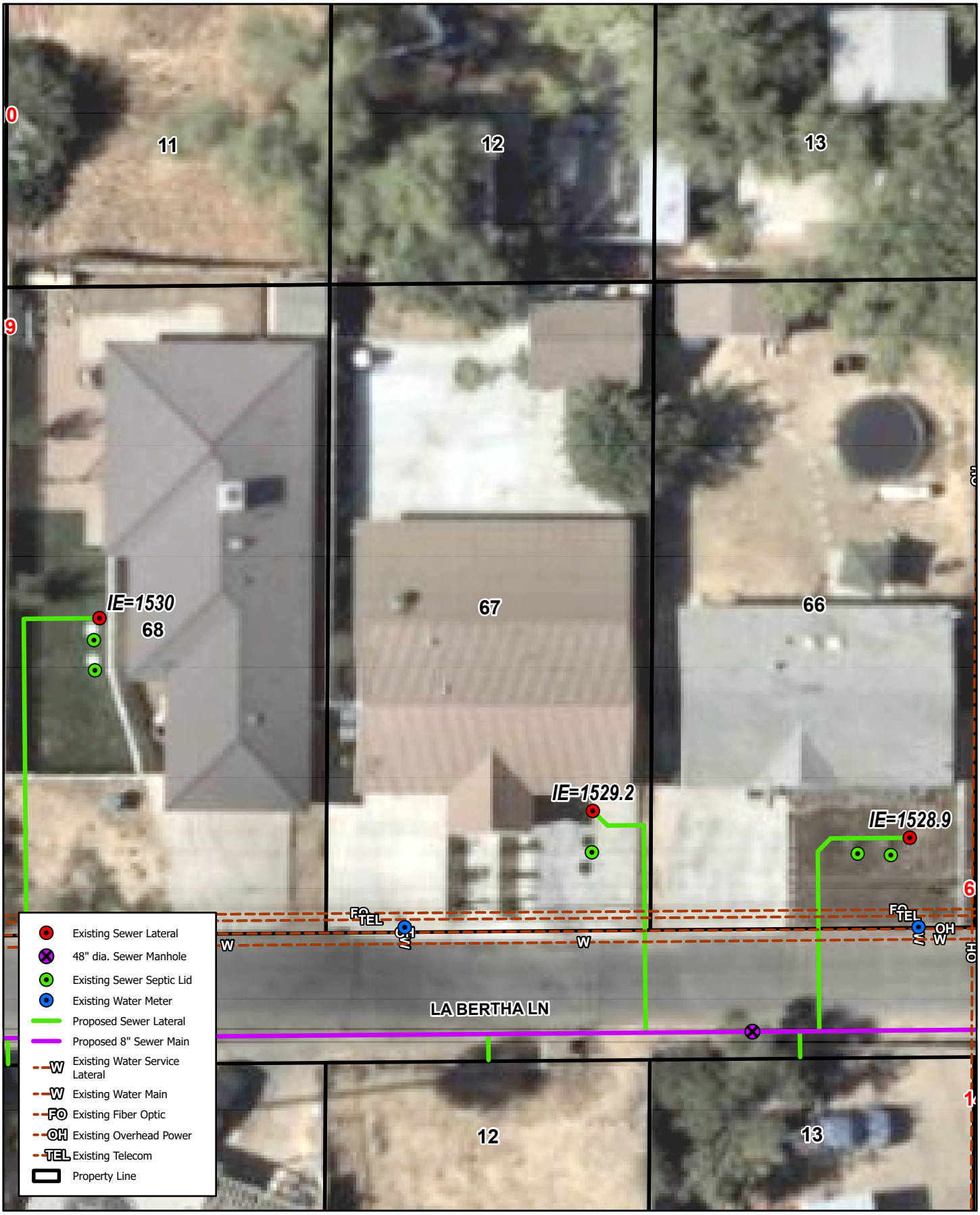


28644 QUAIL PL, CANYON LAKE, CA 92587

LOT #67

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

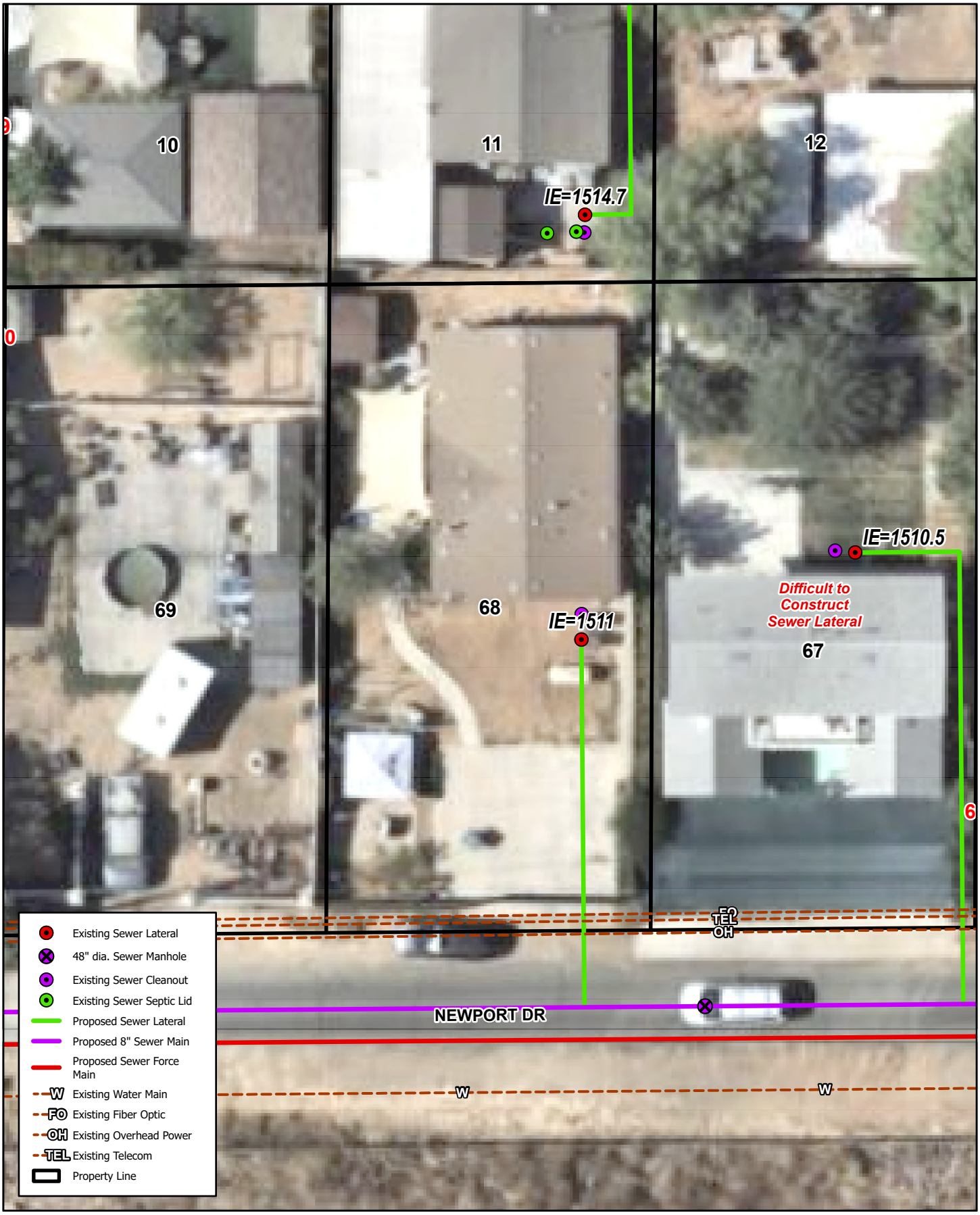


23588 LA BERTHA LN, CANYON LAKE, CA 92587

LOT #67

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

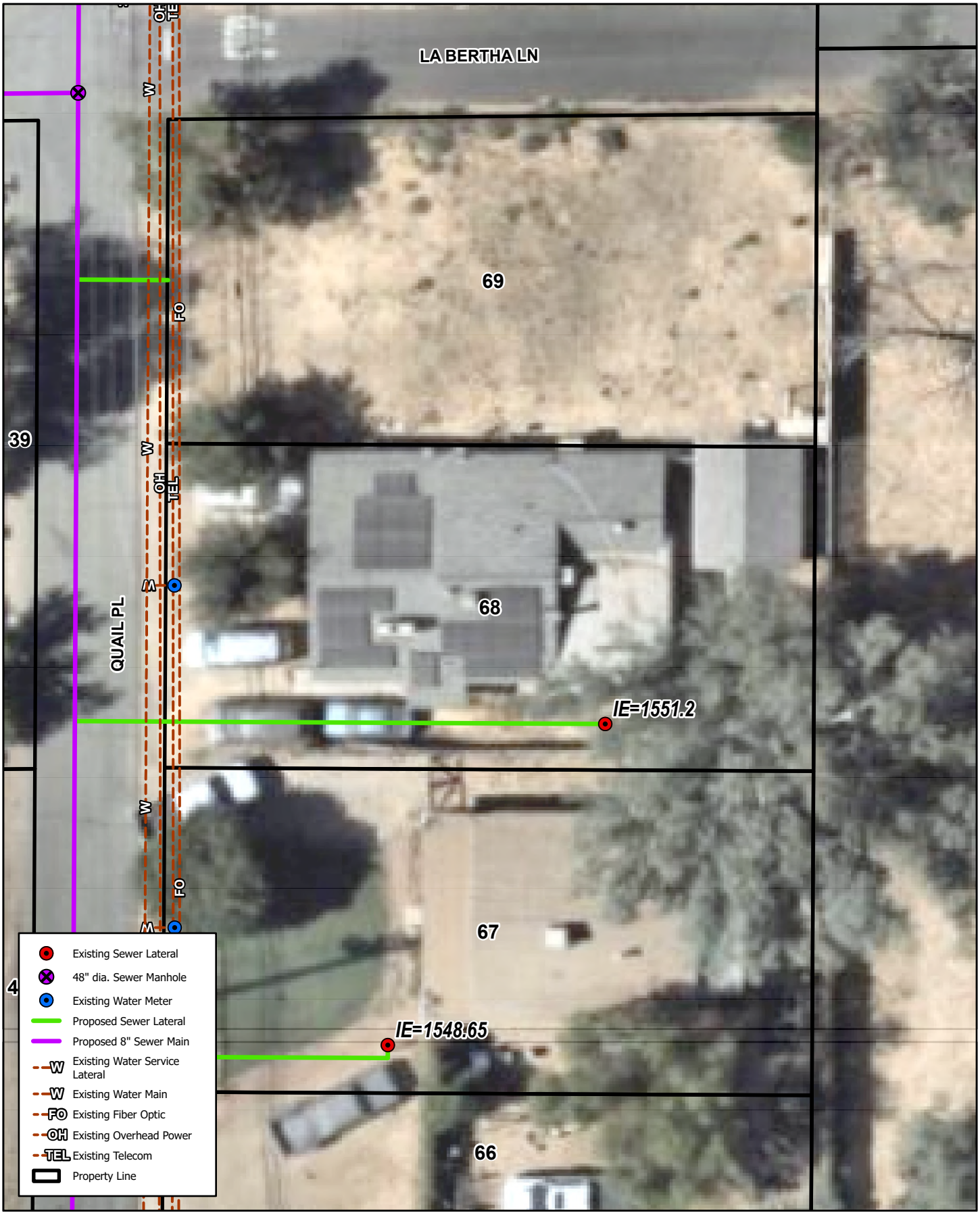


23596 NEWPORT DR, CANYON LAKE, CA 92587

LOT #68

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

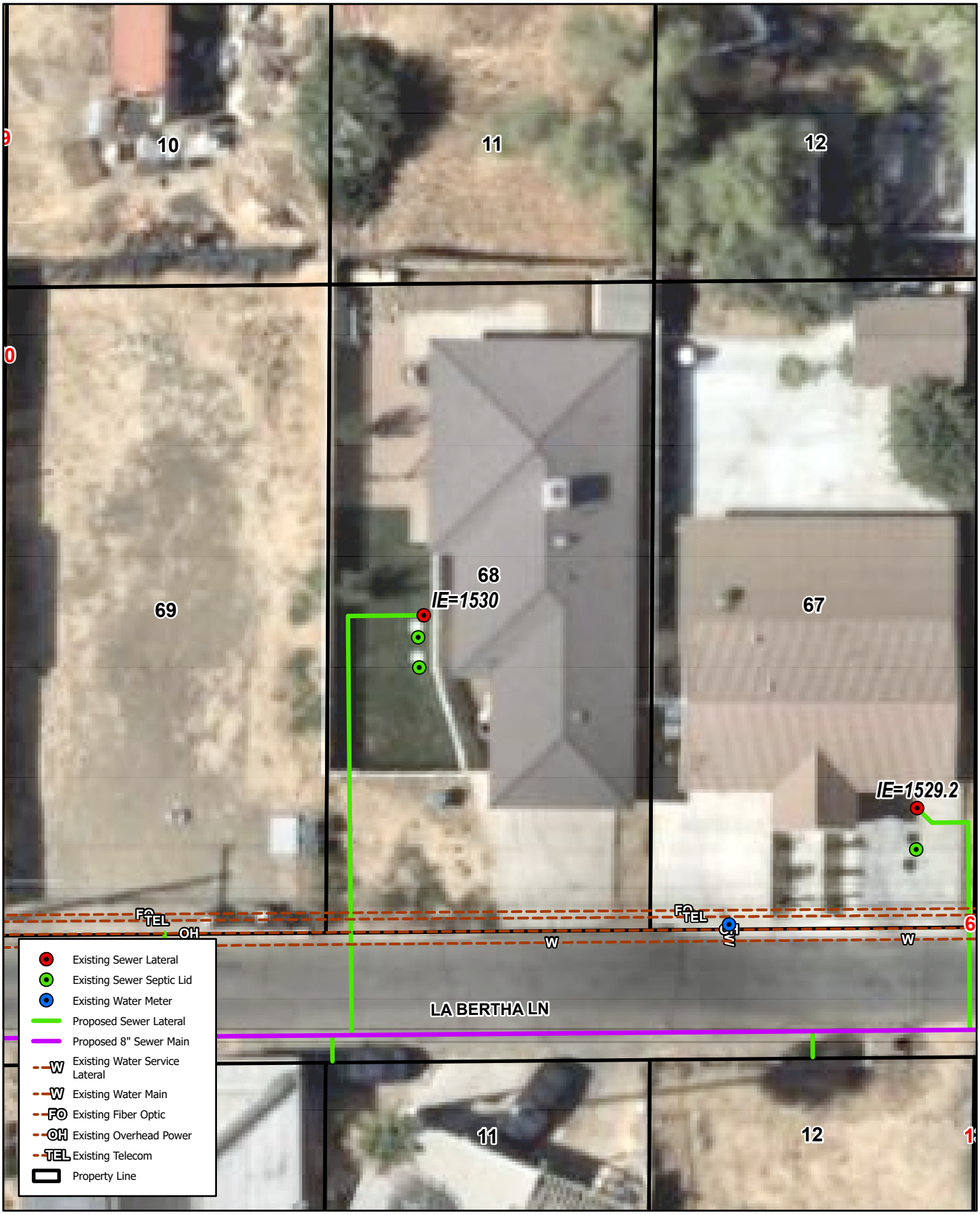


28636 QUAIL PL, CANYON LAKE, CA 92587

LOT #68

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

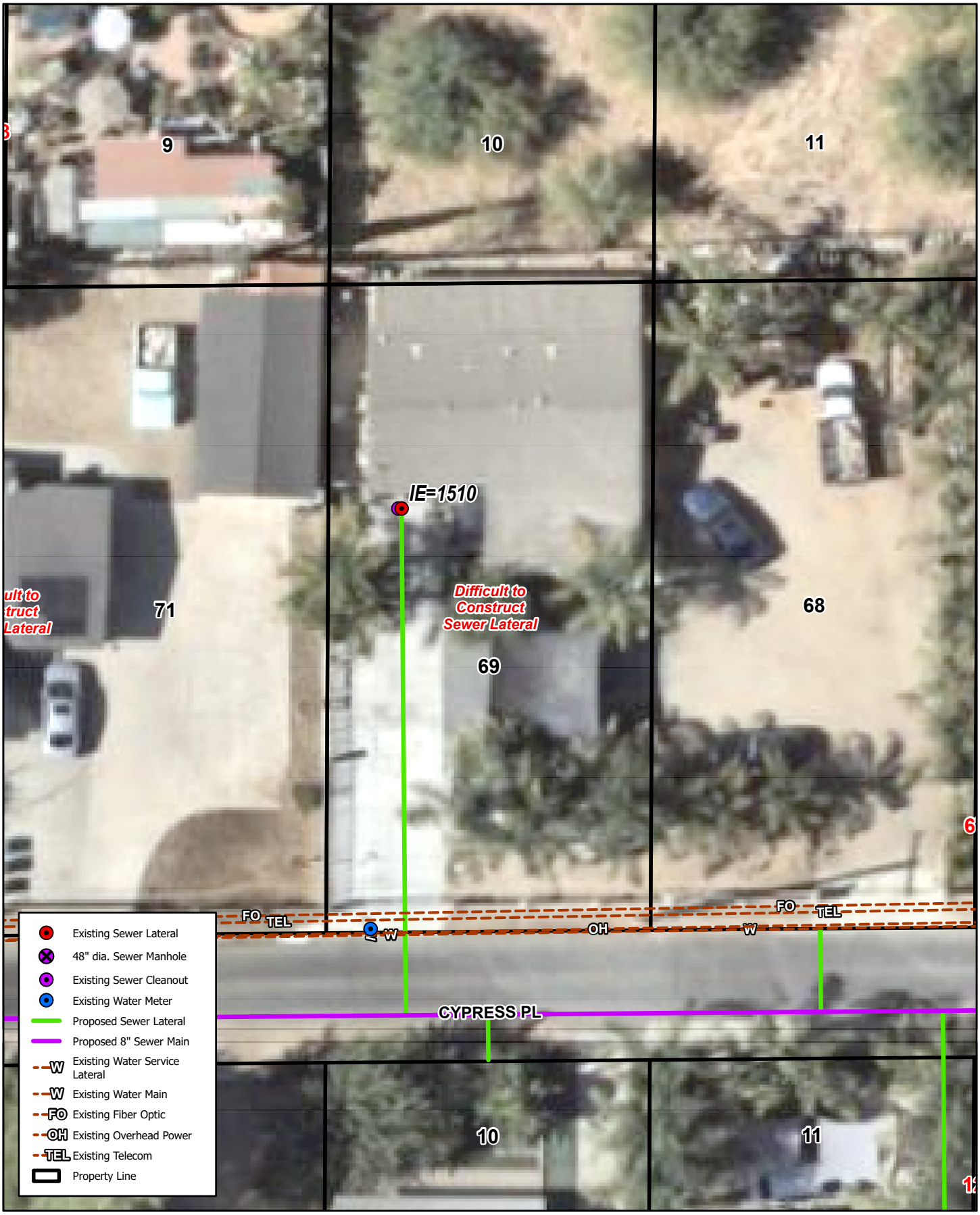


23582 LABERTHA LN, CANYON LAKE, CA 92587

LOT #68

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23590 CYPRESS PL, CANYON LAKE, CA 92587

LOT #69

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

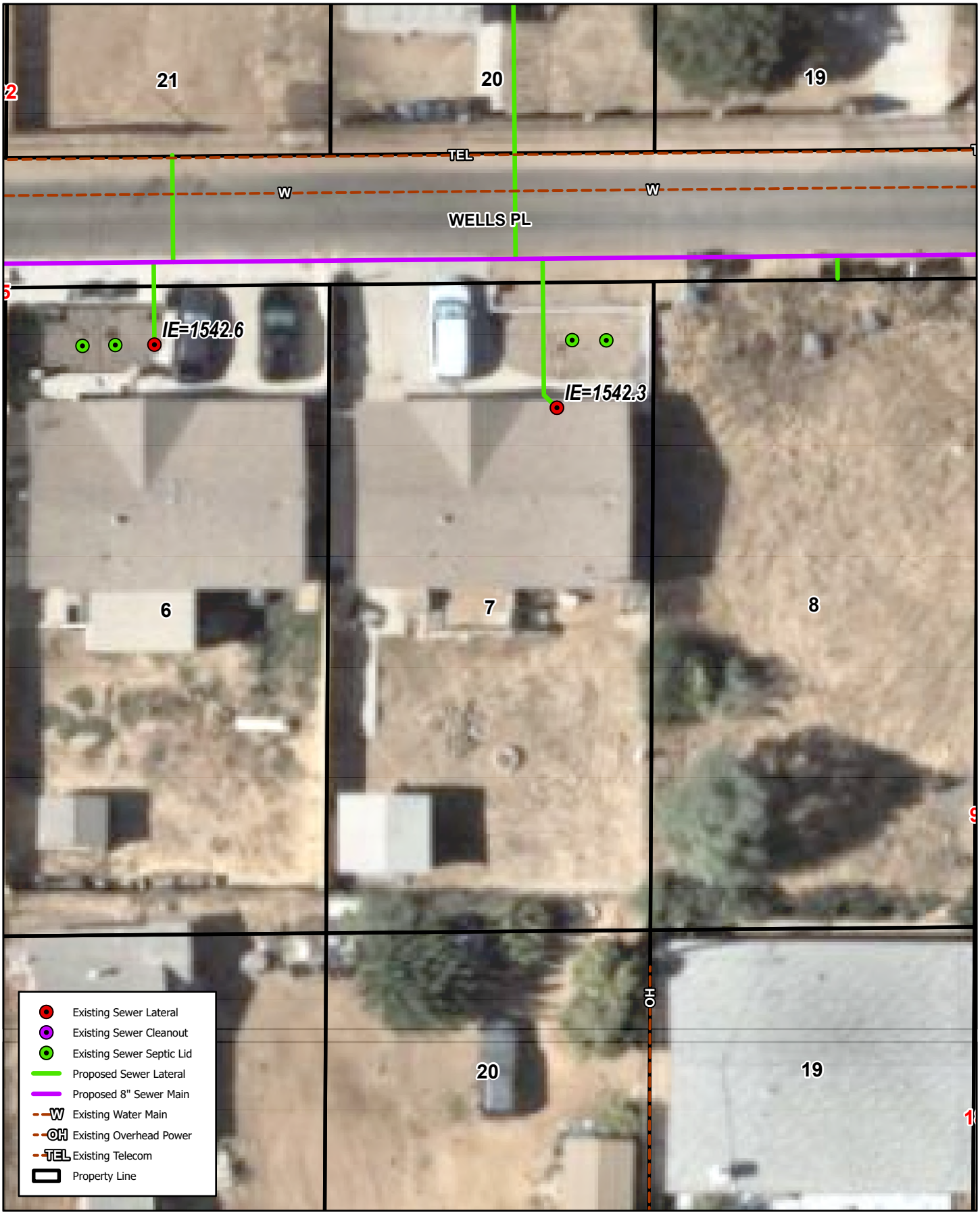


23560 CLARA PL, CANYON LAKE, CA 92587

LOT #69

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23941 WELLS PL, CANYON LAKE, CA 92587

LOT #7

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

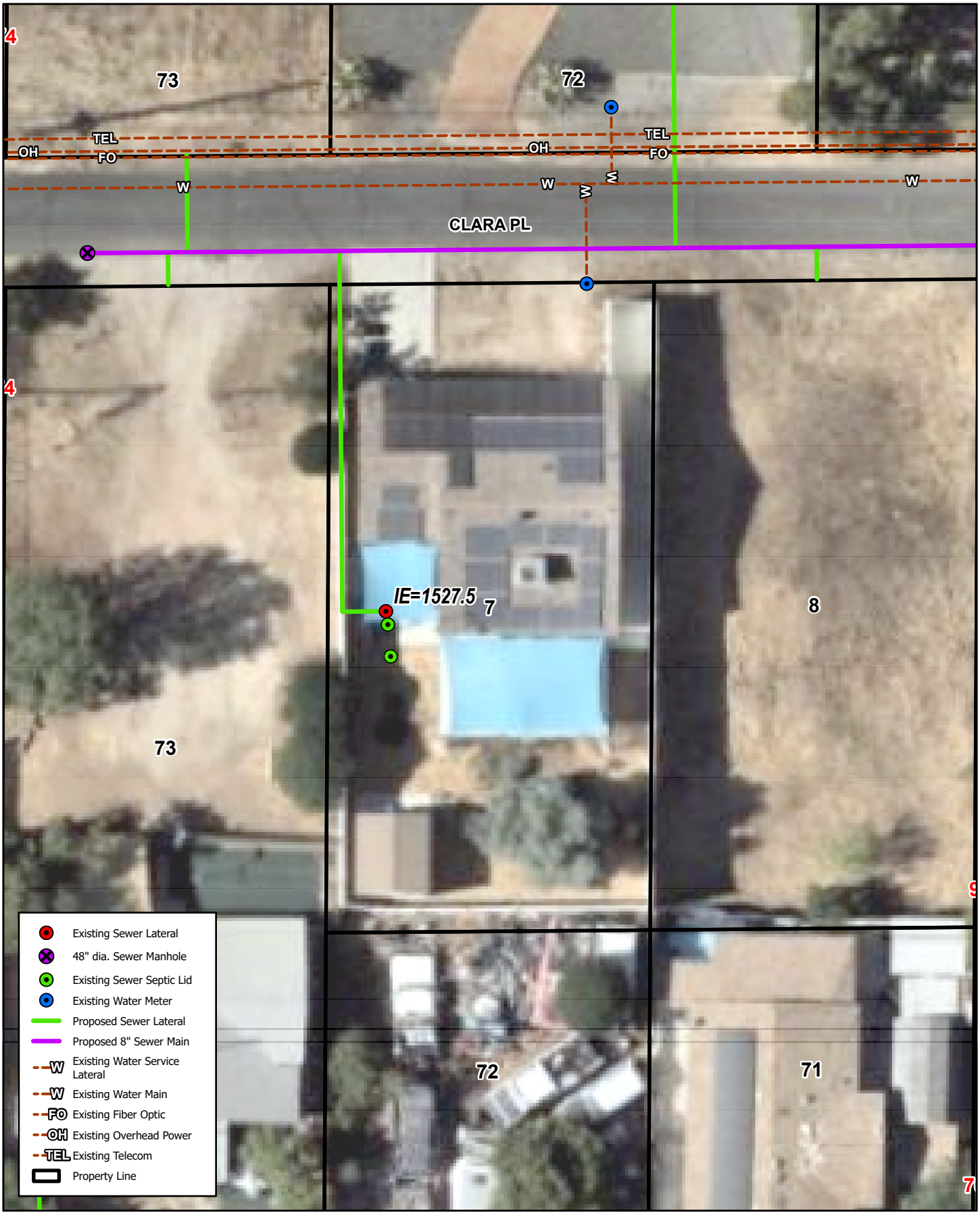


23563 LODGE DR, CANYON LAKE, CA 92587

LOT #7

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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Quail Valley - Subarea 4 Sewer Improvement Plans

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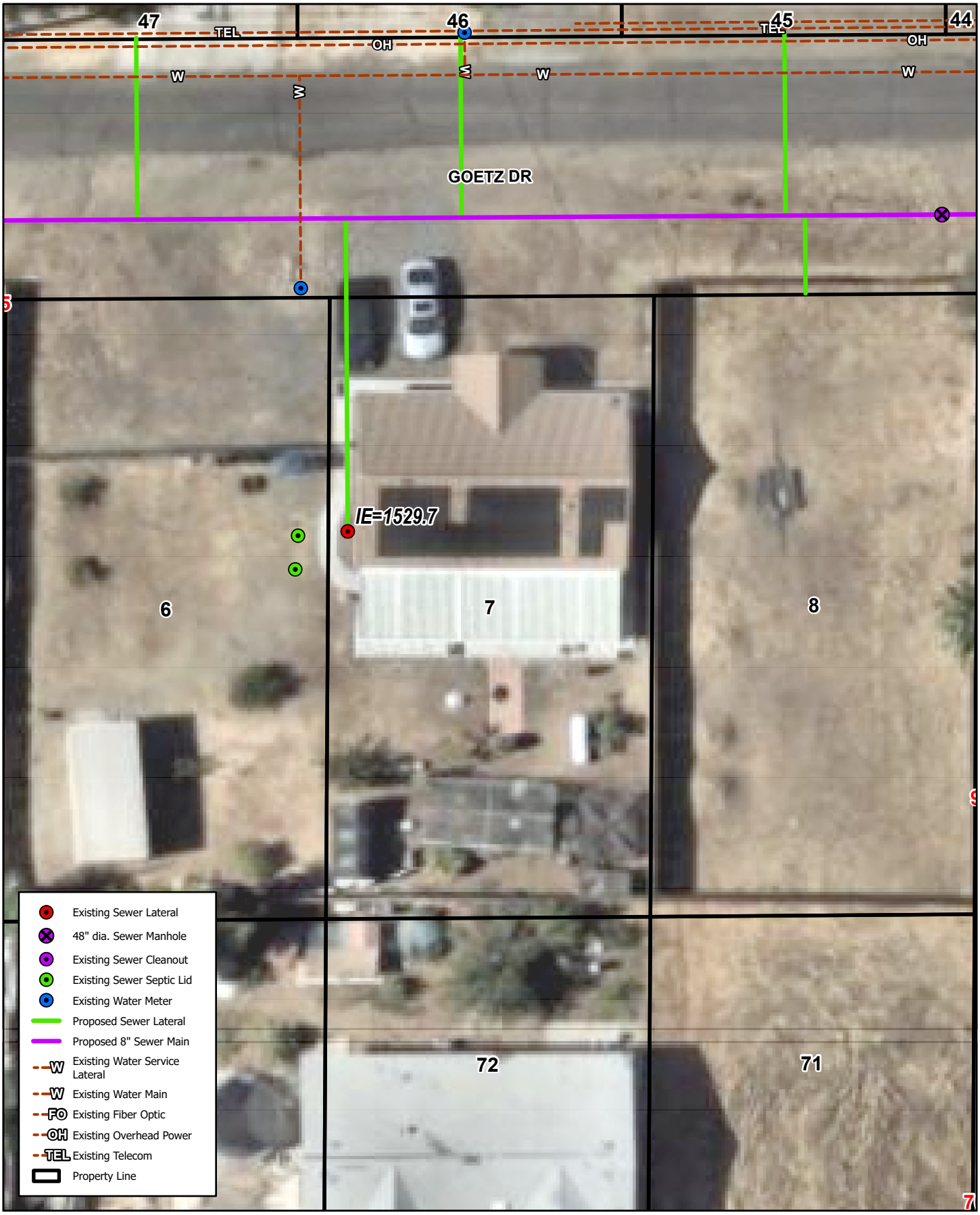

23551 GOETZ DR, CANYON LAKE, CA 92587

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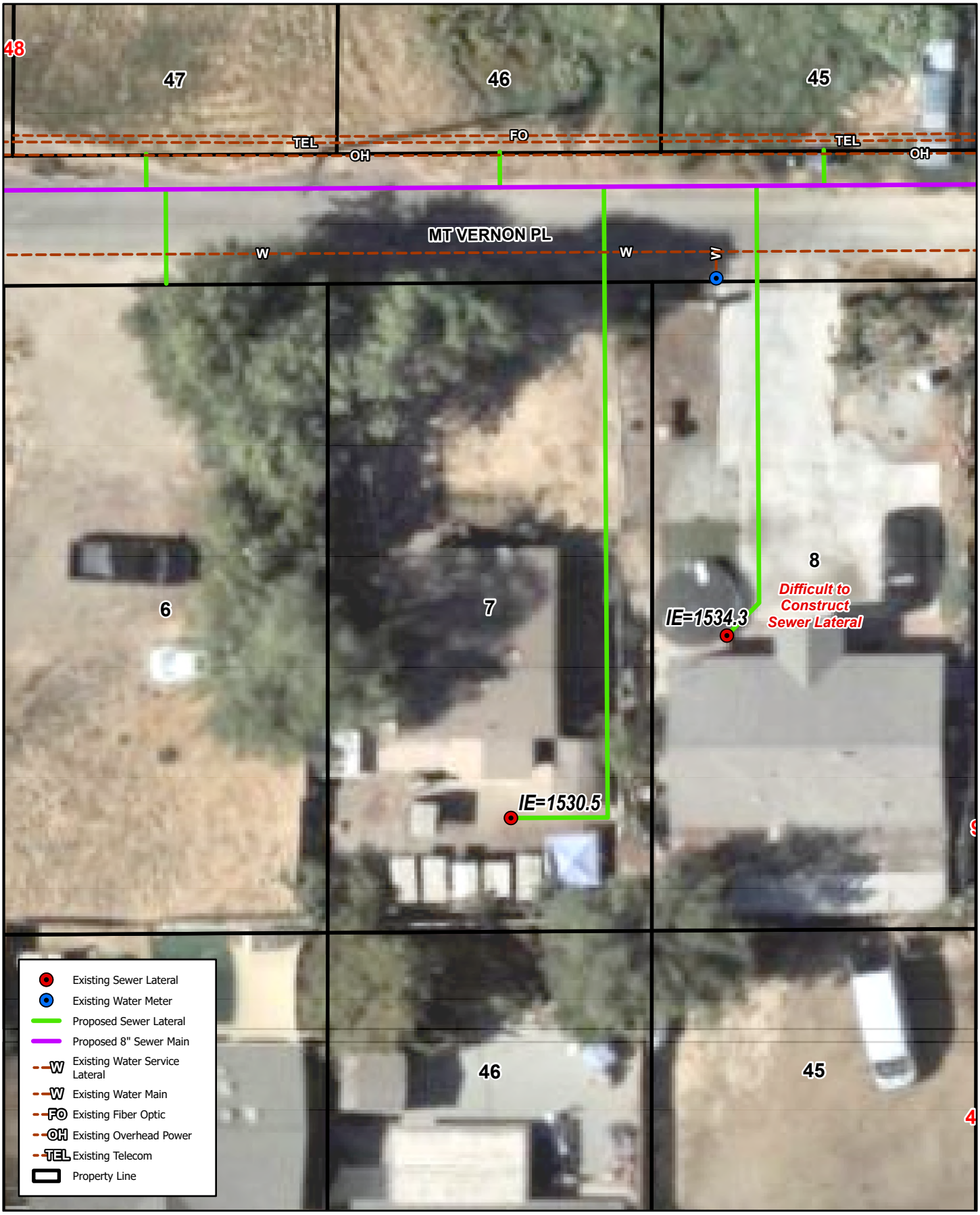
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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Quail Valley - Subarea 4 Sewer Improvement Plans

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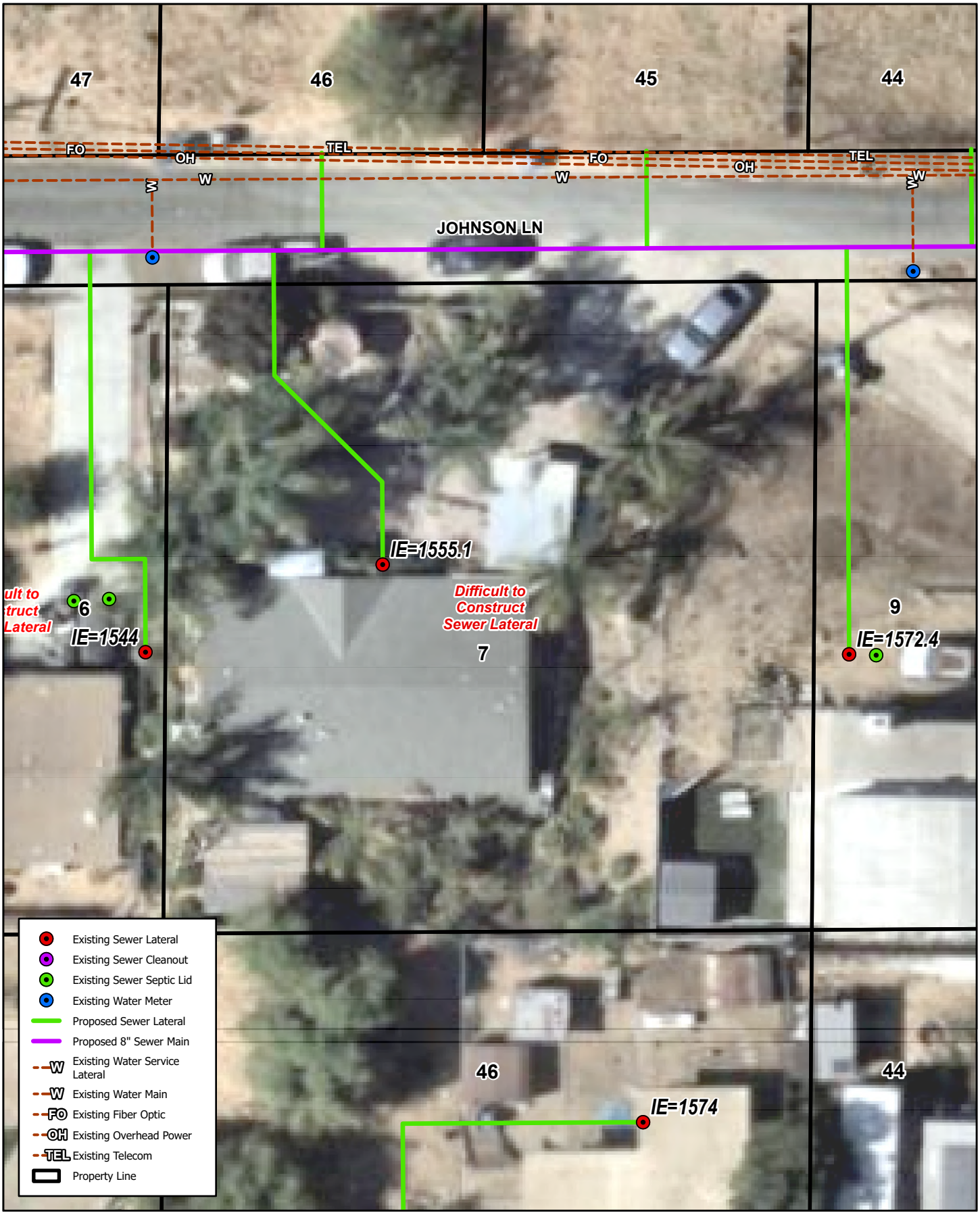
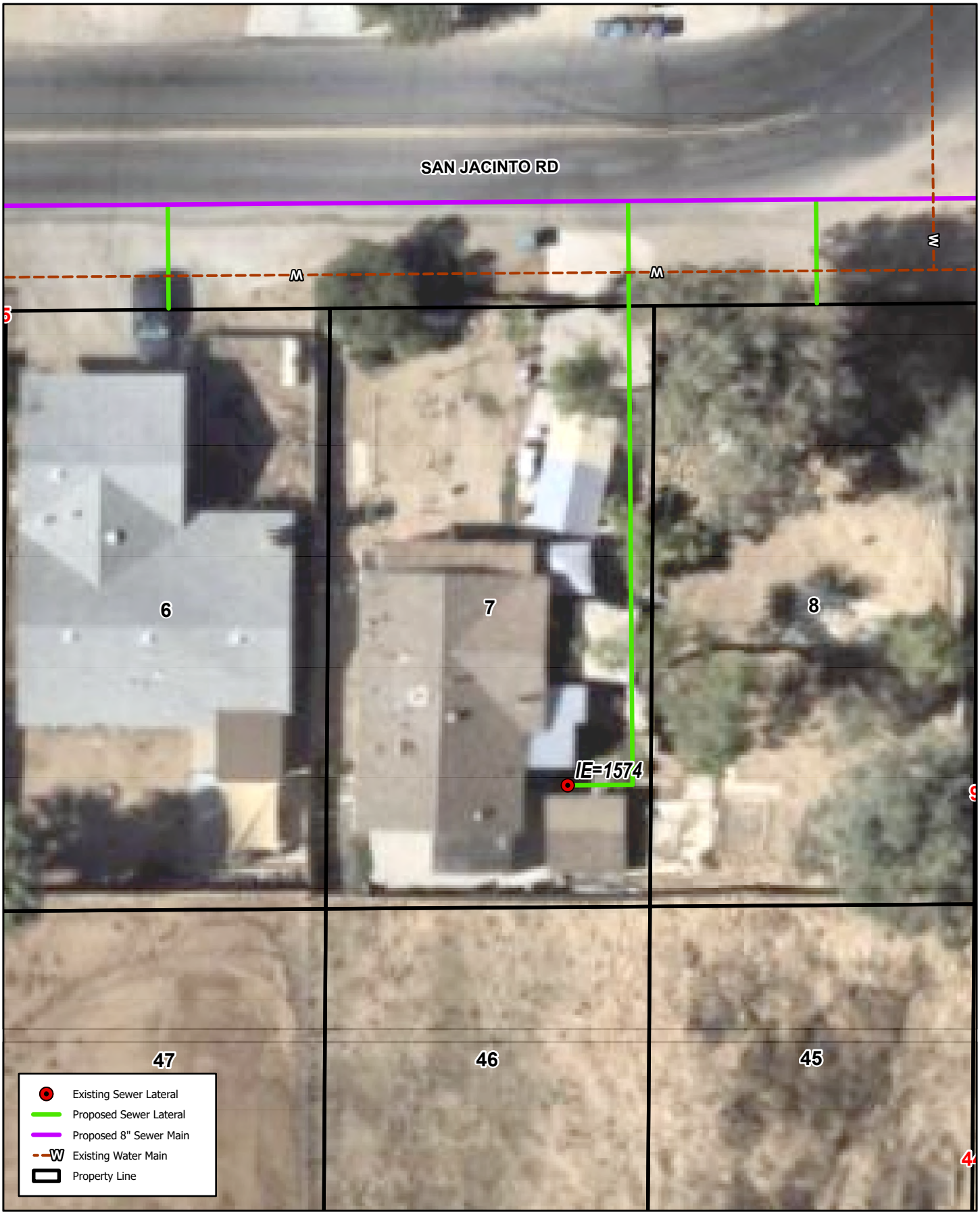


23567 JOHNSON LN, CANYON LAKE, CA 92587

LOT #7

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23815 SAN JACINTO RD, CANYON LAKE, CA 92587

LOT #7

Quail Valley - Subarea 4 Sewer Improvement Plans

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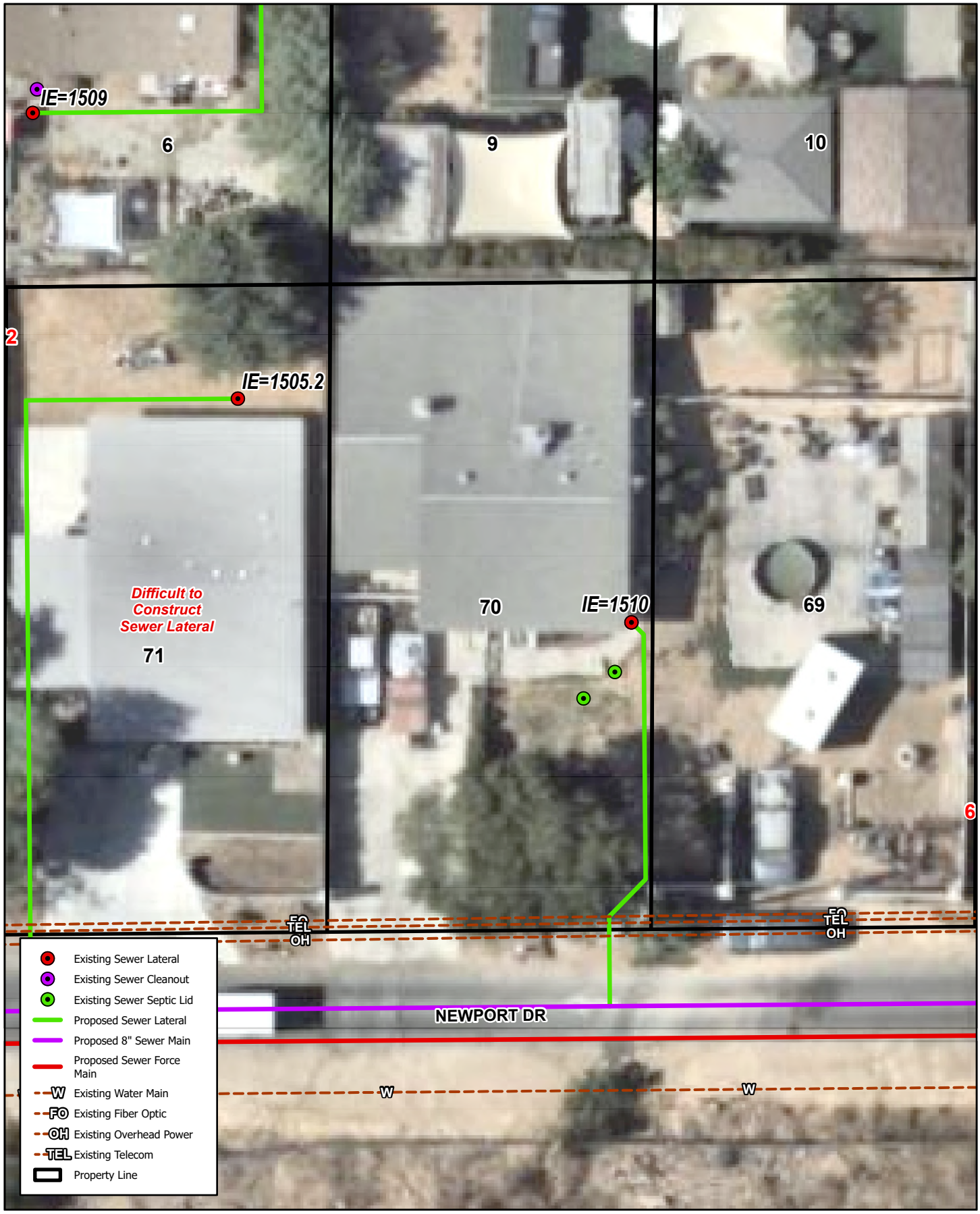
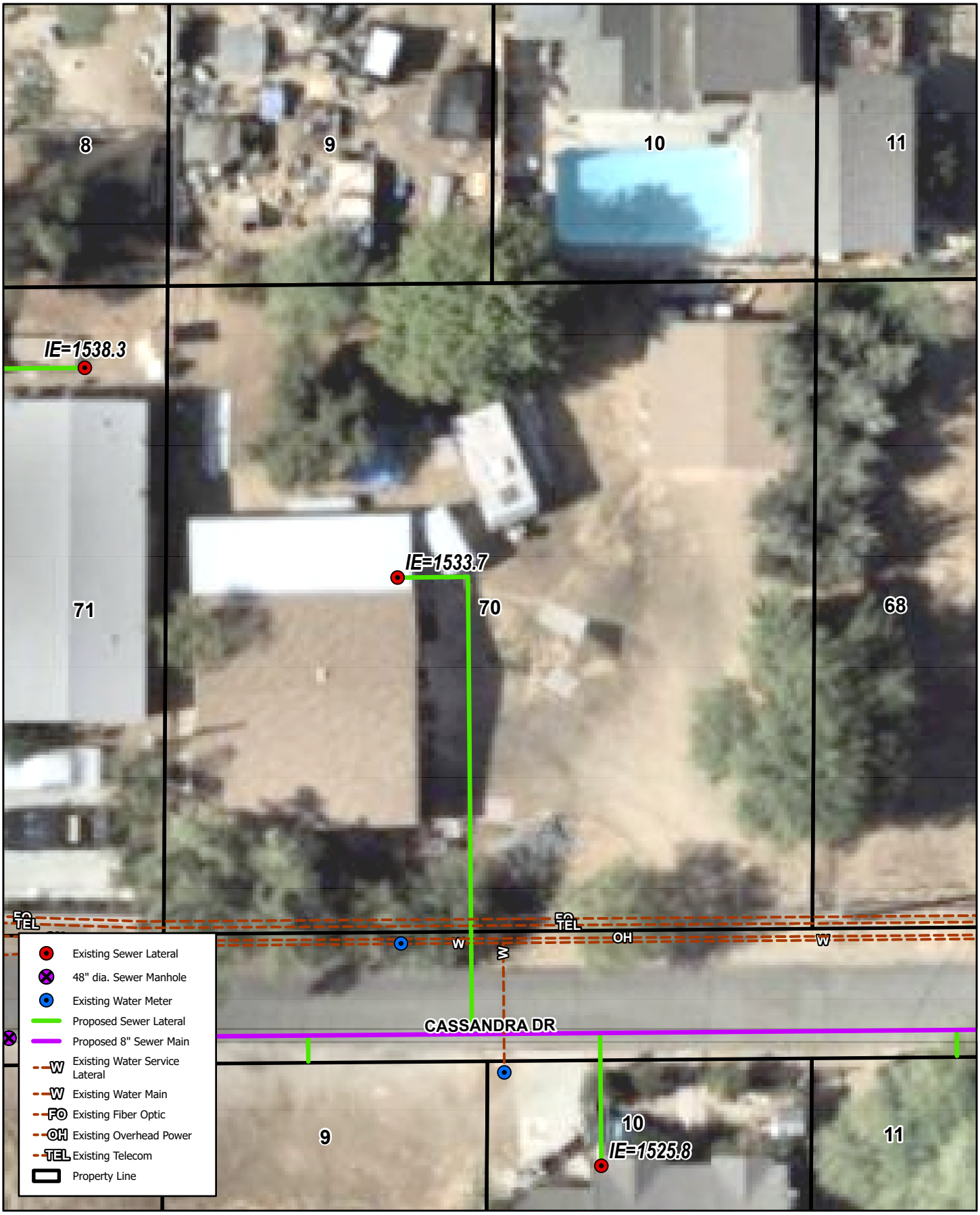


23576 NEWPORT DR, QUAIL VALLEY, CA 92587

LOT #70

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

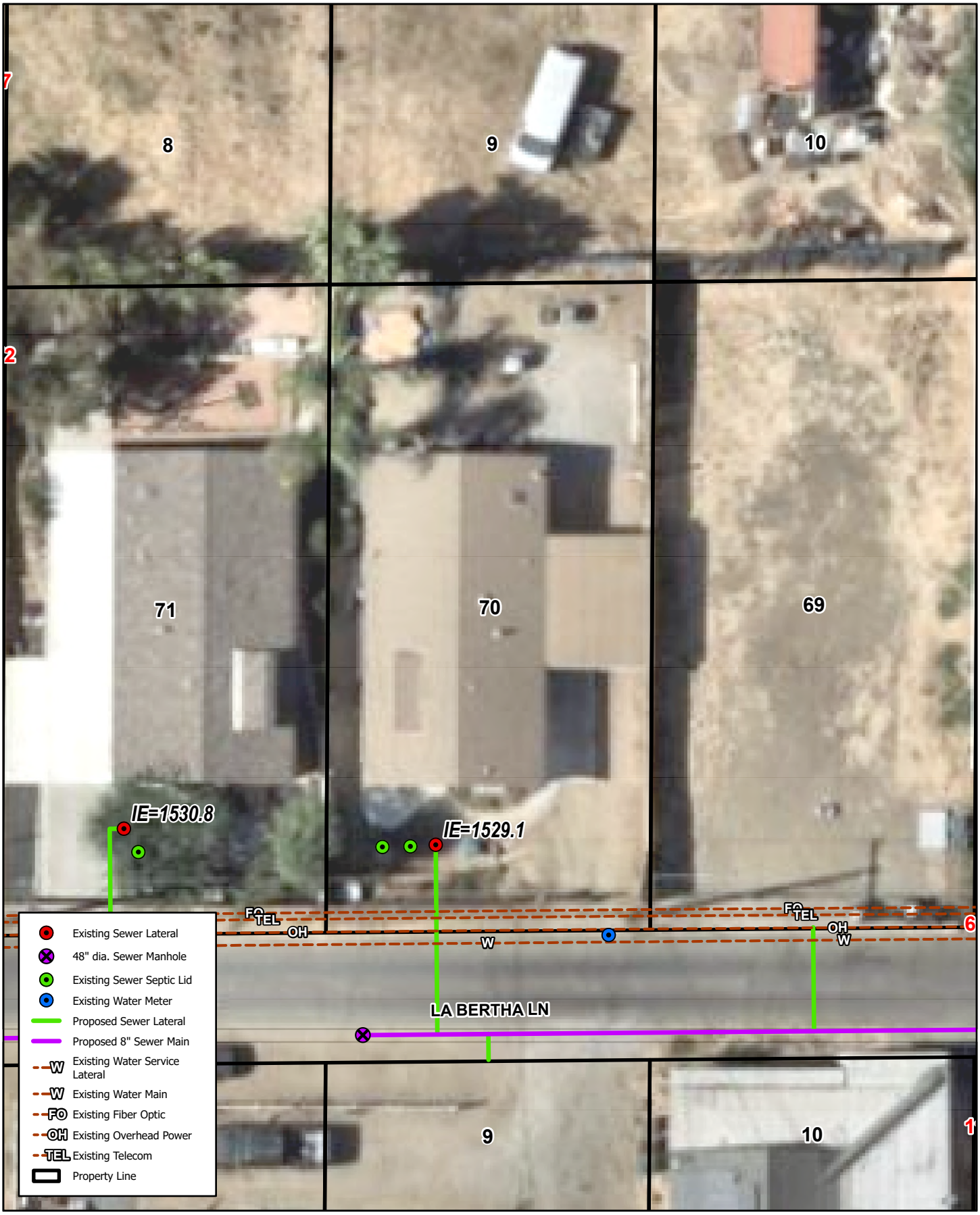


23570 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #70

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

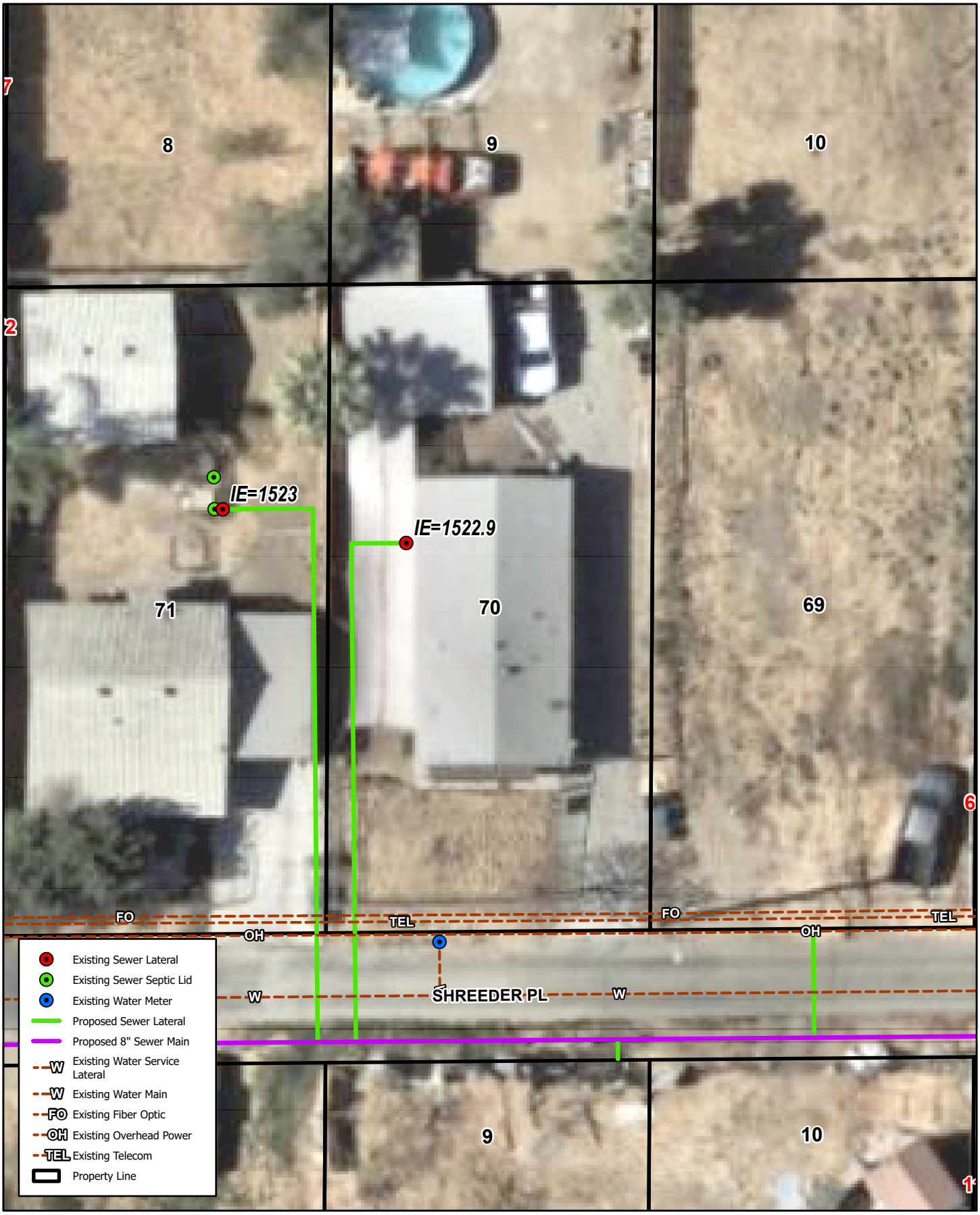


23572 LA BERTHA LN, CANYON LAKE, CA 92587

LOT #70

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23572 SHREEDER PL, CANYON LAKE, CA 92587

LOT #70

Quail Valley - Subarea 4 Sewer Improvement Plans

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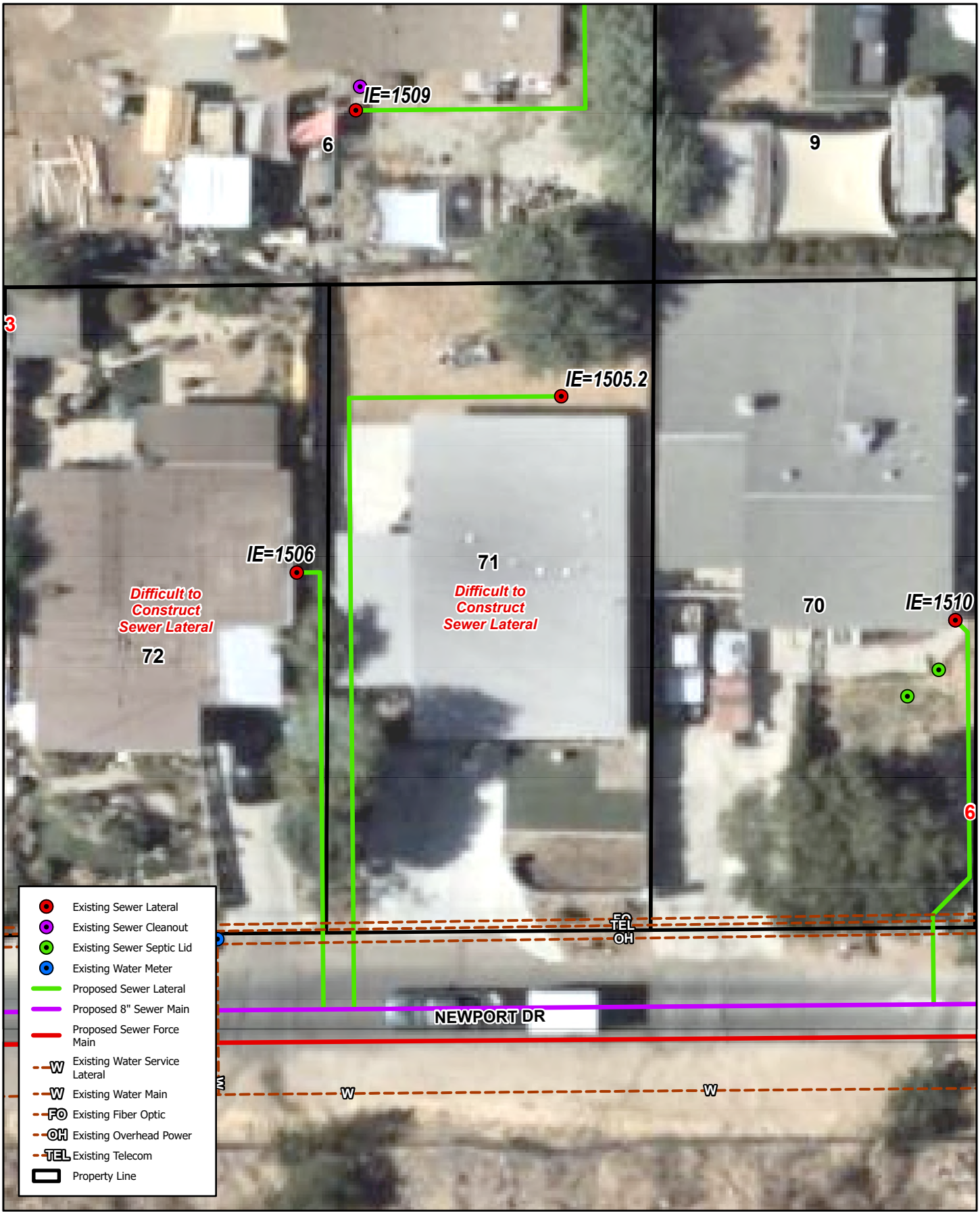

23570 NEWPORT DR, CANYON LAKE, CA 92587

LOT #71

Quail Valley - Subarea 4 Sewer Improvement Plans

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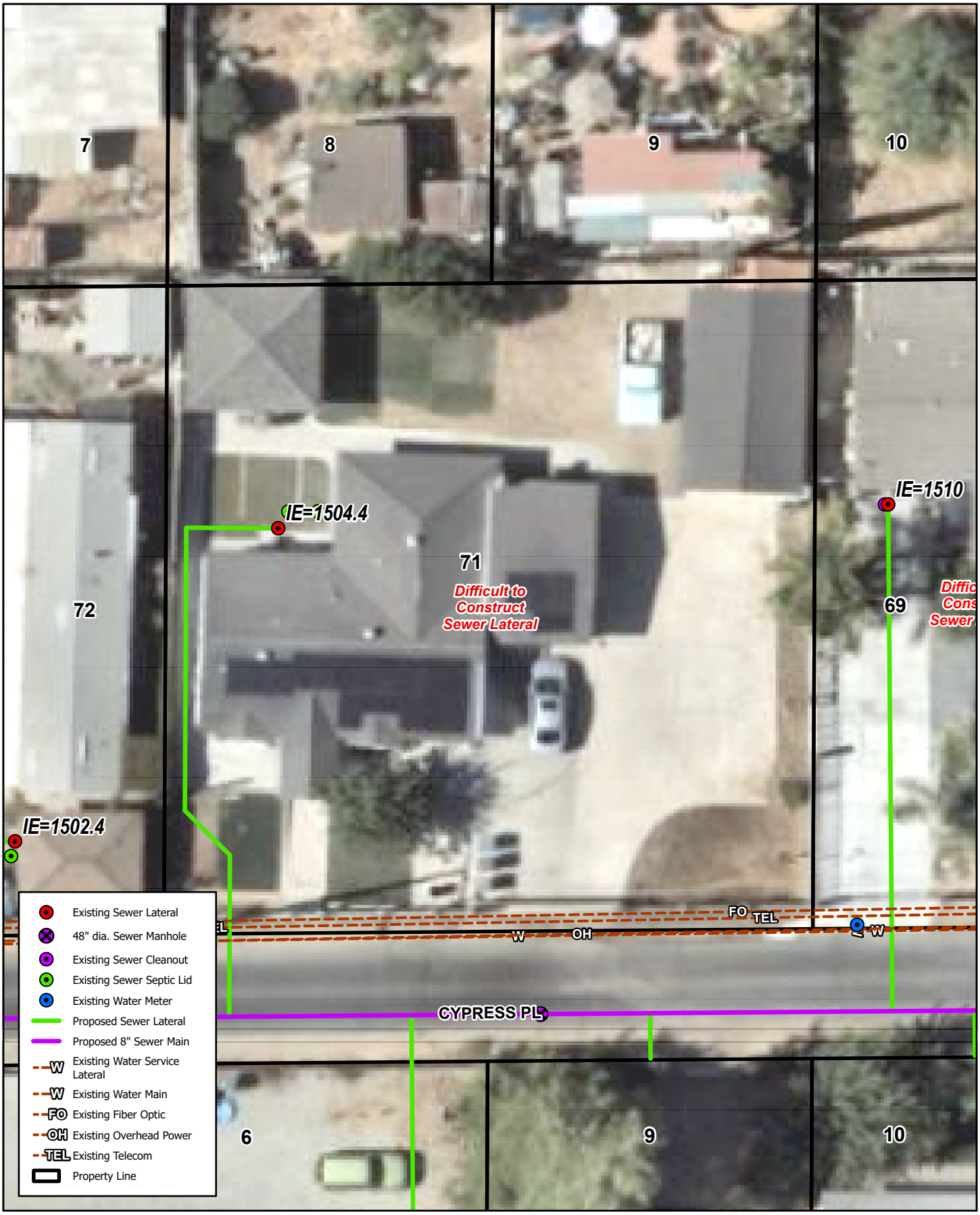

23572 CYPRESS PL, CANYON LAKE, CA 92587

LOT #71

Quail Valley - Subarea 4 Sewer Improvement Plans

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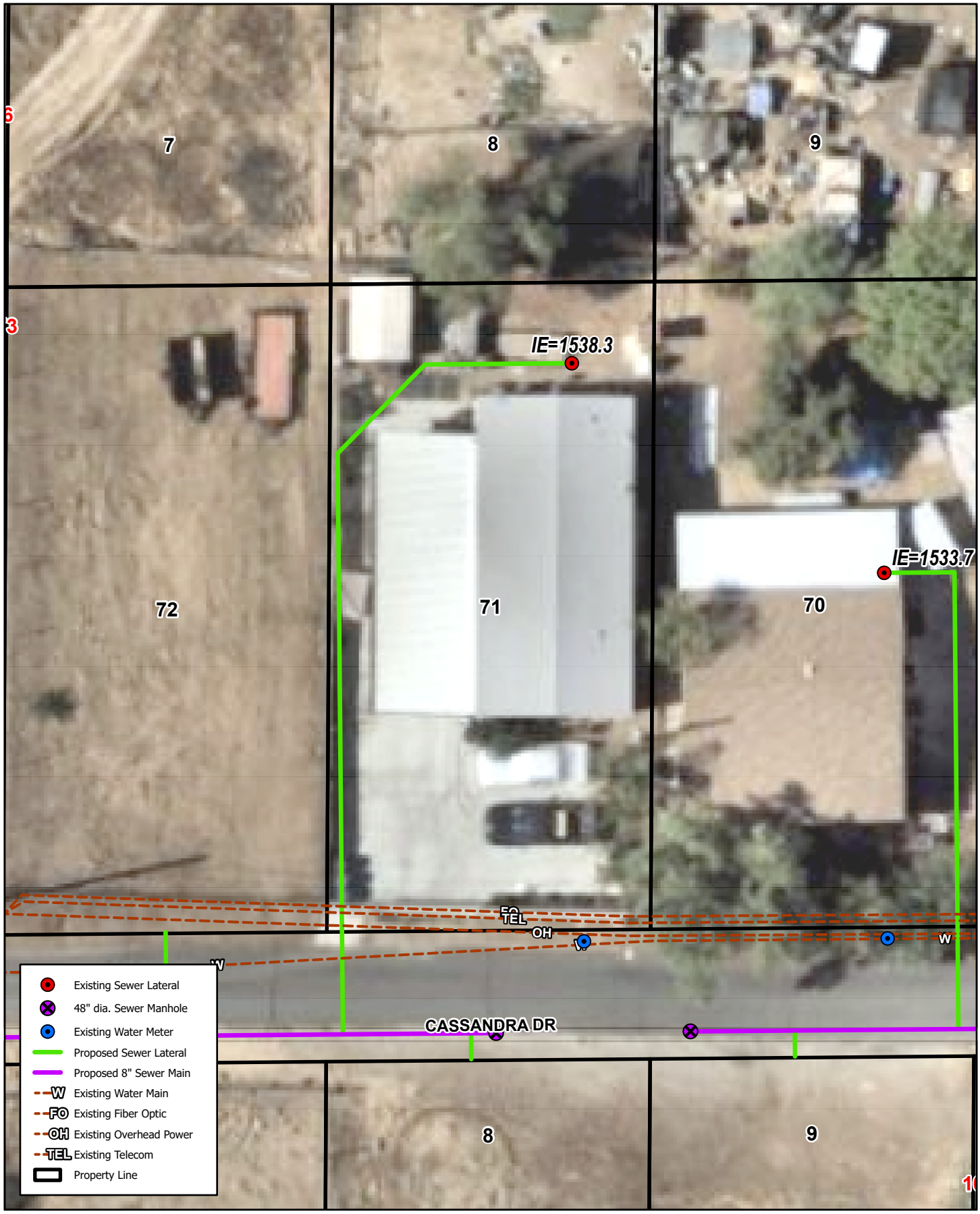

23560 CASSANDRA DR, CANYON LAKE, CA 92587

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Quail Valley - Subarea 4 Sewer Improvement Plans

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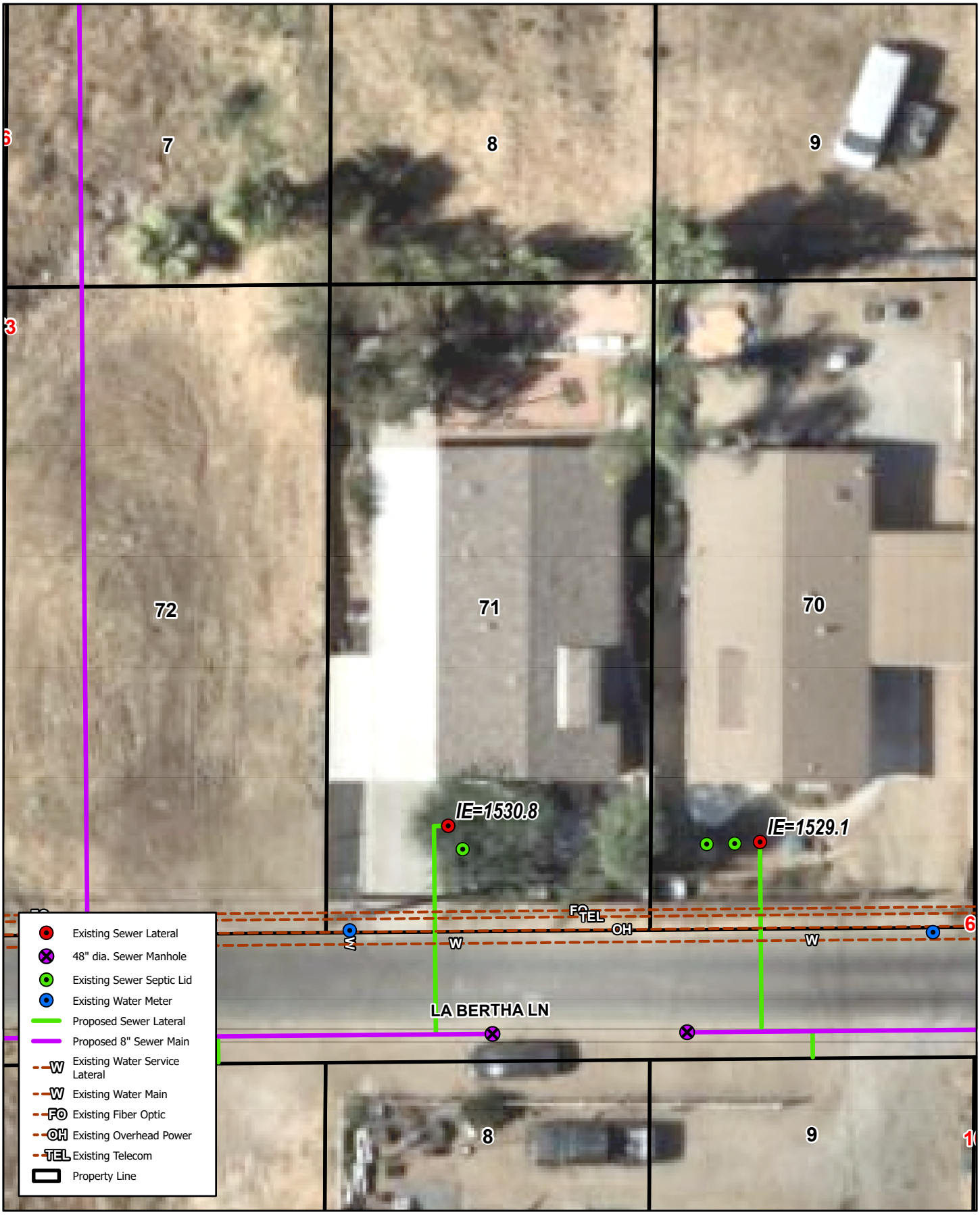

23566 LA BERTHA LN, CANYON LAKE, CA 92587

LOT #71

Quail Valley - Subarea 4 Sewer Improvement Plans

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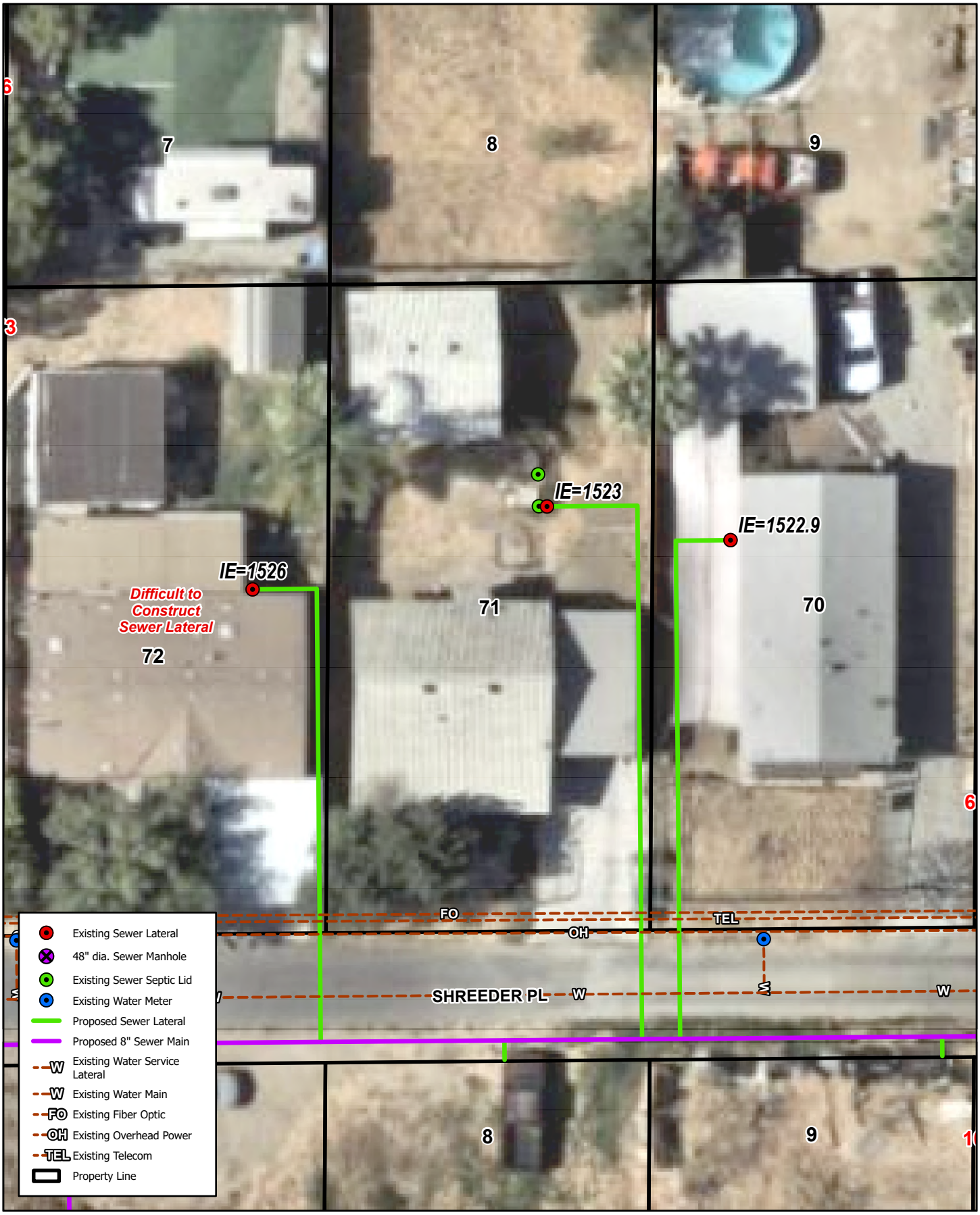

23564 SHREEDER PL, CANYON LAKE, CA 92587

LOT #71

Quail Valley - Subarea 4 Sewer Improvement Plans

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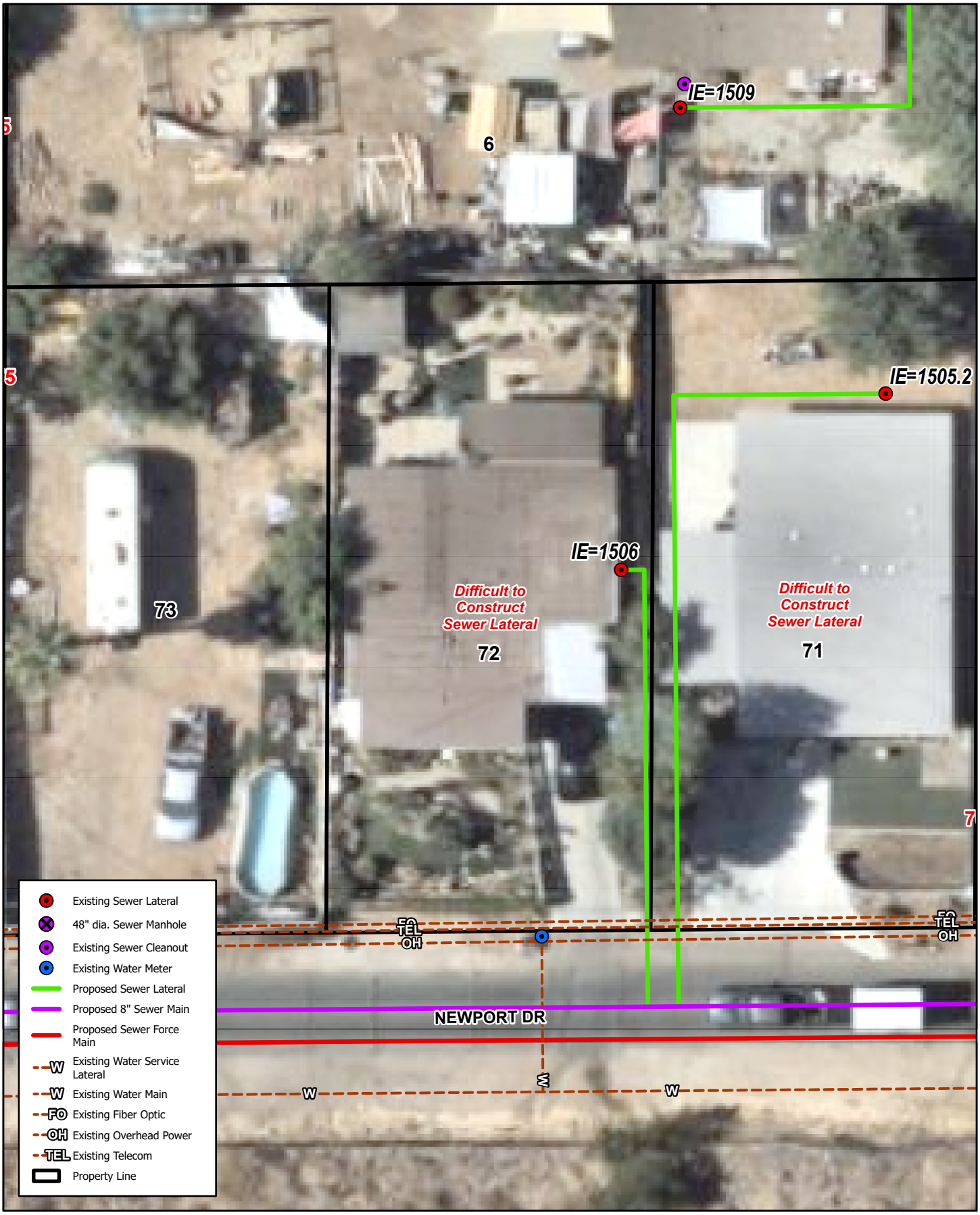


23564 NEWPORT DR, CANYON LAKE, CA 92587

LOT #72

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23566 CYPRESS PL, QUAIL VALLEY, CA 92587

LOT #72

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

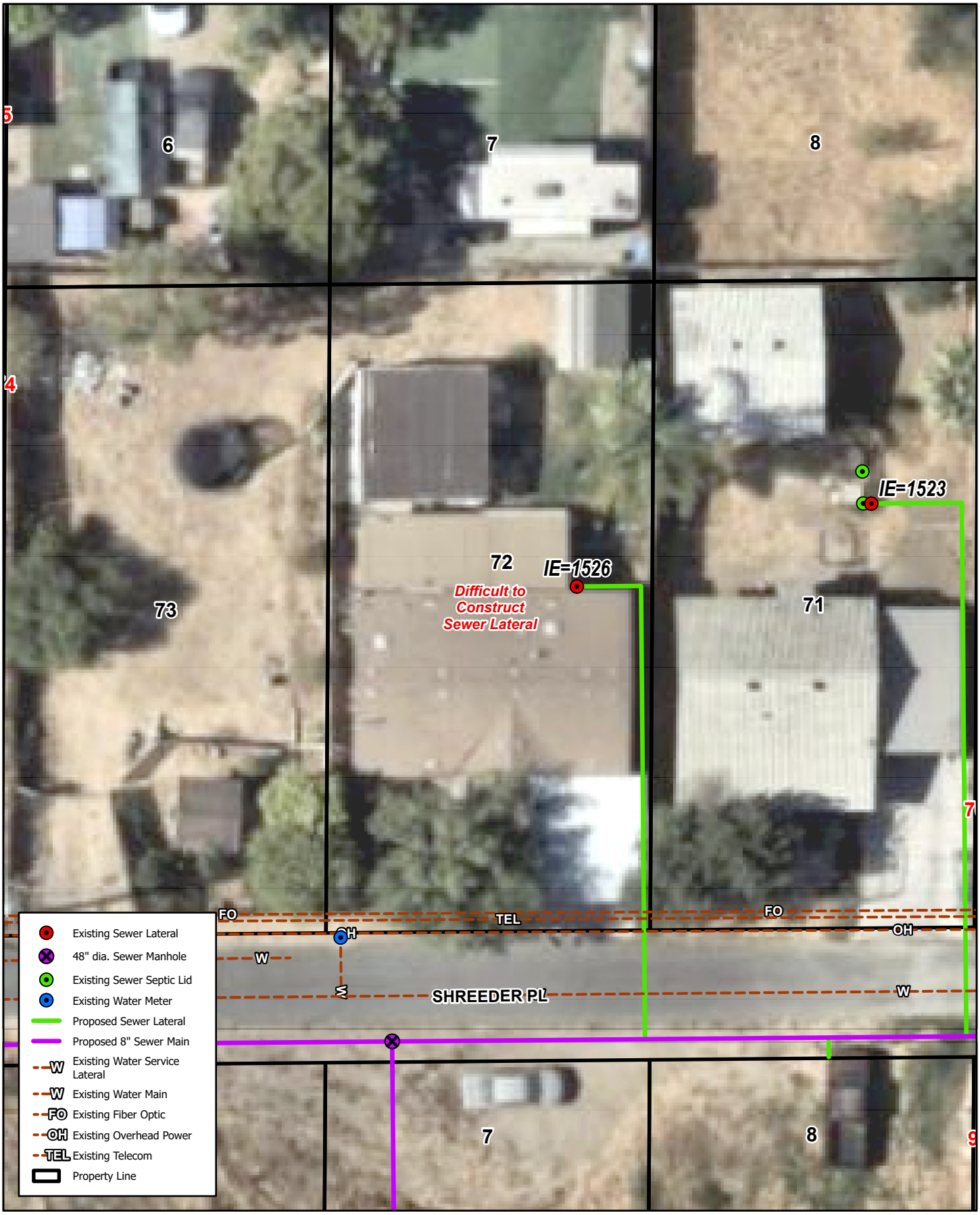


23550 CLARA PL, CANYON LAKE, CA 92587

LOT #72

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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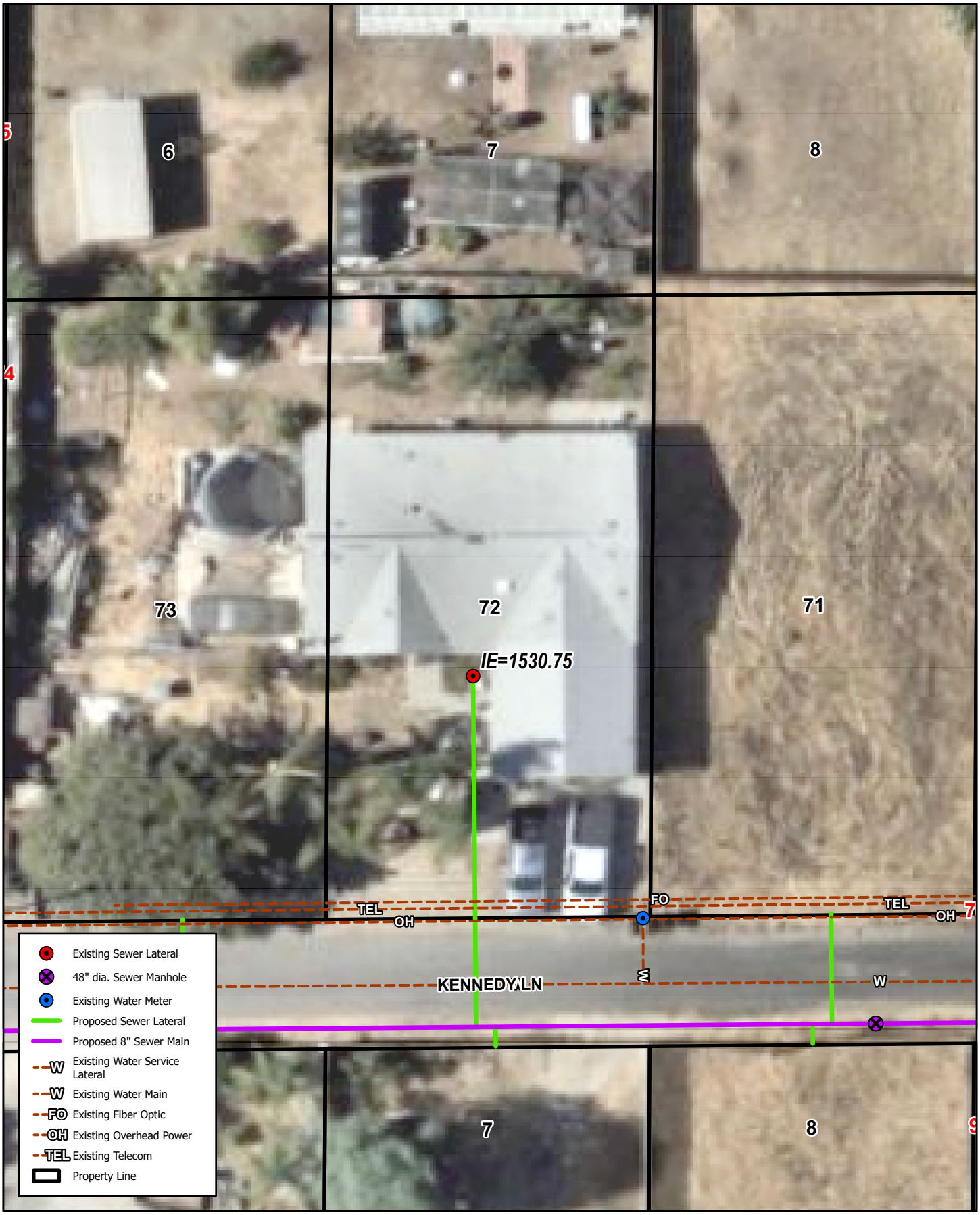
LOT #72

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

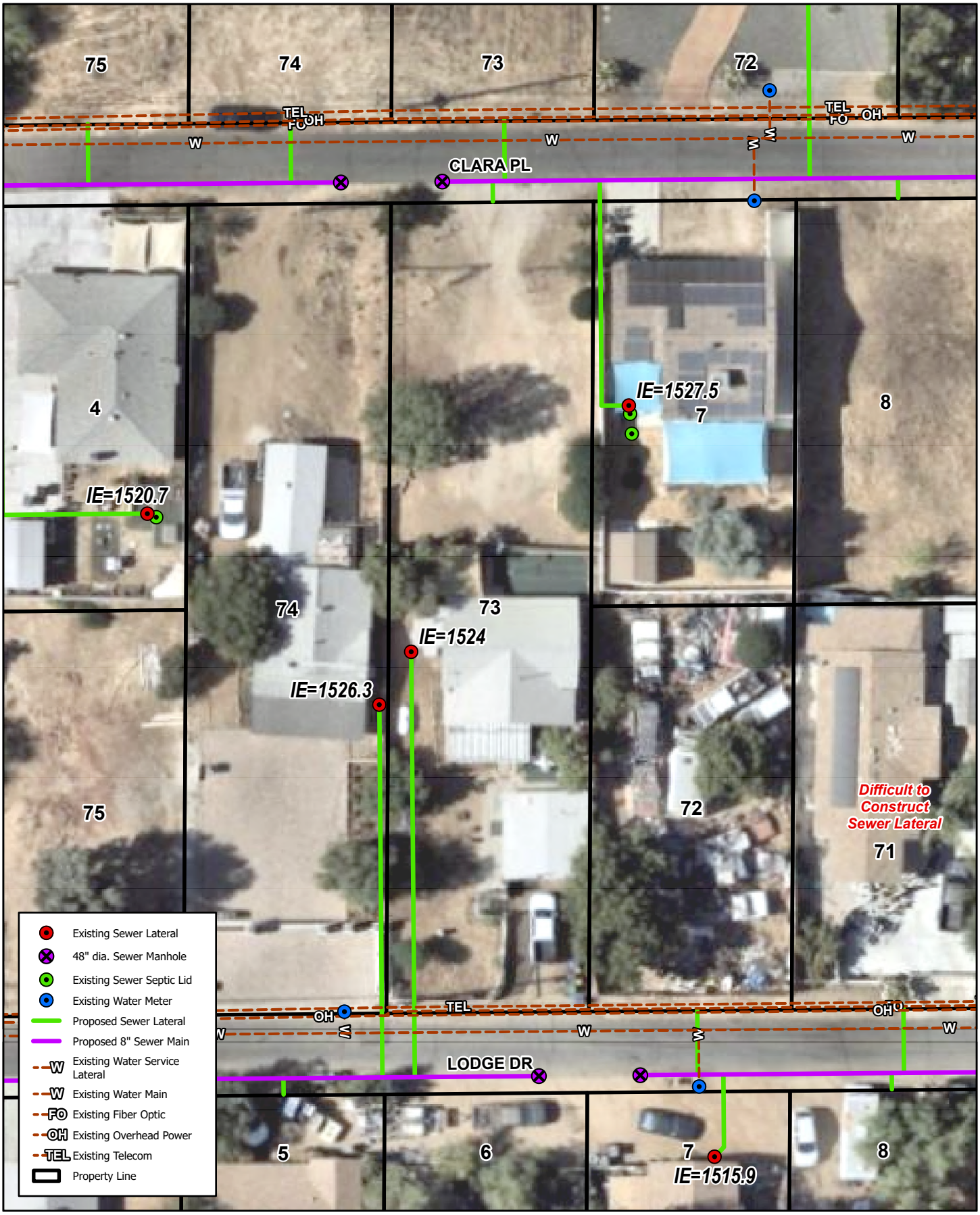


23554 KENNEDY LN, QUAIL VALLEY, CA 92587

LOT #72

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23550 LODGE DR, CANYON LAKE, CA 92587

LOT #73

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

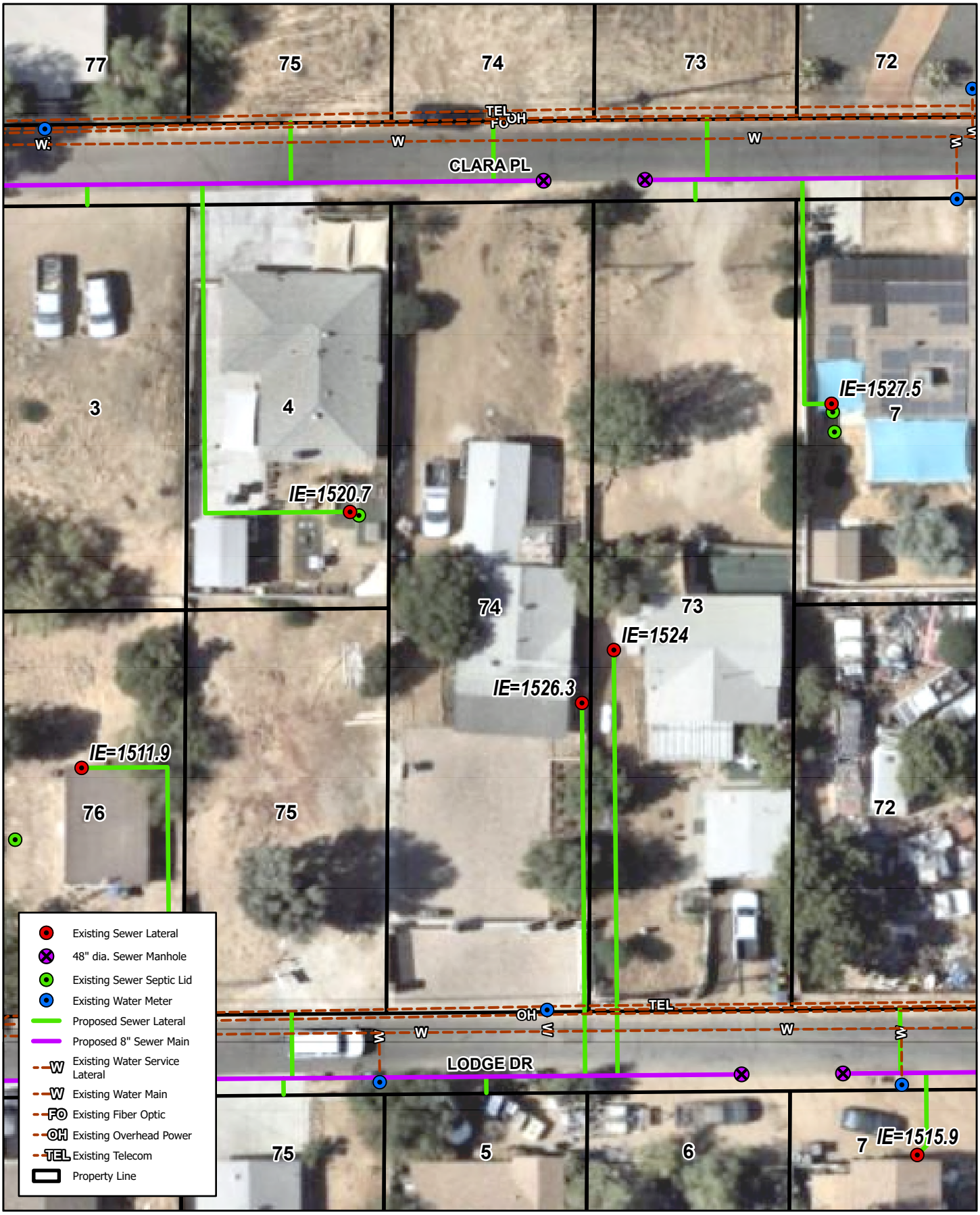


23552 NORMA DR, CANYON LAKE, CA 92587

LOT #74

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

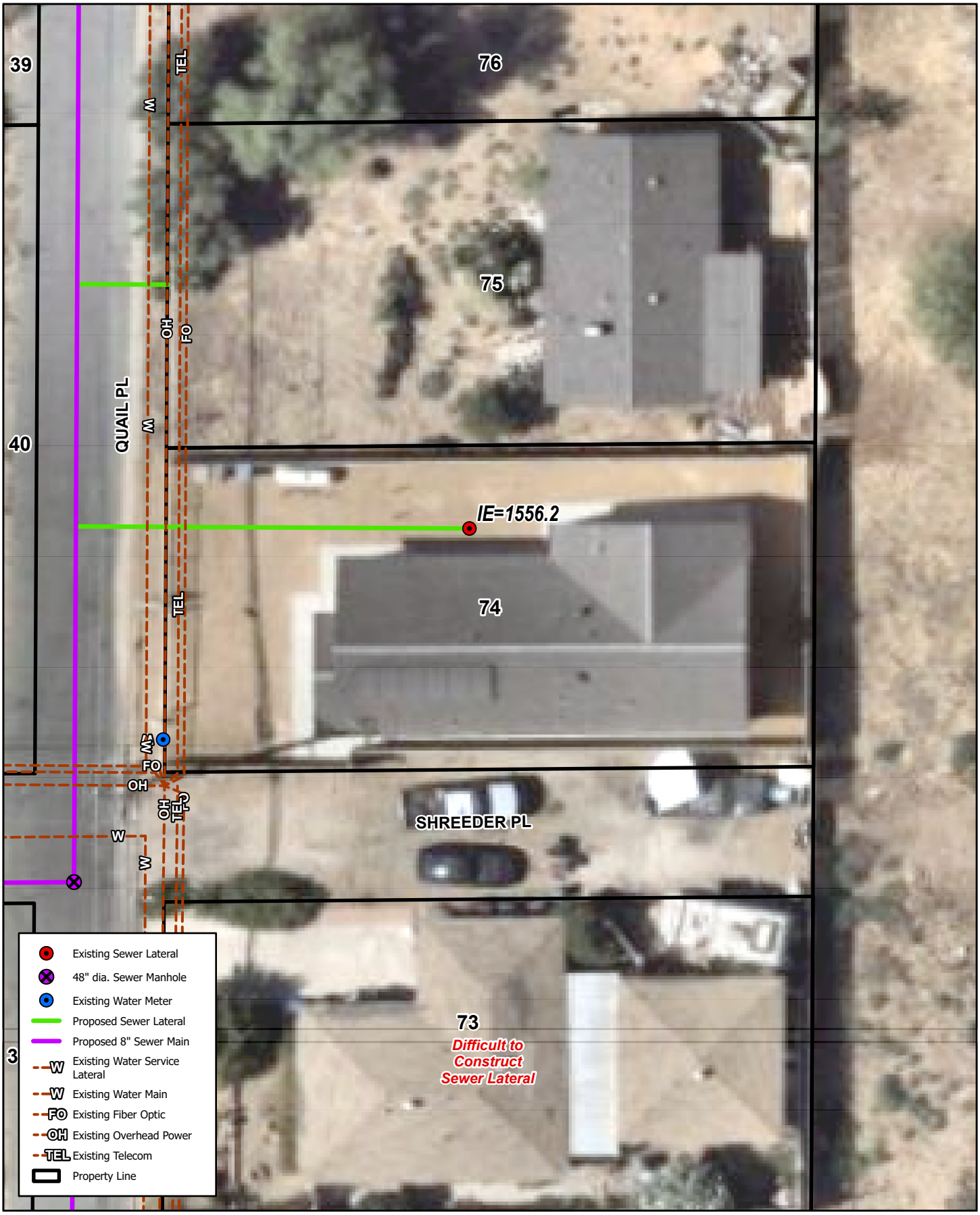


23540 LODGE DR, QUAIL VALLEY, CA 92587

LOT #74

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

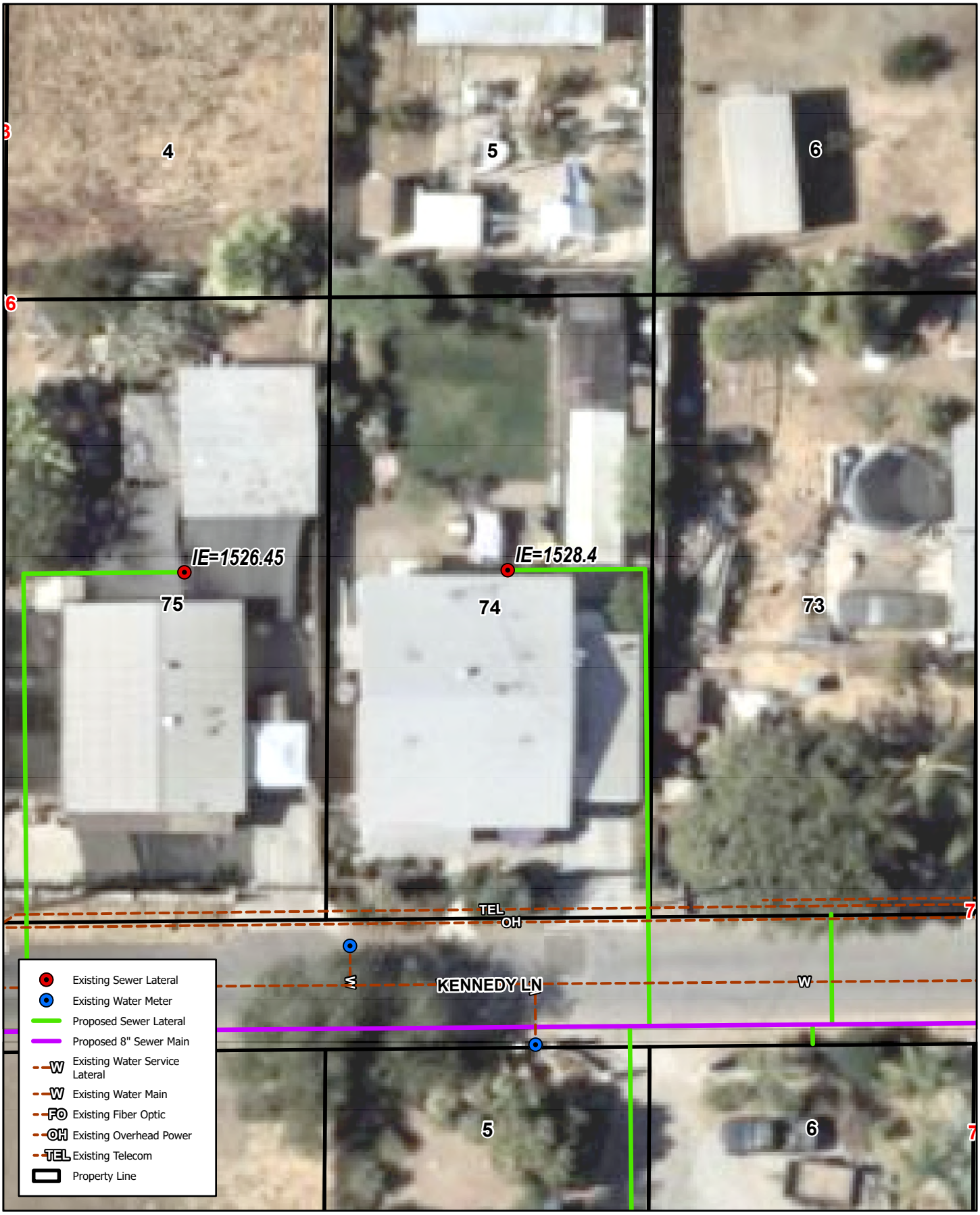


28576 QUAIL PL, CANYON LAKE, CA 92587

LOT #74

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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LOT #74

Quail Valley - Subarea 4 Sewer Improvement Plans

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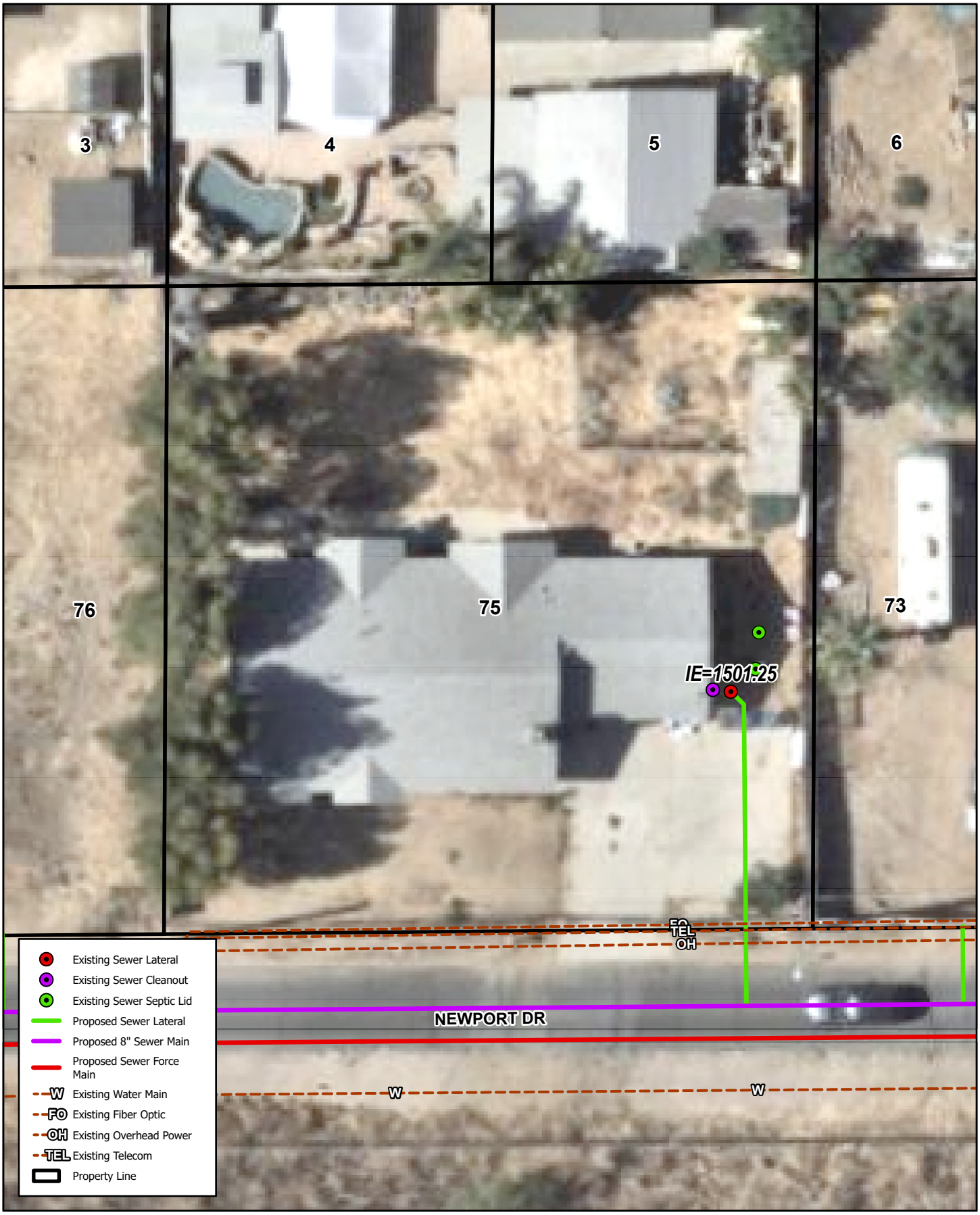
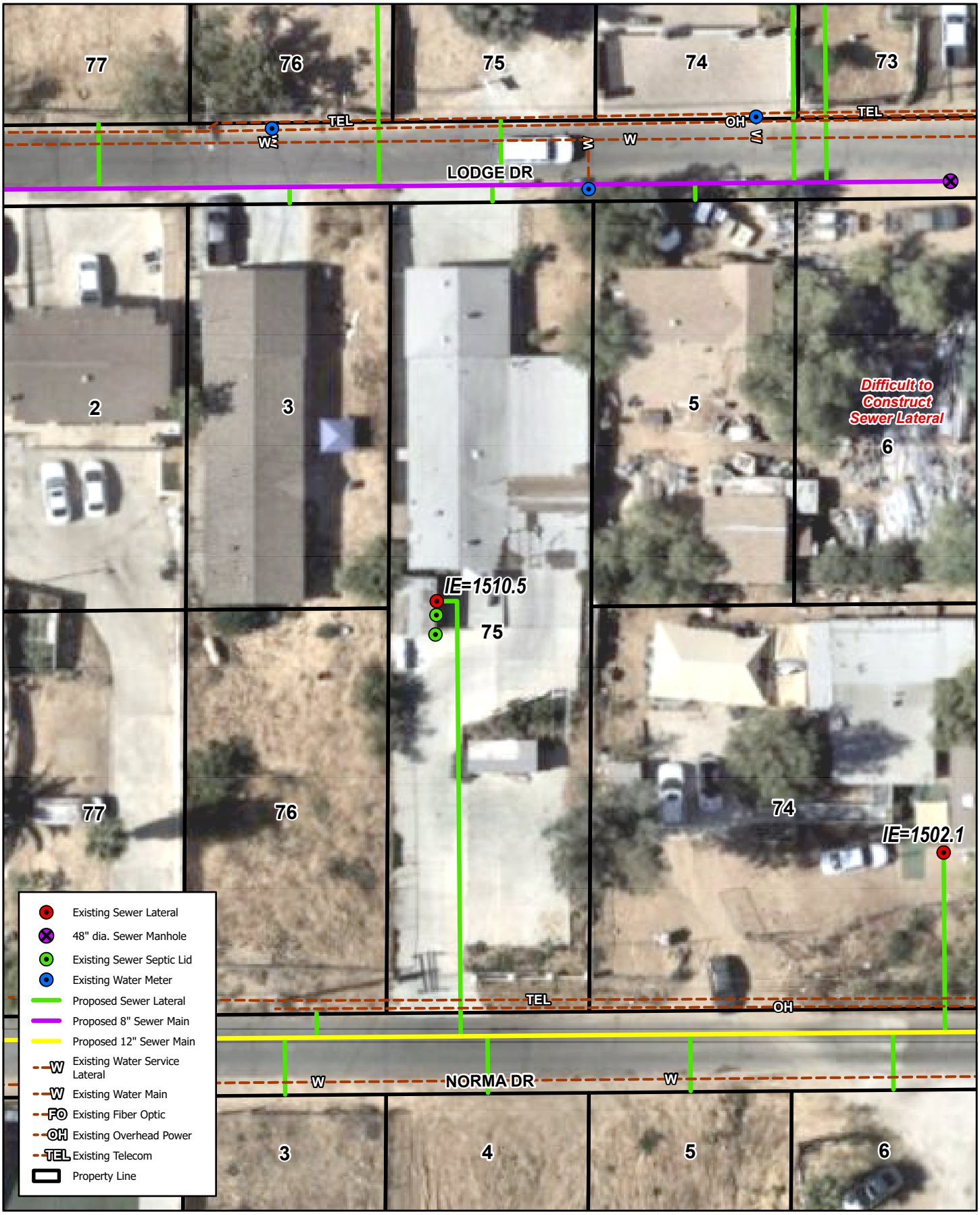


23540 NEWPORT DR, QUAIL VALLEY, CA 92587

LOT #75

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

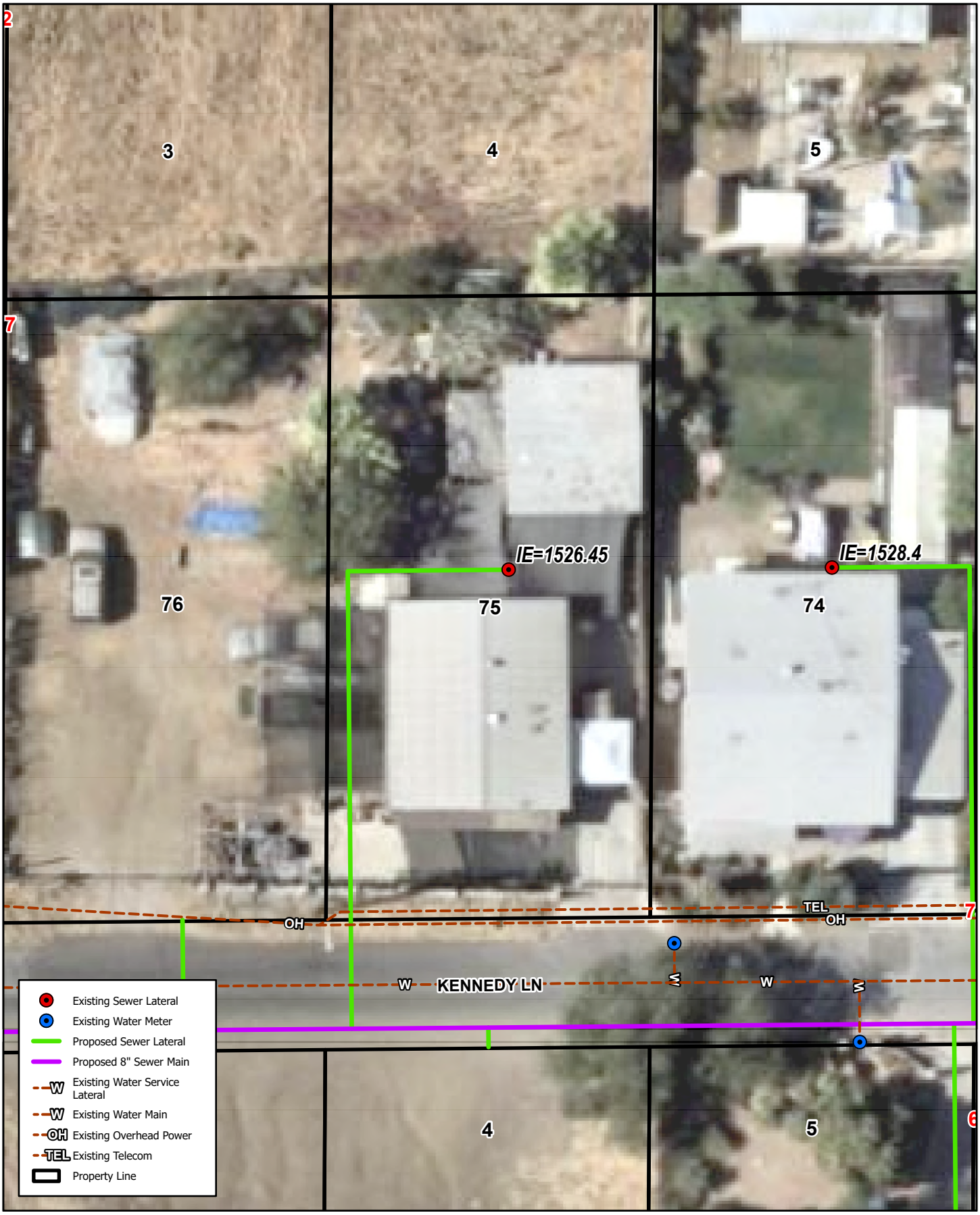


23537 LODGE DR, CANYON LAKE, CA 92587

LOT #75

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23532 KENNEDY LN, CANYON LAKE, CA 92587

LOT #75

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23524 LODGE DR, CANYON LAKE, CA 92587

LOT #76

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23522 LA BERTHA LN, MENIFEE, CA 92587

LOT #76

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

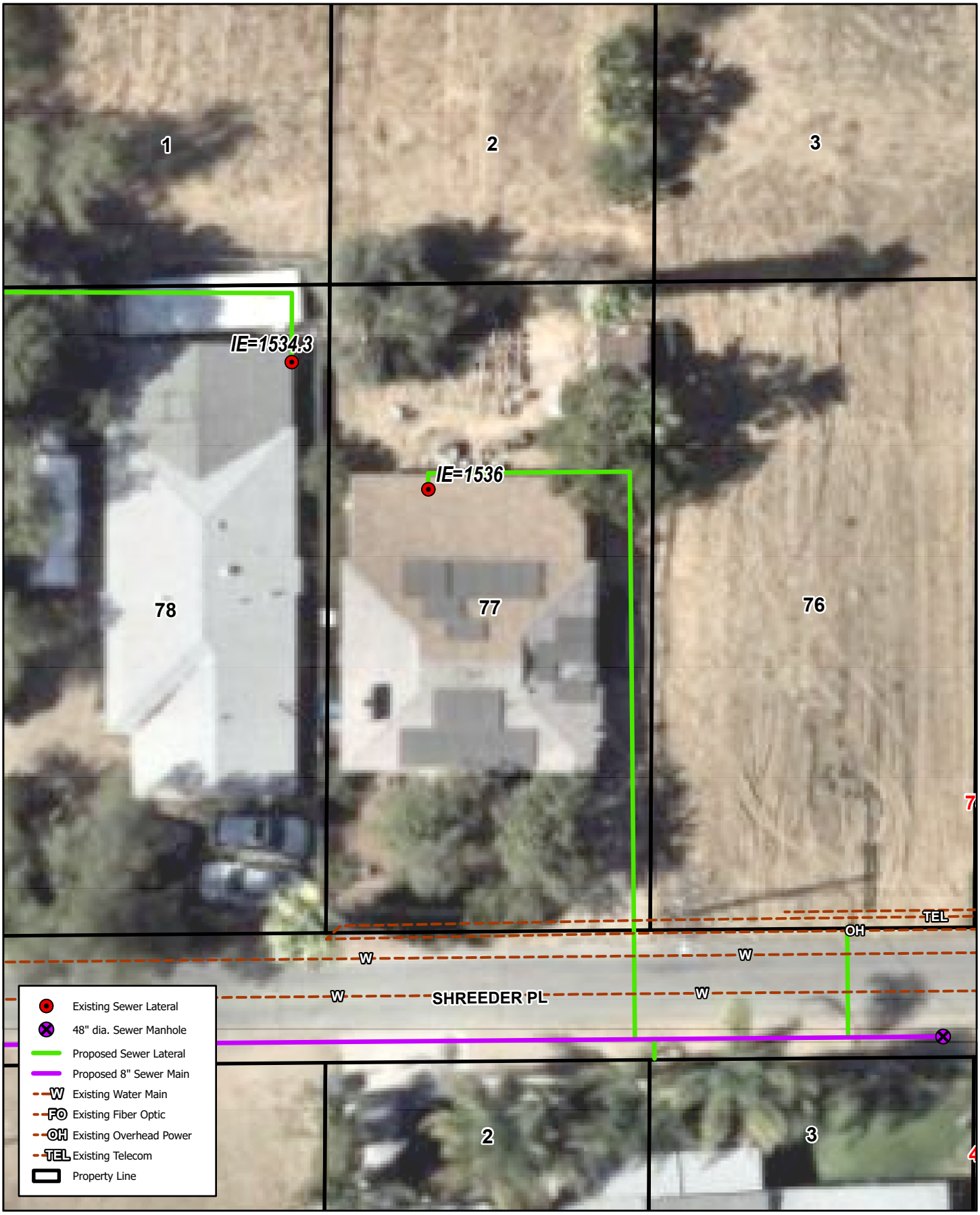


23526 CLARA PL, MENIFEE, CA 92587

LOT #77

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

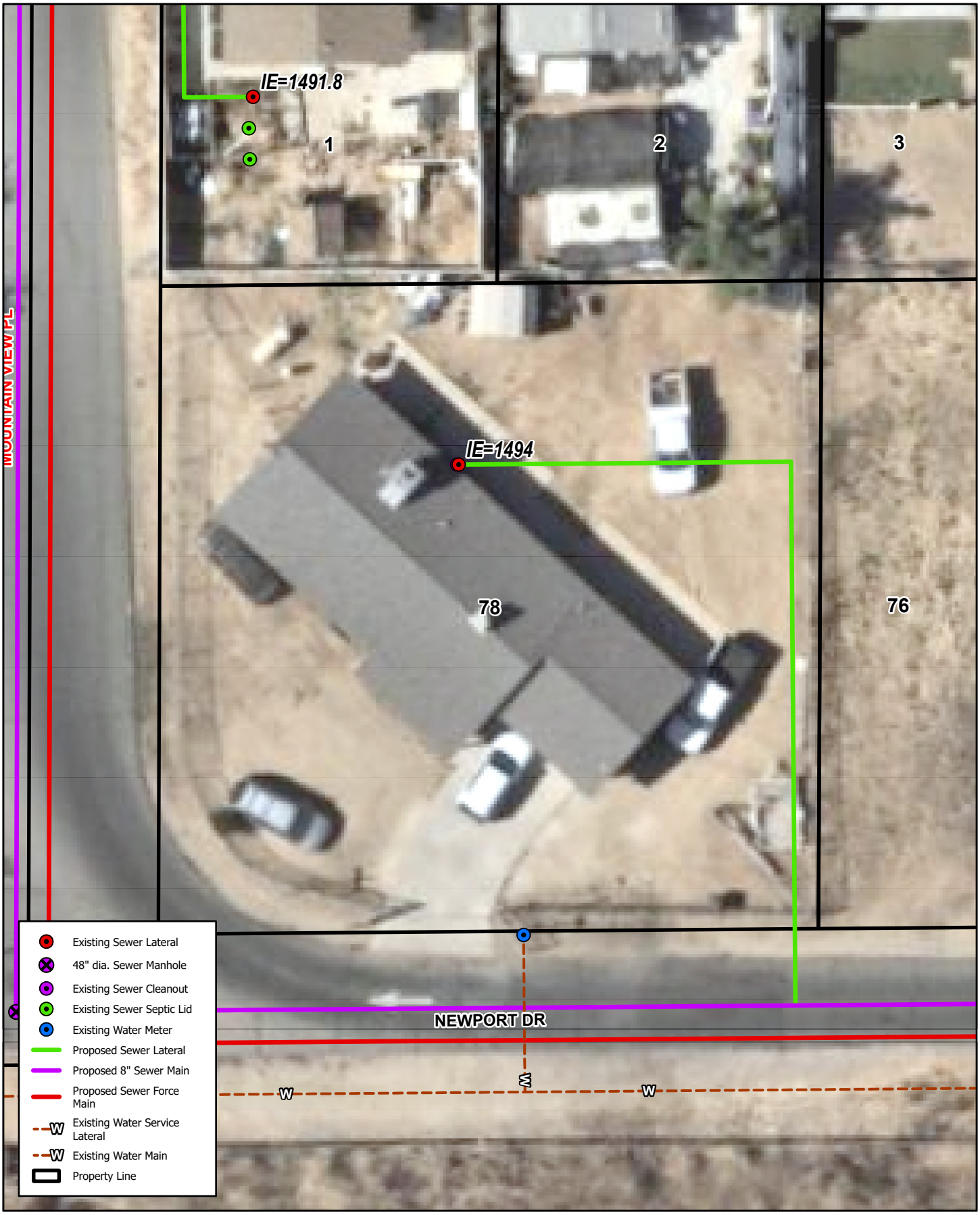


23516 SHREEDER PL, CANYON LAKE, CA 92587

LOT #77

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

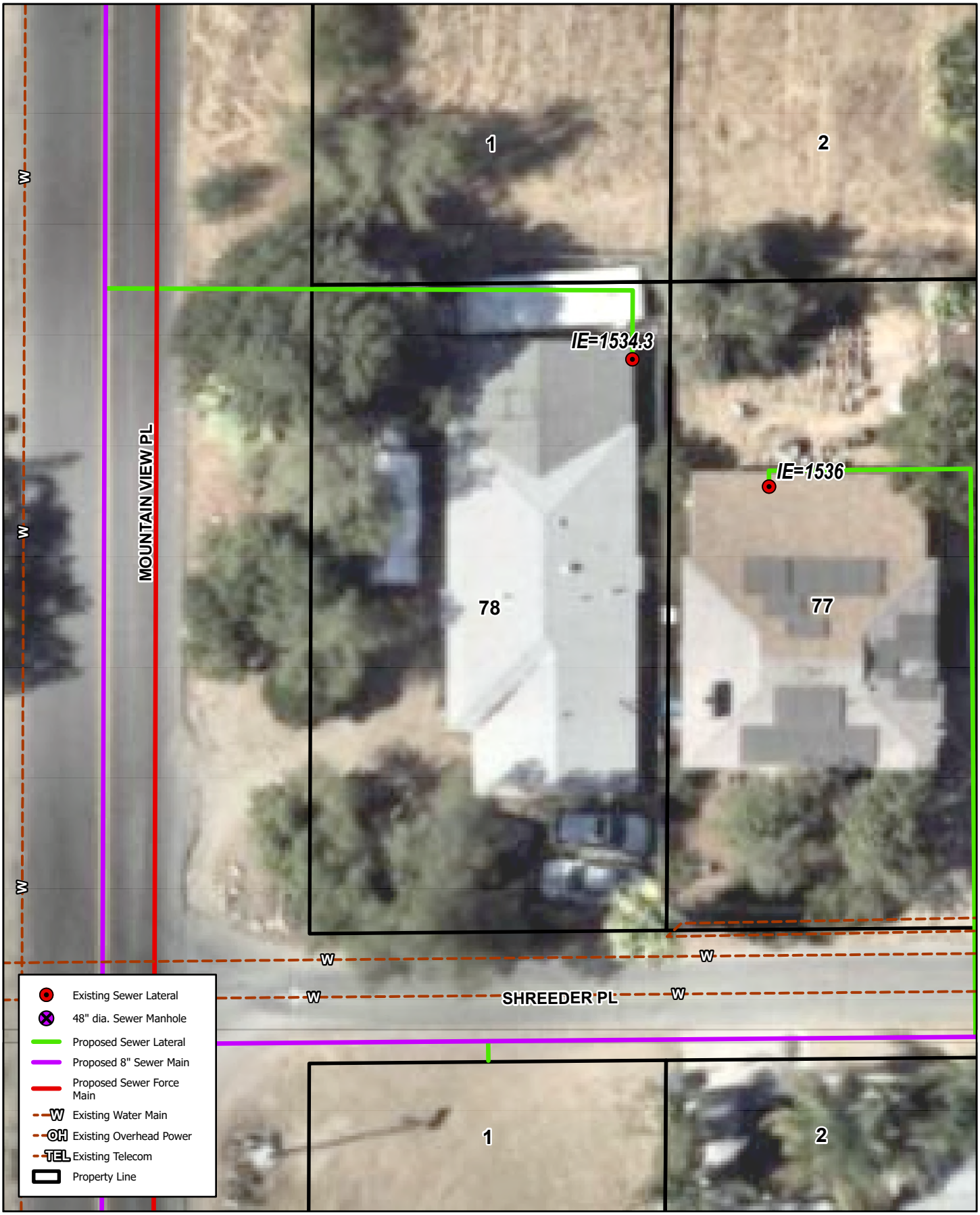


23514 NEWPORT DR, CANYON LAKE, CA 92587

LOT #78

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

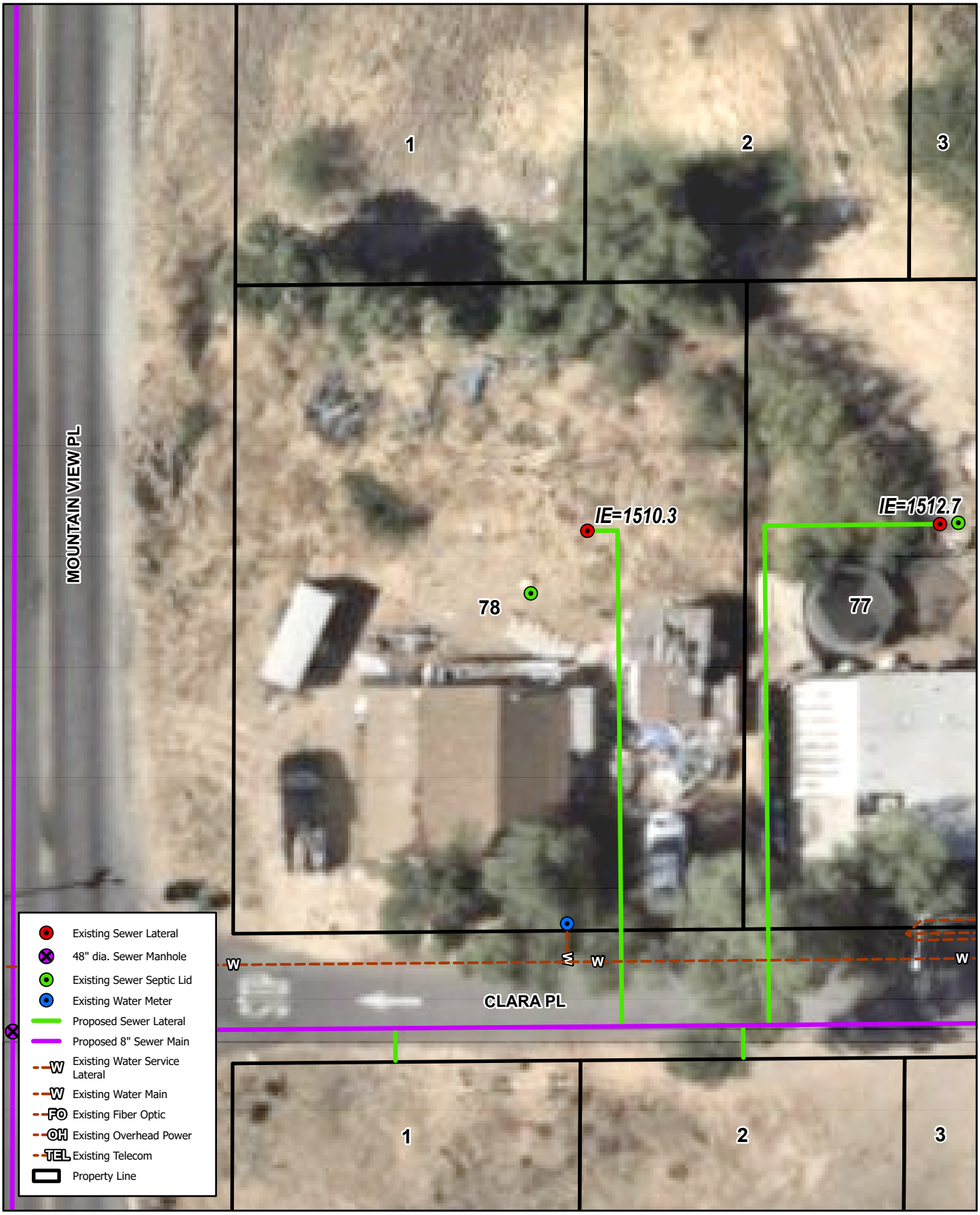


28570 MOUNTAIN VIEW PL, CANYON LAKE, CA 92587

LOT #78

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

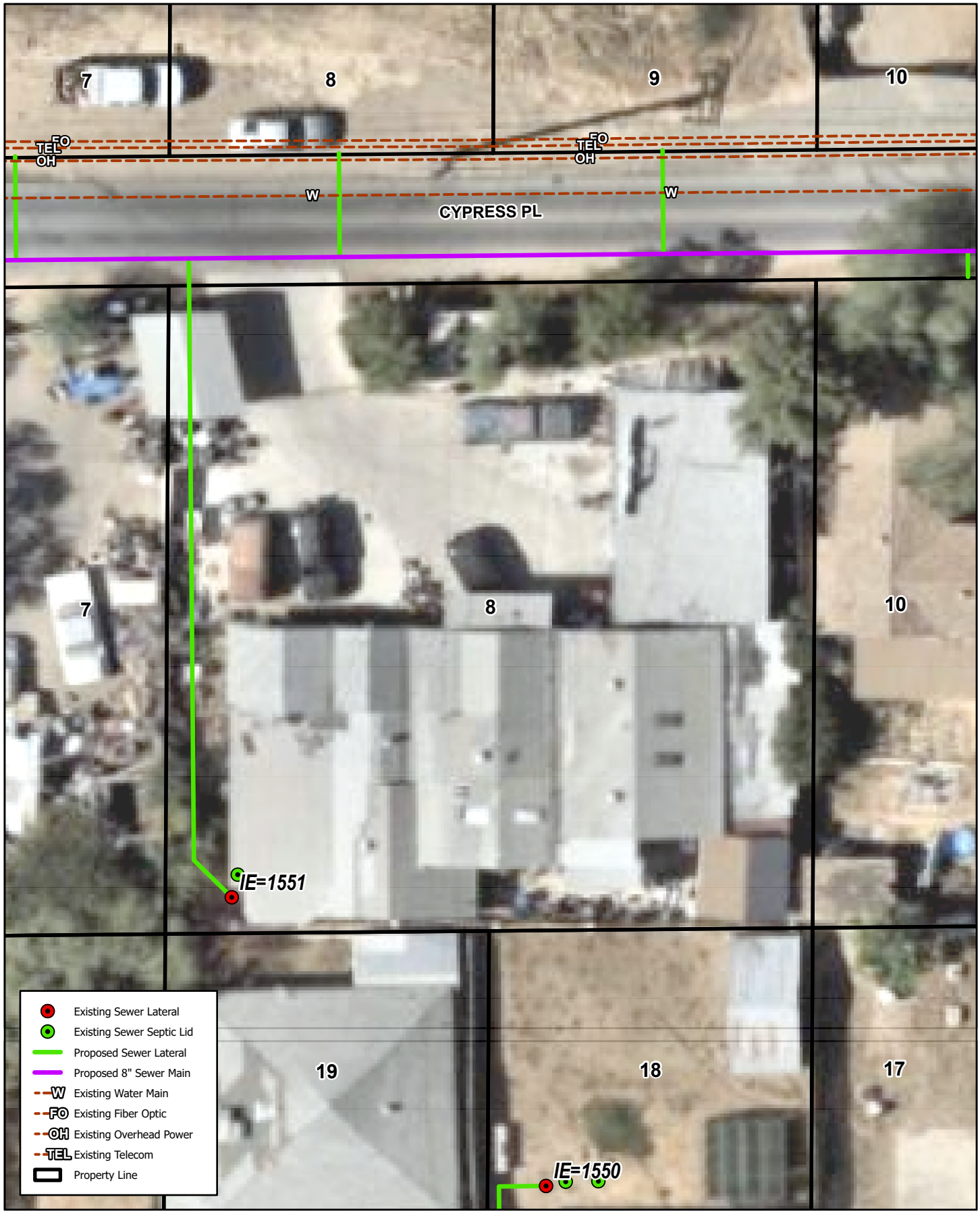


23508 CLARA PL, CANYON LAKE, CA 92587

LOT #78

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23937 CYPRESS PL, CANYON LAKE, CA 92587

LOT #8

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

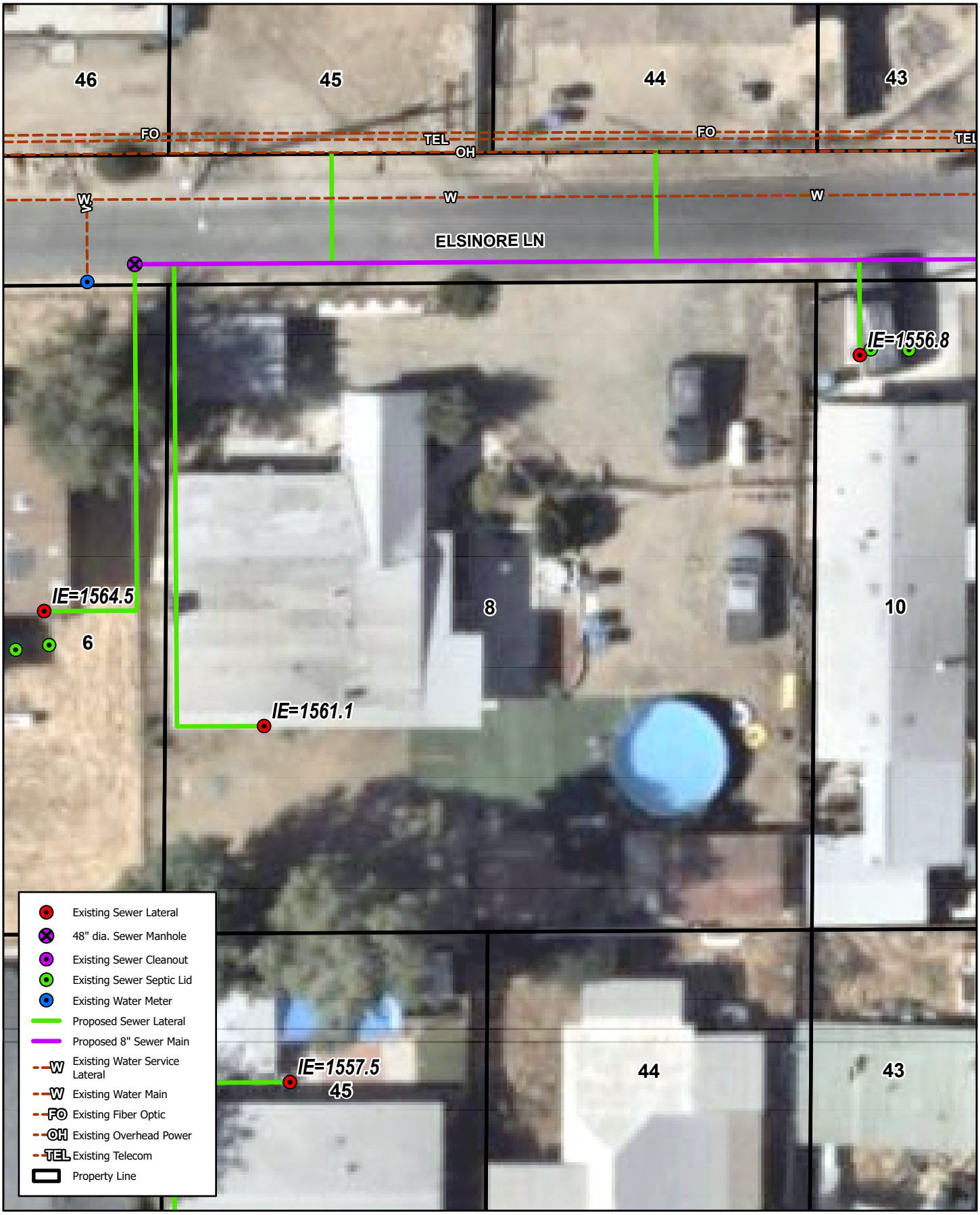


23571 MT VERNON PL, CANYON LAKE, CA 92587

LOT #8

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

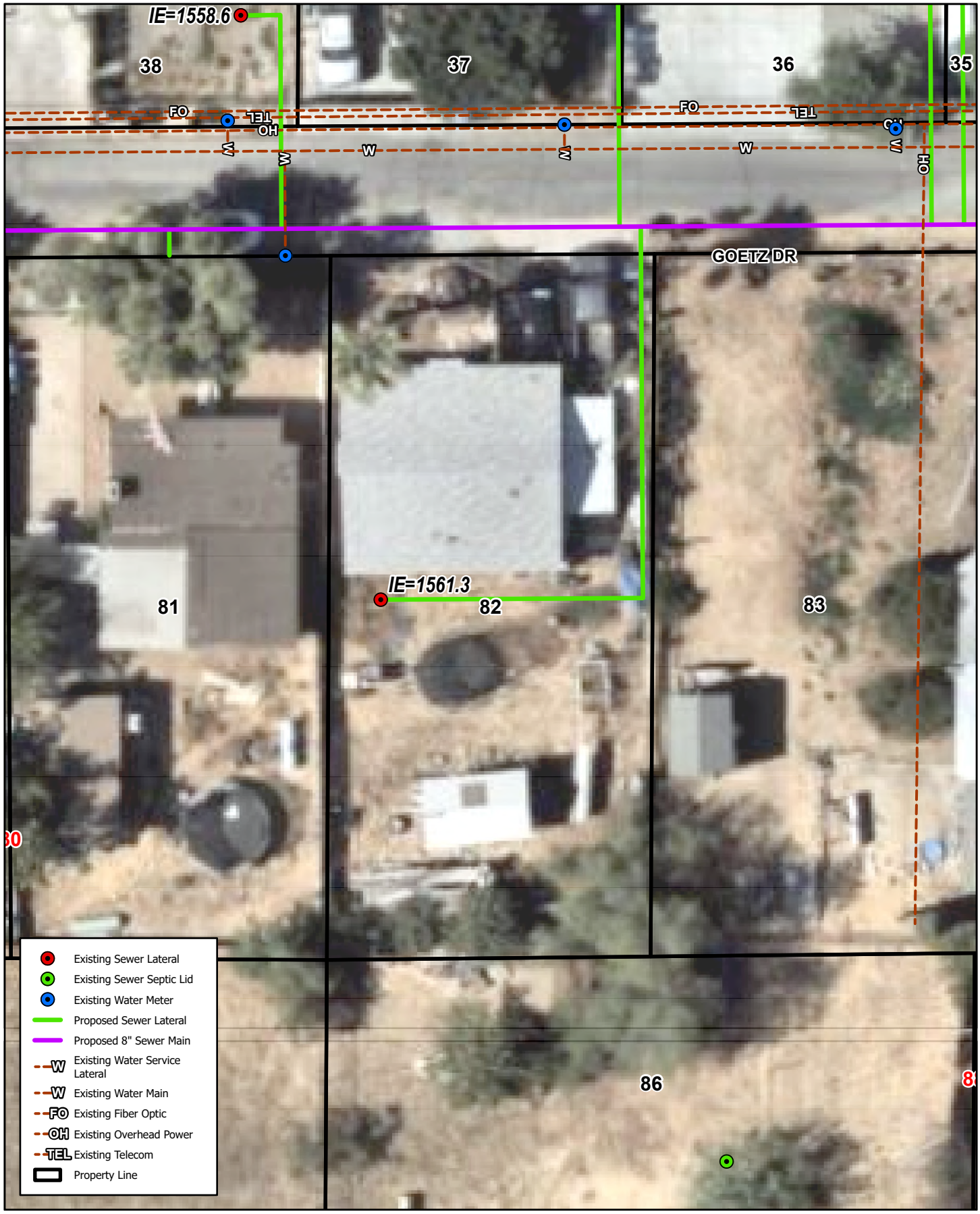


23571 ELSINORE LN, CANYON LAKE, CA 92587

LOT #8

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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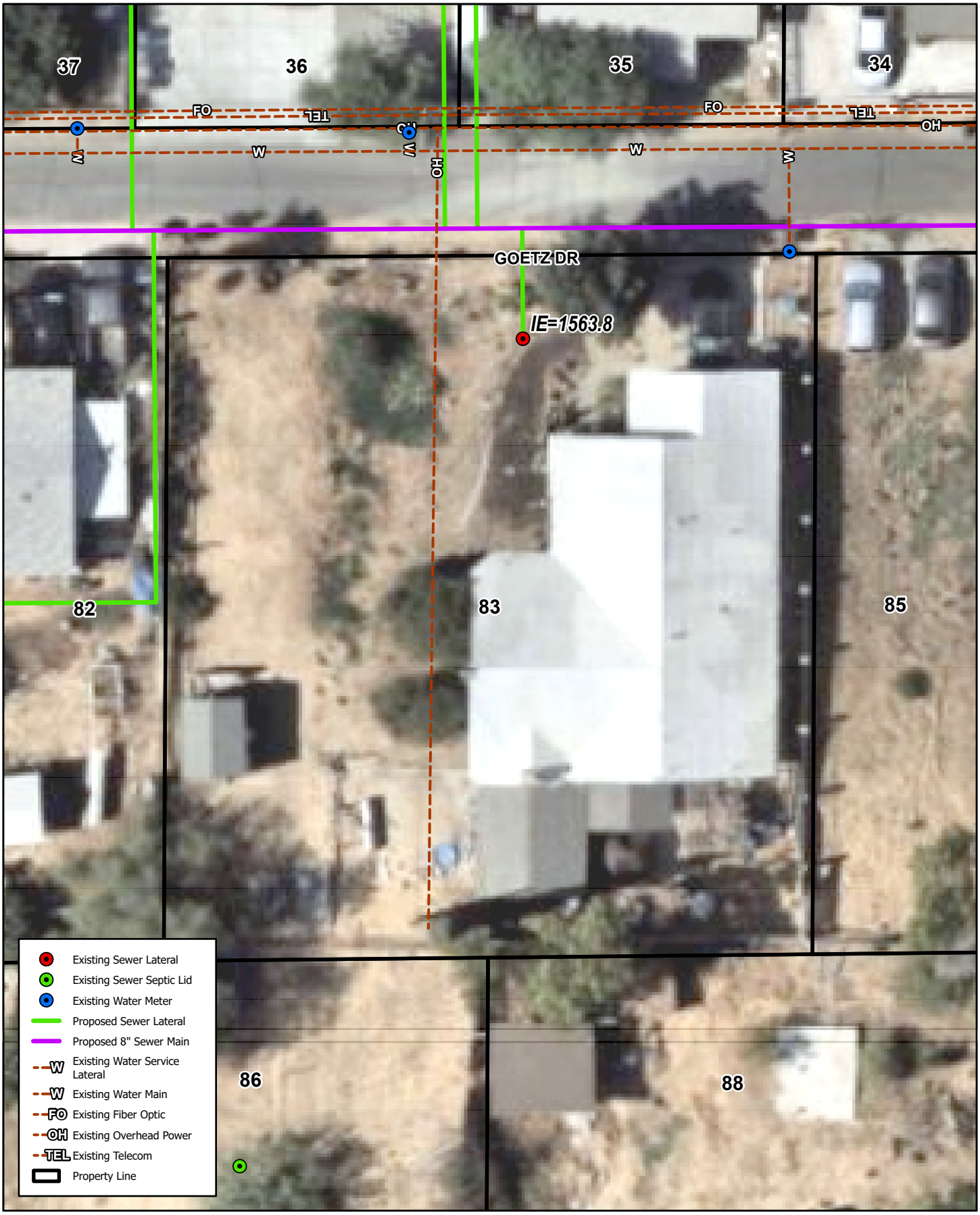
LOT #82

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

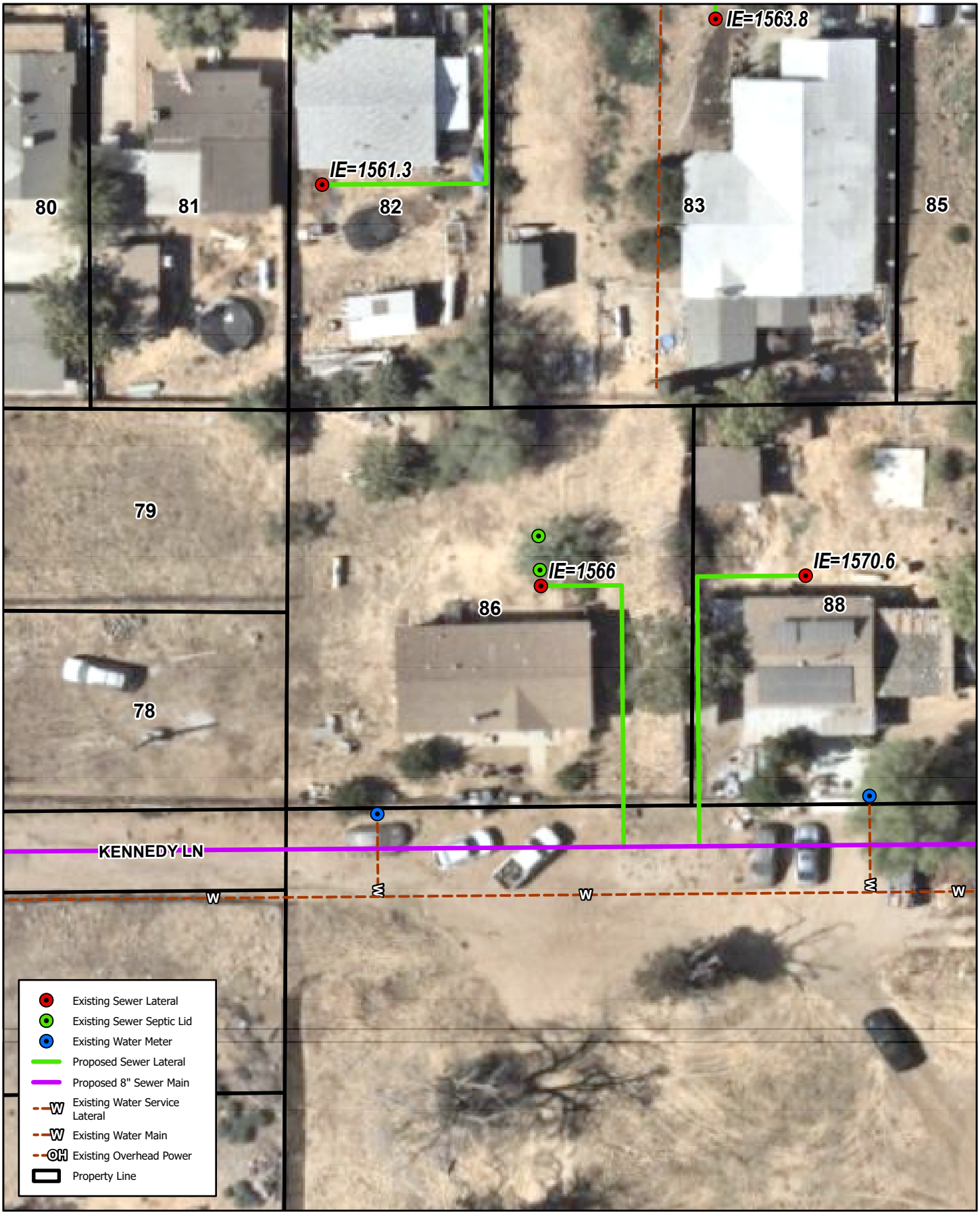


23913 GOETZ DR, CANYON LAKE, CA 92587

LOT #83

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23880 KENNEDY LN, CANYON LAKE, CA 92587

LOT #86

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

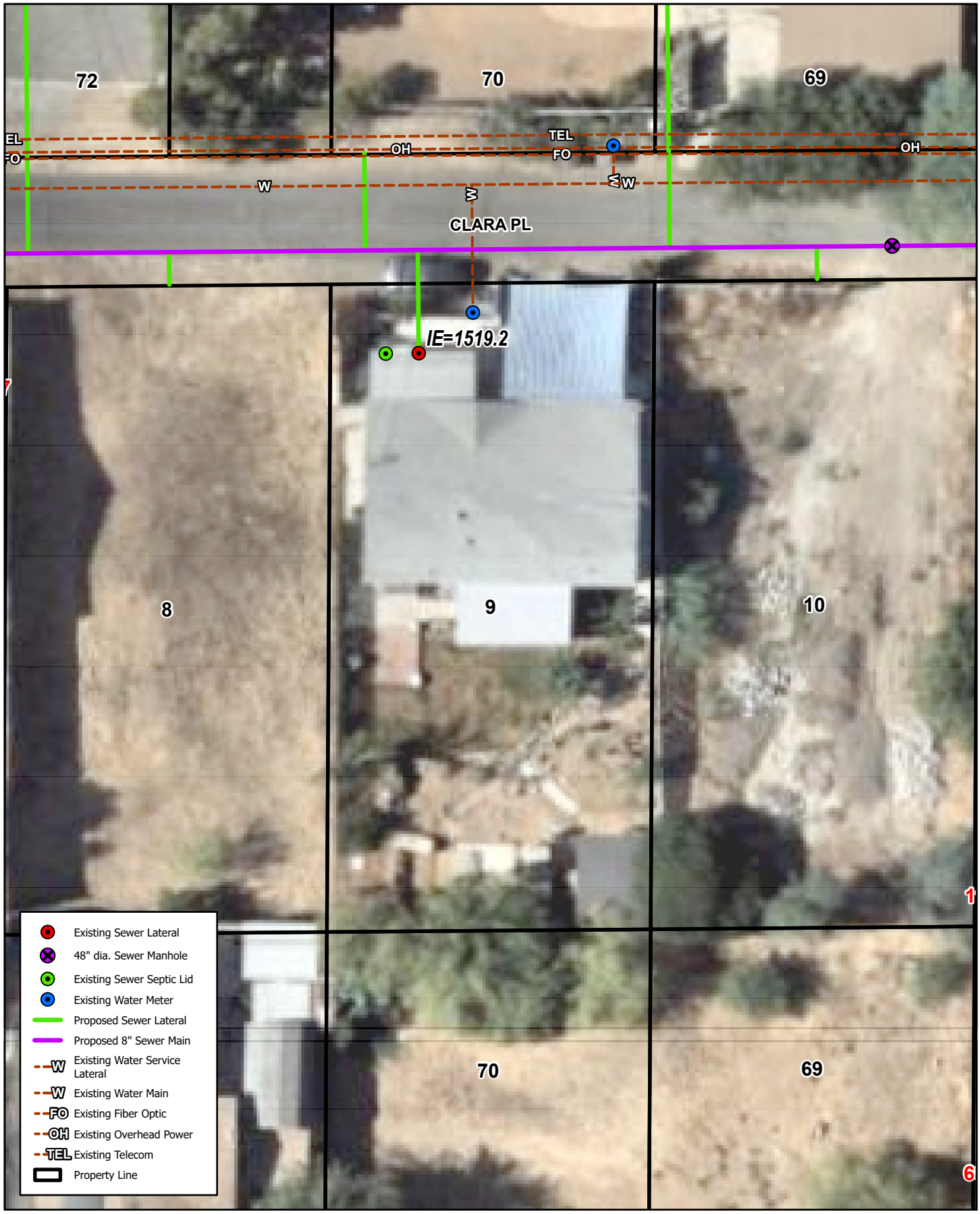


23910 KENNEDY LN, QUAIL VALLEY, CA 92587

LOT #88

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23571 CLARA PL, CANYON LAKE, CA 92587

LOT #9

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

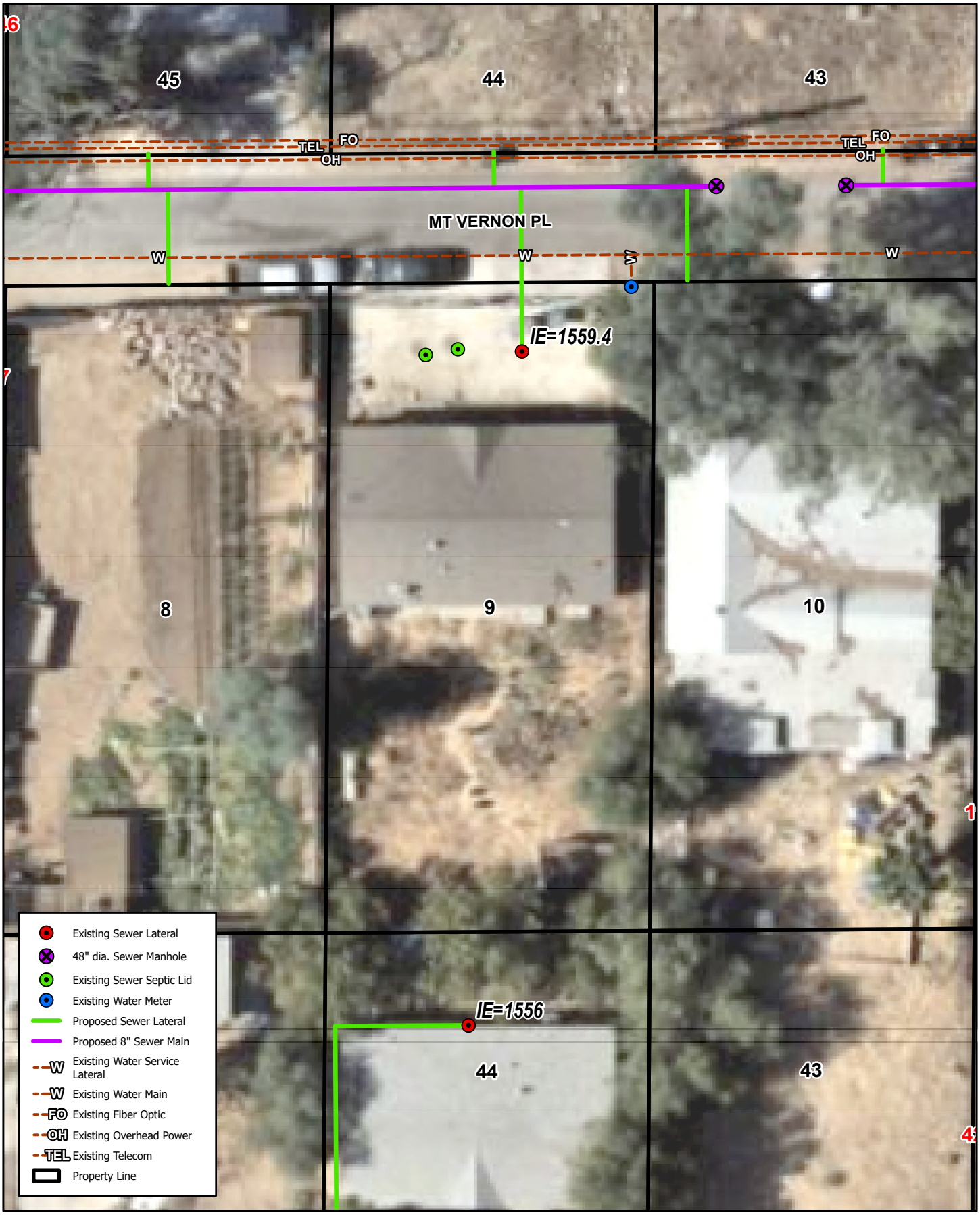


23593 GOETZ DR, QUAIL VALLEY, CA 92587

LOT #9

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

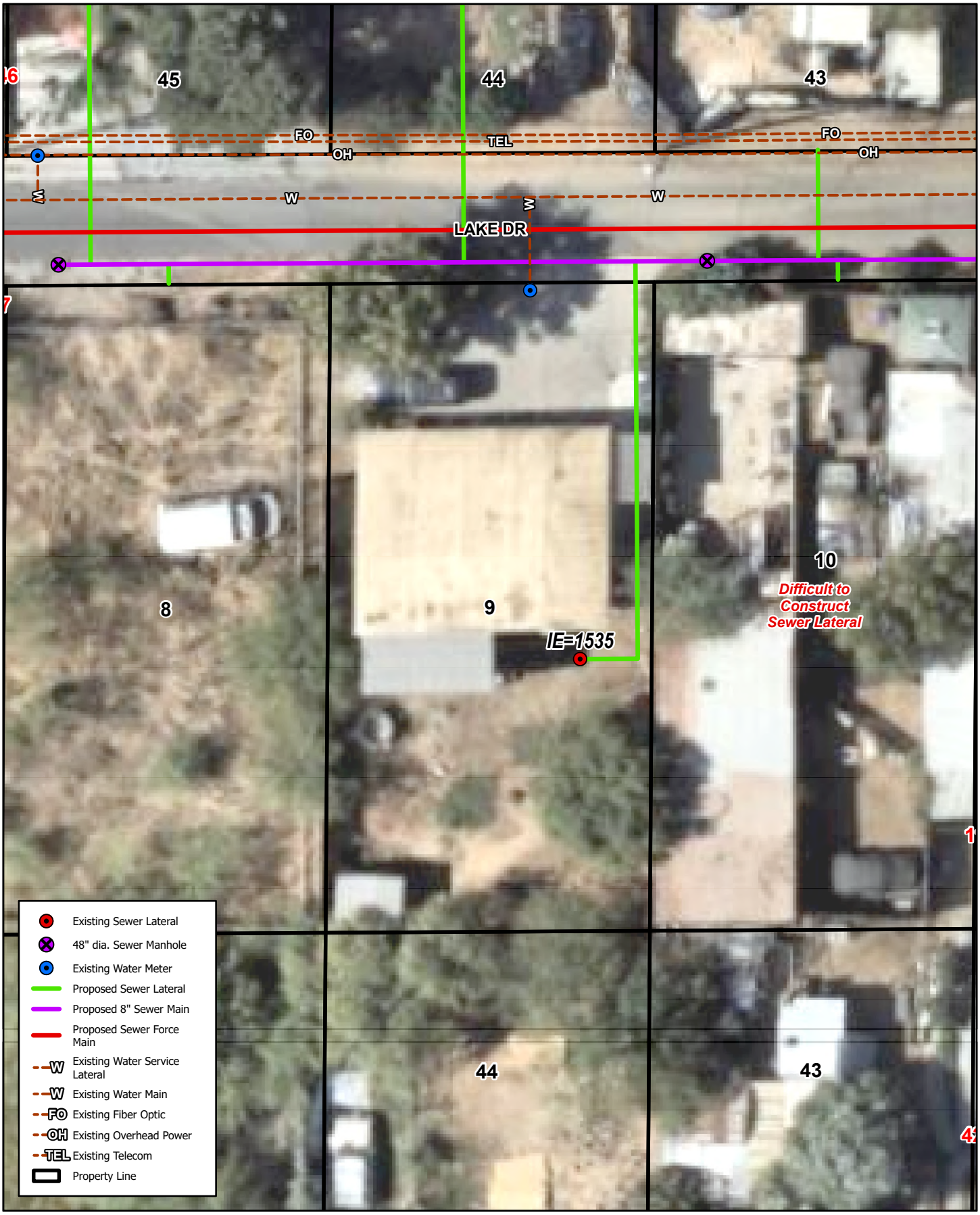


23837 MT VERNON PL, CANYON LAKE, CA 92587

LOT #9

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

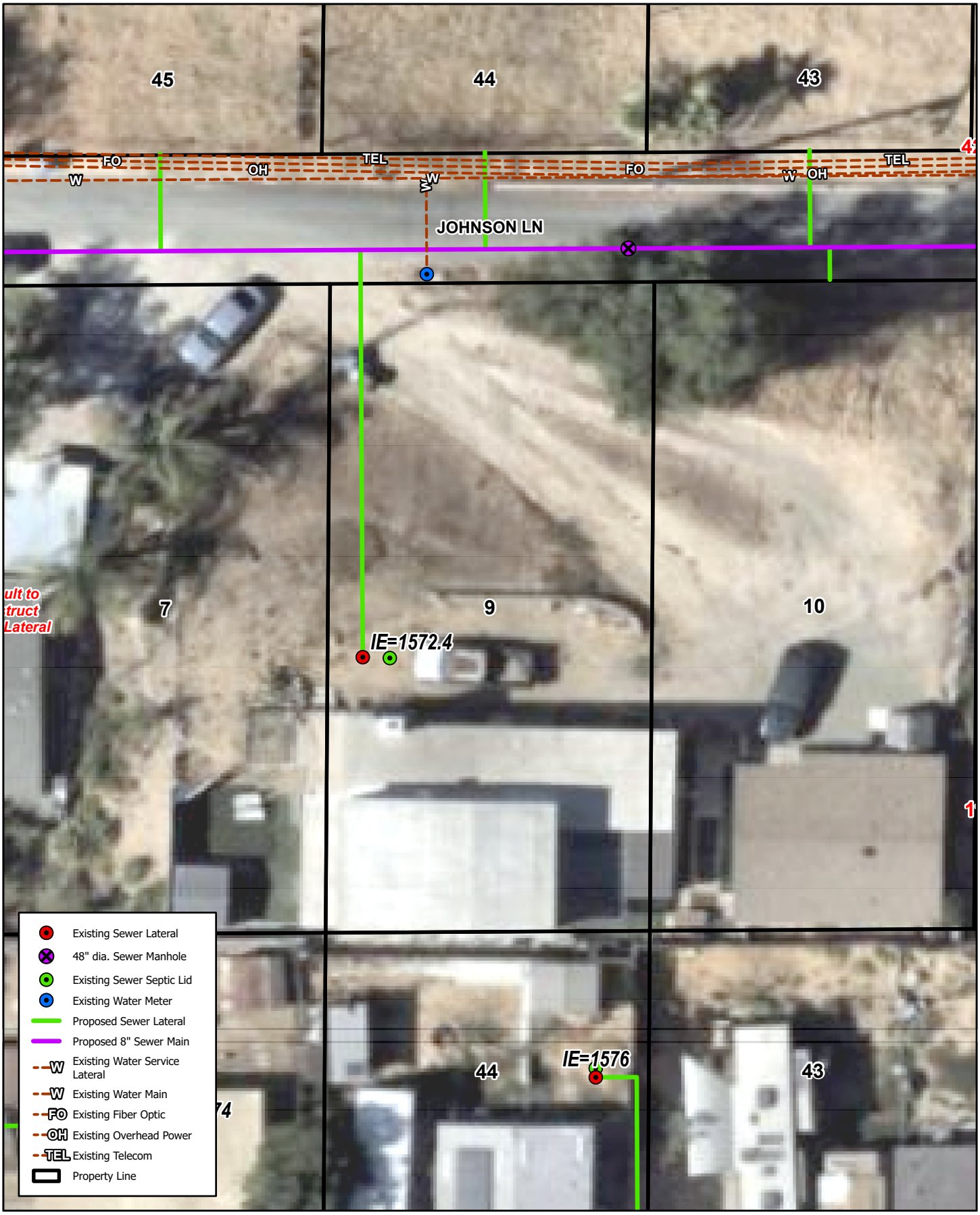


23581 LAKE DR, CANYON LAKE, CA 92587

LOT #9

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

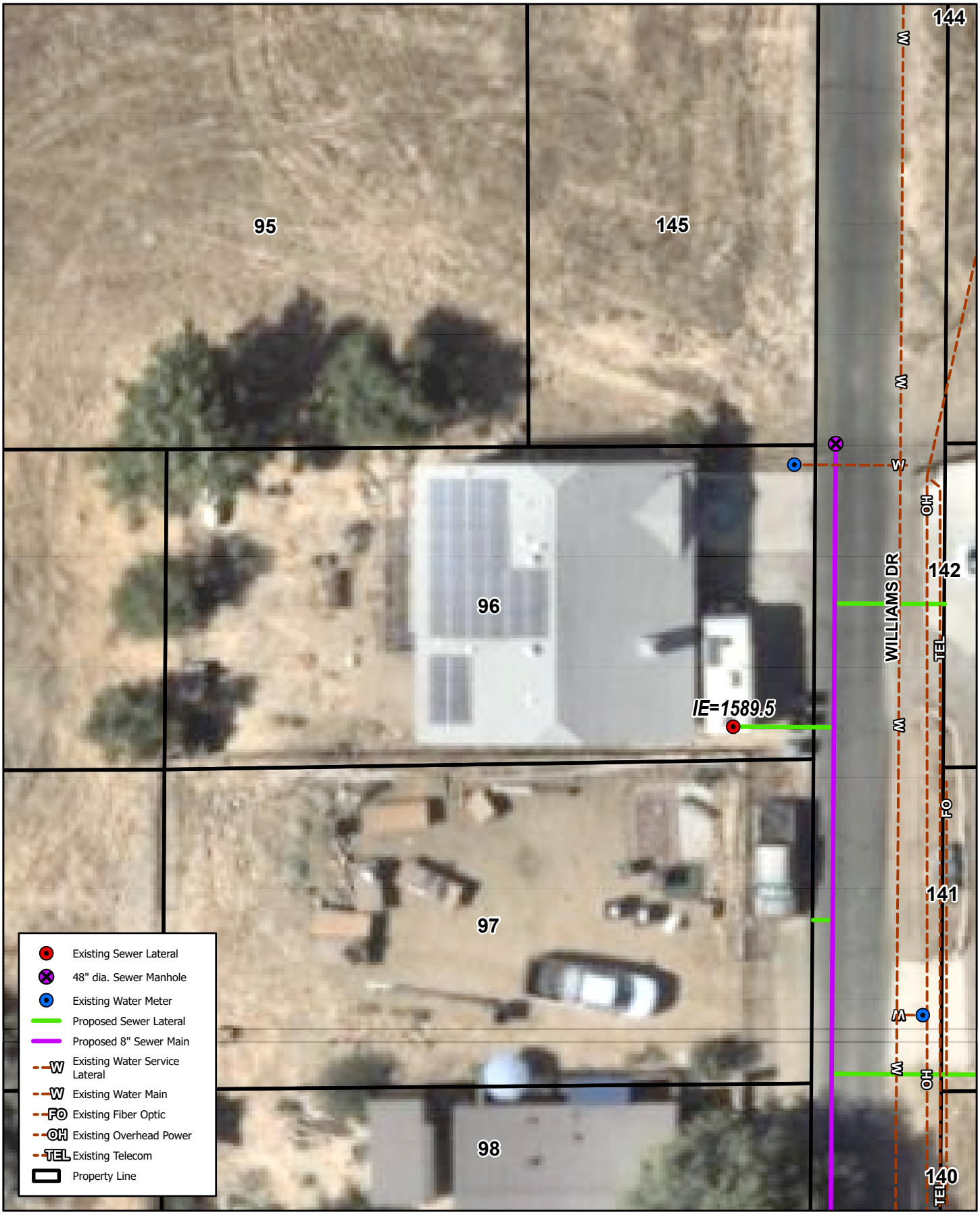


23571 JOHNSON LN, CANYON LAKE, CA 92587

LOT #9

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

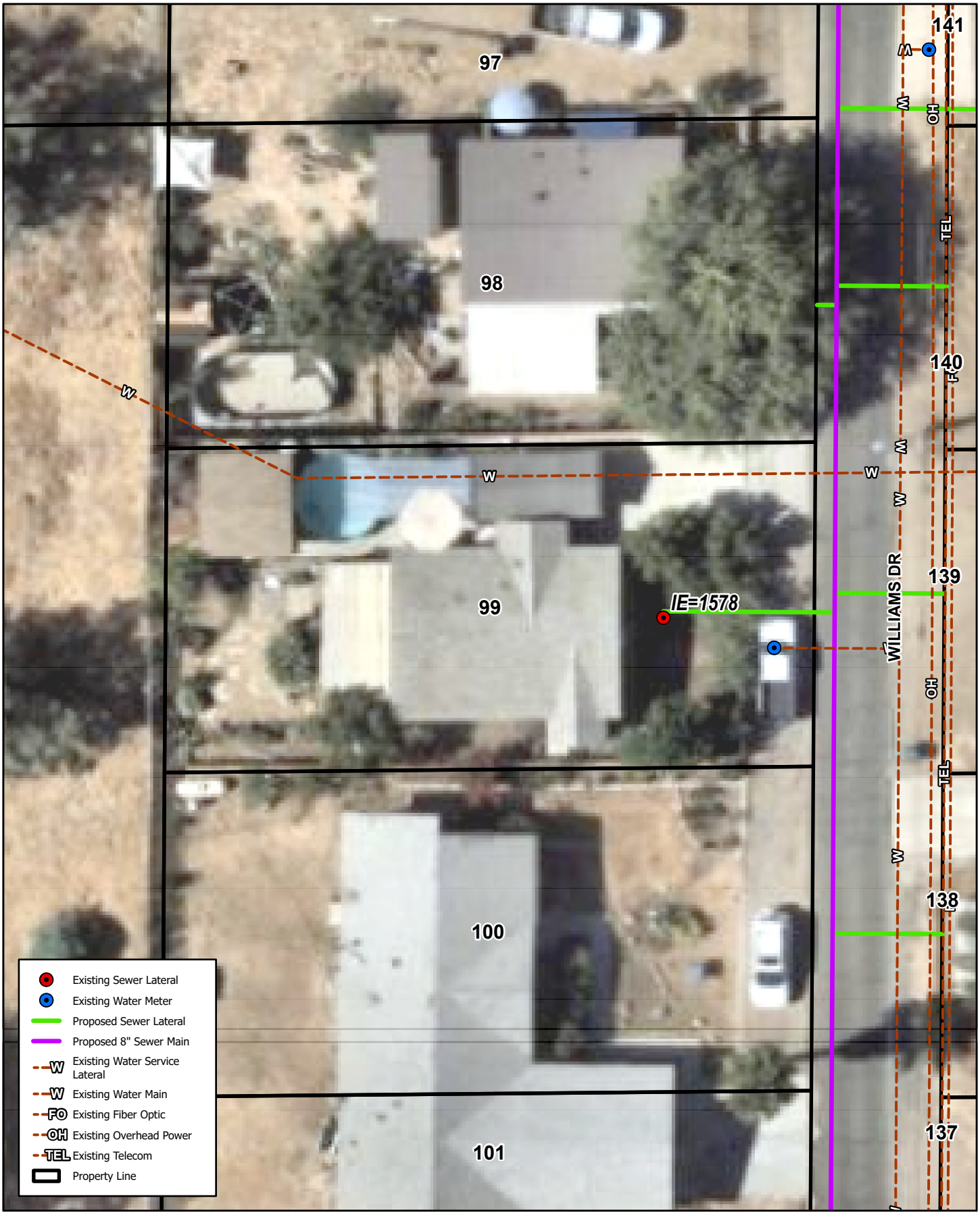


28521 WILLIAMS DR, CANYON LAKE, CA 92587

LOT #96

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

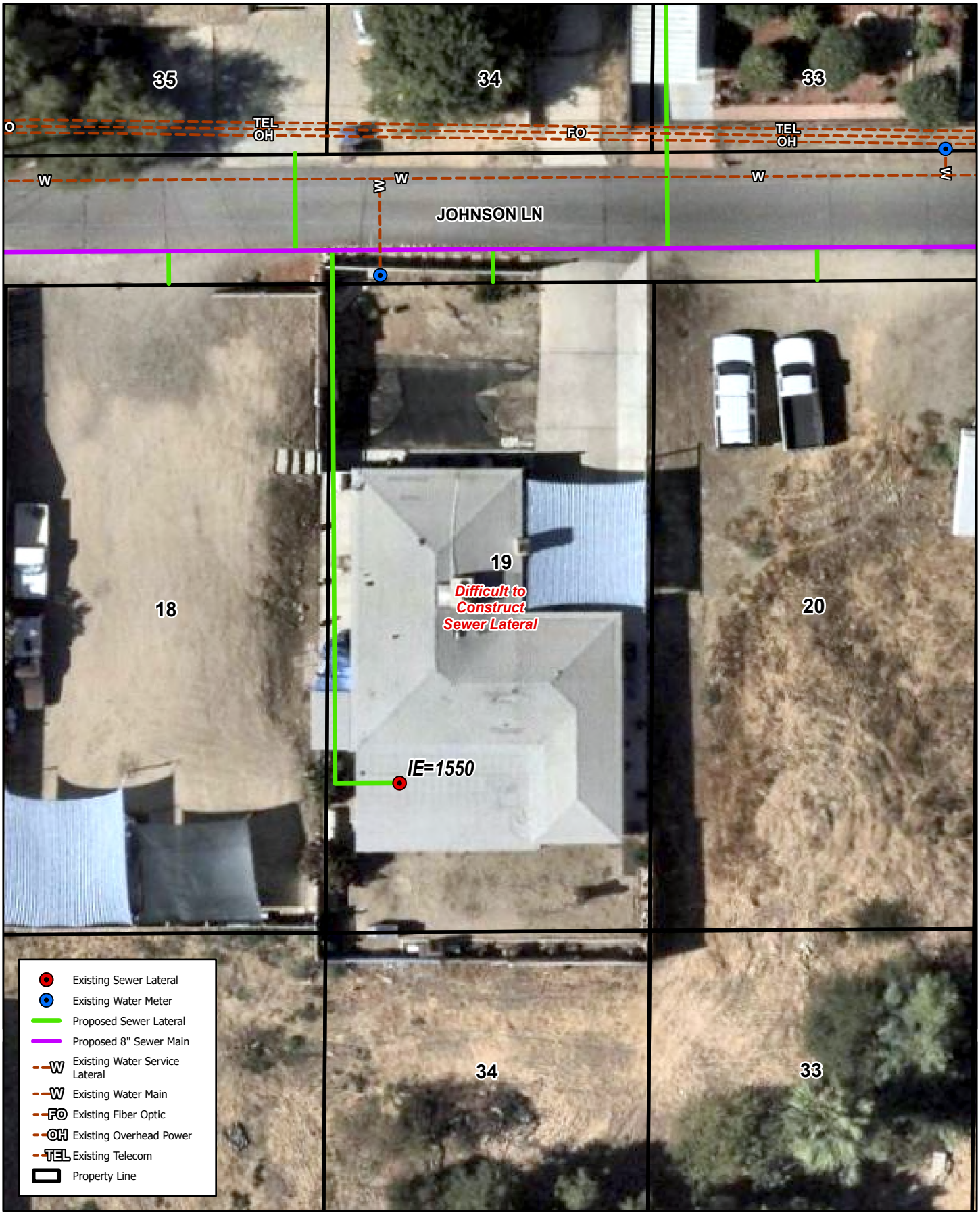


28567 WILLIAMS DR, CANYON LAKE, CA 92587

LOT #99

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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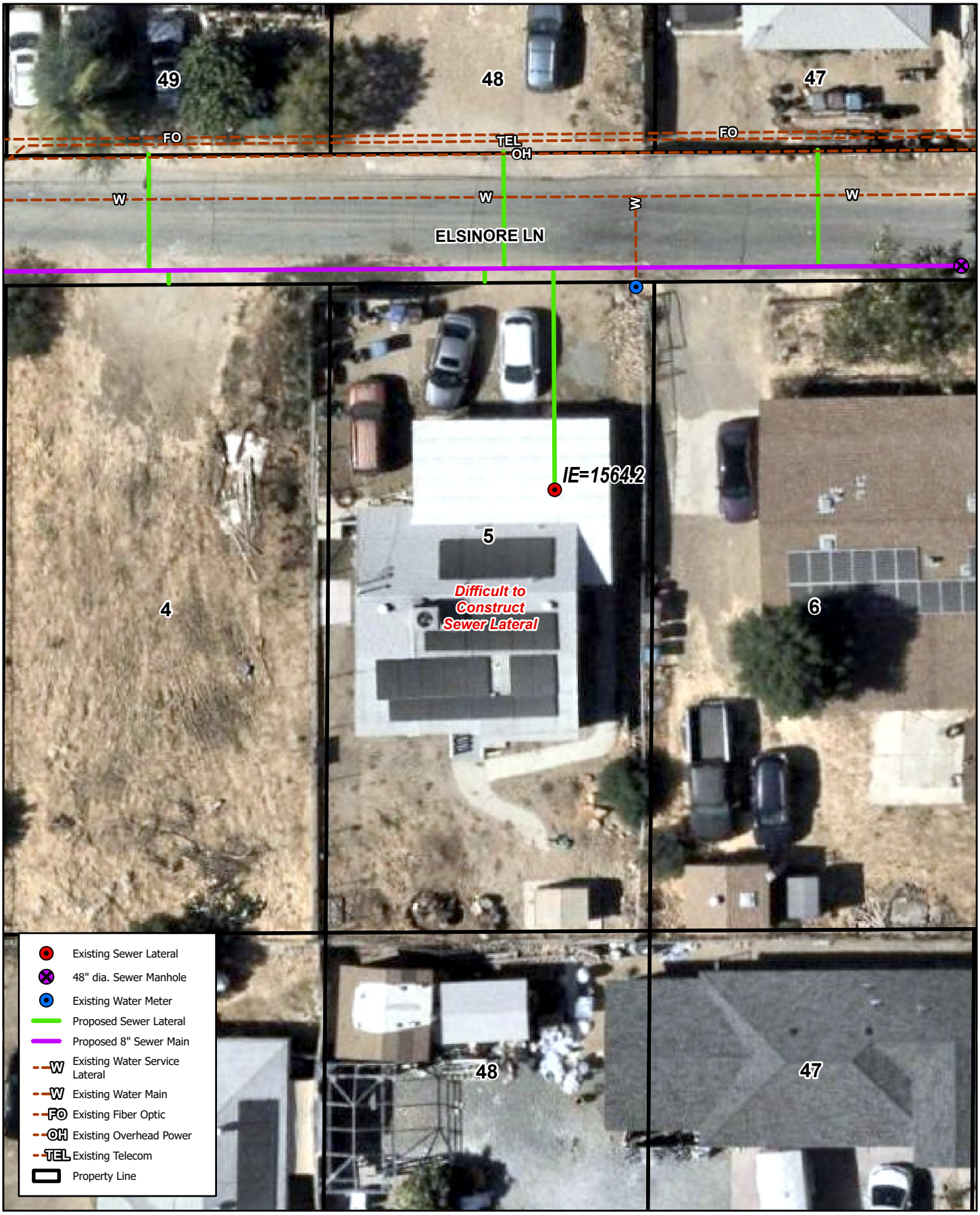
LOT #19

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

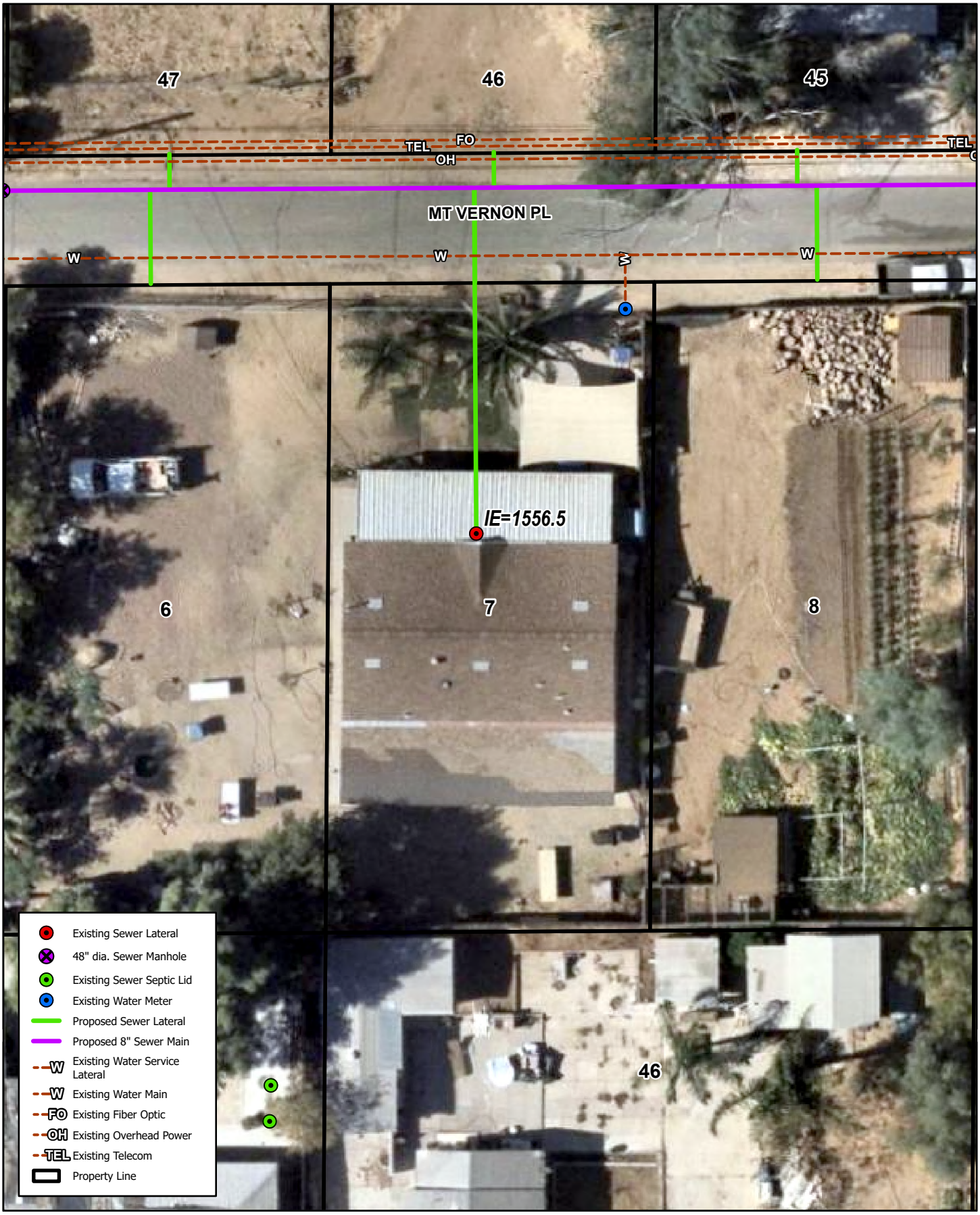


23543 ELSINORE LN, CANYON LAKE, CA 92587

LOT #5

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

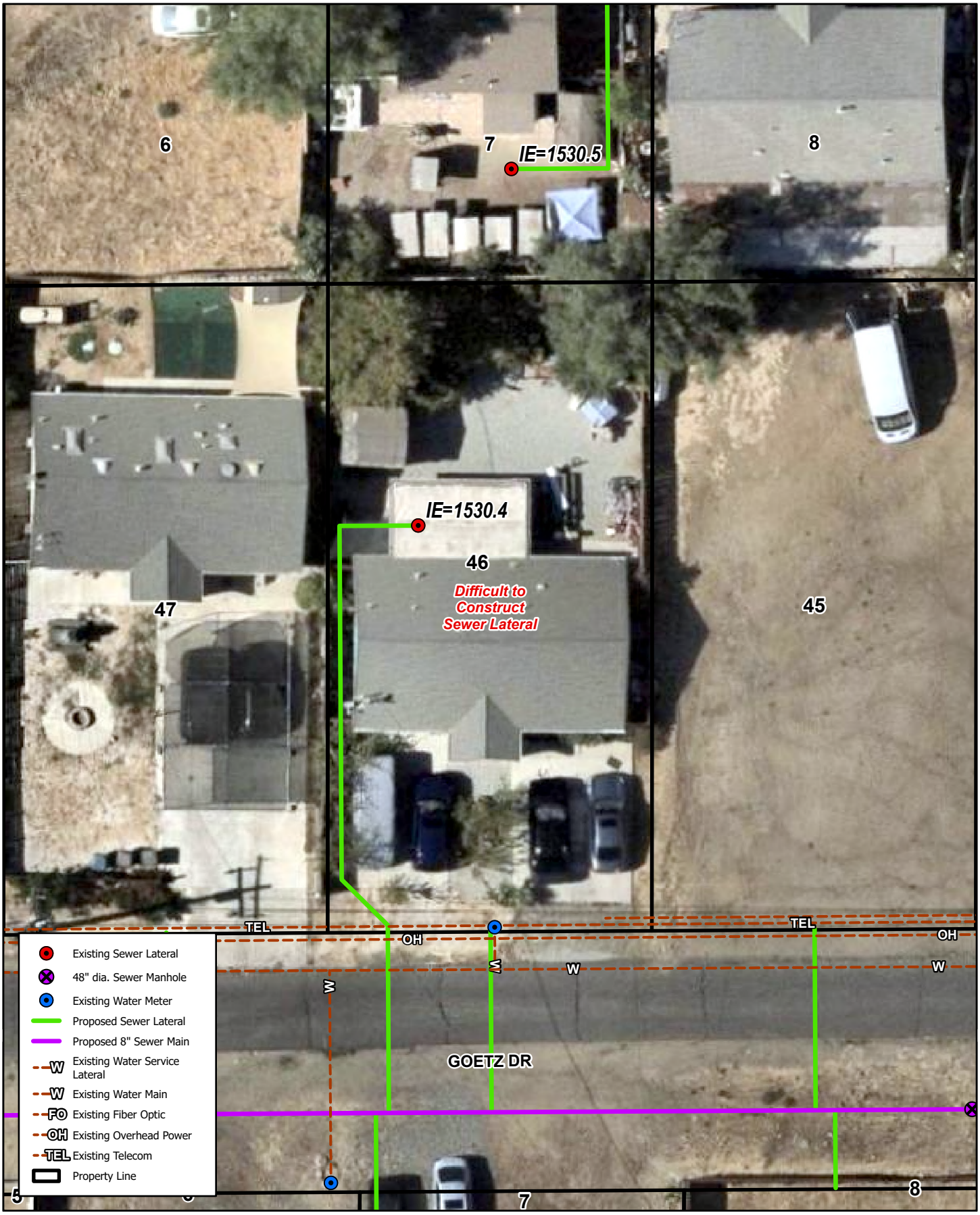


23813 MT VERNON PL, CANYON LAKE, CA 92587

LOT #7

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23580 GOETZ DR, CANYON LAKE, CA 92587

LOT #46

Quail Valley - Subarea 4 Sewer Improvement Plans

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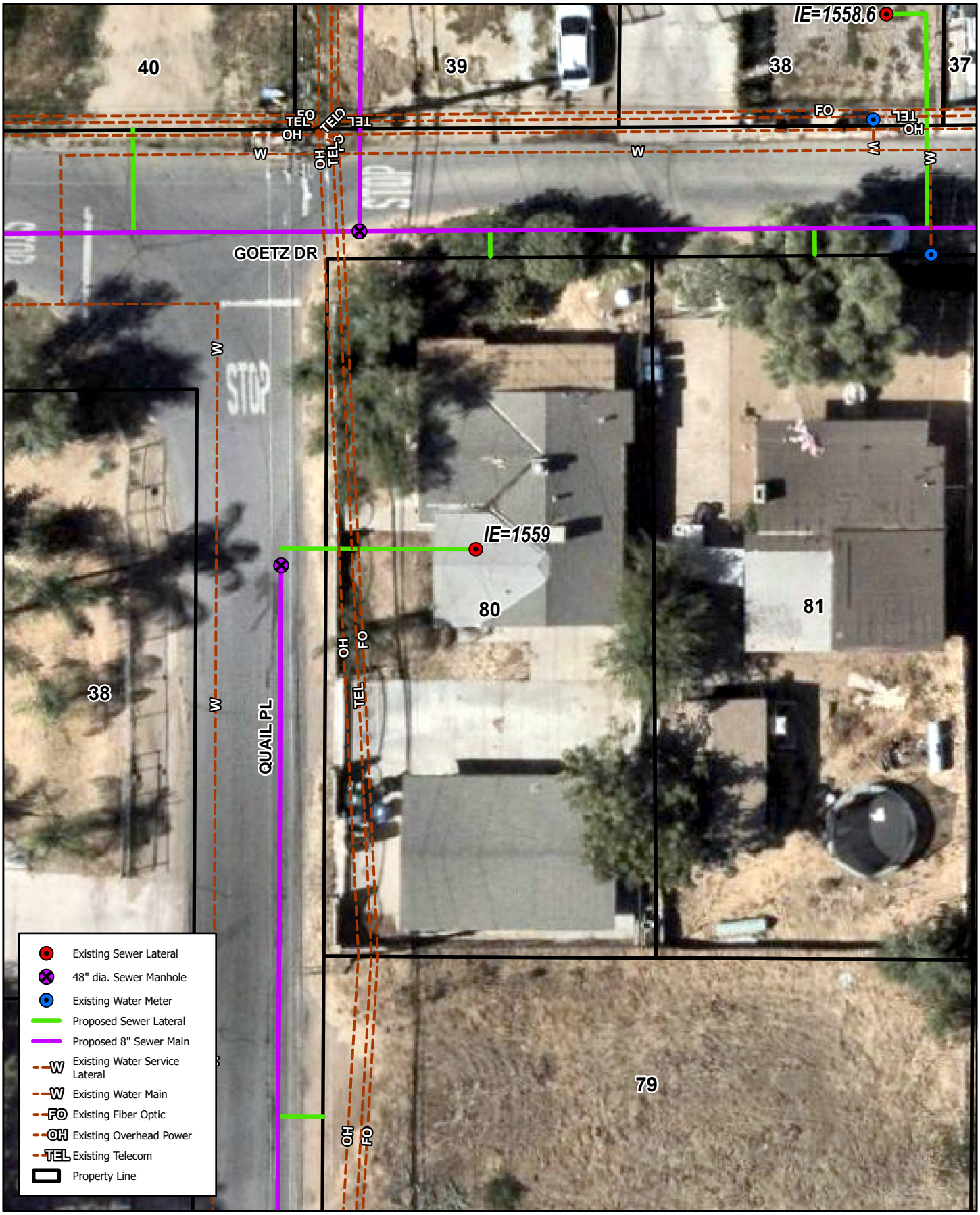

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LOT #80

Quail Valley - Subarea 4 Sewer Improvement Plans

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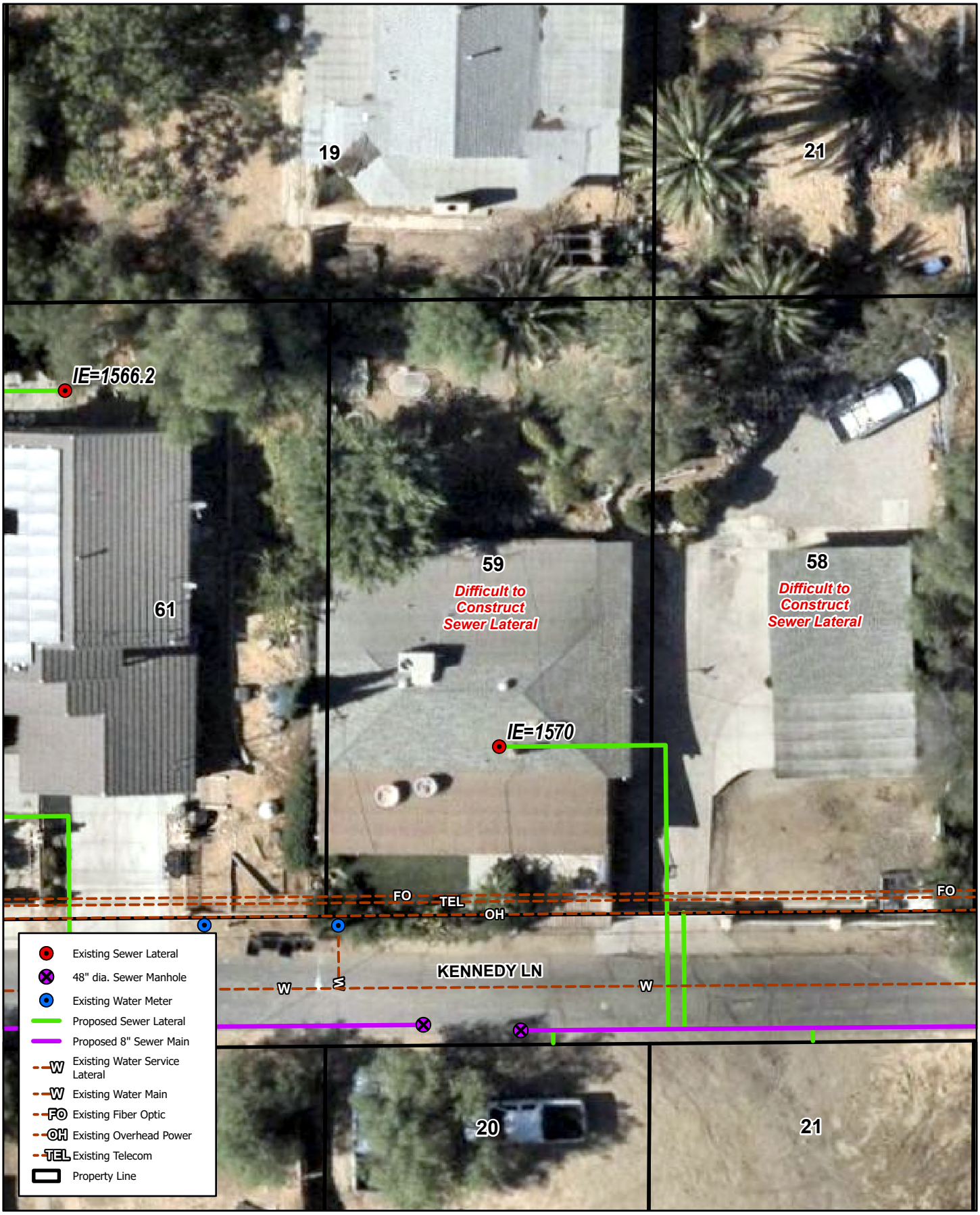

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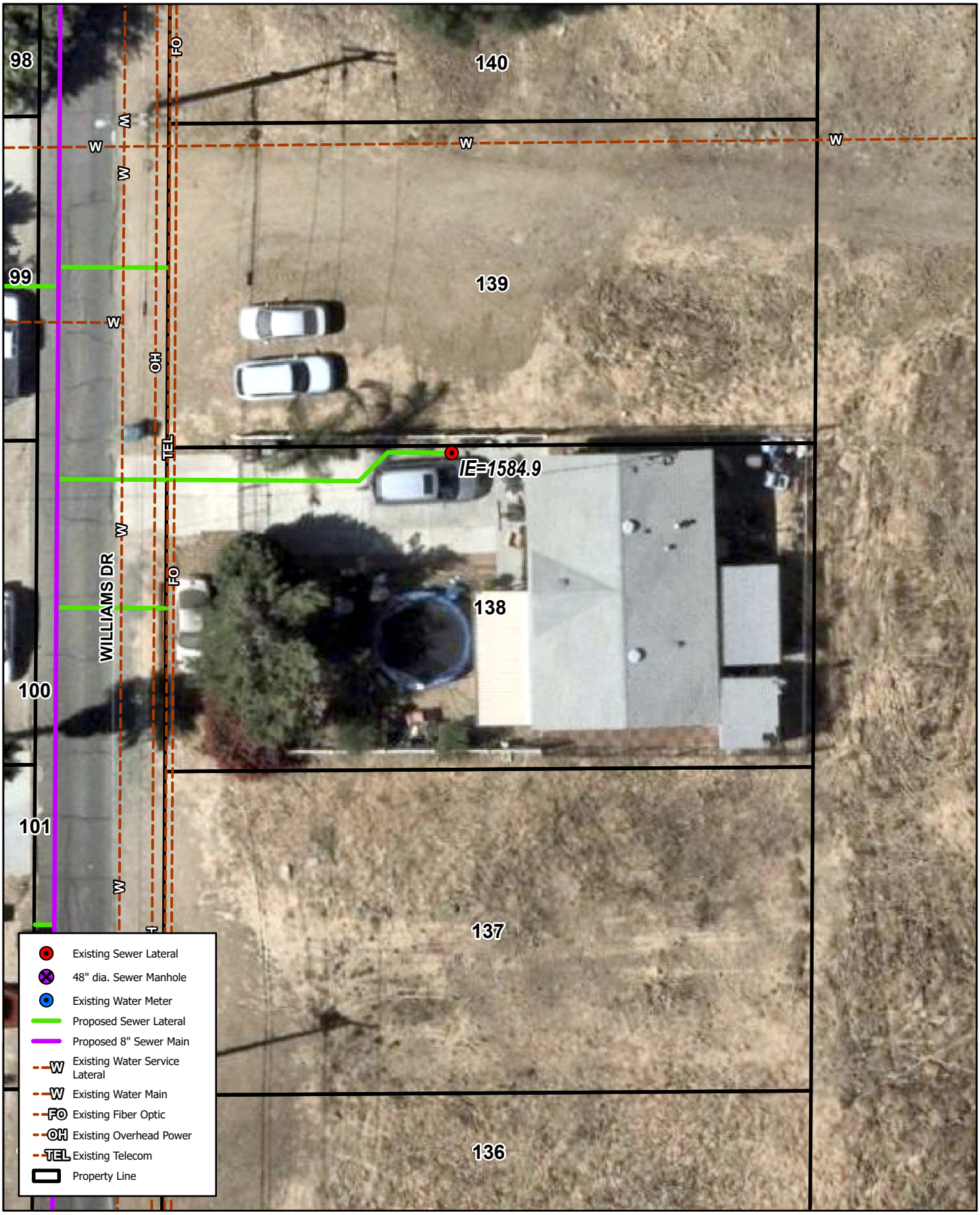
LOT #59

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



28570 WILLIAMS DR, CANYON LAKE, CA 92587

LOT #138

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23580 SHREEDER PL, CANYON LAKE, CA 92587

LOT #68

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



25521 SHREEDER PL, CANYON LAKE, CA 92587

LOT #3

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

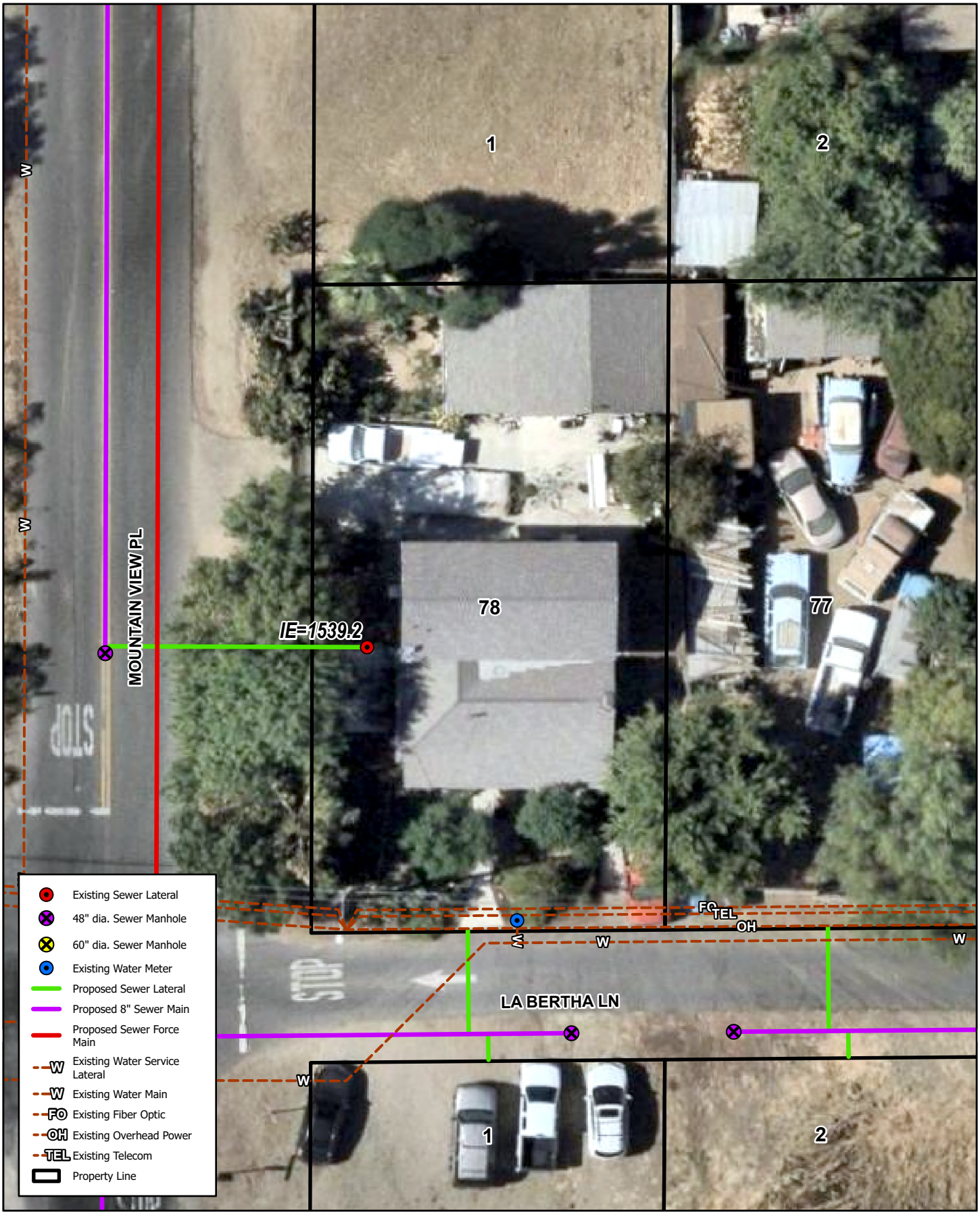


23591 SHREEDER PL, CANYON LAKE, CA 92587

LOT #13

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

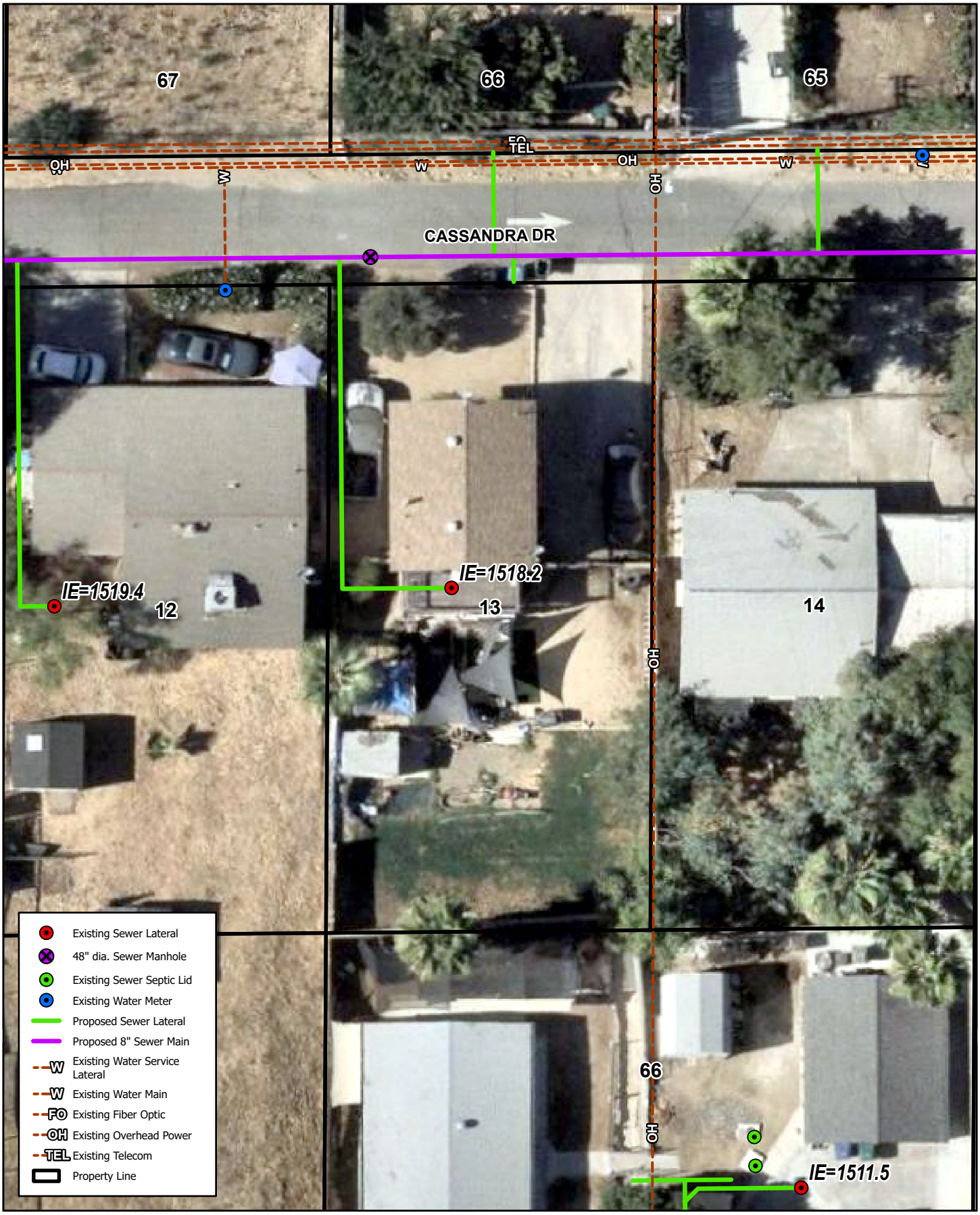


23510 LA BERTHA LN, CANYON LAKE, CA 92587

LOT #78

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23573 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #13

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

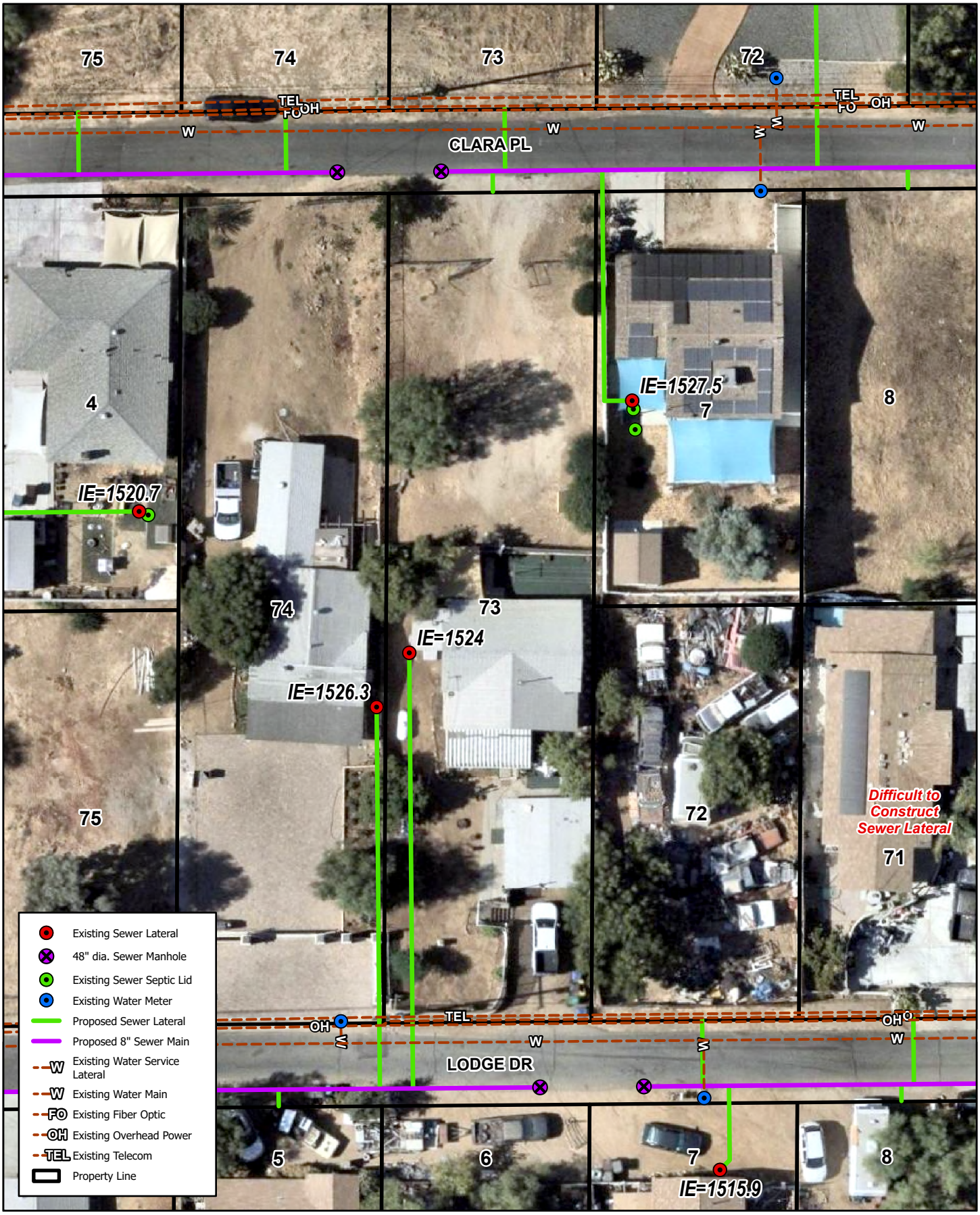


23369 CASSANDRA DR, CANYON LAKE, CA 92587

LOT #20

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

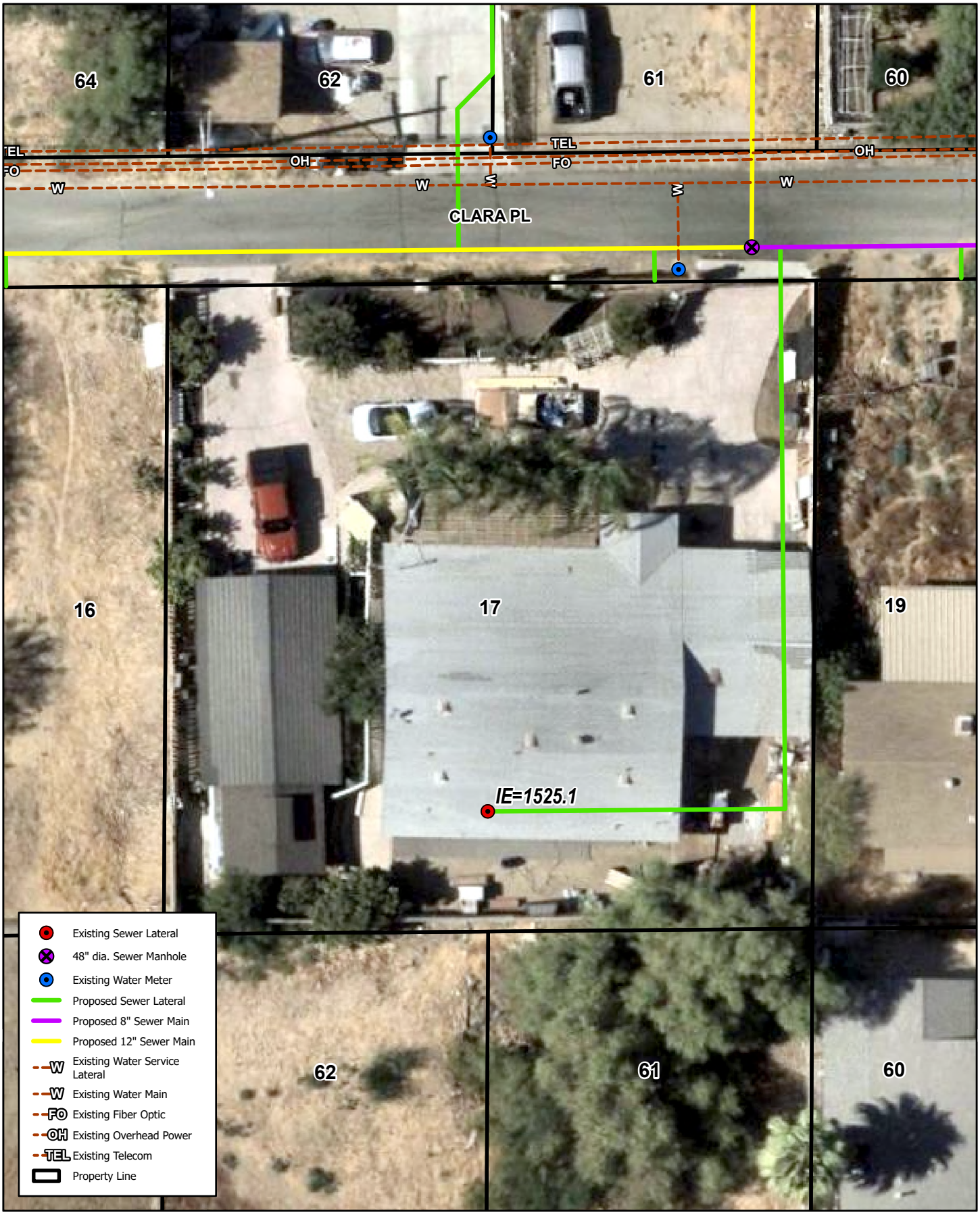


23550 LODGE DR, CANYON LAKE, CA 92587

LOT #73

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

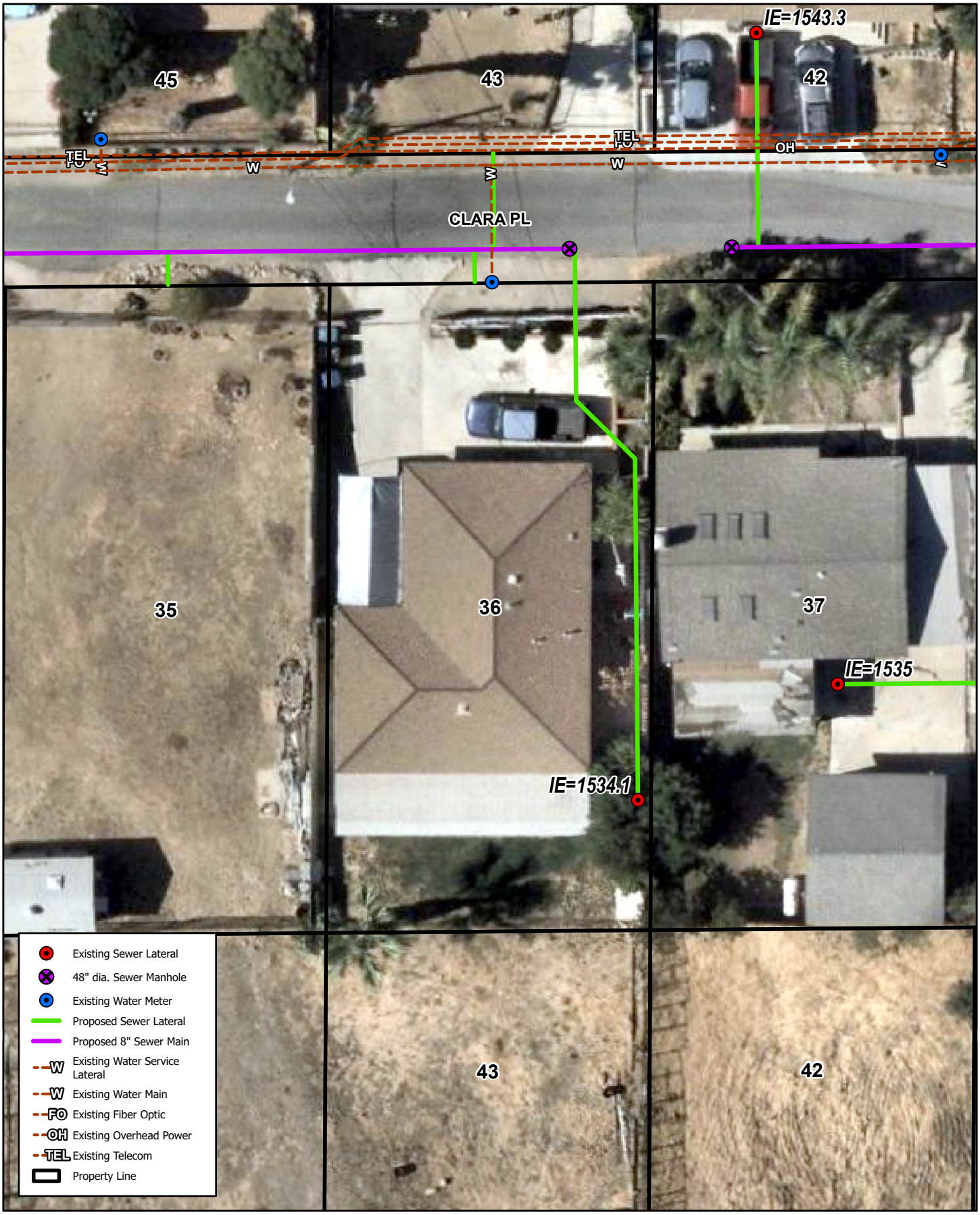


23641 CLARA PL, CANYON LAKE, CA 92587

LOT #17

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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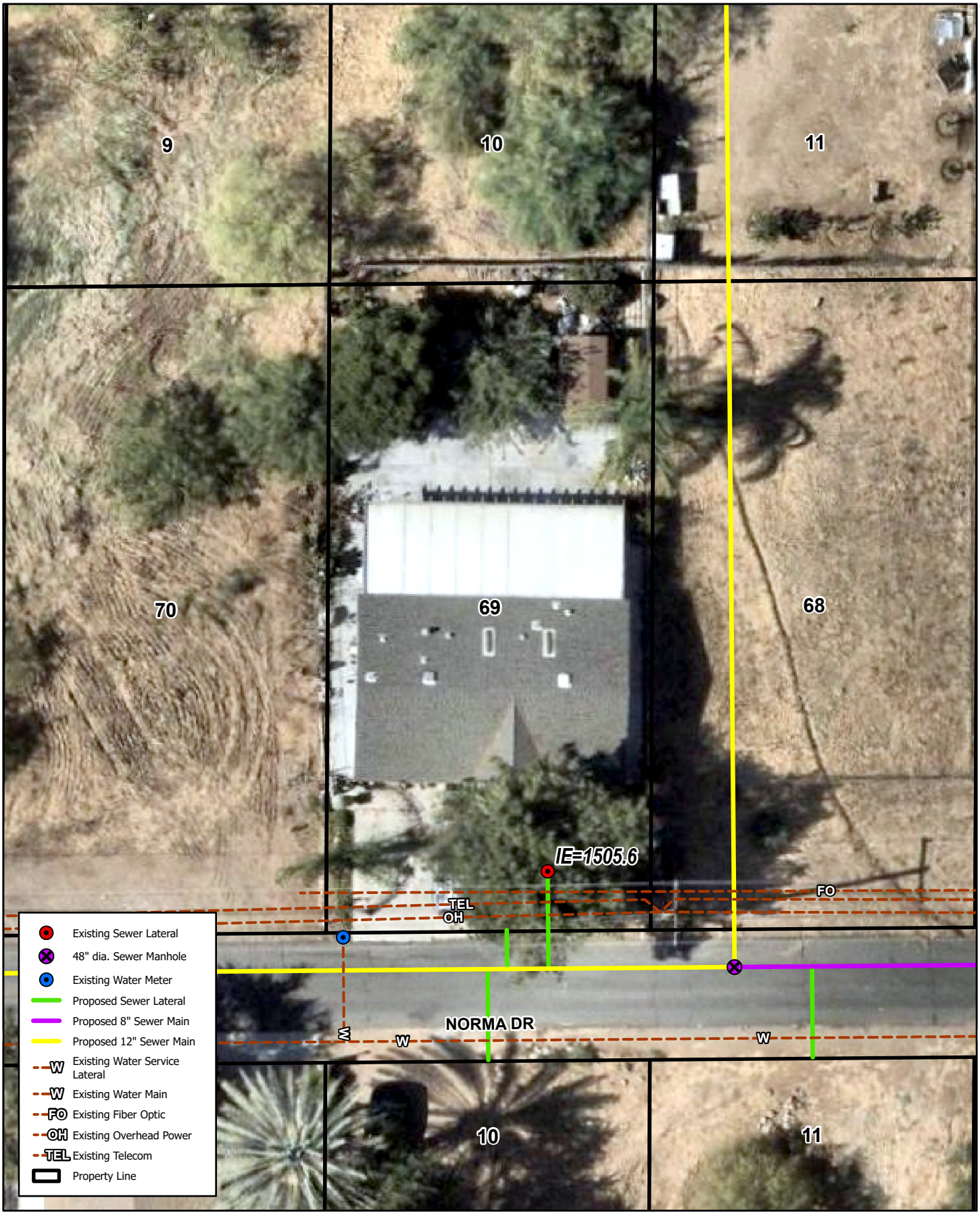
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

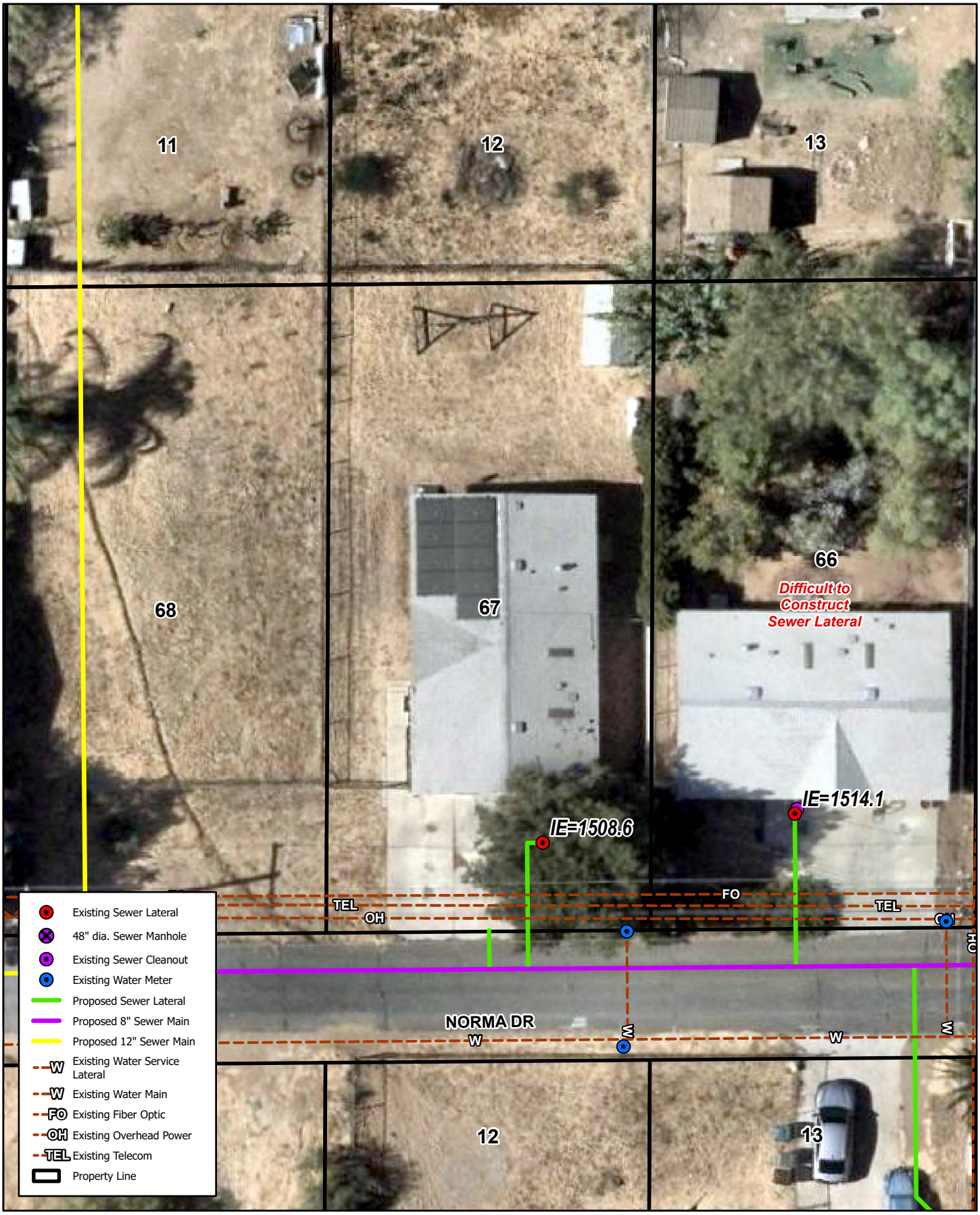


23590 NORMA DR, CANYON LAKE, CA 92587

LOT #69

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

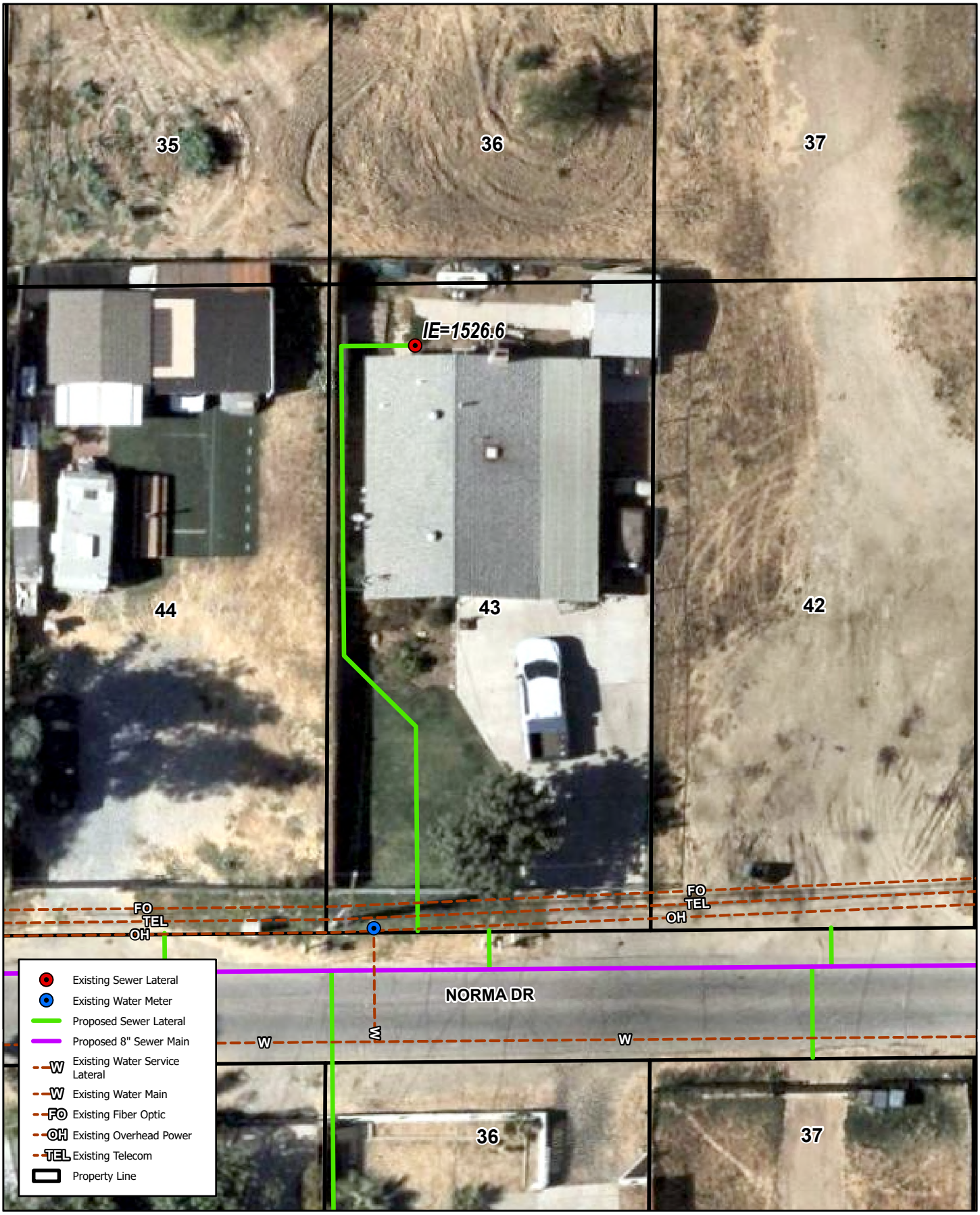


23620 NORMA DR, CANYON LAKE, CA 92587

LOT #67

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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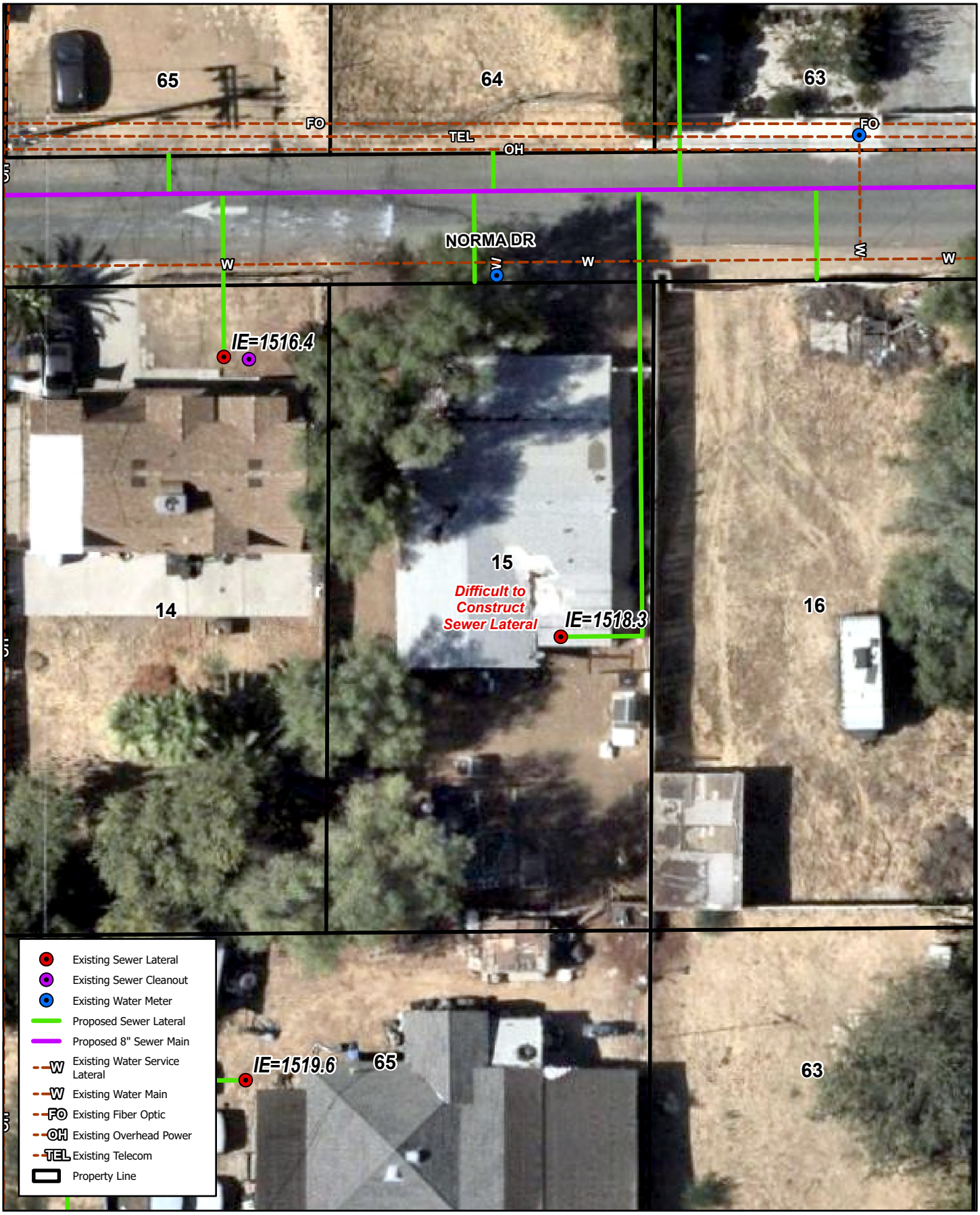
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



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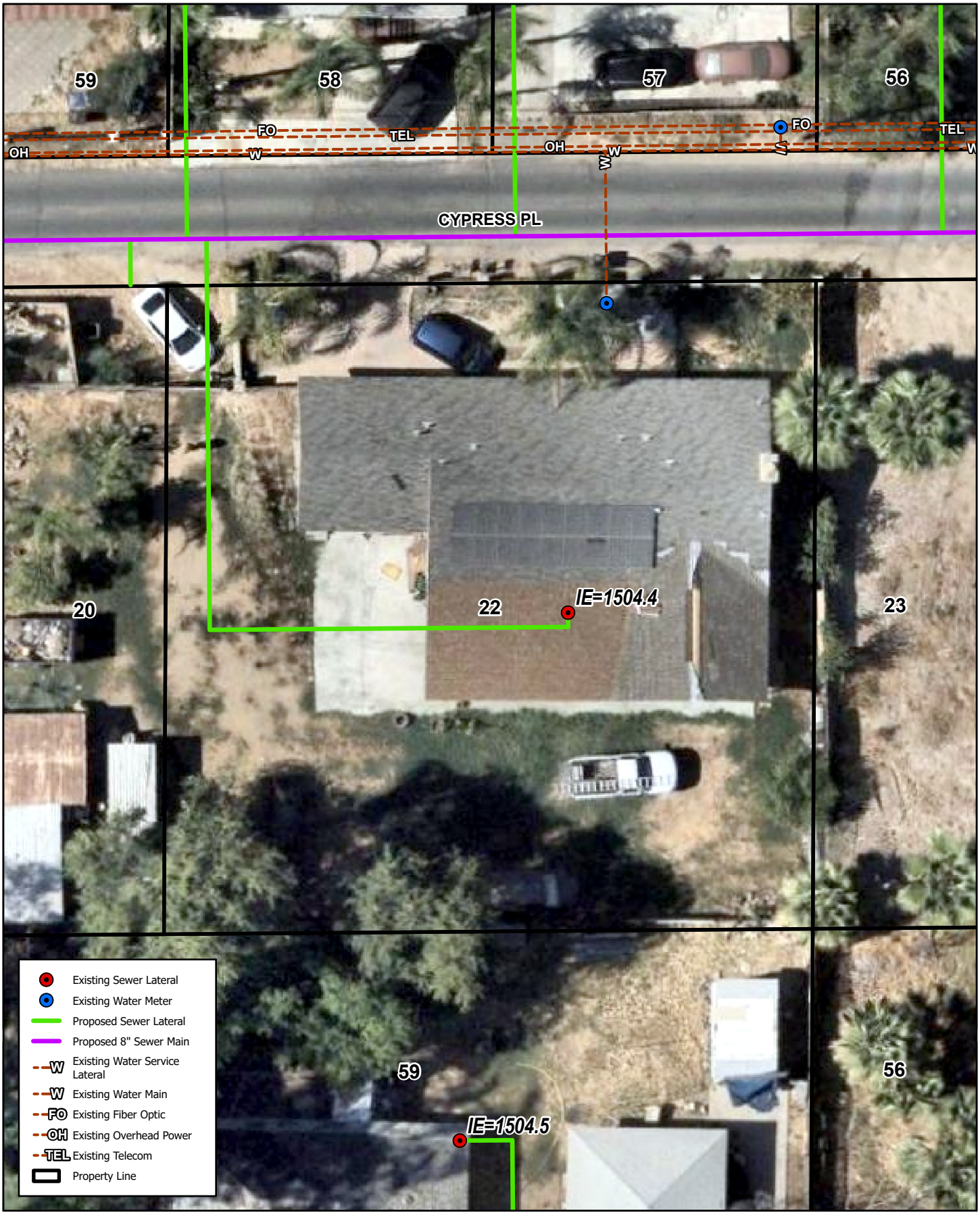
Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL



23705 CYPRESS PL, CANYON LAKE, CA 92587

LOT #22

Quail Valley - Subarea 4 Sewer Improvement Plans

Michael Baker INTERNATIONAL

APPENDIX I – LIST OF PARCELS INDICATING POTHOLE STATUS

The following spreadsheet contains parcel data and status of each pothole. The table below summarizes each pothole status.

Pothole Status	Description
ROE Received	EMWD received a signed right of entry allowing property access.
ROE Outstanding	No signed ROE; MBI left a packet for resident to sign.
ROE Hung	Micheal Baker placed a ROE packet at the property to help secure signatures.
Door Hanger Hung	Property scheduled for septic locating; advance notice given. 4 parcels remain in this status because field crew made multiple attempts to access them but was unable to gain entry.
Could Not Access	Inaccessible due to locked gates, dogs, or other barriers to entry.
Could Not Locate	Hidden or obstructed septic tanks, or Wright Septic was unable to physically locate the septic tank and/or lateral.
Pothole Complete	Lateral found and staked.
Survey Complete	Lateral surveyed, or the crew confirmed in the field that no septic system is present.
Included	Project parcels believed to have a septic system present.
Not Included	Project parcels believed to be undeveloped and lacking septic systems; No EMWD water account.

LIST OF POTHOLES

Lot-APN	Parcel Type	Status	Situs Address	Primary Owner	AB Owner List	Mailing Address	Translator Required	Parcel Developed	Number (Water)	Account Status	Customer Name	Service Address	Email Address	Phone Type	Phone Number	Septic System	Pothole Status
341131004	ROC Received	Not Started	29014 Gantt Road, Canyon Lake, CA 92587	JOSE Estrada		30278 Capri Dr Winchester CA 92596	No	Yes		0 Vacant		29054 GOETZ RD CANYON LAKE CA 92587					Survey Complete
341131008	ROC Received	Not Started	29036 GOETZ RD	PAUL L. RODRIGUEZ		27366 Ybarr Trl El Cajon Lake CA 92587		Yes		502060682	Active	JOHN THOMAS	29036 GOETZ RD CANYON LAKE CA 92587	THOMASJOHN.COM	CELL	9532371002	Yes	Survey Complete
341131009	ROC Received	Not Started	29700 Gantt Road, Canyon Lake, CA 92587	Paul Arnold		32282 Camino Nuevo Temecula CA 92592		Yes		502062214	Active	PILLS, M ARNOLD - INVESTOR	29672 GOETZ RD CANYON LAKE CA 92587	notpaulx1@msn.com	MOVE	9533159603	Unconfirmed	Survey Complete
341131010	ROC Received	Not Started	29680 Gantt Road, Canyon Lake, CA 92587	Joseph Mitchell Lopez				Yes		502060624	Active	ROSE HILLS	29630 GOETZ RD CANYON LAKE CA 92587	ROSEHILLSCR@AOL.COM	CELL	9533196709	Yes	Survey Complete
352010001	ROC Received	Not Started	23887 LUCAS DR, CANYON LAKE, CA 92587	CRAIG JOHN MUNSELL	CRAIG JOHN MUNSELL; ESTELITA B. MUNSELL	8160 TIMOR ST LONG BEACH CA 90808	No	Yes		500021353	Active	TIMOTHY HULL	23887 LUCAS DR CANYON LAKE CA 92587	TIMHHULL33@GMAIL.COM	CELL	9534449436	Yes	Survey Complete
352010002	ROC Received	Not Started	23733 SAN JACINTO RD, CANYON LAKE, CA 92587	ALEJANDRA DE LARA	ALEJANDRA DE LARA	23733 SAN JACINTO RD MENIFEE CA 92587				502064207	Active	ANDREW LINDELL	23733 SAN JACINTO RD CANYON LAKE CA 92587	andrewlindell@gmail.com	MOVE	9532108810	Unconfirmed	Survey Complete
352010005	ROC Received	Not Started	23791 SAN JACINTO RD, CANYON LAKE, CA 92587	BRIAN N. THOMPSON	BRIAN N. THOMPSON; SUSAN DENISON ALLAN	21462 MORESBY WAY LAKE FOREST CA 92630		Yes		500117962	Active	RICHARD WERGENTHALER	23791 SAN JACINTO RD CANYON LAKE CA 92587	wcordn@aol.com	MOVE	9532144055	Unconfirmed	Survey Complete
352010006	ROC Received	Not Started	23699 SAN JACINTO RD, CANYON LAKE, CA 92587	ARMANDO S. RAMIREZ	ARMANDO S. RAMIREZ	P.O. BOX 3329 QUAIL VALLEY CA 92587		Yes		502059749	Active	ARMANDO RAMIREZ	23699 SAN JACINTO RD CANYON LAKE CA 92587		MOVE	9532193370	Unconfirmed	Survey Complete
352010007	ROC Received	Not Started	23963 SAN JACINTO RD, CANYON LAKE, CA 92587	CRAIG J. MUNSELL	CRAIG J. MUNSELL; ESTELITA B. MUNSELL	8160 TIMOR ST LONG BEACH CA 90808	No	Yes		500056551	Active	JOSE S GOMEZ	23963 SAN JACINTO RD CANYON LAKE CA 92587	JOSESGOMEZ@YAHOO.COM.MT	CELL	9535107351	Yes	Survey Complete
352010008	ROC Received	Not Started	23695 SAN JACINTO RD, CANYON LAKE, CA 92587	CHRISTOPHER DURBIN	CHRISTOPHER DURBIN	23695 SAN JACINTO RD MENIFEE CA 92587		Yes		500113233	Active	CHRISTOPHER DURBIN	23695 SAN JACINTO RD CANYON LAKE CA 92587	CHRISTOPHERDURBIN@GMAIL.COM	CELL	9532172408	Unconfirmed	Survey Complete
352010010	ROC Received	Not Started	23873 SAN JACINTO RD, CANYON LAKE, CA 92587	DIRVIN HANSON	DIRVIN HANSON; CRYSTAL HANSON; ERIC MUSTELL	23873 SAN JACINTO RD SUN CITY CA 92587	No	Yes		500099743	Active	CHARLOTTE F MINIVATO	23873 SAN JACINTO RD CANYON LAKE CA 92587	PATMYERATJHOTMAIL.COM	MOVE	9532144820	Unconfirmed	Survey Complete
352010011	ROC Received	Not Started	23815 SAN JACINTO RD, CANYON LAKE, CA 92587	ABRAHAM ARIVO	ABRAHAM ARIVO; IRIS ELAINE	23815 SAN JACINTO RD QUAIL VALLEY CA 92587		Yes		500108417	Active	ABRAHAM ARIVO	23815 SAN JACINTO RD CANYON LAKE CA 92587		CELL	9533228620	Yes	Survey Complete
352010064	ROC Received	Not Started	23778 JOHNSON LN, CANYON LAKE, CA 92587	MORE ROBERT EVAN REVOCABLE TRUST DTD 10/20/21	MORE ROBERT EVAN REVOCABLE TRUST DTD 10/20/21; ROBERT EVAN MORE	23778 JOHNSON LN CANYON LAKE CA 92587	No			0 Vacant						No	Survey Complete
352010065	ROC Received	Not Started	23778 JOHNSON LN, CANYON LAKE, CA 92587	MORE ROBERT EVAN REVOCABLE TRUST DTD 10/20/21	MORE ROBERT EVAN REVOCABLE TRUST DTD 10/20/21; ROBERT EVAN MORE	23778 JOHNSON LN CANYON LAKE CA 92587	No	Yes		500084863	Active	ROBERT MOORE	23778 JOHNSON LN CANYON LAKE CA 92587	BOBTECH12@YEB.COM.NET	MOVE	9093383527	No	Survey Complete
352010092	ROC Received	Not Started		HAROLD ALVIN JONES	HAROLD ALVIN JONES	P O BOX 3239 CANYON LAKE CA 92587		No		0 Vacant						No	Survey Complete
352010093	ROC Received	Not Started	23691 JOHNSON LN, CANYON LAKE, CA 92587	HARVEY RONALD S TRUST DTD 01/17/22	HARVEY RONALD S TRUST DTD 01/17/22; RONALD S. HARVEY	23691 JOHNSON LN CANYON LAKE CA 92587		Yes		500053203	Active	RONALD S HARVEY	23691 JOHNSON LN CANYON LAKE CA 92587	RH@BCSCI.RRDEF.COM	CELL	9532451867	Yes	Survey Complete
352010094	ROC Received	Not Started	23599 JOHNSON LN, CANYON LAKE, CA 92587	HARVEY RONALD S TRUST DTD 01/17/22	HARVEY RONALD S TRUST DTD 01/17/22; RONALD S. HARVEY	23995 JOHNSON LN CANYON LAKE CA 92587				0 Vacant						No	Survey Complete
352010163	ROC Received	Not Started	23769 LUCAS DR, CANYON LAKE, CA 92587	HAROLD ALVIN JONES	HAROLD ALVIN JONES	P O BOX 3239 QUAIL VALLEY CA 92587	No	Yes		500121889	Active	HAROLD JONES	23769 LUCAS DR CANYON LAKE CA 92587		MOVE	9532437545	Yes	Survey Complete
352010164	ROC Received	Not Started	23691 JOHNSON LN, CANYON LAKE, CA 92587	VINCENTE LEON MORADRAGON	VINCENTE LEON MORADRAGON	23691 JOHNSON LN SUN CITY CA 92587		Yes		502125681	Active	VICENTE LEON	23691 JOHNSON LN CANYON LAKE CA 92587		CELL	7602721963	Yes	Survey Complete
352010166	ROC Received	Not Started	23895 JOHNSON LANE, CANYON LAKE, CA 92587	GUADALUPE SARMIENTO	GUADALUPE SARMIENTO	23895 JOHNSON LN QUAIL VALLEY CA 92587	Yes	Yes		500126798	Active	GUADALUPE SARMIENTO	23895 JOHNSON LANE CANYON LAKE CA 92587	DAISY.GOMEZ@GMAIL.COM	CELL	9535153366	Yes	Survey Complete
352010006	ROC Received	Not Started	23809 LUCAS DR, CANYON LAKE, CA 92587	CYNTHIA DURBIN	JOHN D. CARROLL	23809 LUCAS DR SUN CITY CA 92587		Yes		0 Vacant			23809 LUCAS DR CANYON LAKE CA 92587				No	Survey Complete
352010016	ROC Received	Not Started		CYNTHIA DURBIN MUNSELL	CRAIG JOHN MUNSELL; ESTELITA B. MUNSELL	8160 TIMOR ST LONG BEACH CA 90808		No		0 Vacant						No	Survey Complete
352010015	ROC Received	Not Started	23598 LUCAS DR, CANYON LAKE, CA 92587	WILLIAM MOYA	WILLIAM MOYA; VANESSA VILLAFRANCO	23598 LUCAS DR CANYON LAKE CA 92587		Yes		502059508	Active	VANESSA VILLALPANDO	23598 LUCAS DR CANYON LAKE CA 92587	VVILLALPANDO08@YAHOO.COM	CELL	9534829524	Yes	Survey Complete
352010017	ROC Received	Not Started	23966 ESPUMOSO, CANYON LAKE, CA 92587	MARCUS T. SHOEMAKER OWENS	MARCUS T. SHOEMAKER OWENS	PO BOX 3239 QUAIL VALLEY CA 92587	No	Yes		500113558	Active	MARCUS OWENS	23966 ESPUMOSO CANYON LAKE CA 92587	MARCUSMOWENS@TMBL.COM	CELL	9535819950	Yes	Survey Complete
352010020	ROC Received	Not Started	23930 ESPUMOSO, CANYON LAKE, CA 92587	ALEM FAMILY 2017 TRUST DATED 12/16/17	ALEM FAMILY 2017 TRUST DATED 12/16/17; CATHERINE FANE ALOM; NIF ALEM	12652 CARMEL COUNTRY RD # 99 SAN DIEGO CA 92130		Yes		500130222	Active	ANGEL OCHOA	23930 ESPUMOSO CANYON LAKE CA 92587	ADOCHOA@YAHOO.COM	CELL	9534188322	Yes	Survey Complete
352010021	ROC Received	Not Started	23934 ESPUMOSO, CANYON LAKE, CA 92587	ALEM FAMILY 2017 TRUST DATED 12/16/17	ALEM FAMILY 2017 TRUST DATED 12/16/17; CATHERINE FANE ALOM; NIF ALEM	12652 CARMEL COUNTRY RD # 99 SAN DIEGO CA 92130		No		0 Vacant			23934 ESPUMOSO CANYON LAKE CA 92587				No	Survey Complete
352010082	ROC Received	Not Started	23922 ESPUMOSO, CANYON LAKE, CA 92587	JUAN CARLOS ANGULO	JUAN CARLOS ANGULO; ELIANA MEJIA	23922 ESPUMOSO DR CANYON LAKE CA 92587	Yes	Yes		500099007	Active	LILIA MEJIA	23922 ESPUMOSO DR CANYON LAKE CA 92587	ELIANAMEJIA1052@GMAIL.COM	CELL	9535236636	Yes	Survey Complete
352010083	ROC Received	Not Started	23910 ESPUMOSO, CANYON LAKE, CA 92587	GENEGENOVEVA CHRISTINA VEGELGOCZIN	GENEGENOVEVA CHRISTINA VEGELGOCZIN	28771 BEARCAT DR EVERTON CA 92346		Yes		502113500	Active	MARIA SANCHEZ	23910 ESPUMOSO CANYON LAKE CA 92587	SANCHEZGENEVEVA@GMAIL.COM	CELL	9534429041	Yes	Survey Complete
352010087	ROC Received	Not Started	23770 ESPUMOSO, CANYON LAKE, CA 92587	LITANIA SHRADER	LITANIA SHRADER; SEAN SHRADER	19484 KELLER AVE RIVERSIDE CA 92505		Yes		500021894	Active	LITANIA SHRADER	23770 ESPUMOSO DR CANYON LAKE CA 92587	LWZDT@HOTMAIL.COM	CELL	9087677972	Yes	Survey Complete
352010088	ROC Received	Not Started	23760 ESPUMOSO, CANYON LAKE, CA 92587	FRANCISCO MARIETTE	FRANCISCO MARIETTE; FELIA RAVANETTE	23760 ESPUMOSO DR QUAIL VALLEY CA 92587	No	Yes		500035123	Active	FRANCISCO RAVANETTE	23760 ESPUMOSO DR CANYON LAKE CA 92587	jacwrgrupoinversion@gmail.com	CELL	9532315264	Yes	Survey Complete
352010052	ROC Received	Not Started	23778 ESPUMOSO, CANYON LAKE, CA 92587	JULIO CASTRO JR	JULIO CASTRO JR	23778 ESPUMOSO DR SUN CITY CA 92587	Yes	Yes		500060998	Active	JULIO G CASTRO	23778 ESPUMOSO DR CANYON LAKE CA 92587	CRHINOGLASS@VERIZON.NET	MOVE	9532454200	Yes	Survey Complete
352010055	ROC Received	Not Started	23581 LUCAS DR, CANYON LAKE, CA 92587	KINTO ROMUALDO	KINTO ROMUALDO	23581 LUCAS DR SUN CITY CA 92587		Yes		500102826	Active	CAROLINA MATEO	23581 LUCAS DR CANYON LAKE CA 92587	CAROMATEO1985@YAHOO.COM	CELL	9532455855	Yes	Survey Complete
352010057	ROC Received	Not Started	23840 ESPUMOSO, CANYON LAKE, CA 92587	JUAN I. BANISTAS	JUAN I. BANISTAS	23840 ESPUMOSO, CANYON LAKE, CA 92587		Yes		500130961	Active	JUAN MAJESTAS	23840 ESPUMOSO CANYON LAKE CA 92587		CELL	9532710231	Yes	Survey Complete
352010058	ROC Received	Not Started	23659 LUCAS DR, CANYON LAKE, CA 92587	ERNESTO MEJIA LAN	ERNESTO MEJIA LAN	23659 LUCAS DR CANYON LAKE CA 92587	Yes	Yes		500099508	Active	EDMUNDO GRIJALVA	23659 LUCAS DR CANYON LAKE CA 92587		CELL	9534829524	Yes	Survey Complete
352010060	ROC Received	Not Started	23878 ESPUMOSO, CANYON LAKE, CA 92587	LADD SHAWNA TRUST DTD 12/01/22	LADD SHAWNA TRUST DTD 12/01/22; SHAWNA WAYNE LADD	23878 ESPUMOSO DR CANYON LAKE CA 92587		Yes		500029079	Active	SHAWNA M LADD	23878 ESPUMOSO DR CANYON LAKE CA 92587	SHAWNALADD1@GMAIL.COM	CELL	9536030564	Yes	Survey Complete
352011004	ROC Received	Not Started	23544 SAN JACINTO RD, CANYON LAKE, CA 92587	ROBERTO S. RAMIREZ		672 CLAUDIA WAY HEMET CA 92545		Yes		500108503	Active	FERNANDA RUIZ	23544 SAN JACINTO RD CANYON LAKE CA 92587		MOVE	9532163487	Yes	Survey Complete
352011002	ROC Received	Not Started	23680 JOHNSON LN, CANYON LAKE, CA 92587	IGNACIO R. VALLE RODRIGUEZ	IGNACIO R. VALLE RODRIGUEZ	23680 JOHNSON LN QUAIL VALLEY CA 92587	No	Yes		500109008	Active	IGNACIO VALLE	23680 JOHNSON LN CANYON LAKE CA 92587	ignaciovalle20@gmail.com	CELL	9534833185	Unconfirmed	Survey Complete
352011005	ROC Received	Not Started	23542 SAN JACINTO, CANYON LAKE, CA 92587	CARLOS J SANDOVAL	CARLOS J SANDOVAL; DANAMARIS B. SANDOVAL	23542 SAN JACINTO CANYON LAKE CA 92587	No	Yes		500059070	Active	DANAMARIS SANDOVAL	23542 SAN JACINTO CANYON LAKE CA 92587		CELL	9532776386	Yes	Survey Complete
352011056	ROC Received	Not Started	26100 MOUNTAIN VIEW PL, CANYON LAKE, CA 92587	LORETTA M LASCO	LORETTA M LASCO	26100 MOUNTAIN VIEW PL MENIFEE CA 92587		Yes		500059028	Active	LORETTA M LASCO	26100 MOUNTAIN VIEW PL CANYON LAKE CA 92587	ROBERTOMM@GMAIL.COM	CELL	9533778703	Yes	Survey Complete
352012003	ROC Received	Not Started	28210 MOUNTAIN VIEW PL, CANYON LAKE, CA 92587	RODNEY LOUIS PERES	RODNEY LOUIS PERES; LANA KAY PERES	15271 ALVARADO ST LAKE ELSINORE CA 92530	No	Yes		500031099	Active	LANA PERES	28210 MOUNTAIN VIEW PL CANYON LAKE CA 92587	MOVE	9536782246	Yes	Survey Complete
352011003	ROC Received	Not Started	23577 JOHNSON LN, CANYON LAKE, CA 92587	MICHELLE F FECHER	MICHELLE F FECHER	23577 JOHNSON LN SUN CITY CA 92587	Yes	Yes		500045281	Active	MICHELLE M HAVERFIELD	23577 JOHNSON LN CANYON LAKE CA 92587	MAMERICA98@GMAIL.COM	CELL	9538553543	Yes	Survey Complete
352011009	ROC Received	Not Started	23571 JOHNSON LN, CANYON LAKE, CA 92587	KEITH LINK	KEITH LINK	23571 JOHNSON LN SUN CITY CA 92587	Yes	Yes		500096067	Active	KEITH LINK	23571 JOHNSON LN CANYON LAKE CA 92587	KJL2200@YAHOO.COM	MOVE	9532449833	Yes	Survey Complete
352011012	Vacant Lot	Not Started	23573 JOHNSON LN, CANYON LAKE, CA 92587	KEITH LINK	KEITH LINK	23571 JOHNSON LN SUN CITY CA 92587				0 Vacant			23573 JOHNSON LN CANYON LAKE CA 92587				Yes	Survey Complete
352011013	ROC Received	Not Started	23606 JOHNSON LN, CANYON LAKE, CA 92587	APRIL CORO	APRIL CORO	23606 JOHNSON LN SUN CITY CA 92587	No	Yes		0 Vacant			23606 JOHNSON LN CANYON LAKE CA 92587				No	Survey Complete
352011012	ROC Received	Not Started	23606 JOHNSON LN, CANYON LAKE, CA 92587	APRIL CORO	APRIL CORO	23606 JOHNSON LN SUN CITY CA 92587		Yes		500097902	Active	APRIL S CORO	23606 JOHNSON LN CANYON LAKE CA 92587		CELL	9532458529	Yes	Survey Complete
352011016	ROC Received	Not Started	23655 JOHNSON LN, CANYON LAKE, CA 92587	ALBERTO ALVAREZ	ALBERTO ALVAREZ	23655 JOHNSON LN SUN CITY CA 92587	Yes	Yes		500097903	Active	ALBERTO ALVAREZ	23655 JOHNSON LN CANYON LAKE CA 92587	SUBERCHAO1010@GMAIL.COM	CELL	9532239546	Yes	Survey Complete
352011017	ROC Received	Not Started	23665 JOHNSON LN, CANYON LAKE, CA 92587	ILDEFONSO TAMEZ	ILDEFONSO TAMEZ; AMY TAMEZ	23665 JOHNSON LN SUN CITY CA 92587		Yes		500093702	Active	AMY TAMEZ	23665 JOHNSON LN CANYON LAKE CA 92587	@KATEFLUMOMMY09@YAHOO.COM	HOME	9535720905	Yes	Survey Complete
352011012	ROC Received	Not Started	23606 JOHNSON LN, CANYON LAKE, CA 92587	ANTONIO MALPICA CALDENA	ANTONIO MALPICA CALDENA	23681 JOHNSON LN MENIFEE CA 92587				0 Vacant			23606 JOHNSON LN CANYON LAKE CA 92587				No	Survey Complete
352011016	ROC Received	Not Started	23681 JOHNSON LN, CANYON LAKE, CA 92587	ANTONIO MALPICA CALDENA	ANTONIO MALPICA CALDENA	23681 JOHNSON LN MENIFEE CA 92587		Yes		500060950	Active	ALMA RODRIGUEZ	23681 JOHNSON LN CANYON LAKE CA 92587	LIZETTEROBERGUZ21@YAHOO.COM	CELL	6266645527	Yes	Survey Complete
352011040	ROC Received	Not Started	23620 LUCAS DR, CANYON LAKE, CA 92587	JOSE GALO	JOSE GALO	23540 LUCAS DR SUN CITY CA 92587	Yes	Yes		500060956	Active	ADRIANA GALO	23540 LUCAS DR CANYON LAKE CA 92587	GALOADRIANA@GMAIL.COM	CELL	9535830387	Yes	Survey Complete
352011041	ROC Received	Not Started	23560 LUCAS DR, CANYON LAKE, CA 92587	MANUEL MAGALLANES	MANUEL MAGALLANES; ADRIANA R. RANGEL	23560 LUCAS DR SUN CITY CA 92587		Yes		500060568	Active	MANUEL MAGALLANES	23560 LUCAS DR CANYON LAKE CA 92587	MANUELMAGALLANES27@YAHOO.COM	WORK	9536741300	Yes	Survey Complete
352011042	ROC Received	Not Started	23550 LUCAS DR, CANYON LAKE, CA 92587	RAUL MARTINEZ DE SOLIZ	RAUL MARTINEZ DE SOLIZ; BEATRIZ MARTINEZ DE MATA	23550 LUCAS DR QUAIL VALLEY CA 92587	No	Yes		500110844	Active	RAUL MARTINEZ DE SOLIZ	23550 LUCAS DR CANYON LAKE CA 92587	BETMARTINEZ@HOTMAIL.COM	CELL	9536150346	Yes	Survey Complete
352011052	ROC Received	Not Started	23720 LUCAS DR, CANYON LAKE, CA 92587	PETA J. PETERS	PETA J. PETERS	23720 LUCAS DR QUAIL VALLEY CA 92587		Yes		500024622	Active	PETA PETERS	23720 LUCAS DR CANYON LAKE CA 92587	PETAPETERS420@GMAIL.COM	HOME	9532463128	Yes	Survey Complete
352011053	ROC Received	Not Started	23670 LUCAS DR, CANYON LAKE, CA 92587	DONNELL WASHINGTON	DONNELL WASHINGTON; SUE ANN WASHINGTON	P O BOX 3364 QUAIL VALLEY CA 92587	No	Yes		500031126	Active	DONNELL WASHINGTON	23670 LUCAS DR CANYON LAKE CA 92587		CELL	9532455855	Yes	Survey Complete
352011057	ROC Received	Not Started	23590 LUCAS DR, CANYON LAKE, CA 92587	SANDRA S. WEST	SANDRA S. WEST	26100 NEWPORT RD STE A12 MENIFEE CA 92584		No		500098457	Active	SANDRA WEST	23590 LUCAS DR CANYON LAKE CA 92587	RAMESSANDRA@YAHOO.COM	CELL	9533806057	Yes	Survey Complete
352011058	ROC Received	Not Started	23560 JOHNSON LN, CANYON LAKE, CA 92587	BENITO RODRIGUEZ	BENITO RODRIGUEZ; CHERYENNE DE ROJAS	23560 JOHNSON LN CANYON LAKE CA 92587	No	Yes		500071947	Active	ALMA RODRIGUEZ	23560 JOHNSON LN CANYON LAKE CA 92587		CELL	9534388915	Yes	Survey Complete
352011006	ROC Received	Not Started	23553 LUCAS DR, CANYON LAKE, CA 92587	WENDY LETICIA MITCHELL	WENDY LETICIA MITCHELL	23553 LUCAS DR CANYON LAKE CA 92587		Yes		500092975	Active	WENDY MITCHELL	23553 LUCAS DR CANYON LAKE CA 92587	wlatchel1634@gmail.com	MOVE	9537663766	Unconfirmed	Survey Complete
352011004	ROC Received	Not Started		KEVIN ZOZNIK	KEVIN ZOZNIK; ELIZABETH ZOZNIK	23552 ELSINORE LN MENIFEE CA 92587		Yes		0 Vacant			23552 ELSINORE LN CANYON LAKE CA 92587				No	Survey Complete
352011003	ROC Received	Not Started	23671 LUCAS DR, CANYON LAKE, CA 92587	HECTOR E HERNANDEZ	HECTOR E HERNANDEZ	23671 LUCAS DR SUN CITY CA 92587		Yes		500081164	Active	MARIO CASTRO	23671 LUCAS DR CANYON LAKE CA 92587		CELL	7143997221	Yes	Survey Complete
352011003	ROC Received	Not Started	23642 ELSINORE LN, CANYON LAKE, CA 92587	RACHEL ESPINOZA	TONI REESE SANDOVAL	23682 ELSINORE LN CANYON LAKE CA 92587	No	Yes		500020818	Active	TONY SANDOVAL	23682 ELSINORE LN CANYON LAKE CA 92587	TONYSANDOVAL1000@GMAIL.COM	CELL	9534227328	Yes	Survey Complete
352011005	ROC Received	Not Started	23672 ELSINORE LN, CANYON LAKE, CA 92587	GUADALUPE GUZMAN ALVARADO	GUADALUPE GUZMAN ALVARADO; ANGELINA GUZMAN VELAZQUEZ	23682 ELSINORE LN SUN CITY CA 92587		Yes		500047352	Active	GUADALUPE GUZMAN ALVARADO	23672 ELSINORE LN CANYON LAKE CA 92587	jguzman52@outlook.com	CELL	9534419083	Yes	Survey Complete
352011002	ROC Received	Not Started		KEVIN ZOZNIK	KEVIN ZOZNIK; ELIZABETH ZOZNIK	23652 ELSINORE LN QUAIL VALLEY CA 92587		No		0 Vacant			23652 ELSINORE LN CANYON LAKE CA 92587				No	Survey Complete
352011001	ROC Received	Not Started	23692 ELSINORE LN, CANYON LAKE, CA 92587	KEVIN ZOZNIK	KEVIN ZOZNIK; ELIZABETH ZOZNIK	23652 ELSINORE LN MENIFEE CA 92587		Yes		500097403	Active	ELIZABETH ZOZNIK	ELIZABETHZOZNIK@YAHOO.COM	CELL	9537364602	Yes	Survey Complete
352011004	ROC Received	Not Started		CATALINA ROSALES	CATALINA ROSALES	23550 ELSINORE LN QUAIL VALLEY CA 92587		No		0 Vacant							No	Survey Complete
352011005	ROC Received	Not Started	23744 ELSINORE LN, CANYON LAKE, CA 92587	APOLENO MENDEZ	APOLENO MENDEZ; PATRICIA ELIZABETH MENDEZ	23740 ELSINORE LN CANYON LAKE CA 92587		Yes		500082784	Active	PATRICIA MENDEZ	23740 ELSINORE LN CANYON LAKE CA 92587	eworkcp1022@gmail.com	CELL	7019977510	Yes	Survey Complete
352011005	ROC Received	Not Started	23620 ELSINORE LN, CANYON LAKE, CA 92587	DANIEL MARTINEZ SARABIA	DANIEL MARTINEZ SARABIA	23620 ELSINORE LN CANYON LAKE CA 92587	Yes	Yes		500035083	Active	DANIEL MARTINEZ SARABIA	23620 ELSINORE LN CANYON LAKE CA 92587	DANIEL.MARTINEZSARABIA@GMAIL.COM	CELL	7602702977	Yes	Survey Complete
352011007	ROC Received	Not Started	23712 ELSINORE LN, CANYON LAKE, CA 92587	VILMA MEDINA	VILMA MEDINA; CESAR J MEDINA RODRIGUEZ	23712 ELSINORE LN MENIFEE CA 92587	No	Yes		500047587	Active	VILMA MEDINA	23712 ELSINORE LN CANYON LAKE CA 92587	medinavilma7@yahoo.com	MOVE	7027073389	Yes	Survey Complete
352011008	ROC Received	Not Started		VILMA MEDINA	VILMA MEDINA; CESAR J MEDINA RODRIGUEZ	23712 ELSINORE LN MENIFEE CA 92587				0 Vacant							No	Survey Complete
352271012	Vacant Lot	Not Started	23736 SHROEDER PL, CANYON LAKE, CA 92587	JOHNNY BARRAS	JOHNNY BARRAS	23736 SHROEDER PL MENIFEE CA 92587		Yes		500097656	Active	JOHNNY BARRAS	23736 SHROEDER PL CANYON LAKE CA 92587	JBARRAS101@LIVE.COM	CELL	5626756563	Yes	Survey Complete
352011004	ROC Received	Not Started	28676 QUAIL PL, CANYON LAKE, CA 92587	HECTOR E. ROLANDS	MARCOS T. ROLANDS; GRACIELA ROLANDS	27821 ENVIR AVE SUN CITY CA 92585				0 Vacant			28676 QUAIL PL CANYON LAKE CA 92587				Yes	Survey Complete
352011004	ROC Received	Not Started	23543 ELSINORE LN, CANYON LAKE, CA 92587	ROE E MORALES	TONI REESE SANDOVAL; ALEXSANDRA PALACIOS-GARCIA	23543 ELSINORE LN CANYON LAKE CA 92587	Yes	Yes		500116337	Active	ROE ESCOBAR MORALES	23543 ELSINORE LN CANYON LAKE CA 92587	ROE_ESCOBAR@HOTMAIL.COM	CELL	9536836470	Yes	Survey Complete
352011004	ROC Received	Not Started	28679 ELSINORE PL, CANYON LAKE, CA 92587	GAUDENCIO RAMOS	GAUDENCIO RAMOS	28771 BEARCAT DR EVERTON CA 92346	No	Yes		500116339	Active	GAUDENCIO RAMOS	28679 ELSINORE PL CANYON LAKE CA 92587	GAMOS1CBX@HOTMAIL.COM	CELL	9536836470	Yes	Survey Complete
352011002	ROC Received	Not Started	23635 ELSINORE LN, CANYON LAKE, CA 92587	JOSE FEREGRINO SANCHEZ	JOSE FEREGRINO SANCHEZ	1305 CAMINO RANCHO DEL MAR OCEANSIDE CA 92058	No	Yes		500098452	Active	JOSE FEREGRINO	23635 ELSINORE LN CANYON LAKE CA 92587	JOSE FEREGRINO	CELL	7019389834	Yes	Survey Complete
352011001	ROC Received	Not Started	23655 ELSINORE LN, CANYON LAKE, CA 92587	PABLO CRUZ	PABLO CRUZ	23655 ELSINORE LN CANYON LAKE CA 92587		Yes		500098729	Active	DELIA CRUZ	23655 ELSINORE LN CANYON LAKE CA 92587		CELL	2534691858	Yes	Survey Complete
352011001	Not Included	Not Included		GUSTAVO PIZA-LUNA	GUSTAVO PIZA-LUNA; G PIZA ROMERO MARIA	23667 ELSINORE LN CANYON LAKE CA 92587		Yes		0 Vacant							No	Survey Complete
352011002	ROC Received	Not Started	23667 ELSINORE LN, CANYON LAKE, CA 92587	GUSTAVO PIZA-LUNA	GUSTAVO PIZA-LUNA; G PIZA ROMERO MARIA	23667 ELSINORE LN CANYON LAKE CA 92587	Yes	Yes		500098648	Active	MARIA PIZA ROMERO	23667 ELSINORE LN CANYON LAKE CA 92587	CELL	9533871983	Yes	Survey Complete
352011002	ROC Received	Not Started	23711 ELSINORE LN, MENIFEE, CA 92584	ROBERTO CAMARILLO	ROBERTO CAMARILLO	PO BOX 3329 MENIFEE CA 92587		Yes		500099053	Active	ROBERTO CAMARILLO	23711 ELSINORE LN MENIFEE CA 92584		MOVE	9532148258	Unconfirmed	Survey Complete
352011002	ROC Received	Not Started		ROBERTO CAMARILLO	ROBERTO CAMARILLO	PO BOX 3329 MENIFEE CA 92587		No		0 Vacant							No	Survey Complete
352011005	ROC Received	Not Started		ROCIO GARCIA	ROCIO GARCIA	3712 DENTHOF COVE AUSTIN TX 78725		No		0 Vacant							No	Survey Complete
352011004	ROC Received	Not Started	23666 LAKE DR, CANYON LAKE, CA 92587	ROCIO GARCIA	ROCIO GARCIA	3712 DENTHOF COVE AUSTIN TX 78725	Yes	Yes		500097984	Active	RAMON MALDONADO	23666 LAKE DR CANYON LAKE CA 92587	CELL	9535301036	Unconfirmed	Survey Complete
352011004	ROC Received	Not Started	23643 Lake Dr	JOSE GOMEZ	JOSE GOMEZ; LIDIA GOMEZ	23643 LAKE DR MORENO VALLEY CA 92557		Yes		500063437	Active	JOSE GOMEZ	23643 LAKE DR CANYON LAKE CA 92587	EL8FAMILY@YAHOO.COM	CELL	9535388725	Yes	Survey Complete
352011004	ROC Received	Not Started	23560 LAKE DR, CANYON LAKE, CA 92587	ROBERTO S. RAMIREZ	ROBERTO S. RAMIREZ	672 CLAUDIA WAY HEMET CA 92545	Yes	Yes		500062227	Active	CHRISTIAN NAVARRO	23560 LAKE DR CANYON LAKE CA 92587	newmtnmotives@icloud.com	MOVE	9097469227	Yes	Survey Complete
352011004	ROC Received	Not Started	23570 LAKE DR, CANYON LAKE, CA 92587	BLANCA E. VAZQUEZ	BLANCA E. VAZQUEZ	23570 LAKE DR CANYON LAKE CA 92587		Yes		500076977	Active	JOSE ANGEL SOTO	23570 LAKE DR CANYON LAKE CA 92587	gdlvoice25@gmail.com	CELL	7028477913	Unconfirmed	Survey Complete
352011004	ROC Received	Not Started	23560 LAKE DR, CANYON LAKE, CA 92587	CARMEN NOSQUEDA REYES	CARMEN NOSQUEDA REYES	23560 LAKE DR SUN CITY CA 92587		Yes		500093171	Active	IMELDA G LOPEZ TORRES	23560 LAKE DR CANYON LAKE CA 92587	CELL	6197884941	Yes	Survey Complete
352011004	ROC Received	Not Started		CARMEN NOSQUEDA REYES	CARMEN NOSQUEDA REYES	23560 LAKE DR SUN CITY CA 92587		Yes		0

350203044 ROE Received	Not Started	23830 GOETZ DR, CANYON LAKE, CA 92587	GAYLE D. ROLLER	GAYLE D. ROLLER	P O BOX 3001 MENIFEE CA 92587			500031857 Active	GAYLE ROLLER	23830 GOETZ DR CANYON LAKE CA 92587		HOME	9512448184 Unconfirmed	Survey Complete
350203052 ROE Received	Not Started	23750 GOETZ DR, CANYON LAKE, CA 92587	ANTONIO HERRERA	ANTONIO HERRERA; CARMEN HERRERA	23750 GOETZ DR SUN CITY CA 92587	No	Yes	500030256 Active	ANTONIO HERRERA	23750 GOETZ DR CANYON LAKE CA 92587		CELL	9515811387 Yes	Survey Complete
350203053 ROE Received	Not Started	23968 GOETZ DR, CANYON LAKE, CA 92587	TIBERIO SANDRA ROBERTSON LIVING TRUST DTD 11/6/2017	TIBERIO SANDRA ROBERTSON LIVING TRUST DTD 11/6/2017; SANDRA ROBERTSON TIBERIO	29231 VACATION DR CANYON LAKE CA 92587			500001910 Active	DANIEL LEE	23968 GOETZ DR CANYON LAKE CA 92587	DTLEE2010@GMAIL.COM	CELL	9518344663 Yes	Survey Complete
350203054 ROE Received	Not Started	23810 GOETZ DR, CANYON LAKE, CA 92587	HEIDI MARIE SCHROEDER	HEIDI MARIE SCHROEDER	23810 GOETZ DR MENIFEE CA 92587			500207407 Active	HEIDI SCHROEDER	23810 GOETZ DR CANYON LAKE CA 92587	HEIDISCHRO70@GMAIL.COM	CELL	9513473063 Yes	Survey Complete
350203055 ROE Received	Not Started	23760 GOETZ DR, CANYON LAKE, CA 92587	JUVENTINO VERDUZCO	JUVENTINO VERDUZCO	23760 GOETZ DR CANYON LAKE CA 92587		Yes	500567297 Active	LESLIE NUNEZ DE LA CRUZ	23760 GOETZ DR CANYON LAKE CA 92587	lnnvdd@yahoo.com	CELL	9512611771 Yes	Survey Complete
350203056 ROE Received	Not Started	23790 GOETZ DR, CANYON LAKE, CA 92587	MANUEL V. GARCIA	MANUEL V. GARCIA; MARIA GARCIA	23790 GOETZ DR SUN CITY CA 92587		Yes	500109560 Active	MANUEL GARCIA	23790 GOETZ DR CANYON LAKE CA 92587	FABGARCIA729@GMAIL.COM	CELL	9512851403 Yes	Survey Complete
350203060 ROE Received	Not Started		MANUEL V. GARCIA	MANUEL V. GARCIA; MARIA GARCIA	23790 GOETZPL MENIFEE CA 92587		No	0 Vacant					No	Survey Complete
350203061 ROE Received	Not Started	23945 MT VERNON PL, CANYON LAKE, CA 92587	HOLLY C. PADGETT	HOLLY C. PADGETT	P O BOX 3596 QUAIL VALLEY CA 92587			500081487 Active	HOLLY PADGETT	23945 MT VERNON PL CANYON LAKE CA 92587	HOLLYPADGETT@OUTLOOK.COM	HOME	9512440989 Unconfirmed	Survey Complete
350203063 ROE Received	Not Started	23965 MT VERNON PL, CANYON LAKE, CA 92587	MICHAEL E. KING	MICHAEL E. KING; MIRELLA J. KING	23965 MT VERNON PL QUAIL VALLEY CA 92587			500023379 Active	MICHAEL KING	23965 MT VERNON PL CANYON LAKE CA 92587	EUGENEKING777@YAHOO.COM	HOME	9512462790 Yes	Survey Complete
350203064 ROE Received	Not Started		MARIO SEGURA BANDERAS	MARIO SEGURA BANDERAS; ALMA ROSA BENITEZ RICO	23889 MT VERNON PL QUAIL VALLEY CA 92587			500011354 Active	MARIO SEGURA		MARIOSEGURA73@GMAIL.COM	CELL	9513785050 Yes	Survey Complete
350211011 ROE Received	Not Started	23831 GOETZ DR, CANYON LAKE, CA 92587	DAVID STANLEY	DAVID STANLEY; CHIOKO STANLEY	PO BOX 3574 QUAIL VALLEY CA 92587		Yes	500118436 Active	DAVID STANLEY	23831 GOETZ DR CANYON LAKE CA 92587	STANLEYHERE2000@GMAIL.COM	HOME	9514304208 Yes	Survey Complete
350211025 ROE Received	Not Started	23736 KENNEDY LN, CANYON LAKE, CA 92587	ROBERTO AYALA CORDOVA	ROBERTO AYALA CORDOVA; ROSA M. AYALA	PO BOX 3255 QUAIL VALLEY CA 92587	Yes		0 Vacant		23736 KENNEDY LN CANYON LAKE CA 92587			Yes	Survey Complete
350211033 ROE Received	Not Started	28515 QUAIL PL, CANYON LAKE, CA 92587	MAXIMINO GUZMAN	MAXIMINO GUZMAN	28515 QUAIL PL SUN CITY CA 92587	Yes		500019304 Active	MAXIMINO GUZMAN	28515 QUAIL PL CANYON LAKE CA 92587		CELL	7608012011 Yes	Survey Complete
350211033 ROE Received	Not Started	23754 KENNEDY LN, CANYON LAKE, CA 92587	DEOLEGARIO SALAZAR	DEOLEGARIO SALAZAR; HUMBERTINA SALAZAR	23754 KENNEDY LN MENIFEE CA 92587			500034434 Active	HUMBERTINA SUASTEGUI	23754 KENNEDY LN CANYON LAKE CA 92587		CELL	9513558889 Unconfirmed	Survey Complete
350211034 ROE Received	Not Started	23755 GOETZ DR, CANYON LAKE, CA 92587	ROBERT H ZMYEWSKI [JENNIFER OGLESBY]	ROBERT H ZMYEWSKI; LAI QING LIU ZMYEWSKI [JENNIFER OGLESBY]	23755 GOETZ DR CANYON LAKE CA 92587		Yes	500341327 Active	JENNIFER OGLESBY	23755 GOETZ DR CANYON LAKE CA 92587	jreneeogles@gmail.com	HOME	8157864169 Unconfirmed	Survey Complete
350212002 ROE Received	Not Started		MONICA DUSCA	MONICA DUSCA; RAFAEL DUSCA	23745 KENNEDY LN MENIFEE CA 92587			0 Vacant					No	Survey Complete
350212003 ROE Received	Not Started	23745 KENNEDY LN, CANYON LAKE, CA 92587	MONICA DUSCA	MONICA DUSCA; RAFAEL DUSCA	23745 KENNEDY LN MENIFEE CA 92587		No	500103530 Active	MONICA DUSCA	23745 KENNEDY LN CANYON LAKE CA 92587	MDUSCA@YAHOO.COM	CELL	9518616976 Yes	Survey Complete
350212004 ROE Received	Not Started		MONICA DUSCA	MONICA DUSCA; RAFAEL DUSCA	23745 KENNEDY LN MENIFEE CA 92587			0 Vacant					No	Survey Complete
350212027 ROE Received	Not Started	23770 SHREEDER PL, CANYON LAKE, CA 92587	J ABRAM MORALES	J ABRAM MORALES; JOSEFINA MORALES	P O BOX 3344 QUAIL VALLEY CA 92587			500120986 Active	ABRAM MORALES	23770 SHREEDER PL CANYON LAKE CA 92587		HOME	9512441647 Yes	Survey Complete
350212028 Not Included	Not Included	23831 KENNEDY LN, CANYON LAKE, CA 92587	ALFREDO GOMEZ-CAHUE	ALFREDO GOMEZ-CAHUE	364 W 6TH ST PERRIS CA 92570	No		0 Vacant		23831 KENNEDY LN CANYON LAKE CA 92587			Yes	Survey Complete
350212029 ROE Received	Not Started	23811 KENNEDY LN, CANYON LAKE, CA 92587	TRINIDAD MARIA LIVING TRUST U/A DATED 06/16/22	TRINIDAD MARIA LIVING TRUST U/A DATED 06/16/22; MARIA TRINIDAD	23811 KENNEDY LN CANYON LAKE CA 92587	Yes	Yes	500131727 Active	MANUEL TRINIDAD	23811 KENNEDY LN CANYON LAKE CA 92587	mariatrinidad742@gmail.com	HOME	9515807485 Yes	Survey Complete
350212030 ROE Received	Not Started	23810 SHREEDER PL, CANYON LAKE, CA 92587	ELENA DIAZ-LOZANO	ELENA DIAZ-LOZANO; ALEJANDRO BARAJAS	23810 SHREEDER PL CANYON LAKE CA 92587	Yes	Yes	500131729 Active	MARIA E DIAZ	23810 SHREEDER PL CANYON LAKE CA 92587		CELL	9517464011 Yes	Survey Complete
350212031 ROE Received	Not Started	23820 SHREEDER PL, CANYON LAKE, CA 92587	JASON P. ATKINSON	JASON P. ATKINSON	23820 SHREEDER PL CANYON LAKE CA 92587			500131728 Active	EILEEN ATKINSON	23820 SHREEDER PL CANYON LAKE CA 92587	EILEENATKINSON13@GMAIL.COM	CELL	9516239779 Yes	Survey Complete
350213001 ROE Received	Not Started	23727 SHREEDER PL, CANYON LAKE, CA 92587	JOSHUA JOHN THOMAS	D JEAN TALCOTT	P O BOX 390635 ANZA CA 92539	No		500125272 Active	MARC C TAYLOR	23727 SHREEDER PL CANYON LAKE CA 92587	MARCTAYLORIBEW440@GMAIL.COM	CELL	9512834488 Yes	Survey Complete
350213014 ROE Received	Not Started	23842 LABERTHA LN, CANYON LAKE, CA 92587	ANGELA SOTO	ANGELA SOTO	23842 LA BERTHA LN MENIFEE CA 92587		Yes	500029547 Active	ANGELA SOTO	23842 LABERTHA LN CANYON LAKE CA 92587	LOVINGLIFEJESSE@GMAIL.COM	CELL	9513378799 Yes	Survey Complete
350213020 Not Included	Not Included	23792 LA BERTHA LN, CANYON LAKE, CA 92587	BLANCA E HERNANDEZ VAZQUEZ	BLANCA E HERNANDEZ VAZQUEZ	23570 LAKE DR MENIFEE CA 92587		No	0 Vacant		23792 LA BERTHA LN CANYON LAKE CA 92587			Yes	Survey Complete
350214001 ROE Received	Not Started	23865 GOETZ DR, CANYON LAKE, CA 92587	RAMON AYARD	RAMON AYARD; MARTHA AYARD	25788 HARZBURG RD MENIFEE CA 92584		Yes	500430247 Active	DESIREE CIRVELLO	23865 GOETZ DR CANYON LAKE CA 92587	cirvello96@gmail.com	HOME	9515378730 Yes	Survey Complete
350214003 ROE Received	Not Started	23889 GOETZ DR, CANYON LAKE, CA 92587	JOSHUA EASTERLY	JOSHUA EASTERLY; PATRICIA EASTERLY	29971 LASSEN DR CANYON LAKE CA 92587		Yes	500113210 Active	MIGUEL NUNEZ	23889 GOETZ DR CANYON LAKE CA 92587	IVANZUMBA90@YAHOO.COM	CELL	9514534091 Yes	Survey Complete
350214007 ROE Received	Not Started		LAWRENCE W. WATSON	LAWRENCE W. WATSON; SCOTT WATSON	7244 AMESTOY AVE VAN NUYS CA 91406		No	0 Vacant					No	Survey Complete
350214012 ROE Received	Not Started	28521 WILLIAMS DR, CANYON LAKE, CA 92587	BENJAMIN WINNINGHAM	BENJAMIN WINNINGHAM; PEYTON WINNINGHAM	1233 S OAKHAVEN DR ANAHEIM CA 92804	No	Yes	500320697 Active	PEYTON WINNINGHAM	28521 WILLIAMS DR CANYON LAKE CA 92587	peytonmassae1996@gmail.com	CELL	7147689656 Yes	Survey Complete
350214015 ROE Received	Not Started		OMAR ZARAK MEDINA	OMAR ZARAK MEDINA	28541 WILLIAMS DR CANYON LAKE CA 92587		No	0 Vacant					No	Survey Complete
350214017 ROE Received	Not Started	28567 WILLIAMS DR, CANYON LAKE, CA 92587	LEONEL A. RAMOS	LEONEL A. RAMOS; OLGA RAMOS	28567 WILLIAMS DR SUN CITY CA 92587			500157017 Active	LEONEL RAMOS	28567 WILLIAMS DR CANYON LAKE CA 92587	PANCHOLOPES7122@GMAIL.COM	CELL	9517226740 Unconfirmed	Survey Complete
350214049 ROE Received	Not Started	23913 GOETZ DR, CANYON LAKE, CA 92587	SCOTT HEATHER L TRUST DTD 3/19/20	SCOTT HEATHER L TRUST DTD 3/19/20; HEATHER L. SCOTT	23913 GOETZ DR CANYON LAKE CA 92587		Yes	500160136 Active	HEATHER L SCOTT	23913 GOETZ DR CANYON LAKE CA 92587		HOME	9512441971 Unconfirmed	Survey Complete
350214050 ROE Received	Not Started	23910 KENNEDY LN, CANYON LAKE, CA 92587	MARIA A. ESPINOZA	MARIA A. ESPINOZA; ARTURO VERJAN	23910 KENNEDY LN QUAIL VALLEY CA 92587	No	Yes	500061249 Active	MARIA ESPINOSA	23910 KENNEDY LN CANYON LAKE CA 92587	JUDYFERN2002@GMAIL.COM	CELL	9519738489 Yes	Survey Complete
350214053 ROE Received	Not Started	28573 WILLIAMS DR, CANYON LAKE, CA 92587	CAROLINA E. GONZALEZ	SO BRIARSTONE LLC % OCH	50 BRIARSTONE CT LAKE ELSINORE CA 92530			500019462 Active	CAROLINA GONZALEZ	28573 WILLIAMS DR CANYON LAKE CA 92587	cindi51139@gmail.com	CELL	9492055459 Yes	Survey Complete
350214052 ROE Received	Not Started	23880 KENNEDY LN, CANYON LAKE, CA 92587	ROBERT L. MCQUARTERS	ROBERT L. MCQUARTERS; LUCILLE MCQUARTERS	23880 KENNEDY LN QUAIL VALLEY CA 92587	Yes	Yes	500025879 Active	ROBERT MCQUARTERS	23880 KENNEDY LN CANYON LAKE CA 92587	LYNNMCQUARTERS@GMAIL.COM	CELL	9515520140 Yes	Survey Complete
350215003 ROE Received	Not Started		CARLOS ZARAGOZA	CARLOS ZARAGOZA; GRISELDA ZARAGOZA	3698 TOWER LN PERRIS CA 92570		No	0 Vacant					No	Survey Complete
350215004 ROE Received	Not Started	28530 WILLIAMS DR, CANYON LAKE, CA 92587	CARLOS ZARAGOZA	CARLOS ZARAGOZA; GRISELDA ZARAGOZA	3698 TOWER LN PERRIS CA 92570			500025693 Active	CARLOS SARAGOSA	28530 WILLIAMS DR CANYON LAKE CA 92587	GRISELDA_0533@ATT.NET	CELL	7144146052 Yes	Survey Complete
350215005 ROE Received	Not Started		CARLOS ZARAGOZA	CARLOS ZARAGOZA; GRISELDA ZARAGOZA	3698 TOWER LN PERRIS CA 92570		No	0 Vacant					No	Survey Complete
350215007 ROE Received	Not Started	28570 WILLIAMS DR, CANYON LAKE, CA 92587	JERRY MARTIN	JERRY MARTIN; NOELIA MARTIN	28570 WILLIAMS DR MENIFEE CA 92587		Yes	500056074 Active	JERRY MARTIN	28570 WILLIAMS DR CANYON LAKE CA 92587	GRPPZMARTIN@GMAIL.COM	CELL	9512406494 Yes	Survey Complete
350215013 ROE Received	Not Started		SPERRY INV	SPERRY INV	29260 CALLE DE CABALLOS ROMOLAND CA 92585		No	0 Vacant					No	Survey Complete
350221005 ROE Received	Not Started	23541 GOETZ DR, CANYON LAKE, CA 92587	PEDRO PABLO ROMO	PEDRO PABLO ROMO; YENNY C. LINARES; P PABLO ROMO	23541 GOETZ DR MENIFEE CA 92587	No	Yes	500030916 Active	YENNY LINARES	23541 GOETZ DR CANYON LAKE CA 92587	YENNYLINARES45@GMAIL.COM	CELL	9514003787 Yes	Survey Complete
350221009 ROE Received	Not Started	23593 GOETZ DR, CANYON LAKE, CA 92587	JACKIE C. STAIB	JACKIE C. STAIB; JORDAN R. FISHER	23593 GOETZ DR CANYON LAKE CA 92587		Yes	500024666 Active	JACKIE FISHER	23593 GOETZ DR CANYON LAKE CA 92587	jcstaib0828@gmail.com	CELL	9519635272 Yes	Survey Complete
350221016 ROE Received	Not Started	23649 GOETZ DR, CANYON LAKE, CA 92587	HUGO OROS	HUGO OROS; BRENDA OROS	23649 GOETZ DR SUN CITY CA 92587	No	Yes	500052563 Active	HUGO OROS	23649 GOETZ DR CANYON LAKE CA 92587	OGHUGO1@GMAIL.COM	CELL	5626881678 Yes	Survey Complete
350221024 ROE Received	Not Started	23709 GOETZ DR, CANYON LAKE, CA 92587	ANDREW NGUYEN	ANDREW NGUYEN; KATIE CAO	9611 PORT CLYDE DR HUNTINGTON BEACH CA 92646		No	500115297 Active	ANDREW NGUYEN	23709 GOETZ DR CANYON LAKE CA 92587	SUNLITECAPITAL@GMAIL.COM	CELL	3106780069 Unconfirmed	Survey Complete
350221040 ROE Received	Not Started		MARIA SOLEDAD CAMPOS	MARIA SOLEDAD CAMPOS	23630 KENNEDY LN QUAIL VALLEY CA 92587		No	0 Vacant					No	Survey Complete
350221046 ROE Received	Not Started	23554 KENNEDY LN, CANYON LAKE, CA 92587	ELOY JOSE LUNA	ELOY JOSE LUNA	23554 KENNEDY LN CANYON LAKE CA 92587		Yes	500037790 Active	ELOY J LUNA	23554 KENNEDY LN CANYON LAKE CA 92587	eloyluna750@gmail.com	CELL	9513870528 Unconfirmed	Survey Complete
350221047 ROE Received	Not Started		ELOY JOSE LUNA	ELOY JOSE LUNA	23554 KENNEDY LN CANYON LAKE CA 92587		Yes	0 Vacant					No	Survey Complete
350221048 ROE Received	Not Started	23542 KENNEDY LN, CANYON LAKE, CA 92587	PATRICIO GONZALEZ	PATRICIO GONZALEZ; MARIA J. GONZALEZ	PO BOX 3451 QUAIL VALLEY CA 92587			500027532 Active	PATRICIO GONZALEZ	23542 KENNEDY LN CANYON LAKE CA 92587	GONZALEZ525@MSN.COM	HOME	9512440549 Yes	Survey Complete
350221049 ROE Received	Not Started	23532 KENNEDY LN, CANYON LAKE, CA 92587	ENRIQUE GONZALEZ	ENRIQUE GONZALEZ	23532 KENNEDY LN SUN CITY CA 92587	Yes	Yes	500068144 Active	JORGE RAMIREZ	23532 KENNEDY LN CANYON LAKE CA 92587		CELL	9514579599 Yes	Survey Complete
350221050 ROE Received	Not Started		ENRIQUE GONZALEZ ABONCE	ENRIQUE GONZALEZ ABONCE	2122 SUNPARK DR PERRIS CA 92570		No	0 Vacant					No	Survey Complete
350221052 ROE Received	Not Started	23675 GOETZ RD, CANYON LAKE, CA 92587	MATTHEW DEAN ADAMS	MATTHEW DEAN ADAMS; KATRINA J. ADAMS	23675 GOETZ RD CANYON LAKE CA 92587	No	Yes	500036155 Active	MATTHEW ADAMS	23675 GOETZ RD CANYON LAKE CA 92587	MATT_ADAMS@HOTMAIL.COM	CELL	9098003739 Yes	Survey Complete
350221055 ROE Received	Not Started	23676 KENNEDY LN, CANYON LAKE, CA 92587	ABEL ALEGRIA	ABEL ALEGRIA; CRISTINA GARRIAS DEALEGRIA	P O BOX 3261 QUAIL VALLEY CA 92587			500100898 Active	ABEL ALEGRIA	23676 KENNEDY LN CANYON LAKE CA 92587		CELL	9513683835 Yes	Survey Complete
350221057 ROE Received	Not Started	23617 GOETZ DR, CANYON LAKE, CA 92587	TRIDIDAD SANTILLAN DESANTILLAN	TRIDIDAD SANTILLAN DESANTILLAN	23617 GOETZ DR QUAIL VALLEY CA 92587		Yes	500069569 Active	BERNARDO SANTILLAN	23617 GOETZ DR CANYON LAKE CA 92587	BSANTILLANO2@GMAIL.COM	CELL	9514838695 Yes	Survey Complete
350221059 ROE Received	Not Started	23551 GOETZ DR, MENIFEE, CA 92587	BARBARA LIZOTTE	BARBARA LIZOTTE	23551 GOETZ DR MENIFEE CA 92587	No	Yes	500125481 Active	BARBARA E LIZOTTE	23551 GOETZ DR MENIFEE CA 92587	LIZOTTE61@GMAIL.COM	WORK	9512453246 Yes	Survey Complete
350221060 ROE Received	Not Started	23670 KENNEDY LN, CANYON LAKE, CA 92587	JESSE CRUZ	JESSE CRUZ	23670 KENNEDY LN MENIFEE CA 92587			500059191 Active	JESSE CRUZ	23670 KENNEDY LN CANYON LAKE CA 92587	JBBC1414@YAHOO.COM	CELL	9512831291 Unconfirmed	Survey Complete
350221061 ROE Received	Not Started	23633 GOETZ DRIVE, CANYON LAKE, CA 92587	RAFAEL JIMENEZ	RAFAEL JIMENEZ	23633 GOETZ DRIVE CANYON LAKE CA 92587			500162775 Active	JOSEFINA LOPEZ	23633 GOETZ DRIVE CANYON LAKE CA 92587		CELL	9512469834 Unconfirmed	Survey Complete
350222005 ROE Received	Not Started	23541 KENNEDY LN, CANYON LAKE, CA 92587	UBALDO LOPEZ	UBALDO LOPEZ; YESSICA LOPEZ	PO BOX 182 MURRIETA CA 92564			500118518 Active	UVALDO LOPEZ	23541 KENNEDY LN CANYON LAKE CA 92587		HOME	9512445163 Unconfirmed	Survey Complete
350222006 ROE Received	Not Started		UBALDO LOPEZ	UBALDO LOPEZ; YESSICA LOPEZ	PO BOX 182 MURRIETA CA 92564		No	0 Vacant					No	Survey Complete
350222027 ROE Received	Not Started		JOHNNY BARAJAS	JOHNNY BARAJAS	23736 SHREEDER PL MENIFEE CA 92587		No	0 Vacant					No	Survey Complete
350222041 ROE Received	Not Started		ROBERT H. MURILLO	ROBERT H. MURILLO; LORENA MURILLO	P O BOX 3093 QUAIL VALLEY CA 92587		No	0 Vacant					No	Survey Complete
350222042 ROE Received	Not Started	23580 SHREEDER PL, CANYON LAKE, CA 92587	ROBERT MURILLO	ROBERT MURILLO; LORENA MUNOZ	23580 SHREEDER PL CANYON LAKE CA 92587	No	Yes	500024667 Active	ROBERT H MURILLO	23580 SHREEDER PL CANYON LAKE CA 92587	LALONDRA@VERIZON.NET	CELL	9515516201 Yes	Survey Complete
350222044 ROE Received	Not Started	23572 SHREEDER PL, CANYON LAKE, CA 92587	FUERTE GONZALO RANGEL REVOCABLE TRUST DTD 10/28/2016	FUERTE GONZALO RANGEL REVOCABLE TRUST DTD 10/28/2016; GONZALO RANGEL FUERTE	12289 CAPONERA CT RIVERSIDE CA 92505	Yes	Yes	500158120 Active	JACOB MOORE	23572 SHREEDER PL CANYON LAKE CA 92587	daniellewallace@gmail.com	HOME	9514011813 Yes	Survey Complete
350222045 ROE Received	Not Started	23564 SHREEDER PL, CANYON LAKE, CA 92587	DOUGLAS CORUM	DOUGLAS CORUM; ASHLEY CORUM	23564 SHREEDER PL CANYON LAKE CA 92587			500029584 Active	DOUGLAS CORUM	23564 SHREEDER PL CANYON LAKE CA 92587	dougcorum@icloud.com	HOME	9513555877 Yes	Survey Complete
350222046 ROE Received	Not Started	23560 SHREEDER PL, CANYON LAKE, CA 92587	SEBASTIAN GARCIA QUIROZ JUAN	SEBASTIAN GARCIA QUIROZ JUAN	23560 SHREEDER PL CANYON LAKE CA 92587		Yes	500041069 Active	JUAN SEBASTIAN GARCIA	23560 SHREEDER PL CANYON LAKE CA 92587	SEBASTGARCIA@HOTMAIL.COM	CELL	9517225315 Yes	Survey Complete
350222051 ROE Received	Not Started	23516 SHREEDER PL, CANYON LAKE, CA 92587	JOHN C. FREULER	JOHN C. FREULER; HELEN M. FREULER	P O BOX 3113 QUAIL VALLEY CA 92587			0 Vacant		23516 SHREEDER PL CANYON LAKE CA 92587			Yes	Survey Complete
350222052 ROE Received	Not Started	28570 MOUNTAIN VIEW PL, CANYON LAKE, CA 92587	SEBASTIAN BOTELLO HERRERA	SEBASTIAN BOTELLO HERRERA	28570 MOUNTAIN VIEW PL SUN CITY CA 92587			500142855 Active	SEBASTIAN BOTELLO	28570 MOUNTAIN VIEW PL CANYON LAKE CA 92587		CELL	9514341021 Yes	Survey Complete
350222055 ROE Received	Not Started	23627 KENNEDY LN, CANYON LAKE, CA 92587	REYES ANTONIO	REYES ANTONIO; RODRIGUEZ JAVIER	23627 KENNEDY LN MENIFEE CA 92587	No	Yes	500571477 Active	JAVIER RODRIGUEZ	23627 KENNEDY LN CANYON LAKE CA 92587	javirodriguez0623@icloud.com	CELL	9515038745 Yes	Survey Complete
350257010 ROE Received	Not Started	28780 QUAIL PL, CANYON LAKE, CA 92587	QUAIL VALLEY CHAPEL INC	QUAIL VALLEY CHAPEL INC	23905 LODGE DR QUAIL VALLEY CA 92587		Yes	500072287 Active	QUAIL VALLEY BIBLE CHURCH	28780 QUAIL PL CANYON LAKE CA 92587	ANNTARUSSELL189@GMAIL.COM	CELL	9512595184 Yes	Survey Complete
350262014 ROE Received	Not Started	23635 NORMA DR, CANYON LAKE, CA 92587	ANTONIO FLORES	ANTONIO FLORES	23635 NORMA DR CANYON LAKE CA 92587		Yes	500117885 Active	ANTONIO FLORES	23635 NORMA DR CANYON LAKE CA 92587	TONYFLO94@GMAIL.COM	CELL	9513788963 Yes	Survey Complete
350273021 ROE Received	Not Started		FLORELINDA DOMINGUEZ	FLORELINDA DOMINGUEZ	P O BOX 3388 CANYON LAKE CA 92587			0 Vacant					No	Survey Complete
350223039 ROE Received	Not Started	23620 LA BERTHA LN, CANYON LAKE, CA 92587	WILLIAM J. VETTER	WILLIAM J. VETTER; NATALIE S. VETTER	30430 COMANCHE CIR CANYON LAKE CA 92587		Yes	500037400 Active	NATALIE VETTER	23620 LA BERTHA LN CANYON LAKE CA 92587	MISSVETTER87@YMAIL.COM	CELL	6197219705 Yes	Survey Complete
350223040 ROE Received	Not Started	23592 LA BERTHA LN, CANYON LAKE, CA 92587	CECILIA QUIROZ	CECILIA QUIROZ	P O BOX 590 SUN CITY CA 92586			500035249 Active	CECILIA QUIROZ	23592 LA BERTHA LN CANYON LAKE CA 92587	CCNANNIE@MSN.COM	HOME	9512445246 Yes	Survey Complete
350223041 ROE Received	Not Started	23588 LA BERTHA LN, CANYON LAKE, CA 92587	IVAN G. LOPEZ/MELISSA RUIZ	IVAN G. LOPEZ; MELISSA RUIZ	23588 LA BERTHA LN SUN CITY CA 92587			500037401 Active	MELISSA RUIZ	23588 LA BERTHA LN CANYON LAKE CA 92587	MELIRUIZ89@YAHOO.COM	CELL	9513851321 Yes	Survey Complete
350223042 ROE Received	Not Started	23582 LABERTHA LN, CANYON LAKE, CA 92587	IVAN H. AYALA	IVAN H. AYALA	23582 LA BERTHA LN MENIFEE CA 92587	No	Yes	500078714 Active	IVAN H AYALA	23582 LABERTHA LN CANYON LAKE CA 92587	IVANAYALA_03@YAHOO.COM	CELL	9514453449 Yes	Survey Complete
350223044 ROE Received	Not Started	23572 LA BERTHA LN, CANYON LAKE, CA 92587	RUBEN MIRELES ARRIETA	RUBEN MIRELES ARRIETA	23572 LA BERTHA LN CANYON LAKE CA 92587	No	Yes	500363187 Active	RUBEN ARRIETA	23572 LA BERTHA LN CANYON LAKE CA 92587	magdaminet@yahoo.com	HOME	9515819301 Yes	Survey Complete
350223045 ROE Received	Not Started	23566 LA BERTHA LN, CANYON LAKE, CA 92587	GUSTAVO MENDEZ RAMIREZ ALLEN	GUSTAVO MENDEZ RAMIREZ ALLEN; A PARRA MARTINEZ VERONICA	23566 LA BERTHA LN MENIFEE CA 92587			500183577 Active	VERONICA PARRA	23566 LA BERTHA LN CANYON LAKE CA 92587	avmendez0506@gmail.com	HOME	9519560580 Yes	Survey Complete
350223049 ROE Received	Not Started		FRANCISCO HERRERA	FRANCISCO HERRERA; RAMONA HERRERA	23522 LA BERTHA LN CANYON LAKE CA 92587		No	0 Vacant					No	Survey Complete
350223050 ROE Received	Not Started	23522 LA BERTHA LN, CANYON LAKE, CA 92587	FRANCISCO HERRERA	FRANCISCO HERRERA; RAMONA HERRERA	23522 LA BERTHA LN SUN CITY CA 92587	Yes	Yes	500158959 Active	FRANCISCO HERRERA	23522 LA BERTHA LN CANYON LAKE CA 92587	jennyherrera199621@gmail.com	HOME	9519410344 Yes	Survey Complete
350223051 ROE Received	Not Started		FELIX MIRELES	FELIX MIRELES; MARIA MIRELES	23510 LA BERTHA QUAIL VALLEY CA 92587		No	0 Vacant					No	Survey Complete
350223052 ROE Received	Not Started	23510 LA BERTHA LN, CANYON LAKE, CA 92587	JUAN MIRELES	JUAN MIRELES; MARIA MIRELES	23510 LA BERTHA LN SUN CITY CA 92587	No	Yes	500032067 Active	JUAN A MIRELES	23510 LA BERTHA LN CANYON LAKE CA 92587		HOME	9512447692 Yes	Survey Complete
350223056 ROE Received	Not Started	23690 LA BERTHA LN, CANYON LAKE, CA 92587	EVANGELINA VAZQUEZ	EVANGELINA VAZQUEZ	304 MONUMENT PKY PERRIS CA 92570			500023440 Active	PAULINA JAVIER	23690 LA BERTHA LN CANYON LAKE CA 92587	ANA.TJAVIER21@GMAIL.COM	HOME	9512461796 Yes	Survey Complete
350223060 ROE Received	Not Started	23709 SHREEDER PL, CANYON LAKE, CA 92587	JOSE AGUAYO	JOSE AGUAYO; CRISTINA AGUAYO	23709 SHREEDER PL SUN CITY CA 92587		Yes	500036828 Active	CRISTINA G AGUAYO	23709 SHREEDER PL CANYON LAKE CA 92587	PATOAGUAYO372@GMAIL.COM	CELL	9518348832 Yes	Survey Complete
350223063 ROE Received	Not Started	23591 SHREEDER PL, CANYON LAKE, CA 92587	ELIZABETH MURO	ELIZABETH MURO	PO BOX 3322 QUAIL VALLEY CA 92587		Yes	500028452 Active	ELIZABETH MURO	23591 SHREEDER PL CANYON LAKE CA 92587	MUROINCLAN@HOTMAIL.COM	CELL	9514426579 Yes	Survey Complete
350223064 ROE Received	Not Started	23521 SHREEDER PL, CANYON LAKE, CA 92587	JAMIE E. CASTRO	JAMIE E. CASTRO; JOSEFINA LANDEROS; GUADALUPE LANDEROS	P O BOX 3339 QUAIL VALLEY CA 92587		Yes	500022963 Active	JOSEFINA LANDEROS	23521 SHREEDER PL CANYON LAKE CA 92587	cornerolist313@gmail.com	HOME	9514377410 Yes	Survey Complete
350223065 ROE Received	Not Started	23722 LA BERTHA LN, CANYON LAKE, CA 92587	BRANDON JAMES ELPHICK	BRANDON JAMES ELPHICK; LYNETTE JANE KOLKOW	23722 LA BERTHA LN CANYON LAKE CA 92587	Yes	Yes	500057262 Active	BRANDON ELPHICK	23722 LA BERTHA LN CANYON LAKE CA 92587	ELPHICK_8@HOTMAIL.COM	CELL	9513183236 Yes	Survey Complete
350231010 ROE Received	Not Started	23633 LA BERTHA LN, CANYON LAKE, CA 92587	MICHAEL J. MANLEY	MICHAEL J. MANLEY; JOHN MANLEY; MELINDA L. PARKER	23633 LA BERTHA LN MENIFEE CA 92587		Yes	500032402 Active	MICHAEL J MANLEY	23633 LA BERTHA LN CANYON LAKE CA 92587	NASITEK@GMAIL.COM	WORK	9512712020 Yes	Survey Complete
350231020 ROE Received	Not Started	23665 LA BERTHA LN, CANYON LAKE, CA 92587	CELIA PEREZ	CELIA PEREZ; FRANCISCO MENDEZ	23665 LA BERTHA LN QUAIL VALLEY CA 92587		Yes	500040413 Active	CELIA PEREZ	23665 LA BERTHA LN CANYON LAKE CA 92587	PEREZCELIA946@YAHOO.COM	CELL	9516095782 Yes	Survey Complete
350231027 ROE Received	Not Started		JESSE H. RICO	JESSE H. RICO	29991 CANYON HILLS RD LAKE ELSINORE CA 92532			0 Vacant					Yes	Survey Complete
350231033 ROE Received	Not Started	23670 CASSANDRA DR, CANYON LAKE, CA 92587	JASON RYAN DOMINGUEZ	JASON RYAN DOMINGUEZ

350241028 ROE Received	Not Started	23795 LA BERTHA LN, CANYON LAKE, CA 92587	JOSHUA EASTERLY	JOSHUA EASTERLY; PATRICIA EASTERLY	22971 LASSEN DR CANYON LAKE CA 92587		Yes	500286327 Active	ABISAID GARIBAY	23795 LA BERTHA LN CANYON LAKE CA 92587	abi_garibay@yahoo.com	HOME	7606878966 Yes	Survey Complete
350242012 ROE Received	Not Started	23835 CASSANDRA DR CANYON LAKE, CA 92587	JASON HAVILI	JASON HAVILI; JOHN JARNAGIN	23833 CASSANDRA DR SUN CITY CA 92587	No	Yes	500041066 Active	MELISSA NIX	23835 CASSANDRA DR CANYON LAKE CA 92587		CELL	9512566423 Yes	Survey Complete
350242015 ROE Received	Not Started	23840 CLARA PL, CANYON LAKE, CA 92587	GEORGE E. JEFFERS	GEORGE E. JEFFERS; NANCY L. HUNTER	23840 CLARA PL CANYON LAKE CA 92587	No	Yes	500085883 Active	GEORGE JEFFERS SR	23840 CLARA PL CANYON LAKE CA 92587	GJEFFERS0957@GMAIL.COM	CELL	9512967593 Unconfirmed	Survey Complete
350242016 ROE Received	Not Started	23830 CLARA PL, CANYON LAKE, CA 92587	CESAREO DIAZ	CESAREO DIAZ; ADRIANA DIAZ	23830 CLARA PL CANYON LAKE CA 92587		Yes	500050048 Active	ADRIANA JIMENEZ DIAZ	23830 CLARA PL CANYON LAKE CA 92587		CELL	9513857444 Yes	Survey Complete
350242021 ROE Received	Not Started		LUIS BRULLES	LUIS BRULLES	8888 N 47TH AVE APT 157 GLENDALE AZ 85302		No	0 Vacant					No	Survey Complete
350242022 ROE Received	Not Started	23768 CLARA PL, CANYON LAKE, CA 92587	RICARDO DIAZ DE LA VEGA	RICARDO DIAZ DE LA VEGA; DIANA ELIZABETH DE LA VEGA	23768 CLARA PL CANYON LAKE CA 92587		Yes	500043689 Active	RICARDO DIAZ VEGA	23768 CLARA PL CANYON LAKE CA 92587	MAMICH6212828@GMAIL.COM	CELL	3109617864 Yes	Survey Complete
350242027 ROE Received	Not Started	23810 CLARA PL, CANYON LAKE, CA 92587	DOUGLAS BETHEL	DOUGLAS BETHEL	23810 CLARA PL SUN CITY CA 92587	No	Yes	500102969 Active	DOUGLAS W BETHEL	23810 CLARA PL CANYON LAKE CA 92587		CELL	9517950032 Yes	Survey Complete
350242029 ROE Received	Not Started	23771 CASSANDRA DR CANYON LAKE, CA 92587	NICOLAS BELT	NICOLAS BELT; LYNETTE NORTON	23771 CASSANDRA DR CANYON LAKE CA 92587	No	Yes	500029507 Active	LYNETTE NORTON	23771 CASSANDRA DR CANYON LAKE CA 92587	NLTBK4@GMAIL.COM	CELL	7147917350 Yes	Survey Complete
350242030 ROE Received	Not Started	23825 CASSANDRA DR, CANYON LAKE, CA 92587	BERTHA LIDIA OROZCO	BERTHA LIDIA OROZCO; ABIGAIL ALEJANDRA CARRILLO	23825 CASSANDRA DR MENIFEE CA 92587		Yes	500030098 Active	BERTHA EL-CHEIKH	23825 CASSANDRA DR CANYON LAKE CA 92587	OROZCOBERTHA11@GMAIL.COM	CELL	9512209536 Unconfirmed	Survey Complete
350242031 ROE Received	Not Started	23723 Cassandra	SALVADOR MEDINA VALLADARES	SALVADOR MEDINA VALLADARES; BLANCA HERNANDEZ	3820 PERIDOT CT PERRIS CA 92570		No	500468187 Active	SALVADOR MEDINA VALLADARES		symedina723@gmail.com	CELL	9517968330 Unconfirmed	Survey Complete
350243010 ROE Received	Not Started	23823 CLARA PL, CANYON LAKE, CA 92587	LUIS MANUEL AVARD	LUIS MANUEL AVARD; LETICIA AVARD	23823 CLARA PL SUN CITY CA 92587	No	Yes	500056600 Active	LETICIA AVARD	23823 CLARA PL CANYON LAKE CA 92587	LETY0865@YAHOO.COM	CELL	9512192994 Yes	Survey Complete
350243027 ROE Received	Not Started	23780 LODGE DR, CANYON LAKE, CA 92587	LUIS ALFONSO GALINDO GONZALEZ	LUIS ALFONSO GALINDO GONZALEZ; YURIDIA REYES	23780 LODGE DR MENIFEE CA 92587			500097678 Active	YURIDIA REYES	23780 LODGE DR CANYON LAKE CA 92587	YURIDIARG@HOTMAIL.COM	CELL	9519736236 Unconfirmed	Survey Complete
350243028 ROE Received	Not Started	23791 CLARA PL, CANYON LAKE, CA 92587	BILLY GENE CHAMBERS	BILLY GENE CHAMBERS; HERMILIA CRUZ CHAMBERS	P O BOX 3399 QUAIL VALLEY CA 92587			500571957 Active	HERMILLA CHAMBERS	23791 CLARA PL CANYON LAKE CA 92587		CELL	9512944414 Yes	Survey Complete
350243029 ROE Received	Not Started	23831 CLARA PL, CANYON LAKE, CA 92587	CATHY HOLLAND	CATHY HOLLAND	P O BOX 3125 QUAIL VALLEY CA 92587	No	Yes	500002257 Active	CATHY HOLLAND	23831 CLARA PL CANYON LAKE CA 92587	katerussell2008@hotmail.com	HOME	3108338002 Yes	Survey Complete
350244002 ROE Received	Not Started	28636 QUAIL PL, CANYON LAKE, CA 92587	LATRESE MITCHELL	LATRESE MITCHELL; MAURICE MCPHERSON	28636 QUAIL PL CANYON LAKE CA 92587			500034365 Active	LATRESE MITCHELL	28636 QUAIL PL CANYON LAKE CA 92587	LATRESE99@GMAIL.COM	CELL	9094403324 Yes	Survey Complete
350244003 ROE Received	Not Started	28644 QUAIL PL, CANYON LAKE, CA 92587	ROSALIA M. OCAMPO	ROSALIA M. OCAMPO	28644 QUAIL PL SUN CITY CA 92587		Yes	500029329 Active	KARLEE WRIGHT	28644 QUAIL PL CANYON LAKE CA 92587	KARKARWRIGHT17@GMAIL.COM	CELL	9513005619 Yes	Survey Complete
350244005 ROE Received	Not Started	28666 QUAIL PL, CANYON LAKE, CA 92587	TREMONE ALLEN STEWART	TREMONE ALLEN STEWART	28666 QUAIL PL CANYON LAKE CA 92587			500482227 Active	TREMONE STEWARD	28666 QUAIL PL CANYON LAKE CA 92587	masterofairbending@gmail.com	HOME	4243125292 Yes	Survey Complete
350244006 ROE Received	Not Started	28674 QUAIL PL, CANYON LAKE, CA 92587	ROLANDO MARTINEZ TORRES	ROLANDO MARTINEZ TORRES; LORENZO ANTONIO VARGAS	PO BOX 3135 MENIFEE CA 92587		Yes	500026325 Active	ROLANDA MARTINEZ TORREZ	28674 QUAIL PL CANYON LAKE CA 92587	L.COSIOA18@AOL.COM	CELL	3239227923 Yes	Survey Complete
350244008 ROE Received	Not Started	28694 QUAIL PL, CANYON LAKE, CA 92587	JESUS P. CASTILLO	JESUS P. CASTILLO; MARIA ISABEL CASTILLO	P O BOX 3228 QUAIL VALLEY CA 92587	Yes	Yes	500019320 Active	JESUS CASTILLO	28694 QUAIL PL CANYON LAKE CA 92587		HOME	9512444912 Yes	Survey Complete
350244009 ROE Received	Not Started		ENRIQUE OROZCO	ENRIQUE OROZCO; SARA OROZCO	P O BOX 3269 QUAIL VALLEY CA 92587		No	0 Vacant					No	Survey Complete
350244016 ROE Received	Not Started	23910 LODGE DR, CANYON LAKE, CA 92587	DEIDRA ANN MENDOZA	DEIDRA ANN MENDOZA	23910 LODGE DR SUN CITY CA 92587			500032882 Active	DEIDRA MENDOZA	23910 LODGE DR CANYON LAKE CA 92587	Deidra.mendoza14@gmail.com	HOME	9512415276 Yes	Survey Complete
350244018 ROE Received	Not Started	23870 LODGE DR, CANYON LAKE, CA 92587	JOSE A. AYALA	JOSE A. AYALA; LINDA M. AYALA	23870 LODGE DR SUN CITY CA 92587		Yes	500030251 Active	LINDA AYALA	23870 LODGE DR CANYON LAKE CA 92587		HOME	9517462304 Yes	Survey Complete
350244056 ROE Received	Not Started	28736 ANITA DR, CANYON LAKE, CA 92587	STEVEN R. VILLARREAL	STEVEN R. VILLARREAL; CARLENE L. VILLARREAL	28736 ANITA DR MENIFEE CA 92587			500047915 Active	STEVEN VILLARREAL	28736 ANITA DR CANYON LAKE CA 92587	STEVENVEA7@GMAIL.COM	CELL	7143335750 Yes	Survey Complete
350244057 ROE Received	Not Started	28696 ANITA DR, CANYON LAKE, CA 92587	LOURDES HERNANDEZ	LOURDES HERNANDEZ	28686 ANITA DR MENIFEE CA 92587		Yes	500047914 Active	LOURDES HERNANDEZ	28696 ANITA DR CANYON LAKE CA 92587	HERNANDEZ.LOURDES77@YAHOO.COM	CELL	9513301842 Unconfirmed	Survey Complete
350244058 ROE Received	Not Started	28686 ANITA DR, MENIFEE, CA 92584	MARIA DEL CARMEN VELASCO	MARIA DEL CARMEN VELASCO	28686 ANITA DR MENIFEE CA 92587			500047913 Active	MARIA DEL CARMEN VELASCO	28686 ANITA DR MENIFEE CA 92584		CELL	9512877225 Unconfirmed	Survey Complete
350245012 ROE Received	Not Started	23998 LODGE DR, CANYON LAKE, CA 92587	ANTONIO E. TRISTAN	ANTONIO E. TRISTAN	8001 SOMERSET BLVD., #30 PARAMOUNT CA 90723			500158302 Active	ANTONIO TRISTAN	23998 LODGE DR CANYON LAKE CA 92587	MTRISTAN3@GMAIL.COM	CELL	3232704435 Yes	Survey Complete
350245014 ROE Received	Not Started	28720 WILLIAMS DR, CANYON LAKE, CA 92587	CAMERON SIMMONS	CAMERON SIMMONS; SCOTT SIMMONS	28720 WILLIAMS DR CANYON LAKE CA 92587		Yes	500479837 Active	CAMERON SIMMONS	28720 WILLIAMS DR CANYON LAKE CA 92587	cameronnnscottt@yahoo.com	HOME	7144126787 Unconfirmed	Survey Complete
350251005 ROE Received	Not Started	23785 LODGE DR, CANYON LAKE, CA 92587	JOSE MANUEL BARRIGA	JOSE MANUEL BARRIGA	23785 LODGE DR SUN CITY CA 92587		Yes	500062760 Active	GABRIEL GONZALEZ	23785 LODGE DR CANYON LAKE CA 92587		HOME	9514301190 Yes	Survey Complete
350251007 ROE Received	Not Started	23801 LODGE DR, CANYON LAKE, CA 92587	IAN G. MORE	IAN G. MORE	23801 LODGE DR SUN CITY CA 92587	No	Yes	500031481 Active	IAN MORE	23801 LODGE DR CANYON LAKE CA 92587	HAULMORE88@YAHOO.COM	CELL	9517465606 Yes	Survey Complete
350251008 ROE Received	Not Started		IAN G. MORE	IAN G. MORE	23801 LODGE DR CANYON LAKE CA 92587		No	0 Vacant					No	Survey Complete
350251017 ROE Received	Not Started	23820 NORMA DR, CANYON LAKE, CA 92587	PEGGY A. HUST	PEGGY A. HUST; HISEL CAROLYN D ESTATE OF	23820 NORMA DR QUAIL VALLEY CA 92587		Yes	500024058 Active	PEGGY HUST	23820 NORMA DR CANYON LAKE CA 92587	PEGGYHOUST1@ICLOUD.COM	CELL	9517299667 Yes	Survey Complete
350251030 ROE Received	Not Started		JAMES K. HALEY	JAMES K. HALEY; KATHY J. HALEY	33477 LITTLE REB PL MENIFEE CA 92584		No	500021309 Active	ESTEBAN RIOS		esteban.rios123@gmail.com	CELL	9497226401 No	Survey Complete
350251033 ROE Received	Not Started		JAMES K. HALEY	JAMES K. HALEY; KATHY J. HALEY	33477 LITTLE REB PL MENIFEE CA 92584		No	0 Vacant					No	Survey Complete
350252004 ROE Received	Not Started		SANTOS MARTINEZ	SANTOS MARTINEZ	23769 NORMA DR MENIFEE CA 92587		No	0 Vacant					No	Survey Complete
350252010 ROE Received	Not Started	23821 NORMA DR, CANYON LAKE, CA 92587	TYLER SARTY	TYLER SARTY	23821 NORMA DR MENIFEE CA 92587		Yes	500022326 Active	TYLER G SARTY	23821 NORMA DR CANYON LAKE CA 92587	TYLER.SARTY@GMAIL.COM	WORK	9513133893 Yes	Survey Complete
350252013 ROE Received	Not Started	23847 NORMA DR, CANYON LAKE, CA 92587	ERNIE C. ENRIQUEZ	ERNIE C. ENRIQUEZ; DESTINY M. YOUNG	23847 NORMA DR CANYON LAKE CA 92587		Yes	500019450 Active	ERNIE ENRIQUEZ	23847 NORMA DR CANYON LAKE CA 92587	ERNIEQUEZ97@GMAIL.COM	CELL	7604212766 Yes	Survey Complete
350252019 ROE Received	Not Started	23808 CYPRESS PL, CANYON LAKE, CA 92587	DEAN A. MACK	DEAN A. MACK; RANDA MACK	23763 VIA SEGOVIA MURRIETA CA 92562		No	500493077 Active	LINDA VARGAS	23808 CYPRESS PL CANYON LAKE CA 92587	PERALES3581@GMAIL.COM	CELL	9512398811 Yes	Survey Complete
350252023 ROE Received	Not Started	23790 CYPRESS PL, CANYON LAKE, CA 92587	DEAN A. MACK	DEAN A. MACK; RANDA F. MACK	23763 VIA SEGOVIA MURRIETA CA 92562		No	500098160 Active	ALEXIS CHIP	23790 CYPRESS PL CANYON LAKE CA 92587	ALEXISCHIP@GMAIL.COM	CELL	9517229146 Yes	Survey Complete
350252027 ROE Received	Not Started	23799 NORMA DR, CANYON LAKE, CA 92587	ANTONIO MONTES BERUMEN	ANTONIO MONTES BERUMEN	23799 NORMA DR SUN CITY CA 92587		Yes	500072178 Active	ANTONIO MONTES BERUMEN	23799 NORMA DR CANYON LAKE CA 92587	KARINA.MINNELLA@GMAIL.COM	CELL	9517222231 Yes	Survey Complete
350252028 ROE Received	Not Started	23780 CYPRESS PL, CANYON LAKE, CA 92587	PEDRO ARMIENTA	PEDRO ARMIENTA; ROSALVA ARMIENTA	23780 CYPRESS PL QUAIL VALLEY CA 92587			500103354 Active	PEDRO ARMIENTA	23780 CYPRESS PL CANYON LAKE CA 92587	ROSALVAARMIENTA@GMAIL.COM	BUS	7607235140 Yes	Survey Complete
350252031 ROE Received	Not Started	23757 NORMA DR, CANYON LAKE, CA 92587	DENISE REYES	DENISE REYES	29277 CORTE RIOJO SUN CITY CA 92587		Yes	500030480 Active	ESPERANZA REYES	23757 NORMA DR CANYON LAKE CA 92587	ramirezclaudia776@gmail.com	HOME	9513495866 Yes	Survey Complete
350252032 ROE Received	Not Started	23769 NORMA DR, CANYON LAKE, CA 92587	SANTOS MARTINEZ	SANTOS MARTINEZ	P O BOX 3386 QUAIL VALLEY CA 92587		Yes	500109571 Active	SANTOS MARTINEZ BERNARDINO	23769 NORMA DR CANYON LAKE CA 92587		CELL	9514224046 Yes	Survey Complete
350252033 ROE Received	Not Started	23815 NORMA DR, CANYON LAKE, CA 92587	MIGUEL PANIAGUE	MIGUEL PANIAGUE; EMILIA D. PANIAGUE	23815 NORMA DR SUN CITY CA 92587			500068138 Active	MIGUEL PANIAGUE	23815 NORMA DR CANYON LAKE CA 92587		HOME	9512443151 Yes	Survey Complete
350253002 ROE Received	Not Started		JIM SIZER	JIM SIZER	28426 PEBBLE BEACH DR SUN CITY CA 92586		No	0 Vacant					No	Survey Complete
350253009 ROE Received	Not Started		MIRIAM OSORNIO	WAYNE RICHARD DEVENNY	26124 SUNNYWOOD ST SUN CITY CA 92586		No	0 Vacant					Yes	Survey Complete
350253010 ROE Received	Not Started	23823 CYPRESS PL, CANYON LAKE, CA 92587	MIRIAM OSORNIO	WAYNE RICHARD DEVENNY	26124 SUNNYWOOD ST SUN CITY CA 92586	No	Yes	500587587 Active	RYAN DEVENNY	23823 CYPRESS PL CANYON LAKE CA 92587		CELL	5307988091 No	Survey Complete
350253014 ROE Received	Not Started	28863 QUAIL PL, CANYON LAKE, CA 92587	JUAN GOMEZ GOMEZ	JUAN GOMEZ GOMEZ; LESLIE AGUILAR	28863 QUAIL PL CANYON LAKE CA 92587		Yes	500125745 Active	LESLIE AGUILAR	28863 QUAIL PL CANYON LAKE CA 92587	LESSGOMEZ07@GMAIL.COM	CELL	9517566055 Unconfirmed	Survey Complete
350253016 ROE Received	Not Started	23832 NEWPORT DR, CANYON LAKE, CA 92587	LUCIA G. VALLE	LUCIA G. VALLE; CLAUDIO ARMANDO LARA	23832 NEWPORT DR QUAIL VALLEY CA 92587		Yes	500108695 Active	LUCIA G VALLE	23832 NEWPORT DR CANYON LAKE CA 92587		HOME	9512443331 Yes	Survey Complete
350253019 ROE Received	Not Started	23806 NEWPORT DR, CANYON LAKE, CA 92587	MARGARITA RIVERA SANCHEZ	MARGARITA RIVERA SANCHEZ	23806 NEWPORT DR CANYON LAKE CA 92587		Yes	500106693 Active	MARGARITA RIVERA SANCHEZ	23806 NEWPORT DR CANYON LAKE CA 92587	MARGARITA.R517@OUTLOOK.COM	CELL	6198065144 Yes	Survey Complete
350253020 ROE Received	Not Started	23798 NEWPORT DR, CANYON LAKE, CA 92587	BRIAN CHARLES BURT	BRIAN CHARLES BURT; LISA ANN SCILLEY BURT	23798 NEWPORT DR CANYON LAKE CA 92587		Yes	500045049 Active	BRIAN BURT	23798 NEWPORT DR CANYON LAKE CA 92587	BRIAN.BURT73@GMAIL.COM	CELL	9492890413 Yes	Survey Complete
350253021 ROE Received	Not Started	23792 NEWPORT DR, CANYON LAKE, CA 92587	DON C. BENNEWATE	DON C. BENNEWATE; CHARLES MONTANA	78 MEADOW VIEW DR POMONA CA 91766			500043282 Active	SANDRA J CRUCE MONTANA	23792 NEWPORT DR CANYON LAKE CA 92587		CELL	9092087680 Yes	Survey Complete
350253027 ROE Received	Not Started	23753 CYPRESS PL, CANYON LAKE, CA 92587	JIM SIZER	JIM SIZER	28426 PEBBLE BEACH DR SUN CITY CA 92586			500154770 Active	YENI NAVARRO	23753 CYPRESS PL CANYON LAKE CA 92587	YENINAVARRO423@GMAIL.COM	CELL	9512826616 Yes	Survey Complete
350254003 ROE Received	Not Started		ARTURO BRAVO	JOHANNA BRAVO	23893 CYPRESS PL MENIFEE CA 92587	No		0 Vacant					No	Survey Complete
350254007 ROE Received	Not Started		RENE AJCA	RENE AJCA	23937 CYPRESS PL MENIFEE CA 92587	No		0 Vacant					No	Survey Complete
350254012 ROE Received	Not Started	23987 CYPRESS PL, CANYON LAKE, CA 92587	RENE AJCA	RENE AJCA	23937 CYPRESS PL QUAIL VALLEY CA 92587			500026537 Active	MARIA R LOPEZ	23987 CYPRESS PL CANYON LAKE CA 92587	ROSIEYRENE1@GMAIL.COM	CELL	9515889149 Yes	Survey Complete
350254013 ROE Received	Not Started		RENE AJCA	RENE AJCA	23937 CYPRESS PL QUAIL VALLEY CA 92587		No	0 Vacant					No	Survey Complete
350254018 ROE Received	Not Started	23960 NEWPORT DR, CANYON LAKE, CA 92587	TED RICHARD MORRISON	TED RICHARD MORRISON; BONNIE SUE MORRISON	23960 NEWPORT DR QUAIL VALLEY CA 92587		No	500030865 Active	TED MORRISON	23960 NEWPORT DR CANYON LAKE CA 92587	BSSMOR37@GMAIL.COM	CELL	9517466116 Yes	Survey Complete
350254019 ROE Received	Not Started	23940 NEWPORT DR, CANYON LAKE, CA 92587	SIFREDO V. CALDERON	SIFREDO V. CALDERON; FLOR AZUCENA CALDERON	23940 NEWPORT DR SUN CITY CA 92587			500054504 Active	FLOR CALDERON	23940 NEWPORT DR CANYON LAKE CA 92587		CELL	9517227957	Survey Complete
350254030 ROE Received	Not Started	23916 NEWPORT DR, CANYON LAKE, CA 92587	DONALD EUGENE DALTON	DONALD EUGENE DALTON; BLAIR METZE	23916 NEWPORT DR MENIFEE CA 92587	No	Yes	500103542 Active	DONALD DALTON	23916 NEWPORT DR CANYON LAKE CA 92587	BCMETZE@MSN.COM	CELL	9516239321 Yes	Survey Complete
350254022 ROE Received	Not Started		DONALD EUGENE DALTON	DONALD EUGENE DALTON; BLAIR METZE	23916 NEWPORT DR MENIFEE CA 92587			0 Vacant					No	Survey Complete
350254029 ROE Received	Not Started	23874 NEWPORT DR, CANYON LAKE, CA 92587	RENE AJCA	RENE AJCA	23937 CYPRESS PL QUAIL VALLEY CA 92587			500191367 Active	VALERIA NUNEZ	23874 NEWPORT DR CANYON LAKE CA 92587	Valerianune89@yahoo.com	HOME	6504959443 Yes	Survey Complete
350254030 ROE Received	Not Started	23937 CYPRESS PL, CANYON LAKE, CA 92587	RENE AJCA	RENE AJCA	23937 CYPRESS PL SUN CITY CA 92587			500025238 Active	RENE AJCA	23937 CYPRESS PL CANYON LAKE CA 92587	RELLING@MWD.ORG	CELL	9517953133 Yes	Survey Complete
350255011 ROE Received	Not Started	23971 NORMA DR, CANYON LAKE, CA 92587	JULIA R. DICKERSON	JULIA R. DICKERSON; VICTOR R. DICKERSON	P O BOX 3315 QUAIL VALLEY CA 92587	No	Yes	500030948 Active	VICTOR R DICKERSON	23971 NORMA DR CANYON LAKE CA 92587	DD9516@AOL.COM	HOME	9512444609 Yes	Survey Complete
350255015 ROE Received	Not Started		RENE AJCA	RENE AJCA	23937 CYPRESS PL QUAIL VALLEY CA 92587		No	0 Vacant					No	Survey Complete
350255022 ROE Received	Not Started	23908 CYPRESS PL, CANYON LAKE, CA 92587	MARIA CARMEN BOTELLO	MARIA CARMEN BOTELLO	P O BOX 3315 QUAIL VALLEY CA 92587		Yes	500078671 Active	MARIA BOTELLO	23908 CYPRESS PL CANYON LAKE CA 92587		CELL	9512652576 Yes	Survey Complete
350255028 ROE Received	Not Started	23887 NORMA DR, CANYON LAKE, CA 92587	CHRISTINA MARIE DOMINGUEZ	CHRISTINA MARIE DOMINGUEZ	23680 LABERTHA LN QUAIL VALLEY CA 92587			500033486 Active	CHRISTINA M DOMINGUEZ	23887 NORMA DR CANYON LAKE CA 92587		CELL	9512293925 Yes	Survey Complete
350255029 No Mailbox	Not Started	23880 CYPRESS PL, CANYON LAKE, CA 92587	JOSE MARIO BOTELLO	JOSE MARIO BOTELLO	23880 CYPRESS PL QUAIL VALLEY CA 92587			0 Vacant		23880 CYPRESS PL CANYON LAKE CA 92587			No	Survey Complete
350256003 ROE Received	Not Started	23963 LODGE DR, CANYON LAKE, CA 92587	LOUIS VILLA	LOUIS VILLA; MARCELA VILLA	25370 VIA DE LA TEMECULA CA 92590		Yes	500031585 Active	LOUIS VILLA	23963 LODGE DR CANYON LAKE CA 92587	LAVLS211@GMAIL.COM	CELL	9512958731 Yes	Survey Complete
350256006 ROE Received	Not Started	28767 LODGE DR, CANYON LAKE, CA 92587	ADELITA PUGA	ADELITA PUGA	44512 LA PAZ RD TEMECULA CA 92592		Yes	500263107 Active	ADELITA PUGA	28767 LODGE DR CANYON LAKE CA 92587	puga.adelita@gmail.com	CELL	9519727106 Unconfirmed	Survey Complete
350256008 ROE Received	Not Started	23984 NORMA DR, CANYON LAKE, CA 92587	SALVADOR CORTES GARIBAY	SALVADOR CORTES GARIBAY	29685 WISE ST LAKE ELSINORE CA 92530			500035683 Active	ALFONSO OROZCO	23984 NORMA DR CANYON LAKE CA 92587		CELL	7073577858 Yes	Survey Complete
350256009 ROE Received	Not Started		NORMA CORTEZ	NORMA CORTEZ	23984 NORMA DR CANYON LAKE CA 92587		Yes	0 Vacant					No	Survey Complete
350256010 ROE Received	Not Started	23960 NORMA DR, CANYON LAKE, CA 92587	GU DONNA H TRUST 3/19/19	GU DONNA H TRUST 3/19/19; MATHIEU SCHMITT; DONNA H. GU	5057 JADE TER CHINO HILLS CA 91709		Yes	500020058 Active	MATHIEU SCHMITT	23960 NORMA DR CANYON LAKE CA 92587	BRIGHTSKYLLC@OUTLOOK.COM	CELL	6263409827 Yes	Survey Complete
350256011 Not Included	Not Included	23950 NORMA DR, CANYON LAKE, CA 92587	GU DONNA H TRUST 3/19/19	GU DONNA H TRUST 3/19/19; MATHIEU SCHMITT; DONNA H. GU	5057 JADE TER CHINO HILLS CA 91709		No	0 Vacant		23950 NORMA DR CANYON LAKE CA 92587			Yes	Survey Complete

350256013 ROE Received	Not Started	23940 NORMA DR, CANYON LAKE, CA 92587	HOFER FAMILY TRUST DATED 6/17/2020	HOFER FAMILY TRUST DATED 6/17/2020; HOFER CHRISTY J; HOFER BRUCE J	11430 TURNER HEIGHTS DR ESCONDIDO CA 92026		Yes	500022640 Active	CHRIS HOFER	23940 NORMA DR CANYON LAKE CA 92587		CELL	7605946444 Yes	Survey Complete
350256107 ROE Received	Not Started	23563 LODGE DR, CANYON LAKE, CA 92587	JIMMY P. CAMACHO	JIMMY P. CAMACHO	23563 LODGE DR MENIFEE CA 92587			500020188 Active	MARY PARRA CANTU	23563 LODGE DR CANYON LAKE CA 92587		CELL	9097039435 Unconfirmed	Survey Complete
350256132 ROE Received	Not Started	23613 LODGE DR, CANYON LAKE, CA 92587	ROBERT STEVEN GLENN	ROBERT STEVEN GLENN	P O BOX 2044 PALM LINCOLN CA 95885			500037393 Active	DENISE POU	23613 LODGE DR CANYON LAKE CA 92587		CELL	9514402858 Yes	Survey Complete
350256103 ROE Received	Not Started	23625 LODGE DR, CANYON LAKE, CA 92587	JESUS CASTILLO	JESUS CASTILLO; MARIA CASTILLO	23625 LODGE DR CANYON LAKE CA 92587		No	500068702 Active	JESSICA TORRES CASTILLO	23625 LODGE DR CANYON LAKE CA 92587	LUCKALEXLUCK@GMAIL.COM	WORK	9514865548 Yes	Survey Complete
350261021 ROE Received	Not Started		FEDERICO ROMERO	FEDERICO ROMERO; CAROLINA HINOJOSA	PO BOX 1352 BONSALL CA 92003		No	0 Vacant					No	Survey Complete
350261023 ROE Received	Not Started	23733 LODGE DR, CANYON LAKE, CA 92587	ARTEMIO CANTU MAGANA	ARTEMIO CANTU MAGANA	23733 LODGE DR SUN CITY CA 92587	Yes	Yes	500125575 Active	SALUD CANTU	23733 LODGE DR CANYON LAKE CA 92587		CELL	9512294922 Unconfirmed	Survey Complete
350261027 ROE Received	Not Started		JAMES K. HALEY	JAMES K. HALEY; KATHY J. HALEY	33477 LITTLE REB PL MENIFEE CA 92584		No	0 Vacant					No	Survey Complete
350261028 ROE Received	Not Started	23746 NORMA DR, CANYON LAKE, CA 92587	JAMES K. HALEY	JAMES K. HALEY; KATHY J. HALEY	33477 LITTLE REB PL MENIFEE CA 92584		Yes	500062190 Active	TAMARA MARSHALL	23746 NORMA DR CANYON LAKE CA 92587	TAMARAMARSHALL423@GMAIL.COM	CELL	9512496090 Yes	Survey Complete
350261040 ROE Received	Not Started	23628 NORMA DR, CANYON LAKE, CA 92587	HILDA RIOS	HILDA RIOS	23628 NORMA DR CANYON LAKE CA 92587			500035827 Active	HILDA RIOS	23628 NORMA DR CANYON LAKE CA 92587	HILDAR1209@GMAIL.COM	CELL	9519770138 Yes	Survey Complete
350261041 ROE Received	Not Started	23620 NORMA DR, CANYON LAKE, CA 92587	DEREK A. HUDSON	DEREK A. HUDSON	23620 NORMA DR MENIFEE CA 92587		Yes	500030481 Active	DEREK A HUDSON	23620 NORMA DR CANYON LAKE CA 92587		CELL	9515265140 Yes	Survey Complete
350261043 ROE Received	Not Started	23590 NORMA DR, CANYON LAKE, CA 92587	JOSE A. MENDEZ	JOSE A. MENDEZ; JUDITH MENDEZ	23590 NORMA DR SUN CITY CA 92587		Yes	500030250 Active	JOSE ANTONIO MENDEZ	23590 NORMA DR CANYON LAKE CA 92587		CELL	9517753576 Yes	Survey Complete
350261054 ROE Received	Not Started	23658 NORMA DR, CANYON LAKE, CA 92587	NICOLAS A. CHAVEZ	NICOLAS A. CHAVEZ; LETICIA CHAVEZ	23658 NORMA DR SUN CITY CA 92587			500105133 Active	LETICIA CHAVEZ	23658 NORMA DR CANYON LAKE CA 92587	ramirochavez020187@yahoo.com	CELL	4805659699 Yes	Survey Complete
350261058 ROE Received	Not Started	23552 NORMA DR, CANYON LAKE, CA 92587	ERIK ALAN VALLE DE LA LUZ	ERIK ALAN VALLE DE LA LUZ	23552 NORMA DR MENIFEE CA 92587		Yes	500211627 Active	DANA ORGANISTA-VELAZQUEZ	23552 NORMA DR CANYON LAKE CA 92587	danaorganista517@gmail.com,	CELL	9514584590 Unconfirmed	Survey Complete
350261060 ROE Received	Not Started	23741 LODGE DR, CANYON LAKE, CA 92587	CALERO FAMILY TRUST DATED 12/12/2019	CALERO FAMILY TRUST DATED 12/12/2019; VIOLET CALERO; RAMON ORLANDO CALERO	16451 JANINE DR WHITTIER CA 90603			500021346 Active	MARIA INIGUEZ	23741 LODGE DR CANYON LAKE CA 92587	TERESA.INIGUEZ65@GMAIL.COM	CELL	5624587436 Yes	Survey Complete
350261065 ROE Received	Not Started	23521 LODGE DR, CANYON LAKE, CA 92587	THOMAS PETRAK	THOMAS PETRAK; MELISSA PETRAK	23521 LODGE DR SUN CITY CA 92587		Yes	500027123 Active	TOM PETRAK	23521 LODGE DR CANYON LAKE CA 92587	PEATYGIRL87@GMAIL.COM	CELL	8587756179 Yes	Survey Complete
350261066 ROE Received	Not Started	23537 LODGE DR, CANYON LAKE, CA 92587	ROSA MARIA HERNANDEZ-RAYA	ROSA MARIA HERNANDEZ-RAYA; JOSE RAMOS	23537 LODGE DR CANYON LAKE CA 92587		Yes	500027124 Active	JOSE RAMOS	23537 LODGE DR CANYON LAKE CA 92587	peperoyssyr@gmail.com	HOME	6196094530 Yes	Survey Complete
350262001 ROE Received	Not Started	23507 NORMA DR SUN CITY CA 92587	JANET L. ANDERSON	JANET L. ANDERSON	23507 NORMA DR SUN CITY CA 92587		Yes	500488297 Active	NICHOLAS CROOK	23507 NORMA DR CANYON LAKE CA 92587	nchlscrook@aol.com	CELL	9512970905 Yes	Survey Complete
350262008 ROE Received	Not Started		FERNANDO HIDALGO	FERNANDO HIDALGO	23577 NORMA DR CANYON LAKE CA 92587		No	0 Vacant					No	Survey Complete
350262012 ROE Received	Not Started		JORDY DERRIN JONES	JORDY DERRIN JONES	24815 2ND AVE MURRIETA CA 92562		Yes	0 Vacant					No	Survey Complete
350262013 ROE Received	Not Started	23617 NORMA DR, CANYON LAKE, CA 92587	JORDY D. JONES	JORDY D. JONES	24815 2ND A

350282003 ROE Received	Not Started		SUSIE J. MOLINA	SUSIE J. MOLINA	430 S CST PERRIS CA 92570	No		0 Vacant						No	Survey Complete
350282005 ROE Received	Not Started	23845 WELLS PL, CANYON LAKE, CA 92587	MANUEL RODRIGUEZ GARCIA	MANUEL RODRIGUEZ GARCIA	569 CARRIE CIR SAN MARCOS CA 92069		Yes	500050298 Active	MARIA RODRIGUEZ	23845 WELLS PL CANYON LAKE CA 92587		CELL	7605046082	Yes	Survey Complete
350282013 ROE Received	Not Started	23829 SIERRA DR, CANYON LAKE, CA 92587	SERGIO GONZALEZ	SERGIO GONZALEZ; JUANA GONZALEZ	23829 SIERRA DR MENIFEE CA 92587	No	Yes	500060004 Active	JUANA GONZALEZ	23829 SIERRA DR CANYON LAKE CA 92587	JENNIFER.GONZALEZ_1174@YAHOO.COM	CELL	9515418853	Yes	Survey Complete
350282014 ROE Received	Not Started	23837 SIERRA DR, CANYON LAKE, CA 92587	ABELARDO LOPEZ	ABELARDO LOPEZ; EUSTORGIA LOPEZ	23837 SIERRA DR QUAIL VALLEY CA 92587		Yes	500030116 Active	ABELARDO LOPEZ	23837 SIERRA DR CANYON LAKE CA 92587		HOME	9512443769	Yes	Survey Complete
350282015 ROE Received	Not Started	23843 SIERRA DR, CANYON LAKE, CA 92587	STEVEN JAMES PEREZ	STEVEN JAMES PEREZ	P O BOX 6534 ALHAMBRA CA 91802		Yes	500271197 Active	STEVEN PEREZ	23843 SIERRA DR CANYON LAKE CA 92587	STEVENPEREZ360@GMAIL.COM	CELL	9262162014	Yes	Survey Complete
350282023 ROE Received	Not Started	23818 SIERRA DR, CANYON LAKE, CA 92587	DIANE BERRY SCHWIND	DIANE BERRY SCHWIND	23818 SIERRA DR SUN CITY CA 92587	No	Yes	500022990 Active	DIANE SCHWIND	23818 SIERRA DR CANYON LAKE CA 92587	DSCHWIND2@GMAIL.COM	HOME	9517232229	Yes	Survey Complete
350283004 ROE Received	Not Started	23881 SIERRA DR, CANYON LAKE, CA 92587	ARNULFO HERNANDEZ	ARNULFO HERNANDEZ; PATRICIA MUNGUIA	23881 SIERRA DR SUN CITY CA 92587		Yes	500102230 Active	PATTY MUNGUIA	23881 SIERRA DR CANYON LAKE CA 92587	Sofiamunguiah88@gmail.com	CELL	9518670498	Yes	Survey Complete
350284001 ROE Received	Not Started		SHIRLEY A. LOPEZ	SHIRLEY A. LOPEZ	40680 GOLDEN WAY PALM DESERT CA 92211		No	0 Vacant						No	Survey Complete
350284002 ROE Received	Not Started		SHIRLEY A. LOPEZ	SHIRLEY A. LOPEZ; SHIRLEY ELDRIDGE	40680 GOLDEN WAY PALM DESERT CA 92211		No	0 Vacant						No	Survey Complete
350284004 ROE Received	Not Started	23893 WELLS PL, CANYON LAKE, CA 92587	ROSALIA MARLENE OCAMPO	ROSALIA MARLENE OCAMPO	23893 WELLS PL SUN CITY CA 92587		Yes	500285737 Active	ALEJANDRA CASTELLANOS	23893 WELLS PL CANYON LAKE CA 92587		CELL	6196537089	Yes	Survey Complete
350284006 ROE Received	Not Started	23925 WELLS PL, CANYON LAKE, CA 92587	LUIS FELIPE CAMPOS	LUIS FELIPE CAMPOS; JENNIFER LEIGH CAMPOS	23925 WELLS PL CANYON LAKE CA 92587		Yes	500242257 Active	LUIS CAMPOS	23925 WELLS PL CANYON LAKE CA 92587	l.campos05@yahoo.com	HOME	9090233727	Yes	Survey Complete
350284007 ROE Received	Not Started	23941 WELLS PL, CANYON LAKE, CA 92587	RONULFO SALAS LEYVA	RONULFO SALAS LEYVA	23941 WELLS PL SUN CITY CA 92587		Yes	500023850 Active	RONULFO SALAS	23941 WELLS PL CANYON LAKE CA 92587	cortescarmen@gmail.com	HOME	9512444649	Yes	Survey Complete
350284019 ROE Received	Not Started	23940 SIERRA DR, CANYON LAKE, CA 92587	JOSHUA EASTERLY	JOSHUA EASTERLY; PATRICIA EASTERLY	22971 LASSEN DR CANYON LAKE CA 92587		Yes	500068594 Active	MARGARITA TAVIRA	23940 SIERRA DR CANYON LAKE CA 92587	ETAVIRAGUZMAN18@GMAIL.COM	CELL	9513129905	Yes	Survey Complete
350284028 ROE Received	Not Started	23860 SIERRA DR, CANYON LAKE, CA 92587	MICHAEL GOLDEN ARM	42050 ZARBE LN MURRIETA CA 92562			Yes	5005019874 Active	MICHAELS GOLDEN ARM	23860 SIERRA DR CANYON LAKE CA 92587	laura@presidentialres.com	CELL	9513041234	Yes	Survey Complete
350284030 ROE Received	Not Started		JOSHUA EASTERLY	JOSHUA EASTERLY; PATRICIA EASTERLY	22971 LASSEN DR CANYON LAKE CA 92587		No	0 Vacant						No	Survey Complete
350285001 ROE Received	Not Started		JOSE A. MAYORAL	JOSE A. MAYORAL; JOSEFINA MAYORAL	19380 ELENA LN LAKE ELSINORE CA 92530		No	0 Vacant						No	Survey Complete
350285004 ROE Received	Not Started	23895 NEWPORT DR, CANYON LAKE, CA 92587	MIGUEL P. CONTRERAS	MIGUEL P. CONTRERAS; EMILIA D. PANAGUE	23815 NORMA DR QUAIL VALLEY CA 92587		Yes	500030199 Active	ERNESTO BAZABEZ	23895 NEWPORT DR CANYON LAKE CA 92587		HOME	9516393126	Yes	Survey Complete
350285016 ROE Received	Not Started	23976 WELLS PL, LAKE ELSINORE, CA 92530	MARIA ISABEL H CERVANTES	MARIA ISABEL H CERVANTES	23605 CYPRESS PL MENIFEE CA 92587	No	Yes	500051381 Active	MARIA ISABEL HERRERA CERVANTEZ	23976 WELLS PL LAKE ELSINORE CA 92530	ISACERVANTEZ2000@GMAIL.COM	CELL	9512384431	Yes	Survey Complete
350285017 ROE Received	Not Started	23966 WELLS PL, CANYON LAKE, CA 92587	GRANADOS ESPERANZA REVOCABLE TRUST	GRANADOS ESPERANZA REVOCABLE TRUST	26051 SIERRA SKY ST MENIFEE CA 92584			500023916 Active	MARIA MANCERA	23966 WELLS PL CANYON LAKE CA 92587	bjmancera3@gmail.com	CELL	9512936898	Yes	Survey Complete
350285018 ROE Received	Not Started	23956 WELLS PL, CANYON LAKE, CA 92587	CIRILO HERNANDEZ	CIRILO HERNANDEZ; LORRAINE DONA	23956 WELLS PL MENIFEE CA 92587			500032916 Active	LORRAINE DONA	23956 WELLS PL CANYON LAKE CA 92587	lorrainedona00@gmail.com	CELL	9515257175	Yes	Survey Complete
350285025 ROE Received	Not Started	23872 WELLS PL, CANYON LAKE, CA 92587	LUIS LOPEZ	LUIS LOPEZ	23872 WELLS PL QUAIL VALLEY CA 92587		Yes	500033150 Active	MARIA LOPEZ	23872 WELLS PL CANYON LAKE CA 92587	LALOPEZCT@YAHOO.COM	CELL	7604506198	Yes	Survey Complete
350285026 ROE Received	Not Started	28890 QUAIL PL, CANYON LAKE, CA 92587	LUIS FRANK SAENZ	LUIS FRANK SAENZ; VALERIE R. SAENZ	15607 GARD AVE NORWALK CA 90650		Yes	500105197 Active	JASON WALKER	28890 QUAIL PL CANYON LAKE CA 92587	JASONSWALKER7@GMAIL.COM	CELL	9513674770	Yes	Survey Complete
350285028 ROE Received	Not Started	23946 WELLS PL, CANYON LAKE, CA 92587	ANDREW NGUYEN	ANDREW NGUYEN; KATIE CAO	9611 PORT CLYDE DR HUNTINGTON BEACH CA 92646			0 Vacant						Yes	Survey Complete
350285029 ROE Received	Not Started	23926 WELLS PL, CANYON LAKE, CA 92587	ANDREW NGUYEN	ANDREW NGUYEN; KATIE CAO	9611 PORT CLYDE DR HUNTINGTON BEACH CA 92646		Yes	500125608 Active	ANDREW NGUYEN	23926 WELLS PL CANYON LAKE CA 92587	SUNLITECAPITAL@GMAIL.COM	CELL	3106780609	Yes	Survey Complete
351071001 ROE Received	Not Started	29160 Goetz Road, Canyon Lake, CA 92587	Bryan Geer			No	Yes	500254037 Active	KARMICHAELS CABINETRY INC	29160 GOETZ RD CANYON LAKE CA 92587	jp@karmichaels.com	HOME	9512440202	Yes	Survey Complete
350241025 ROE Received	Not Started		RUSSO 2019 REVOCABLE FAMILY TRUST DATED 6/27/2019	RUSSO 2019 REVOCABLE FAMILY TRUST DATED 6/27/2019; SALVATORE JOSEPH GERVASI; DOMENICO N. RUSSO; PAULA A. RUSSO	29829 LONGHORN DR CANYON LAKE CA 92587			0 Vacant							ROE Received
350101006 ROE Return To Sender	Not Started	23801 SAN JACINTO RD, CANYON LAKE, CA 92587	RAYMOND DELACRUZ	RAYMOND DELACRUZ	166 NIGHT HAWK DR GRAND JUNCTION CO 81503			5004724O7 Active	AZUCENA DE LA CRUZ	23801 SAN JACINTO RD CANYON LAKE CA 92587	azucena.delacruz42@gmail.com	CELL	9512647515		ROE Hung
350101027 Vacant Lot	Not Started		ARMANDO R. RAMIREZ	ARMANDO R. RAMIREZ; ISIDRO RAMIREZ	P O BOX 3605 QUAIL VALLEY CA 92587			0 Vacant							ROE Hung
350101062 Resend	Not Started	3136 GLADIOLA CT, LAKE ELSINORE CA 92532	ABRAHAM ABYADI	ABRAHAM ABYADI; MAI BUSHNAK	3136 GLADIOLA CT LAKE ELSINORE CA 92532			0 Vacant							ROE Hung
350101063 Pending	Not Started	23935 SAN JACINTO RD, CANYON LAKE, CA 92587	CARLOS C. MARTINEZ	CARLOS C. MARTINEZ; GUADALUPE C. MARTINEZ	20360 BRYANT ST WILDOMAR CA 92595			500030106 Active	CARLOS MARTINEZ	23935 SAN JACINTO RD CANYON LAKE CA 92587		HOME	9512454411		ROE Hung
350102028 Pending	Not Started	23979 LUCAS DR, CANYON LAKE, CA 92587	ALEXANDER BAKSA	ALEXANDER BAKSA; MANUELA MATTHESEN	23980 LUCAS DR CANYON LAKE CA 92587			0 Vacant							ROE Hung
350102029 Pending	Not Started	23980 LUCAS DR, CANYON LAKE, CA 92587	ALEXANDER BAKSA	ALEXANDER BAKSA; MANUELA MATTHESEN	23980 LUCAS DR MENIFEE CA 92587			500028966 Active	ALEXANDER BAKSA	23980 LUCAS DR CANYON LAKE CA 92587	don_bax2000@yahoo.de	CELL	7472205695		ROE Hung
350102035 Pending	Not Started	23920 LUCAS DR, CANYON LAKE, CA 92587	ANAHI TALAMANTE CAMPOS TANIA	ANAHI TALAMANTE CAMPOS TANIA	1584 W CANDLEWOOD AVE RIALTO CA 92377			500035388 Active	LACY LUJAN	23920 LUCAS DR CANYON LAKE CA 92587	LACYBOBITT87@GMAIL.COM	CELL	9514905829		ROE Hung
350102047 No Mailbox	Not Started	23800 LUCAS DR, CANYON LAKE, CA 92587	HINKLE FAMILY TRUST ESTABLISHED UNDER AGREEMENT DTD 03/25/15	HINKLE FAMILY TRUST ESTABLISHED UNDER AGREEMENT DTD 03/25/15; REBECCA L. HINKLE; ROBERT E. HINKLE	23800 LUCAS DR MENIFEE CA 92587			500548977 Active	ASHLEY CATHERS	23800 LUCAS DR CANYON LAKE CA 92587	ASHLEY.CATHERS09@GMAIL.COM	CELL	9518559847		ROE Hung
350102050 Pending	Not Started	23778 LUCAS DR, CANYON LAKE, CA 92587	LUCAS TRUST DTD 11/7/22	LUCAS TRUST DTD 11/7/22; HOME EXPO FINANCIAL INC	23580 ALESSANDRO BLVD # 9818 MORENO VALLEY CA 92552			500604137 Active	HOME EXPO FINANCIAL INC	23778 LUCAS DR CANYON LAKE CA 92587	homeexpofinancial@gmail.com	BUS	9514651986		ROE Hung
350103035 Pending	Not Started	23898 ELSINORE LN, CANYON LAKE, CA 92587	CLARK E. DAVIS	CLARK E. DAVIS	23898 ELSINORE LN QUAIL VALLEY CA 92587			0 Vacant							ROE Hung
350103038 No Mailbox	Not Started	23866 ELSINORE LN, CANYON LAKE, CA 92587	RUBEN RAMIREZ	RUBEN RAMIREZ; DONALD MARTIN; MARTHA A. RAMIREZ	P O BOX 3574 QUAIL VALLEY CA 92587			0 Vacant		23866 ELSINORE LN CANYON LAKE CA 92587					ROE Hung
350103056 Pending	Not Started	23781 LUCAS DR, CANYON LAKE, CA 92587	OSVALDO CIBRIAN	OSVALDO CIBRIAN	23781 LUCAS DR CANYON LAKE CA 92587			500029665 Active	GREGORIO CIBRIAN	23781 LUCAS DR CANYON LAKE CA 92587	GREGCIBRIAN@LIVE.COM	CELL	9515530309		ROE Hung
350111020 Pending	Not Started	23711 SAN JACINTO RD, CANYON LAKE, CA 92587	SHEILA LAMB	SHEILA LAMB	23711 SAN JACINTO RD SUN CITY CA 92587			500104860 Active	KRISTINA LEAP	23711 SAN JACINTO RD CANYON LAKE CA 92587	DYLAN123005@VERIZON.NET	HOME	9512442028		ROE Hung
350111026 Pending	Not Started	28281 JOHNSON LN, CANYON LAKE, CA 92587	ACOSTA KATHLEEN L REVOCABLE TRUST DTD 11/12/2019	ACOSTA KATHLEEN L REVOCABLE TRUST DTD 11/12/2019; KATHLEEN L. ACOSTA	PO BOX 3389 QUAIL VALLEY CA 92587			500086538 Active	KATHLEEN ACOSTA	28281 JOHNSON LN CANYON LAKE CA 92587		CELL	9517237289		ROE Hung
350111048 Pending	Not Started	23530 JOHNSON LN, CANYON LAKE, CA 92587	MARGARITA TERESA MALDONADO	MARGARITA TERESA MALDONADO	23530 JOHNSON LN SUN CITY CA 92587			500084493 Active	EMERIK VARGAS	23530 JOHNSON LN CANYON LAKE CA 92587	emerikvargas52@gmail.com	HOME	9513407753		ROE Hung
350111054 Pending	Not Started	23680 JOHNSON LN, CANYON LAKE, CA 92587	SEAN LYNCH	SEAN LYNCH	23680 JOHNSON LN CANYON LAKE CA 92587			500053248 Active	SEAN LYNCH	23680 JOHNSON LN CANYON LAKE CA 92587	S.P.LYNCH03@GMAIL.COM	CELL	9514220669		ROE Hung
350112013 Pending	Not Started		MEZEI XENO A 2019 TRUST DATED 2/21/2019	MEZEI XENO A 2019 TRUST DATED 2/21/2019; XENO A. MEZEI	1059 CANNON RD RIVERSIDE CA 92506			0 Vacant							ROE Hung
350112031 Pending	Not Started		ANTHONY DIBERNARDO	ANTHONY DIBERNARDO	27735 JEFFERSON AVE RIVERSIDE CA 92505			0 Vacant							ROE Hung
350112035 Pending	Not Started	23654 LUCAS DR, CANYON LAKE, CA 92587	JOEL GARCIA	JOEL GARCIA	23654 LUCAS DR SUN CITY CA 92587			500025632 Active	JOEL GARCIA	23654 LUCAS DR CANYON LAKE CA 92587		CELL	9512854082		ROE Hung
350112055 Pending	Not Started		MEZEI XENO A 2019 TRUST DATED 2/21/2019	MEZEI XENO A 2019 TRUST DATED 2/21/2019; XENO A. MEZEI	1059 CANNON RD RIVERSIDE CA 92506			0 Vacant							ROE Hung
350112056 Pending	Not Started	23635 JOHNSON LN, CANYON LAKE, CA 92587	MEZEI XENO A 2019 TRUST DATED 2/21/2019	MEZEI XENO A 2019 TRUST DATED 2/21/2019; XENO A. MEZEI	1059 CANNON RD RIVERSIDE CA 92506			500036895 Active	JOHN MEZEI	23635 JOHNSON LN CANYON LAKE CA 92587		HOME	9512442185		ROE Hung
350113010 Pending	Not Started	23593 LUCAS DR, CANYON LAKE, CA 92587	JEANIE E. BLONDI	JEANIE E. BLONDI	P O BOX 3365 QUAIL VALLEY CA 92587			500019269 Active	JEANIE BIONDI	23593 LUCAS DR CANYON LAKE CA 92587		HOME	9512445561		ROE Hung
350113020 Pending	Not Started		ROSA E. ROSALES	ROSA E. ROSALES	23711 LUCAS DR QUAIL VALLEY CA 92587			0 Vacant							ROE Hung
350113021 Pending	Not Started	23711 LUCAS DR, CANYON LAKE, CA 92587	ROSA E. ROSALES	ROSA E. ROSALES; ELIA ROSALES	23711 LUCAS DR SUN CITY CA 92587			500033110 Active	ROSA ROSALES	23711 LUCAS DR CANYON LAKE CA 92587	rosarosales80@icloud.com	HOME	9513496202		ROE Hung
350113022 Pending	Not Started	23721 LUCAS DR, CANYON LAKE, CA 92587	JESSIE CHRISTOPHER SWIHART	JESSIE CHRISTOPHER SWIHART	23721 LUCAS DR QUAIL VALLEY CA 92587			500019704 Active	JESSE SWIHART	23721 LUCAS DR CANYON LAKE CA 92587		CELL	9512399517		ROE Hung
350113025 Pending	Not Started	23747 LUCAS DR, CANYON LAKE, CA 92587	ANDREW P. MURRY	ANDREW P. MURRY; ZANT DANIELLE VAN	23747 LUCAS DR CANYON LAKE CA 92587			500027702 Active	DANIELLE MURRY	23747 LUCAS DR CANYON LAKE CA 92587	danielleavanzant@gmail.com	HOME	323895297		ROE Hung
350113034 Pending	Not Started	23672 ELSINORE LN, CANYON LAKE, CA 92587	TONY K. RENTERIA	TONY K. RENTERIA; JOSEPH RENTERIA	23672 ELSINORE LN CANYON LAKE CA 92587			500040217 Active	TONY RENTERIA	23672 ELSINORE LN CANYON LAKE CA 92587	TONYRENTERIA338@YAHOO.COM	CELL	9493741237		ROE Hung
350113036 Pending	Not Started	23652 ELSINORE LN, CANYON LAKE, CA 92587	GUILLERMINA DELACRUZ	GUILLERMINA DELACRUZ; FRANCISCO LOZADA	23652 ELSINORE LN SUN CITY CA 92587			500029887 Active	GUILLERMINA DE LA CRUZ	23652 ELSINORE LN CANYON LAKE CA 92587	guillecotto625@gmail.com	CELL	9514301860		ROE Hung
350113046 Pending	Not Started	23550 ELSINORE LN, CANYON LAKE, CA 92587	RICARDO DAMIAN OSEGUERA	RICARDO DAMIAN OSEGUERA	23550 ELSINORE LN SUN CITY CA 92587			500059773 Active	RICARDO DAMIAN	23550 ELSINORE LN CANYON LAKE CA 92587	DEMIANRK@GMAIL.COM	CELL	9518377787		ROE Hung
350113048 ROE Return To Sender	Not Started	23530 ELSINORE LN, CANYON LAKE, CA 92587	CATALINA ROSALES	CATALINA ROSALES; MORGAN ROSALES GOMEZ	23530 ELSINORE LN SUN CITY CA 92587			500302023 Active	CATALINA GOMEZ DE ROSALES	23530 ELSINORE LN CANYON LAKE CA 92587		CELL	5595568401		ROE Hung
350113052 Pending	Not Started	23728 ELSINORE LN, CANYON LAKE, CA 92587	LUIS VELASQUEZ	LUIS VELASQUEZ	23728 ELSINORE LN SUN CITY CA 92587			500068987 Active	JACQUELINE BOTELLO	23728 ELSINORE LN CANYON LAKE CA 92587		HOME	9517463110		ROE Hung
350191002 Pending	Not Started		NOE VARGAS	NOE VARGAS; CLARA VARGAS	23511 ELSINORE LN CANYON LAKE CA 92587			0 Vacant							ROE Hung
350191054 Pending	Not Started	23713 ELSINORE LN, CANYON LAKE, CA 92587	HARRY A. WIEDENHAUPT	HARRY A. WIEDENHAUPT	23713 ELSINORE LN SUN CITY CA 92587			500074642 Active	HARRY WIEDENHAUPT	23713 ELSINORE LN CANYON LAKE CA 92587	ravi.eber@gmail.com	HOME	6195594419		ROE Hung
350192010 Pending	Not Started		HENDERSON HENRY HODGENS	HENDERSON HENRY HODGENS; JAMESETTA HODGENS	23608 MT VERNON PL CANYON LAKE CA 92587			0 Vacant							ROE Hung
350192012 Pending	Not Started		HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRUST DATED 12/10/	HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRUST DATED 12/10/; HENDERSON HENRY HODGENS; JAMESETTA HODGENS	23608 MT VERNON PL CANYON LAKE CA 92587			0 Vacant							ROE Hung
350192023 Pending	Not Started		OLAIZ I DANIEL FAMILY TRUST DATED 4/6/2007	OLAIZ I DANIEL FAMILY TRUST DATED 4/6/2007; SARAH D. CONTRERAS	102 SUPERIOR IRVINE CA 92620			0 Vacant							ROE Hung
350192036 Resend	Not Started	23660 MT VERNON PL, CANYON LAKE, CA 92587	MICHAEL CASARES	MICHAEL CASARES	23660 MOUNT VERMON PL MENIFEE CA 92587		Yes	0 Vacant		23660 MT VERNON PL CANYON LAKE CA 92587		951 535-1028 Victor	Unconfirmed	ROE Hung	
350192056 Pending	Not Started	23608 MT VERNON PL, CANYON LAKE, CA 92587	HENDERSON HENRY HODGENS	HENDERSON HENRY HODGENS; JAMESETTA HODGENS	23608 MT VERNON PL CANYON LAKE CA 92587			500102707 Active	PRECIOUS STEWART	23608 MT VERNON PL CANYON LAKE CA 92587	PS383@LIVE.COM	CELL	9513477518		ROE Hung
350193009 No Mailbox	Not Started	23581 MOUNT VERNON PL, CANYON LAKE, CA 92587	MIGUEL ANGEL RODRIGUEZ	MIGUEL ANGEL RODRIGUEZ; DEBORAH RODRIGUEZ	23581 MT VERNON PL QUAIL VALLEY CA 92587			500156361 Active	MIGUEL A RODRIGUEZ	23581 MOUNT VERNON PL CANYON LAKE CA 92587	QUASHORTB7@GMAIL.COM	CELL	9515506023		ROE Hung
350193047 Pending	Not Started	23570 GOETZ RD, CANYON LAKE, CA 92587	WITSANU PLEANGSORN	WITSANU PLEANGSORN; SYLVIA A. PLEANGSORN	23570 GOETZ RD SUN CITY CA 92587			500017932 Active	SYLVIA PLEANGSORN	23570 GOETZ RD CANYON LAKE CA 92587	MISS_SYLVIA07@YAHOO.COM	CELL	3238399235		ROE Hung
350201031 Pending	Not Started	23960 LUCAS DR, CANYON LAKE, CA 92587	ABRAHAM BENJAMIN FOLMAN	ABRAHAM BENJAMIN FOLMAN; MARLENE JOYCE FOLMAN	27839 RUGGE RD SUN CITY CA 92585			500592117 Active	ERIC BROWN	23960 LUCAS DR CANYON LAKE CA 92587	ericmbrown1122@gmail.com	CELL	6193409251		ROE Hung
350201035 No Mailbox	Not Started	23922 LUKE DR, CANYON LAKE, CA 92587	PABLO MONTALVO	PABLO MONTALVO; MIRIAM MONTALVO	1860 MURRIETA RD PERRIS CA 92571			0 Vacant		23922 LAKE DR CANYON LAKE CA 92587					ROE Hung
350201060 Pending	Not Started	23829 ELSINORE LN, CANYON LAKE, CA 92587	JANET CLEMMONS	JANET CLEMMONS; ZYVOGHN PEREZ	23829 ELSINORE LN CANYON LAKE CA 92587			500039379 Active	ZYVOGHN PEREZ	23829 ELSINORE LN CANYON LAKE CA 92587	ZYVOGHNPEREZ@YAHOO.COM	CELL	6619170191		ROE Hung
350202019 Pending	Not Started	23935 LAKE DR, CANYON LAKE, CA 92587	DC SYNDICATIONS	DC SYNDICATIONS	3633 WILLOWCREST AVE STUDIO CITY CA 91604			500133395 Active	DOMINIC ANDREWS	23935 LAKE DR CANYON LAKE CA 92587	TAMARAANDREWS96@GMAIL.COM	CELL	9514252926		ROE Hung
350203032 Pending	Not Started	23948 MT VERNON PL, CANYON LAKE, CA 92587	ELIAS RODRIGUEZ	ELIAS RODRIGUEZ; GRISELDA RODRIGUEZ	23374 BADGER CREEK QUAIL VALLEY CA 92587			500153237 Active	ELIAS RODRIGUEZ	23948 MT VERNON PL CANYON LAKE CA 92587	ANGELRUBIO@GMAIL.COM	HOME	9512443950		ROE Hung
350202052 Pending	Not Started	23762 MT VERNON PL, CANYON LAKE, CA 92587	DANIEL LOPEZ	DANIEL LOPEZ; JESSICA MCCRAW	23762 MT VERNON PL SUN CITY CA 92587			500019602 Active	JESSICA MCCRAW	23762 MT VERNON PL CANYON LAKE CA 92587	DANLOPEZ49@YAHOO.COM	CELL	9513553388		ROE Hung
350202055 No Mailbox	Not Started	23780 MOUNT VERNON PL, CANYON LAKE, CA 92587	CLAUDIA HERNANDEZ	CLAUDIA HERNANDEZ	23780 MOUNT VERNON PL CANYON LAKE CA 92587			500567317 Active	JOSE NUNEZ	23780 MOUNT VERNON PL CANYON LAKE CA 92587	DELACRUZ.MARI78@YAHOO.COM	CELL	9514170795		ROE Hung

350203010 Pending	Not Started	23849 MOUNT VERNON PL, CANYON LAKE, CA 92587	HIPOLITO FELIX	HIPOLITO FELIX; EVA FELIX	23849 MOUNT VERNON PL QUAIL VALLEY CA 92587			500035694 Active	EVA C FELIX	23849 MOUNT VERNON PL CANYON LAKE CA 92587		CELL	9095280244		ROE Hung
350203012 Pending	Not Started	23946 GOETZ DR, CANYON LAKE, CA 92587	MILLER FAMILY LIVING TRUST [GARY L. BAKER]	MILLER FAMILY LIVING TRUST [GARY L. BAKER; CATHERINE BAKER]	619 TURNBERRY TERRACE RIO VISTA CA 94571			500433257 Active	TERA MILLER	23946 GOETZ DR CANYON LAKE CA 92587	TERAMILLER5@GMAIL.COM	CELL	7143434072		ROE Hung
350203033 No Mailbox	Not Started	23936 GOETZ RD, CANYON LAKE, CA 92587	TOMAS VASQUEZ	TOMAS VASQUEZ	23936 GOETZ RD SUN CITY CA 92587			500028857 Active	TOMAS VASQUEZ	23936 GOETZ RD CANYON LAKE CA 92587	VASQUEZ_TOMAS123@YAHOO.COM	CELL	9513852468		ROE Hung
350203051 Vacant Lot	Not Started		JUVENTINO VERDUZCO	JUVENTINO VERDUZCO	23760 GOETZ DR CANYON LAKE CA 92587	No		0 Vacant							ROE Hung
350203059 Pending	Not Started		BUCIO FAMILY LIVING TRUST	BUCIO FAMILY LIVING TRUST; ERANDENI BUCIO CISNEROS	1815 E 6TH ST LONG BEACH CA 90802			0 Vacant							ROE Hung
350203062 Pending	Not Started	23995 MT VERNON PL, CANYON LAKE, CA 92587	YING CHEN	YING CHEN; ATANACIO LUNA	2312 SUNRISE MEADOWS DR LAS VEGAS NV 89134			500030395 Active	ATANACIO LUNA	23995 MT VERNON PL CANYON LAKE CA 92587	BILLING@EWMD.ORG	CELL	9098437424		ROE Hung
350211035 Pending	Not Started	23765 GOETZ DR, CANYON LAKE, CA 92587	KEVIN LOPEZ	KEVIN LOPEZ; LIBRADA PRADO	23765 GOETZ DR CANYON LAKE CA 92587			500063565 Active	KEVIN LOPEZ	23765 GOETZ DR CANYON LAKE CA 92587	KEVIN.LOPEZ.ROBLES@GMAIL.COM	CELL	3234857833		ROE Hung
350212013 Pending	Not Started	23843 KENNEDY LN, CANYON LAKE, CA 92587	JOSE M. SILVA	JOSE M. SILVA; MARISOL CELAYA	23843 KENNEDY LN MENIFEE CA 92587			500038265 Active	MARISOL CELAYA	23843 KENNEDY LN CANYON LAKE CA 92587	MARISB6658LVA@GMAIL.COM	CELL	7606812139		ROE Hung
350212020 Pending	Not Started	23790 SHREEDER PL, CANYON LAKE, CA 92587	EDGAR A. RAMIREZ	EDGAR A. RAMIREZ; MARICELA BALBUENA	P O BOX 3593 SUN CITY CA 92587			500036069 Active	EDGAR ARMANDO RAMIREZ	23790 SHREEDER PL CANYON LAKE CA 92587	MARICELA_BALBUENA@YAHOO.COM	CELL	9519416774		ROE Hung
350212021 Pending	Not Started	23780 SHREEDER PL, CANYON LAKE, CA 92587	EXAEL L. CUENCA	EXAEL L. CUENCA; JULISSA CUENCA	23780 SHREEDER PL SUN CITY CA 92587			500028344 Active	EXAEL CUENCA	23780 SHREEDER PL CANYON LAKE CA 92587		HOME	9512462165		ROE Hung
350212024 Vacant Lot	Not Started		JOHNNY BARAJAS	JOHNNY BARAJAS	23736 SHREEDER PL MENIFEE CA 92587			0 Vacant							ROE Hung
350213002 Pending	Not Started		THOMAS WILLIAM MICHAEL THIRD PARTY SUPPLEMENTAL NEEDS TRUST	THOMAS WILLIAM MICHAEL THIRD PARTY SUPPLEMENTAL NEEDS TRUST; JOSHUA JOHN THOMAS	8895 MOVIE RIVER RD BONNERS FERRY ID 83805			0 Vacant							ROE Hung
350214016 Pending	Not Started	28541 WILLIAMS DR, CANYON LAKE, CA 92587	OMAR ZARAK MEDINA	OMAR ZARAK MEDINA	28541 WILLIAMS DR CANYON LAKE CA 92587			500156540 Active	MARIA MEDINA	28541 WILLIAMS DR CANYON LAKE CA 92587	mariamedina673@gmail.com	CELL	9512104290		ROE Hung
350214047 Pending	Not Started	23890 LA BERTHA LN, CANYON LAKE, CA 92587	BOYS & GIRLS CLUB OF MENIFEE VALLEY	BOYS & GIRLS CLUB OF MENIFEE VALLEY	PO BOX 2423 MENIFEE CA 92584			500002203 Active	BOYS & GIRLS CLUB OF MENIFEE V	23890 LA BERTHA LN CANYON LAKE CA 92587	JOHNW@MENIFEEBGC.ORG	HOME	9512468845		ROE Hung
350221028 Pending	Not Started	23718 KENNEDY LN, CANYON LAKE, CA 92587	ADELA VELASCO	ADELA VELASCO	P O BOX 3238 QUAIL VALLEY CA 92587			500156905 Active	ADELA VELASCO	23718 KENNEDY LN CANYON LAKE CA 92587		CELL	7608052369		ROE Hung
350221039 Pending	Not Started	23630 KENNEDY LN, CANYON LAKE, CA 92587	ELIAS CAMPOS GUZMAN	ELIAS CAMPOS GUZMAN; MARIA S. CAMPOS	23630 KENNEDY LN SUN CITY CA 92587			500159208 Active	MARIA CAMPOS	23630 KENNEDY LN CANYON LAKE CA 92587	campojessica28@gmail.com	HOME	9514967342		ROE Hung
350221062 Pending	Not Started		RAFAEL JIMENEZ	RAFAEL JIMENEZ; JOSEFINA LOPEZ	P O BOX 3062 MENIFEE CA 92587			0 Vacant							ROE Hung
350222007 Pending	Not Started		GUADALUPE GARCIA	GUADALUPE GARCIA	27150 SHADEL RD # B3 SUN CITY CA 92586			0 Vacant							ROE Hung
350222011 Pending	Not Started	23607 KENNEDY LN, CANYON LAKE, CA 92587	LIANA POMILIA-MACIAS	LIANA POMILIA-MACIAS	23607

350262041 Pending	Not Started	23616 CYPRESS PL, CANYON LAKE, CA 92587	MAHMOOD HATAMABAD	MAHMOOD HATAMABAD; MAHSHID PEDARI			26852 VENADO DR MISSION VIEJO CA 92691		500032297 Active	ANDREW WILLIAMS	23616 CYPRESS PL CANYON LAKE CA 92587	ANDAYWUH@GMAIL.COM	CELL	9517606901	ROE Hung
350262047 Pending	Not Started	23556 CYPRESS PL, CANYON LAKE, CA 92587	EDUARDO GARCIA PIEDRA	EDUARDO GARCIA PIEDRA			23556 CYPRESS PL CANYON LAKE CA 92587		500022869 Active	SANDRA JESSICA HERRERA	23556 CYPRESS PL CANYON LAKE CA 92587	SANDRAHERERA107@ICLOUD.COM	CELL	9512938070	ROE Hung
350262054 Pending	Not Started	23731 NORMA DR, CANYON LAKE, CA 92587	GERD GLOCKZIN	GERD GLOCKZIN; LOURDES URIBE DEGLOCKZIN			23731 NORMA DR SUN CITY CA 92587		500015730 Active	SERGIO VIDES	23731 NORMA DR CANYON LAKE CA 92587	VIDES_SERGIO@YAHOO.COM	CELL	9517460926	ROE Hung
350263017 Pending	Not Started	23675 CYPRESS PL, CANYON LAKE, CA 92587	KEVIN URZUA	KEVIN URZUA; YOLANDA MURILLO			23675 CYPRESS PL CANYON LAKE CA 92587		500021153 Active	YOLANDA MURILLO	23675 CYPRESS PL CANYON LAKE CA 92587	YMURILLO90@YAHOO.COM	CELL	9515322418	ROE Hung
350282007 Pending	Not Started	23846 SIERRA DR, CANYON LAKE, CA 92587	GARFIELD LEWIS	GARFIELD LEWIS; WILLIAM HOWARD; ERIK G. LARSEN; CARLOS VELASQUEZ			23846 SIERRA DR QUAIL VALLEY CA 92587		500039406 Active	ERIC LARSEN	23846 SIERRA DR CANYON LAKE CA 92587	RUSTYBW1@GMAIL.COM	CELL	9516236120	ROE Hung
350282008 Pending	Not Started	23840 SIERRA DR, CANYON LAKE, CA 92587	JOSE P. MIRANDA	JOSE P. MIRANDA; IRMA MIRANDA			23840 SIERRA DR SUN CITY CA 92587		500067995 Active	IRMA MIRANDA	23840 SIERRA DR CANYON LAKE CA 92587	IRMASMIRANDA@YAHOO.COM			ROE Hung
350282010 Vacant Lot	Not Started		DIANE BERRY SCHWIND	DIANE BERRY SCHWIND			23818 SIERRA DR CANYON LAKE CA 92587		0 Vacant						ROE Hung
350284023 Pending	Not Started	23894 SIERRA DR, CANYON LAKE, CA 92587	SKYE WILLIAMNA WALTERS	SKYE WILLIAMNA WALTERS; MICHAEL WALTERS			23894 SIERRA DR CANYON LAKE CA 92587		500025245 Active	SKYE WALTERS	23894 SIERRA DR CANYON LAKE CA 92587	WALTERSJOINTS@GMAIL.COM	CELL	9514238737	ROE Hung
350285010 Pending	Not Started	23971 NEWPORT DR, CANYON LAKE, CA 92587	MICHAEL A. SERNA	MICHAEL A. SERNA; HEATHER A. CUDDY			24321 S CANYON DR MENIFEE CA 92587		500588767 Active	MIGUEL MACIAS	23971 NEWPORT DR CANYON LAKE CA 92587	MIGUEL.DBSCOURT@PROTONMAIL.COM	CELL	9514075532	ROE Hung
350285015 No Mailbox	Not Started	23986 WELLS PL, LAKE ELSINORE, CA 92530	ANTHONY FRANK ESCALANTE	ANTHONY FRANK ESCALANTE; HECTOR GAVIER CARDENAS			23986 WELLS PL LAKE ELSINORE CA 92530		500051380 Active	ANTHONY ESCALANTE	23986 WELLS PL LAKE ELSINORE CA 92530	ANTHONY.ESCALANTE89@GMAIL.COM	CELL	9514177965	ROE Hung
350285023 Pending	Not Started	23896 WELLS PL, CANYON LAKE, CA 92587	YOLANDA A. MOSRI	YOLANDA A. MOSRI			23896 WELLS PL SUN CITY CA 92587		500599317 Active	CARLOS LUGO	23896 WELLS PL CANYON LAKE CA 92587	carlosfb.27@hotmail.com	CELL	9515816405	ROE Hung
350213022 ROE Received	Not Started	23772 LA BERTHA LN, CANYON LAKE, CA 92587	AMANDA TUCKER	AMANDA TUCKER; JACQUELINE TUCKER		Yes	23772 LA BERTHA LN SUN CITY CA 92587	Yes	500054282 Active	JACQUELINE TUCKER	23772 LA BERTHA LN CANYON LAKE CA 92587		CELL	9513866847 Yes	Pothole Complete
350214002 ROE Received	Not Started	23877 GOETZ DR, CANYON LAKE, CA 92587	GERD GLOCKZIN	GERD GLOCKZIN; LOURDES C. URIBEDEGLOCKZIN		Yes	28771 BELMONT CT MENIFEE CA 92586		500341977 Active	TIMOTHY SILVA SILVA	23877 GOETZ DR CANYON LAKE CA 92587	ivansilva.ts@gmail.com	HOME	9514348107 Yes	Pothole Complete
350251031 ROE Received	Not Started	23766 NORMA DR	JAMES K. HALEY	JAMES K. HALEY; KATHY J. HALEY	No	Yes	31477 LITTLE RIER PL MENIFEE CA 92584		0 Vacant					Yes	Pothole Complete
350263002 ROE Received	Not Started	23515 CYPRESS ST, CANYON LAKE, CA 92587	EFRAIN CAMACHO CONTRERAS	EFRAIN CAMACHO CONTRERAS; ROSA RAMIREZ			23515 CYPRES ST QUAIL VALLEY CA 92587		500042413 Active	EFRAIN CAMACHO	23515 CYPRESS ST CANYON LAKE CA 92587	MARILYNN.CAMACHO@GMAIL.COM	CELL	9512655220 Yes	Pothole Complete
350101017 Pending	Not Started	20360 BRYANT ST, WILDOMAR, CA 92595	CARLOS C. MARTINEZ	CARLOS C. MARTINEZ; GUADALUPE C. MARTINEZ			20360 BRYANT ST WILDOMAR CA 92595		0 Vacant						No Information
350111005 Pending	Not Started		ROBERTO S. RAMIREZ	ROBERTO S. RAMIREZ			672 GOLDENROD ST HEMET CA 92545		0 Vacant						No Information
350111025 Pending	Not Started		SALVADOR BARBA	SALVADOR BARBA			10461 DIANE AVE BUENA PARK CA 90620	No	0 Vacant					No	No Information
350111030 Pending	Not Started		POWERS SUZANNE P REVOCABLE TRUST DATED 5/7/1992	POWERS SUZANNE P REVOCABLE TRUST DATED 5/7/1992; SUZANNE P. POWERS			25290 FOREST WOOD CIR MENIFEE CA 92584	No	0 Vacant					No	No Information
350111031 No Mailbox	Not Started	23710 JOHNSON LN, MENIFEE, CA 92586	SUZANNE P. POWERS	SUZANNE P. POWERS			25290 FORWEST WOOD CIR MENIFEE CA 92584		500526527 Active	TERRANCE CLAY	23710 JOHNSON LN MENIFEE CA 92586	BIGBIZZLE300@GMAIL.COM	CELL	9097146054	No Information
350112005 Pending	Not Started	23543 JOHNSON LN, CANYON LAKE, CA 92587	DAVID J. HAMERNIK	DAVID J. HAMERNIK			23557 JOHNSON LN QUAIL VALLEY CA 92587		0 Vacant		23543 JOHNSON LN CANYON LAKE CA 92587				No Information
350113004 Pending	Not Started		CATALINA ROSALES	CATALINA ROSALES; MORGAN ROSALES-GOMEZ			2350 ELSINORE LN QUAIL VALLEY CA 92587		0 Vacant						No Information
350113024 Pending	Not Started		RENE AVALA ACOSTA	RENE AVALA ACOSTA; EVA ACOSTA			1535 NAPOLI WAY SAN JACINTO CA 92583		0 Vacant						No Information
350113050 Vacant Lot	Not Started		CIRILO MELQUIADES RAMIREZ	CIRILO MELQUIADES RAMIREZ; ADELA GARIBAY			20162 MOUNTAIN AVE PERRIS CA 92570	No	0 Vacant						No Information
350191012 Pending	Not Started		CESAR ALCANTAR	CESAR ALCANTAR; SYLVIA ALCANTAR			27878 GREENWALD AVE PERRIS CA 92570	No	0 Vacant					No	No Information
350191042 Pending	Not Started		HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRUST DATED 12/10/	HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRUST DATED 12/10/; HENDERSON HENRY HODGENS; JAMESETTA HODGENS			23608 MT VERNON PL CANYON LAKE CA 92587		0 Vacant						No Information
350191056 Pending	Not Started		OLAIZ J DANIEL FAMILY TRUST DATED 4/6/2007	OLAIZ J DANIEL FAMILY TRUST DATED 4/6/2007; JOE DANIEL OLAIZ			102 SUPERIOR IRVINE CA 92620	No	0 Vacant						No Information
350192040 Pending	Not Started		HENDERSON HENRY HODGENS	HENDERSON HENRY HODGENS; JAMESETTA HODGENS			23608 MT VERNON PL CANYON LAKE CA 92587		0 Vacant						No Information
350201002 Vacant Lot	Not Started		RICHARD MELROSE	RICHARD MELROSE; SANDRA MELROSE			P O BOX 3068 CANYON LAKE CA 92587		0 Vacant						No Information
350202038 ROE Return To Sender	Not Started		NICOLO GOBBI	NICOLO GOBBI			1732 N HARVARD BLVD UNIT 208 LOS ANGELES CA 90027	No	0 Vacant					No	No Information
350203019 Pending	Not Started	23919 MT VERNON PL, CANYON LAKE, CA 92587	JOSUE BETTS	JOSUE BETTS; DAVID RODRIGUEZ			23926 GOETZ DR CANYON LAKE CA 92587		0 Vacant		23919 MT VERNON PL CANYON LAKE CA 92587				No Information
350203027 Pending	Not Started	23998 GOETZ DR, CANYON LAKE, CA 92587	EXAEL CUENCA LOPEZ	EXAEL CUENCA LOPEZ			P O BOX 3247 QUAIL VALLEY CA 92587		500157239 Active	JULISSA CUENCAS	23998 GOETZ DR CANYON LAKE CA 92587		HOME	9512462165	No Information
350213015 Pending	Not Started		ANGELA SOTO	ANGELA SOTO			23842 LA BERTHA LN MENIFEE CA 92587		0 Vacant						No Information
350213027 Pending	Not Started	23810 LA BERTHA LN, CANYON LAKE, CA 92587	EXAEL CUENCA LOPEZ	EXAEL CUENCA LOPEZ			23780 SHREEDER PL QUAIL VALLEY CA 92587		500125702 Active	EXAEL CUENCA	23810 LA BERTHA LN CANYON LAKE CA 92587		HOME	9512462165	No Information
350222014 Pending	Not Started		JAVIER MONTIEL	JAVIER MONTIEL; LUCIA CHAVEZ		No	41171 POCO VIA TEMECULA CA 92591		0 Vacant					No	No Information
350222054 Pending	Not Started	23643 KENNEDY LN, CANYON LAKE, CA 92587	HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRUST DATED 12/10/	HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRUST DATED 12/10/; HENDERSON HENRY HODGENS; JAMESETTA HODGENS			23608 MT VERNON PL CANYON LAKE CA 92587		500019937 Active	LOU MOORE	23643 KENNEDY LN CANYON LAKE CA 92587	MALIAKA69@GMAIL.COM	CELL	9513343472	No Information
350231019 Resend	Not Started		CELIA PEREZ	CELIA PEREZ; FRANCISCO MENDEZ			23664 LA BERTHA LN MENIFEE CA 92587		0 Vacant						No Information
350213008 Pending	Not Started		SCOTT BURHANS	SCOTT BURHANS			23561 CIARA PL CANYON LAKE CA 92587		0 Vacant						No Information
350233013 Pending	Not Started		DANIEL REYES	DANIEL REYES			23591 CLARA PL MENIFEE CA 92587		500040193 Active	DANIEL REYES		SHELBYABRAM21@GMAIL.COM	CELL	9517468512	No Information
350243008 Pending	Not Started		ELDEAN N. HARTER	ELDEAN N. HARTER			23791 CIARA PL QUAIL VALLEY CA 92587		0 Vacant						No Information
350251012 Pending	Not Started	23841 LODGE DR, CANYON LAKE, CA 92587	ZAMORA JUANA ROSALES	ZAMORA JUANA ROSALES			23841 LODGE DR MENIFEE CA 92587		500031580 Active	LETICIA SANTILLAN	23841 LODGE DR CANYON LAKE CA 92587		CELL	9513225564	No Information
350251013 Pending	Not Started	23845 LODGE DR, CANYON LAKE, CA 92587	JESUS ESCOBEDO	JESUS ESCOBEDO; SOFIA ESCOBEDO			23845 LODGE DR QUAIL VALLEY CA 92587		500125734 Active	PERLA C CRUZ	23845 LODGE DR CANYON LAKE CA 92587	PERLACRUZ0209@GMAIL.COM	CELL	7604888632	No Information
350253015 Pending	Not Started		JUAN GOMEZ GOMEZ	JUAN GOMEZ GOMEZ; LESLIE AGUILAR			28863 QUAIL PL CANYON LAKE CA 92587		0 Vacant						No Information
350253011 Pending	Not Started		FREDERIC P. HAYES	FREDERIC P. HAYES; MARIJO D. HAYES			23651 CIARA PL QUAIL VALLEY CA 92587		0 Vacant						No Information
350254010 Pending	Not Started	23969 CYPRESS PL, CANYON LAKE, CA 92587	DANIEL S. NACE	DANIEL S. NACE			32295 MISSION TR NO B-341 LAKE ELSINORE CA 92530		500026426 Active	JOHN SMISEK	23969 CYPRESS PL CANYON LAKE CA 92587	JOHNSMISEK2016@GMAIL.COM	CELL	9098211041	No Information
350254011 Pending	Not Started	23977 CYPRESS PL, CANYON LAKE, CA 92587	MANUEL MENDOZA	MANUEL MENDOZA			23977 CYPRESS PL CANYON LAKE CA 92587		500032716 Active	BÉRENICE NAVARRO	23977 CYPRESS PL CANYON LAKE CA 92587	BERENICENB7@YAHOO.COM	CELL	9514238910	No Information
350261035 Pending	Not Started	23676 NORMA DR, CANYON LAKE, CA 92587	HECTOR ROMO	HECTOR ROMO; BERTHA HERNANDEZ; ROSELIA ROMO; JESUS HERNANDEZ FERNANDEZ			23684 NORMA DR CANYON LAKE CA 92587		0 Vacant		23676 NORMA DR CANYON LAKE CA 92587				No Information
350285021 Pending	Not Started		ANDREW D. NGUYEN	ANDREW D. NGUYEN; KATIE T. CAO			9611 PORT CLYDE RD HUNTINGTN BCH CA 92646		0 Vacant						No Information
350112002 ROE Received	Not Started	23519 JOHNSON LN, CANYON LAKE, CA 92587	DONALD L. GARRETT	DONALD L. GARRETT; JAY MALAENGPHOOTHONG		No	23819 JOHNSON LN MENIFEE CA 92587		500068603 Active	JAY MALAENGPHOOTHONG	23519 JOHNSON LN CANYON LAKE CA 92587	JMALAENGPHOOTHONG@GMAIL.COM	HOME	7608844028	Door Hanger Hung
350203045 ROE Received	Not Started	23828 MT VERNON PL, CANYON LAKE, CA 92587	MARY A. MILLEA	MARY A. MILLEA			1520 TORRANCE BLVD REDONDO BEACH CA 90501		500054452 Active	DEREK R RAYNER	23828 MT VERNON PL CANYON LAKE CA 92587	DRAYNER487@GMAIL.COM	CELL	9517230505	Door Hanger Hung
350241024 ROE Received	Not Started	23760 CASSANDRA DR, CANYON LAKE, CA 92587	RUSSO 2019 REVOCABLE FAMILY TRUST DATED 6/27/2019	RUSSO 2019 REVOCABLE FAMILY TRUST DATED 6/27/2019; SALVATORE JOSEPH GERVASI; DOMENICO N. RUSSO; PAULA A. RUSSO			29829 LONGHORN DR CANYON LAKE CA 92587		500115520 Active	STEPHANIE MARROQUIN	23760 CASSANDRA DR CANYON LAKE CA 92587	SSCURTIN99@GMAIL.COM	CELL	9512599141	Door Hanger Hung
350242017 ROE Received	Not Started	23820 CLARA PL, CANYON LAKE, CA 92587	J RAMON ROBLES	J RAMON ROBLES			23850 VISTA WAY CANYON LAKE CA 92587		500000500 Active	RAMON ROBLES	23820 CLARA PL CANYON LAKE CA 92587	AGARDINEROFACILS8810@GMAIL.COM	CELL	9517220370	Door Hanger Hung
350102048 ROE Received	Not Started	23790 LUCAS DR, CANYON LAKE, CA 92587	EMIGDIO APARICIO	EMIGDIO APARICIO		No	PO BOX 3147 QUAIL VALLEY CA 92587	Yes	500021683 Active	EMIGDIO APARICIO	23790 LUCAS DR CANYON LAKE CA 92587		HOME	9512445212 Yes	Could Not Locate
350103024 ROE Received	Not Started	23995 LUCAS DR, CANYON LAKE, CA 92587	DANIEL JOSE MENDEZ	DANIEL JOSE MENDEZ; MARIA RODRIGUEZ ROMERO; MARIBEL ROMERO			23995 LUCAS DR MENIFEE, CANYON LAKE AREA CA 92587	Yes	500155695 Active	MARIBEL ROMERO	23995 LUCAS DR CANYON LAKE CA 92587		CELL	9517221657 Unconfirmed	Could Not Locate
350103050 ROE Received	Not Started	23792 ELSINORE LN, CANYON LAKE, CA 92587	DENNIS DEAN HARTLEY	DENNIS DEAN HARTLEY; SHERYL LYN HARTLEY		No	P O BOX 357 SUN CITY CA 92586	Yes	500025422 Active	DENNIS HARTLEY	23792 ELSINORE LN CANYON LAKE CA 92587	tinysmurf_1@hotmail.com	CELL	9514429419 Yes	Could Not Locate
350103054 ROE Received	Not Started	23826 ELSINORE LN, CANYON LAKE, CA 92587	MARIA OROZCO	MARIA OROZCO			23826 ELSINORE LN SUN CITY CA 92587	Yes	500030585 Active	IGNACIO OROSCO	23826 ELSINORE LN CANYON LAKE CA 92587	y.ucey102@gmail.com			Could Not Locate
350112025 ROE Received	Not Started		VU PHINGUYEN	VU PHINGUYEN			28030 WEST DR QUAIL VALLEY CA 92587		0 Vacant					No	Could Not Locate
350112026 ROE Received	Not Started	28319 CLARK PL, CANYON LAKE, CA 92587	VU PHINGUYEN	VU PHINGUYEN			28030 WEST DR QUAIL VALLEY CA 92587		500022869 Active	MARCOS BAHENA - GUTIERRES	28319 CLARK PL CANYON LAKE CA 92587		CELL	9514345507 Yes	Could Not Locate
350113054 ROE Received	Not Started	23564 ELSINORE LN, CANYON LAKE, CA 92587	ROCCO VITTORIO MANCINI	ROCCO VITTORIO MANCINI		No	23564 ELSINORE LN SUN CITY CA 92587		500152991 Active	DEBRA A MANCINI	23564 ELSINORE LN CANYON LAKE CA 92587	gdebra45@gmail.com	CELL	9515479708 Yes	Could Not Locate
350191001 ROE Received	Not Started	23511 ELSINORE LN, CANYON LAKE, CA 92587	NOE VARGAS	NOE VARGAS; CLARA VARGAS			23511 ELSINORE LN SUN CITY CA 92587		500020404 Active	NOE VARGAS	23511 ELSINORE LN CANYON LAKE CA 92587	CLARABAZAL@GMAIL.COM	HOME	9512442637 Yes	Could Not Locate
350191047 ROE Received	Not Started		CAMERINO VASQUEZ REYES	CAMERINO VASQUEZ REYES			23560 LAKE DR CANYON LAKE CA 92587		0 Vacant					Yes	Could Not Locate
350191052 ROE Received	Not Started	23690 LAKE DR, CANYON LAKE, CA 92587	ROSALIA MARLENE OCAMPO	ROSALIA MARLENE OCAMPO			23690 LAKE DR QUAIL VALLEY CA 92587		500021050 Active	IVETTE EARL	23690 LAKE DR CANYON LAKE CA 92587	IVETTEEARL@GMAIL.COM	CELL	9517759074 Unconfirmed	Could Not Locate
350192019 ROE Received	Not Started		SANTA CRUZ FAMILY TRUST	SANTA CRUZ FAMILY TRUST DATED 4/22/2019; CRUZ JOSE SANTA			PO BOX 3305 QUAIL VALLEY CA 92587		0 Vacant					Yes	Could Not Locate
350192034 ROE Received	Not Started	23680 MT VERNON PL, CANYON LAKE, CA 92587	SANTA CRUZ FAMILY TRUST	SANTA CRUZ FAMILY TRUST DATED 4/22/2019; CRUZ JOSE SANTA			PO BOX 3305 QUAIL VALLEY CA 92587	Yes	500027637 Active	JOSE L SANTA CRUZ	23680 MT VERNON PL CANYON LAKE CA 92587		HOME	9512441584 Unconfirmed	Could Not Locate
350192059 ROE Received	Not Started	23645 LAKE DR, CANYON LAKE, CA 92587	BAKER ROBERT A REVOCABLE TRUST	BAKER ROBERT A REVOCABLE TRUST; ROBERT A. BAKER			23645 LAKE ST MENIFEE CA 92587	Yes	500028009 Active	ROBERT A BAKER	23645 LAKE DR CANYON LAKE CA 92587		BUS	9512441924 Unconfirmed	Could Not Locate
350193029 ROE Received	Not Started		SALA ERNEST ESTATE	SALA ERNEST ESTATE OF; ROBERT JOE GERACI; GREGORY ERNEST GERACI; MICHAEL DOMINIC GERACI			4105 MARITIME RD RANCHO PALOS VERDES CA 90275	No	0 Vacant					No	Could Not Locate
350193030 ROE Received	Not Started	23722 GOETZ DR, CANYON LAKE, CA 92587	SALA ERNEST ESTATE OF	SALA ERNEST ESTATE OF; ROBERT JOE GERACI; GREGORY ERNEST GERACI; MICHAEL DOMINIC GERACI			4105 MARITIME RD RANCHO PALOS VERDES CA 90275	Yes	500230327 Active	JASON RUTHERFORD	23722 GOETZ DR CANYON LAKE CA 92587	jr_5459@hotmail.com	HOME	2192138529	Could Not Locate
350203023 ROE Received	Not Started	23955 MT VERNON PL, CANYON LAKE, CA 92587	JORGE G. AVILA	JORGE G. AVILA			23955 MT VERNON PL SUN CITY CA 92587	Yes	500097722 Active	JORGE GUZMAN AVILA	23955 MT VERNON PL CANYON LAKE CA 92587		CELL	7142926451 Yes	Could Not Locate
350211030 ROE Received	Not Started	23775 GOETZ DR, CANYON LAKE, CA 92587	JARED REED OVERHOLTZER	JARED REED OVERHOLTZER			PO BOX 3233 QUAIL VALLEY CA 92587		500497477 Active	PAMELA OVERHOLTZER	23775 GOETZ DR CANYON LAKE CA 92587	poindiaho69@hotmail.com	CELL	2089640359 Unconfirmed	Could Not Locate
350214022 ROE Received	Not Started	28591 WILLIAMS DR, CANYON LAKE, CA 92587	CARLOS MARTINEZ LLAMAS	CARLOS MARTINEZ LLAMAS			28591 WILLIAMS DR CANYON LAKE CA 92587	Yes	500032191 Active	FABIOLA NOLASCO	28591 WILLIAMS DR CANYON LAKE CA 92587	FABIOLA.NOLASCO77@GMAIL.COM	CELL	9514465617 Yes	Could Not Locate
350214023 ROE Received	Not Started		CARLOS MARTINEZ LLAMAS	CARLOS MARTINEZ LLAMAS; FABIOLA NOLASCO MOLINA			28591 WILLIAMS DR MENIFEE CA 92587		0 Vacant					No	Could Not Locate
350214030 ROE Received	Not Started	28588 QUAIL PL, CANYON LAKE, CA 92587	ROY A. DEAVER	ROY A. DEAVER; CANDY DEAVER			28588 QUAIL PL CANYON LAKE CA 92587	Yes	500084830 Active	CANDY DEAVER	28588 QUAIL PL CANYON LAKE CA 92587		HOME	9512447161 Unconfirmed	Could Not Locate
350222038 ROE Received	Not Started	23630 SHREEDER PL, CANYON LAKE, CA 92587	ARMANDO HERNANDEZ	ARMANDO HERNANDEZ			23630 SHREEDER PL CANYON LAKE CA 92587	Yes	500121713 Active	TRISTAN MARTINEZ	23630 SHREEDER PL CANYON LAKE CA 92587	TRISMART74@GMAIL.COM	CELL	9512105774 Unconfirmed	Could Not Locate
350223057 ROE Received	Not Started	23680 LA BERTHA LN, CANYON LAKE, CA 92587	JESUS AYARD SANCHEZ	JESUS AYARD SANCHEZ; FLORELINDA DOMINGUEZ			P O BOX 3388 QUAIL VALLEY CA 92587	No	500079836 Active	FLORELINDA DOMINGUEZ	23680 LA BERTHA LN CANYON LAKE CA 92587	FLORDOMINGUEZ291@HOTMAIL.COM	HOME	9512448087 Unconfirmed	Could Not Locate
350233044 ROE Received	Not Started	23570 LODGE DR, CANYON LAKE, CA 92587	GUSTAVO MARTINEZ CARDENAS	GUSTAVO MARTINEZ CARDENAS			23570 LODGE DR SUN CITY CA 92587	No	500060178 Active	JANE DIAZ	23570 LODGE DR CANYON LAKE CA 92587	chatzadiaz@gmail.com	CELL	9518581284 Yes	Could Not Locate
350243023 ROE Received	Not Started	23778 LODGE DR, CANYON LAKE, CA 92587	PATRICIA A. ASHLEY	PATRICIA A. ASHLEY			7456 QUINN DOWNEY CA 90241	No	500057640 Active	PATRICIA ASHLEY	23778 LODGE DR CANYON LAKE CA 92587		CELL	3107142614 Unconfirmed	Could Not Locate
350251018 ROE Received	Not Started		MANUEL GARCIA VARGAS LUIS	MANUEL GARCIA VARGAS LUIS			100 W MIDWAY DR SPC 130 1/2 ANAHEIM CA 92805	Yes	No	0 Vacant				No	Could Not Locate
350261032 ROE Received	Not Started	23700 NORMA DR, CANYON LAKE, CA 92587	ELIZABETH OLMO	ELIZABETH OLMO; MIGUEL DELGADO			23700 NORMA DR SUN CITY CA 92587		Yes	500125766 Active	ELIZABETH OLMO	23700 NORMA DR CANYON LAKE CA 92587	larositta2345@gmail.com	HOME	9515708940 Yes	Could Not Locate
350261055 ROE Received	Not Started	23545 LODGE DR, CANYON LAKE, CA 92587	PASTOR CALDERON	PASTOR CALDERON; MIGUEL CALDERON			23545 LODGE DR SUN CITY CA 92587		Yes	500029994 Active	PASTOR CALDERON	23545 LODGE DR CANYON LAKE CA 92587		CELL	9515811621 Yes	Could Not Locate
350262056 ROE Received	Not Started		VU PHINGUYEN	VU PHINGUYEN			23666 CYPRESS PL CANYON LAKE CA 92587		Yes	500029250 Active	VU PHINGUYEN	NV.PHINGUYEN@GMAIL.COM	CELL	8587171313 Unconfirmed	Could Not Locate
350263010 ROE Received	Not Started	23615 CYPRESS PL, CANYON LAKE, CA 92587	GUITRON JOSE LUIS MORALE	GUITRON JOSE LUIS MORALE			P O BOX 26451 SAN DIEGO CA 92196	No	Yes	500030302 Active	LUDWIG MORALES	23615 CYPRESS PL CANYON LAKE CA 92587	vulalde@yahoo.com	HOME	6197642744 Unconfirmed	Could Not Locate
350263062 ROE Received	Not Started		GUITRON JOSE LUIS MORALE	GUITRON JOSE LUIS MORALE			P O BOX 26451 SAN DIEGO CA 92196		Yes	0 Vacant					Could Not Locate
350281001 ROE Received	Not Started	23755 NEWPORT DR, CANYON LAKE, CA 92587	ANDREW NGUYEN	ANDREW NGUYEN; KATIE CAO			9611 PORT CLYDE DR HUNTINGTON BEACH CA 92646		Yes	500006190 Active	ANDREW NGUYEN			3106780609 Unconfirmed	Could Not Locate
350282002 ROE Received	Not Started	23817 WELLS PL, CANYON LAKE, CA 92587	JAIRO SANCHEZ HILERIO	JAIRO SANCHEZ HILERIO; JOANA MOLINA AMBRIZ SUSIE			23817 WELLS PL CANYON LAKE CA 92587		Yes	500070331 Active	SUSIE MOLINA	23817 WELLS PL CANYON LAKE CA 92587	LITTLESHUCHY1985@YAHOO.COM	CELL	9516239494 Unconfirmed	Could Not Locate
350214032 ROE Received	Not Started	28566 QUAIL PL, CANYON LAKE, CA 92587	ISOM MCCRAY	ISOM MCCRAY; MARCEY MCCRAY			8710 HAAS AVE LOS ANGELES CA 90047		Yes	0 Vacant		28566 QUAIL PL CANYON LAKE CA 92587			Could Not Access
350214033 ROE Received	Not Started		ISOM MCCRAY	ISOM MCCRAY; MARCEY MCCRAY			8710 HAAS AVE LOS ANGELES CA 90047		No	0 Vacant				No	Could Not Access
350214034 ROE Received	Not Started		ISOM MCCRAY	ISOM MCCRAY; MARCEY MCCRAY			8710 HAAS AVE LOS ANGELES CA 90047		No	0 Vacant				No	Could Not Access
350262007 ROE Received	Not Started	23561 NORMA DR, CANYON LAKE, CA 92587	ERNESTO LOPEZ	ERNESTO LOPEZ; JEANINE A. LOPEZ			P O BOX 3542 QUAIL VALLEY CA 92587		Yes	500028674 Active	ERNESTO LOPEZ	23561 NORMA DR CANYON LAKE CA 92587		CELL	9514439224 Unconfirmed	Could Not Access
350284029 ROE Received	Not Started	23916 SIERRA DR, CANYON LAKE, CA 92587	EPIMENIO VIRREY HERRERA	EPIMENIO VIRREY HERRERA; MARIA OLIVIA HERRERA			23950 CIRCLE DR QUAIL VALLEY CA 92587		Yes	500027380 Active	EPIMENIO HERRERA	23916 SIERRA DR CANYON LAKE CA 92587		HOME	9512460383	Could Not Access

APPENDIX J – LIST OF PARCELS WITH DIFFICULT CONSTRUCTABILITY

The following spreadsheet contains parcels within the Quail Valley SA4 project that may require more complex construction effort and property restoration when installing gravity service laterals. This analysis is preliminary and subjective, and the list will evolve during the final design phase. Additionally, the analysis is not comprehensive, as only surveyed parcels were evaluated.

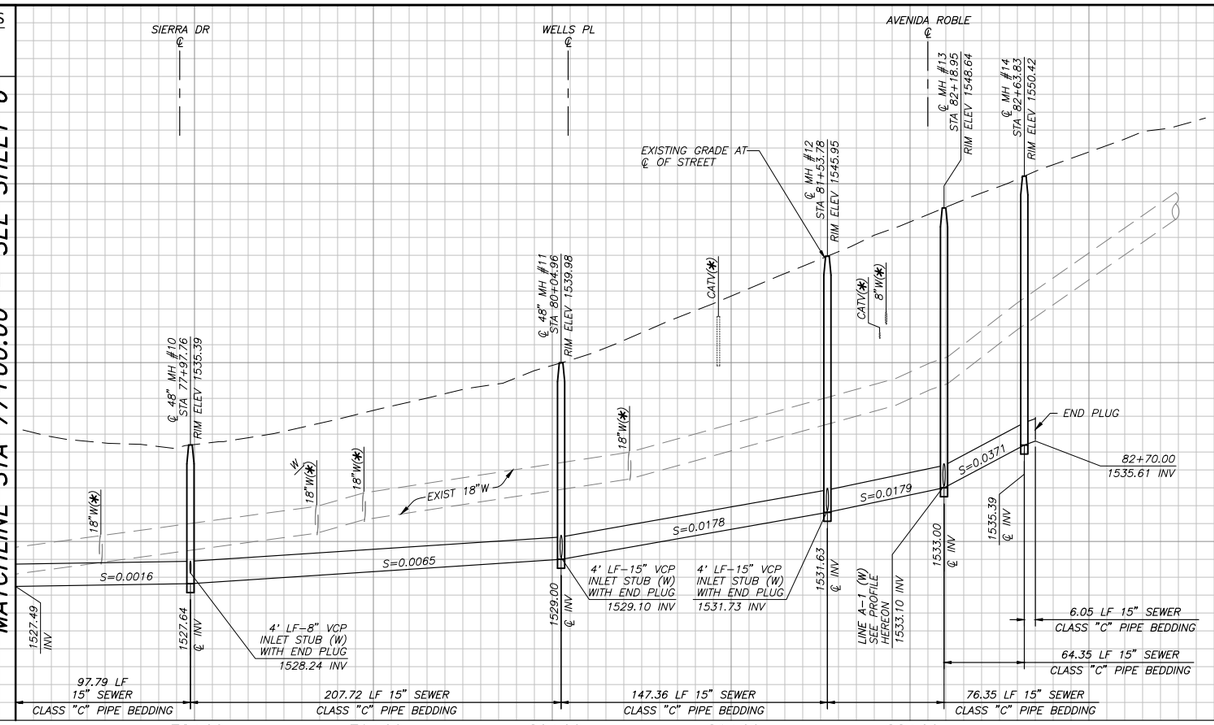
LIST OF PARCELS WITH DIFFICULT CONSTRUCTABILITY

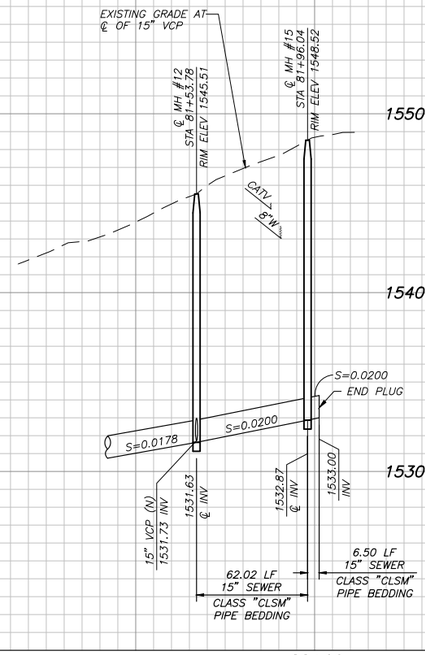
Lot-APN	Parcel Type	Status	Situs Address	Primary Owner	All Owner List	Mailing Address	Translator Required	Account Number (Water)	Account Status	Customer Name	Service Address	Email Address	Phone Type	Phone Number
341133004	ROE Received	Not Started	29054 Goetz Road, Canyon Lake, CA 92587	Abdul Nawabi		36228 Capri Dr Winchester CA 92596	No		Vacant		29054 GOETZ RD CANYON LAKE CA 92587			
350282011	ROE Received	Not Started	23829 SIERRA DR, CANYON LAKE, CA 92587	SERGIO GONZALEZ	SERGIO GONZALEZ; JUANA GONZALEZ	23829 SIERRA DR MENIFEE CA 92587	No	500060004	Active	JUANA GONZALEZ	23829 SIERRA DR CANYON LAKE CA 92587	JENNIFER.GONZALEZ_1174@YAHOO.COM	CELL	9515418853
350282014	ROE Received	Not Started	23837 SIERRA DR, CANYON LAKE, CA 92587	ABELARDO LOPEZ	ABELARDO LOPEZ; EUSTORGIA LOPEZ	23837 SIERRA DR QUAIL VALLEY CA 92587		500030116	Active	ABELARDO LOPEZ	23837 SIERRA DR CANYON LAKE CA 92587		HOME	9512443769
350282015	ROE Received	Not Started	23843 SIERRA DR, CANYON LAKE, CA 92587	STEVEN JAMES PEREZ	STEVEN JAMES PEREZ	P O BOX 6934 ALHAMBRA CA 91802		500271197	Active	STEVEN PEREZ	23843 SIERRA DR CANYON LAKE CA 92587	STEVENPEREZ360@GMAIL.COM	CELL	9262162014
350281034	ROE Received	Not Started	23835 NEWPORT DR, CANYON LAKE, CA 92587	MIRELLA AYALA LOPEZ	MIRELLA AYALA LOPEZ	23835 NEWPORT DR MENIFEE CA 92587		500039401	Active	MIRELLA AYALA	23835 NEWPORT DR CANYON LAKE CA 92587	MIRELLAAYALA7@GMAIL.COM	HOME	9517232232
350263058	ROE Received	Not Started	23564 NEWPORT DR, CANYON LAKE, CA 92587	JUAN RODRIGUEZ	JUAN RODRIGUEZ; FRANCIE MARIE RODRIGUEZ	23564 NEWPORT DR SUN CITY CA 92587		500109584	Active	FRANCIE RODRIGUEZ	23564 NEWPORT DR CANYON LAKE CA 92587	RODRIGUEZ.FRANCIE@GMAIL.COM	CELL	7142224972
350263042	ROE Received	Not Started	23570 NEWPORT DR, CANYON LAKE, CA 92587	MARIA PATRICIA STEWART	MARIA PATRICIA STEWART	23570 NEWPORT DR CANYON LAKE CA 92587		500120500	Active	MARIA STEWART	23570 NEWPORT DR CANYON LAKE CA 92587	PAT_STEWART524@YAHOO.COM	CELL	9515294721
350263038	ROE Received	Not Started	23610 NEWPORT RD, CANYON LAKE, CA 92587	PORFIRIO CUEVAS	PORFIRIO CUEVAS; MARTHA CANALES	23610 NEWPORT RD SUN CITY CA 92587		500159018	Active	MARTHA P CUEVAS	23610 NEWPORT RD CANYON LAKE CA 92587	MYPHYS8@GMAIL.COM	CELL	3105941716
350263016	ROE Received	Not Started	23615 CYPRESS PL, CANYON LAKE, CA 92587	GUITRON JOSE LUIS MORALE	GUITRON JOSE LUIS MORALE	P O BOX 26451 SAN DIEGO CA 92196	No	500030302	Active	LUDWIG MORALES	23615 CYPRESS PL CANYON LAKE CA 92587	vulakle@yahoo.com	HOME	6197642744
350263012	ROE Received	Not Started	23635 CYPRESS PL, CANYON LAKE, CA 92587	JOSHUA EASTERLY	JOSHUA EASTERLY	31117 EMPEROR DR CANYON LAKE CA 92587	No	500125774	Active	CARLOS CASTRO	23635 CYPRESS PL CANYON LAKE CA 92587	CARLOSLEOCSTR@GMAIL.COM	CELL	9514532170
350263011	ROE Received	Not Started	23645 CYPRESS PL, CANYON LAKE, CA 92587	OTONIEL ACOSTA	OTONIEL ACOSTA	23645 CYPRESS PL SUN CITY CA 92587		500097769	Active	OTONIEL HERNANDEZ ACOSTA	23645 CYPRESS PL CANYON LAKE CA 92587		HOME	9512440936
350263055	ROE Received	Not Started	23705 CYPRESS PL, CANYON LAKE, CA 92587	MIGUEL LOPEZ	MIGUEL LOPEZ	23705 CYPRESS PL SUN CITY CA 92587		500091517	Active	MIGUEL LOPEZ	23705 CYPRESS PL CANYON LAKE CA 92587		HOME	9512444280
350262053	ROE Received	Not Started	23572 CYPRESS PL, CANYON LAKE, CA 92587	JUSTIN ESPIRITU ORDONEZ	JUSTIN ESPIRITU ORDONEZ	23572 CYPRESS PL CANYON LAKE CA 92587	No	500101647	Active	MARISSA FLORES	23572 CYPRESS PL CANYON LAKE CA 92587	MARISSA.FLORES.1992@GMAIL.COM	CELL	9096564597
350262043	ROE Received	Not Started	23590 CYPRESS PL, CANYON LAKE, CA 92587	LIBORIA SALGADO ESTRADA	LIBORIA SALGADO ESTRADA; EVERARDO GARCIA	23590 CYPRESS PL CANYON LAKE CA 92587	Yes	500107198	Active	EVERARDO GARCIA	23590 CYPRESS PL CANYON LAKE CA 92587		CELL	9513780913
350252028	ROE Received	Not Started	23780 CYPRESS PL, CANYON LAKE, CA 92587	PEDRO ARMIENTA	PEDRO ARMIENTA; ROSALVA ARMIENTA	23780 CYPRESS PL QUAIL VALLEY CA 92587		500103354	Active	PEDRO ARMIENTA	23780 CYPRESS PL CANYON LAKE CA 92587	ROSALVAARMIENTA@GMAIL.COM	BUS	7607235140
350262007	ROE Received	Not Started	23561 NORMA DR, CANYON LAKE, CA 92587	ERNESTO LOPEZ	ERNESTO LOPEZ; JEANINE A. LOPEZ	P O BOX 3542 QUAIL VALLEY CA 92587	Yes	500028674	Active	ERNESTO LOPEZ	23561 NORMA DR CANYON LAKE CA 92587		CELL	9514439234
350262015	ROE Received	Not Started	23545 NORMA DR, CANYON LAKE, CA 92587	RYAN A. FOY	RYAN A. FOY; GERALDINE P. FOY	23545 NORMA DR SUN CITY CA 92587		500021570	Active	GERALDINE FOY	23545 NORMA DR CANYON LAKE CA 92587	MAILTHEFOYS@YAHOO.COM	CELL	9512331825
350255028	ROE Received	Not Started	23887 NORMA DR, CANYON LAKE, CA 92587	CHRISTINA MARIE DOMINGUEZ	CHRISTINA MARIE DOMINGUEZ	23580 LABERTHA LN QUAIL VALLEY CA 92587		500033486	Active	CHRISTINA M DOMINGUEZ	23887 NORMA DR CANYON LAKE CA 92587		CELL	9512293925
350261040	ROE Received	Not Started	23628 NORMA DR, CANYON LAKE, CA 92587	HILDA RIOS	HILDA RIOS	23628 NORMA DR CANYON LAKE CA 92587		500035827	Active	HILDA RIOS	23628 NORMA DR CANYON LAKE CA 92587	HILDAR1209@GMAIL.COM	CELL	9519770338
350261054	ROE Received	Not Started	23658 NORMA DR, CANYON LAKE, CA 92587	NICOLAS A. CHAVEZ	NICOLAS A. CHAVEZ; LETICIA CHAVEZ	23658 NORMA DR SUN CITY CA 92587		500105133	Active	LETICIA CHAVEZ	23658 NORMA DR CANYON LAKE CA 92587	ramirochavez020187@yahoo.com	CELL	4805659699
350256008	ROE Received	Not Started	23984 NORMA DR, CANYON LAKE, CA 92587	SALVADOR CORTES GARIBAY	SALVADOR CORTES GARIBAY	29689 WISE ST LAKE ELSINORE CA 92530		500035683	Active	ALFONSO OROZCO	23984 NORMA DR CANYON LAKE CA 92587		CELL	7073577858
350261055	ROE Received	Not Started	23545 LODGE DR, CANYON LAKE, CA 92587	PASTOR CALDERON	PASTOR CALDERON; MIGUEL CALDERON	23545 LODGE DR SUN CITY CA 92587		500029994	Active	PASTOR CALDERON	23545 LODGE DR CANYON LAKE CA 92587		CELL	9515811621
350256006	ROE Received	Not Started	28767 LODGE DR, CANYON LAKE, CA 92587	ADELITA PUGA	ADELITA PUGA	44512 LA PAZ RD TEMECULA CA 92592		500263107	Active	ADELITA PUGA	28767 LODGE DR CANYON LAKE CA 92587	puga.adelita@gmail.com	CELL	9519727106
350233044	ROE Received	Not Started	23570 LODGE DR, CANYON LAKE, CA 92587	GUSTAVO MARTINEZ CARDENAS	GUSTAVO MARTINEZ CARDENAS	23570 LODGE DR SUN CITY CA 92587	No	500060178	Active	JANE DIAZ	23570 LODGE DR CANYON LAKE CA 92587	chatadiaz@gmail.com	CELL	9518581284
350244015	Not Included	Not Included	23910 LODGE DR, CANYON LAKE, CA 92587	QUAIL VALLEY CHAPPEL INC	QUAIL VALLEY CHAPPEL INC	23905 LODGE DR QUAIL VALLEY CA 92587		500032882	Vacant			Deidra.mendoza14@gmail.com	HOME	9512415276
350245012	ROE Received	Not Started	23998 LODGE DR, CANYON LAKE, CA 92587	ANTONIO E. TRISTAN	ANTONIO E. TRISTAN	8001 SOMERSET BLVD , #30 PARAMOUNT CA 90723		500158302	Active	ANTONIO TRISTAN	23998 LODGE DR CANYON LAKE CA 92587	MTRISTAN3@GMAIL.COM	CELL	3233704435
350244056	ROE Received	Not Started	28736 ANITA DR, CANYON LAKE, CA 92587	STEVEN R. VILLARREAL	STEVEN R. VILLARREAL; CARLENE L. VILLARREAL	28736 ANITA DR MENIFEE CA 92587		500047915	Active	STEVEN VILLARREAL	28736 ANITA DR CANYON LAKE CA 92587	STEVENVEA7@GMAIL.COM	CELL	7143335750
350245014	ROE Received	Not Started	28720 WILLIAMS DR, CANYON LAKE, CA 92587	CAMERON SIMMONS	CAMERON SIMMONS; SCOTT SIMMONS	28720 WILLIAMS DR CANYON LAKE CA 92587		500479837	Active	CAMERON SIMMONS	28720 WILLIAMS DR CANYON LAKE CA 92587	cameronnnscott@yahoo.com	HOME	7144126787
350233011	ROE Received	Not Started	23581 CLARA PL, CANYON LAKE, CA 92587	CENOVIA GUTIERREZ MATA	CENOVIA GUTIERREZ MATA	P O BOX 3546 SUN CITY CA 92587	No	500112719	Active	CENOVIA GUTIERREZ DE MATA	23581 CLARA PL CANYON LAKE CA 92587	CJDEMATA57@GMAIL.COM	CELL	9513784968
350232042	ROE Received	Not Started	23560 CLARA PL, CANYON LAKE, CA 92587	VICTOR CASTANEDA	VICTOR CASTANEDA	23560 CLARA PL QUAIL VALLEY CA 92587	Yes	500113021	Active	VICTOR CASTANEDA	23560 CLARA PL CANYON LAKE CA 92587		HOME	9512442319
350232061	ROE Received	Not Started	23596 CLARA PL, CANYON LAKE, CA 92587	RAMIRO GARCIA TOVAR	RAMIRO GARCIA TOVAR; JESSICA DENNISE GARCIA	23596 CLARA PL MENIFEE CA 92587		500034717	Active	JESSICA D GARCIA	23596 CLARA PL CANYON LAKE CA 92587	yexikadenix@gmail.com	CELL	9516650226
350232019	ROE Received	Not Started	23369 CASSANDRA DR, CANYON LAKE, CA 92587	ROBERTO VALDEZ	ROBERTO VALDEZ; FLORA VALDEZ	P O BOX 3594 QUAIL VALLEY CA 92587		500035789	Active	ROBERTO VALDEZ	23369 CASSANDRA DR CANYON LAKE CA 92587		HOME	9512442295
350244005	ROE Received	Not Started	28666 QUAIL PL, CANYON LAKE, CA 92587	TREMONE ALLEN STEWART	TREMONE ALLEN STEWART	28666 QUAIL PL CANYON LAKE CA 92587		500482257	Active	TREMONE STEWARD	28666 QUAIL PL CANYON LAKE CA 92587	masterofairbending@gmail.com	HOME	4243125292
350223057	ROE Received	Not Started	23680 LA BERTHA LN, CANYON LAKE, CA 92587	JESUS AYARO SANCHEZ	JESUS AYARO SANCHEZ; FLORELINDA DOMINGUEZ	P O BOX 3388 QUAIL VALLEY CA 92587	No	500079836	Active	FLORELINDA DOMINGUEZ	23680 LA BERTHA LN CANYON LAKE CA 92587	FLORDOMINGUEZ291@HOTMAIL.COM	HOME	9512448087
350223056	ROE Received	Not Started	23690 LA BERTHA LN, CANYON LAKE, CA 92587	EVANGELINA VAZQUEZ	EVANGELINA VAZQUEZ	304 MONUMENT PKY PERRIS CA 92570		500023440	Active	PAULINA JAVIER	23690 LA BERTHA LN CANYON LAKE CA 92587	ANA.T.JAVIER21@GMAIL.COM	HOME	9512461796
350223064	ROE Received	Not Started	25521 SHREEDER PL, CANYON LAKE, CA 92587	JAMIE E. CASTRO	JAMIE E. CASTRO; JOSEFINA LANDEROS; GUADALUPE LANDE	P O BOX 3339 QUAIL VALLEY CA 92587		500022963	Active	JOSEFINA LANDEROS	25521 SHREEDER PL CANYON LAKE CA 92587	cortezelizabeth331@gmail.com	HOME	9514177410
350223063	ROE Received	Not Started	23591 SHREEDER PL, CANYON LAKE, CA 92587	ELIZABETH MURO	ELIZABETH MURO	PO BOX 3322 QUAIL VALLEY CA 92587		500028452	Active	ELIZABETH MURO	23591 SHREEDER PL CANYON LAKE CA 92587	MUROINCLAN@HOTMAIL.COM	CELL	9514426579
350223066	ROE Received	Not Started	23709 SHREEDER PL, CANYON LAKE, CA 92587	JOSE AGUAYO	JOSE AGUAYO; CRISTINA AGUAYO	23709 SHREEDER PL SUN CITY CA 92587		500036828	Active	CRISTINA G AGUAYO	23709 SHREEDER PL CANYON LAKE CA 92587	PATOAGUAYO372@GMAIL.COM	CELL	9518348832
350214030	ROE Received	Not Started	28588 QUAIL PL, CANYON LAKE, CA 92587	ROY A. DEAVER	ROY A. DEAVER; CANDY DEAVER	28588 QUAIL PL CANYON LAKE CA 92587		500084830	Active	CANDY DEAVER	28588 QUAIL PL CANYON LAKE CA 92587		HOME	9512447161
350222046	ROE Received	Not Started	23560 SHREEDER PL, CANYON LAKE, CA 92587	SEBASTIAN GARCIA QUIROZ JUAN	SEBASTIAN GARCIA QUIROZ JUAN	23560 SHREEDER PL CANYON LAKE CA 92587		500041003	Active	JUAN SEBASTIAN GARCIA	23560 SHREEDER PL CANYON LAKE CA 92587	SEBAS7GARCIA@HOTMAIL.COM	CELL	9517225315
350222042	ROE Received	Not Started	23580 SHREEDER PL, CANYON LAKE, CA 92587	ROBERT MURILLO	ROBERT MURILLO; LORENA MUNOZ	23580 SHREEDER PL SUN CITY CA 92587	No	500024667	Active	ROBERT H MURILLO	23580 SHREEDER PL CANYON LAKE CA 92587	LALONDRA@VERIZON.NET	CELL	9515516201
350222055	ROE Received	Not Started	23627 KENNEDY LN, CANYON LAKE, CA 92587	REYES ANTONIO	REYES ANTONIO; RODRIGUEZ JAVIER	23627 KENNEDY LN MENIFEE CA 92587	No	500571477	Active	JAVIER RODRIGUEZ	23627 KENNEDY LN CANYON LAKE CA 92587	javirodriguez0623@icloud.com	CELL	9515038745
350222054	Pending	Not Started	23643 KENNEDY LN, CANYON LAKE, CA 92587	HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRUH	HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRU	23608 MT VERNON PL CANYON LAKE CA 92587		500019937	Active	LOU MOORE	23643 KENNEDY LN CANYON LAKE CA 92587	MALIAKA69@GMAIL.COM	CELL	9513343472
350221006	ROE Received	Not Started	23670 KENNEDY LN, CANYON LAKE, CA 92587	JESSE CRUZ	JESSE CRUZ	23670 KENNEDY LN MENIFEE CA 92587		500559191	Active	JESSE CRUZ	23670 KENNEDY LN CANYON LAKE CA 92587	JBBC1414@YAHOO.COM	CELL	9512831291
350221055	ROE Received	Not Started	23676 KENNEDY LN, CANYON LAKE, CA 92587	ABEL ALEGRIA	ABEL ALEGRIA; CRISTINA GARFIAS DEALEGRIA	P O BOX 3386 QUAIL VALLEY CA 92587	Yes	500100898	Active	ABEL ALEGRIA	23676 KENNEDY LN CANYON LAKE CA 92587		CELL	9513683836
350221016	ROE Received	Not Started	23649 GOETZ DR, CANYON LAKE, CA 92587	HUGO OROS	HUGO OROS; BRENDA OROS	23649 GOETZ DR SUN CITY CA 92587	No	500057263	Active	HUGO OROS	23649 GOETZ DR CANYON LAKE CA 92587	OGHUGO1@GMAIL.COM	CELL	5626881678
350211011	ROE Received	Not Started	23831 GOETZ DR, CANYON LAKE, CA 92587	DAVID STANLEY	DAVID STANLEY; CHICKO STANLEY	PO BOX 3574 QUAIL VALLEY CA 92587		500118436	Active	DAVID STANLEY	23831 GOETZ DR CANYON LAKE CA 92587	STANLEYHERE2000@GMAIL.COM	HOME	9514304708
350211032	ROE Received	Not Started	28515 QUAIL PL, CANYON LAKE, CA 92587	MAXIMINO GUZMAN	MAXIMINO GUZMAN	28515 QUAIL PL SUN CITY CA 92587	Yes	500019304	Active	MAXIMINO GUZMAN	28515 QUAIL PL CANYON LAKE CA 92587		CELL	7608012011
350193055	ROE Received	Not Started	23540 GOETZ DR, CANYON LAKE, CA 92587	ANTONIO BOTELLO-LOPEZ	ANTONIO BOTELLO-LOPEZ	23540 GOETZ DR MENIFEE CA 92587		500090714	Active	ANTONIO B LOPEZ	23540 GOETZ DR CANYON LAKE CA 92587		CELL	9518130449
350193046	ROE Received	Not Started	23580 GOETZ DR, CANYON LAKE, CA 92587	EMMANUEL MARTINEZ	EMMANUEL MARTINEZ	23580 GOETZ DR QUAIL VALLEY CA 92587	Yes	500021967	Active	EMMANUEL MARTINEZ	23580 GOETZ DR CANYON LAKE CA 92587	camaross1999@hotmail.com	CELL	7605359428
350203052	ROE Received	Not Started	23750 GOETZ DR, CANYON LAKE, CA 92587	ANTONIO HERRERA	ANTONIO HERRERA; CARMEN HERRERA	23750 GOETZ DR SUN CITY CA 92587	No	500020256	Active	ANTONIO HERRERA	23750 GOETZ DR CANYON LAKE CA 92587		CELL	9515811387
350203055	ROE Received	Not Started	23760 GOETZ DR, CANYON LAKE, CA 92587	JUVENTINO VERDUZCO	JUVENTINO VERDUZCO	23760 GOETZ DR CANYON LAKE CA 92587		500567297	Active	LESLIE NUNEZ DE LA CRUZ	23760 GOETZ DR CANYON LAKE CA 92587	lmnd@yahoo.com	CELL	9512611771
350203056	ROE Received	Not Started	23790 GOETZ DR, CANYON LAKE, CA 92587	MANUEL V. GARCIA	MANUEL V. GARCIA; MARIA GARCIA	23790 GOETZ DR SUN CITY CA 92587		500109560	Active	MANUEL GARCIA	23790 GOETZ DR CANYON LAKE CA 92587	FABGARCIA729@GMAIL.COM	CELL	9512851403
350203037	ROE Received	Not Started	23890 GOETZ DR, CANYON LAKE, CA 92587	GUSTAVO F. GONZALEZ	GUSTAVO F. GONZALEZ; NORA D. GONZALEZ	23890 GOETZ DR SUN CITY CA 92587	Yes	500408857	Active	FRANKLIN GONZALES	23890 GOETZ DR CANYON LAKE CA 92587	frankie.gonzalez67@yahoo.com	HOME	9513700504
350193008	ROE Received	Not Started	23571 MT VERNON PL, CANYON LAKE, CA 92587	FLORES FAMILY TRUST U/A DATED 06/06/20	FLORES FAMILY TRUST U/A DATED 06/06/20; LUCIA JERONI	23571 MT VERNON PL CANYON LAKE CA 92587		500021966	Active	AGUSTIN FLORES	23571 MT VERNON PL CANYON LAKE CA 92587	floresv355@gmail.com	HOME	9514341577
350193056	ROE Received	Not Started	23617 MT VERNON PL, CANYON LAKE, CA 92587	SERGIO ESCALANTE	SERGIO ESCALANTE; GLORIA ESCALANTE	23617 MT VERNON PL MENIFEE CA 92587	No	500383707	Active	SERGIO ESCALANTE	23617 MT VERNON PL CANYON LAKE CA 92587	sergioescalante0000@gmail.com	HOME	3235611914
350203022	ROE Received	Not Started	23955 MT VERNON PL, CANYON LAKE, CA 92587	JORGE G. AVILA	JORGE G. AVILA	23955 MT VERNON PL SUN CITY CA 92587		500097772	Active	JORGE GUZMAN AVILA	23955 MT VERNON PL CANYON LAKE CA 92587		CELL	7142926451
350192056	Pending	Not Started	23608 MT VERNON PL, CANYON LAKE, CA 92587	HENDERSON HENRY HODGENS	HENDERSON HENRY HODGENS; JAMESETTA HODGENS	23608 MT VERNON PL CANYON LAKE CA 92587		500102707	Active	PRECIOUS STEWART	23608 MT VERNON PL CANYON LAKE CA 92587	P5383@LIVE.COM	CELL	9513477518
350192040	Pending	Not Started		HENDERSON HENRY HODGENS	HENDERSON HENRY HODGENS; JAMESETTA HODGENS	23608 MT VERNON PL CANYON LAKE CA 92587			Vacant					
350192034	ROE Received	Not Started	23680 MT VERNON PL, CANYON LAKE, CA 92587	SANTA CRUZ FAMILY TRUST	SANTA CRUZ FAMILY TRUST DATED 4/22/2019; CRUZ JOSE S	PO BOX 3305 QUAIL VALLEY CA 92587		500027637	Active	JOSE L SANTA CRUZ	23680 MT VERNON PL CANYON LAKE CA 92587		HOME	9512441584
350202034	ROE Received	Not Started	23936 MT VERNON PL, CANYON LAKE, CA 92587	ROBERTO HERNANDEZ ORDAZ	ROBERTO HERNANDEZ ORDAZ	23936 MT VERNON PL SUN CITY CA 92587	Yes	500033092	Active	ROBERTO HERNANDEZ	23936 MT VERNON PL CANYON LAKE CA 92587	GRIZZLY714ER@GMAIL.COM	HOME	9519283518
350192010	Pending	Not Started		HENDERSON HENRY HODGENS	HENDERSON HENRY HODGENS; JAMESETTA HODGENS	23608 MT VERNON PL CANYON LAKE CA 92587			Vacant					
350192012	Pending	Not Started		HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRUH	HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRU	23608 MT VERNON PL CANYON LAKE CA 92587			Vacant					
350191042	Pending	Not Started		HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRUH	HODGENS HENDERSON HENRY JR & JAMESETTA FAMILY TRU	23608 MT VERNON PL CANYON LAKE CA 92587			Vacant					
350191052	ROE Received	Not Started	23690 LAKE DR, CANYON LAKE, CA 92587	ROSALIA MARLENE OCAMPO	ROSALIA MARLENE OCAMPO	23690 LAKE DR QUAIL VALLEY CA 92587		500021055	Active	IVETTE EARL	23690 LAKE DR CANYON LAKE CA 92587	IVETTEEARL@GMAIL.COM	CELL	9517759074
350191004	ROE Received	Not Started	23543 ELSINORE LN, CANYON LAKE, CA 92587	NOE E MORALES	NOE E MORALES [RAYMOND GARCIA; ALEXSANDRA PALACIO	23543 ELSINORE LN CANYON LAKE CA 92587		500516337	Active	NOE ESCOBAR MORALES	23543 ELSINORE LN CANYON LAKE CA 92587	NOE_ESCOBAR@YAHOO.COM	HOME	7605836670
350191021	ROE Received	Not Started	23711 ELSINORE LN, MENIFEE, CA 92584	ROBERTO CAMARILLO	ROBERTO CAMARILLO	PO BOX 3529 MENIFEE CA 92587	Yes	500059053	Active	ROBERTO CARMARILLO	23711 ELSINORE LN MENIFEE CA 92584		HOME	9512448258
350201010	ROE Received	Not Started	23835 ELSINORE LN, CANYON LAKE, CA 92587	BRADLEY KENNETH POST	BRADLEY KENNETH POST	23835 ELSINORE LN CANYON LAKE CA 92587		500159209	Active	BRADLEY POST	23835 ELSINORE LN CANYON LAKE CA 92587	bkpost@gmail.com	HOME	9512496108
350201061	ROE Received	Not Started	23875 ELSINORE LN, CANYON LAKE, CA 92587	ALONZO LAZARO	ALONZO LAZARO	23875 ELSINORE LN SUN CITY CA 92587	Yes	500057275	Active	ALONZO LAZARA	23875 ELSINORE LN CANYON LAKE CA 92587		CELL	7143495484
350113054	ROE Received	Not Started	23564 ELSINORE LN, CANYON LAKE, CA 92587	ROCCO VITTORIO MANCINI	ROCCO VITTORIO MANCINI	23564 ELSINORE LN SUN CITY CA 92587	No	500152911	Active	DEBRA A MANCINI	23564 ELSINORE LN CANYON LAKE CA 92587	gdebra45@gmail.com	CELL	9515479708
350113058	ROE Received	Not Started		VILMA MEDINA	VILMA MEDINA; CESAR J MEDINA RODRIGUEZ	23712 ELSINORE LN MENIFEE CA 92587			Vacant					
350103056	ROE Received	Not Started	23792 ELSINORE LN, CANYON LAKE, CA 92587	DENNIS DEAN HARTLEY	DENNIS DEAN HARTLEY; SHERYL LYN HARTLEY	P O BOX 357 SUN CITY CA 92586	No	500025422	Active	DENNIS HARTLEY	23792 ELSINORE LN CANYON LAKE CA 92587	tinysmurf_1@hotmail.com	CELL	9514429419
350112057	ROE Received	Not Started	23590 LUCAS DR, CANYON LAKE, CA 92587	SANDRA S. WEST	SANDRA S. WEST	26100 NEWPORT RD STE A12 MENIFEE CA 92584	No	500024557	Active	SANDRA WEST	23590 LUCAS DR CANYON LAKE CA 92587	RAMIESANDRA@YAHOO.COM	CELL	9513805067
350112052	ROE Received	Not Started	23720 LUCAS DR, CANYON LAKE, CA 92587	RITA J. PETERS	RITA J. PETERS	23720 LUCAS DR QUAIL VALLEY CA 92587		500024602	Active	RITA PETERS	23720 LUCAS DR CANYON LAKE CA 92587	RITAMETERMAID04@GMAIL.COM	HOME	9512461808
350112006	ROE Received	Not Started	23557 JOHNSON LN, CANYON LAKE, CA 92587	MICHELLE FISCHER	MICHELLE FISCHER	23557 JOHNSON LN SUN CITY CA 92587		500043281	Active	MICHELLE HAMERNICK	23557 JOHNSON LN CANYON LAKE CA 92587	HAMERNIKMR@GMAIL.COM	CELL	9518332845
350112058	ROE Received	Not Started	23567 JOHNSON LN, CANYON LAKE, CA 92587	BENITO ROJAS	BENITO ROJAS; REINA CERRITENO DE ROJAS	23567 JOHNSON LN SUN CITY CA 92587	No	500251947	Active	REINA CERRITENO	23567 JOHNSON LN CANYON LAKE CA 92587		CELL	9514836011
350112011	ROE Received	Not Started	23605 JOHNSON LN, CANYON LAKE, CA 92587	APRIL COBO	APRIL COBO	23605 JOHNSON LN SUN CITY CA 92587	No		Vacant		23605 JOHNSON LN CANYON LAKE CA 92587			
350112019	ROE Received	Not Started	23681 JOHNSON LN, CANYON LAKE, CA 92587	ANTONIO MALPICA CALDENA	ANTONIO MALPICA CALDENA	23681 JOHNSON LN MENIFEE CA 92587		500068459	Active	ALMA RODRIGUEZ	23681 JOHNSON LN CANYON LAKE CA 92587	LIZETTERODRIGUEZ16@YAHOO.COM	CELL	6266646507
350112026	ROE Received	Not Started	28319 CLARK PL, CANYON LAKE, CA 92587	VU PHINGUYEN	VU PHINGUYEN	28030 WEST DR QUAIL VALLEY CA 92587		500022869	Active	MARCOS BAHENA - GUTIERRES	28319 CLARK PL CANYON LAKE CA 92587		CELL	9514345507
350111032	ROE Received	Not Started	23690 JOHNSON LN, CANYON LAKE, CA 92587	IGNACIO R VALLE RODRIGUEZ	IGNACIO R VALLE RODRIGUEZ	23690 JOHNSON LN QUAIL VALLEY CA 92587	No	500100920	Active	IGNACIO VALLE	23690 JOHNSON LN CANYON LAKE CA 92587	ignaciovalle20@gmail.com	CELL	9514833181

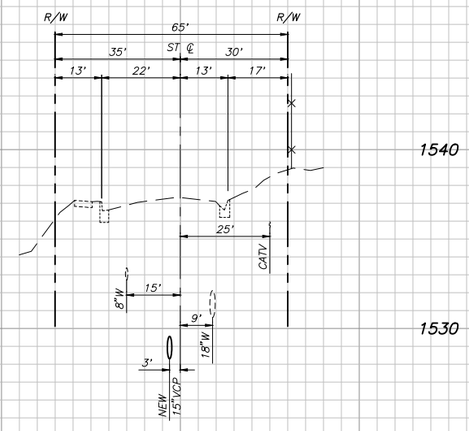
APPENDIX K – EMWD DRAFT RECORD DRAWING D-71448

PROFILE SCALES
HORZ : 1" = 40'
VERT : 1" = 4'

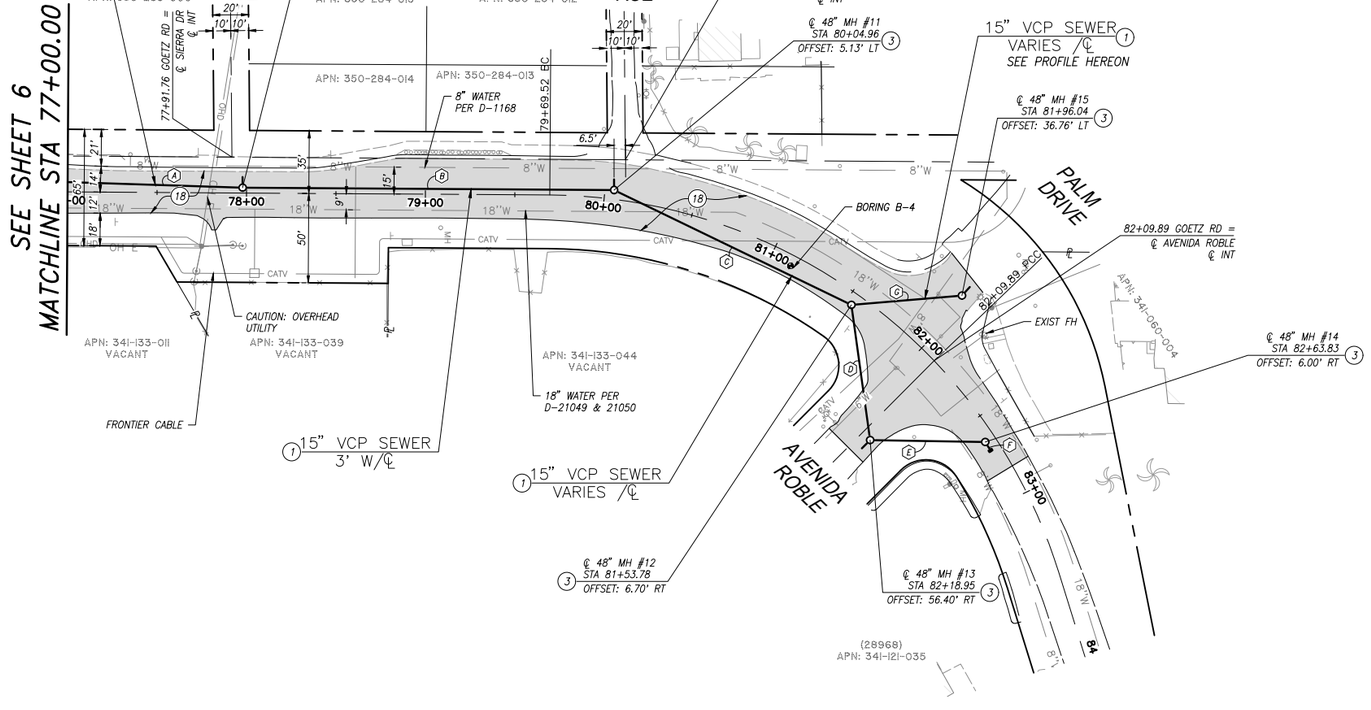
MATCHLINE STA 77+00.00 – SEE SHEET 6







CROSS SECTION
AT STA 79+00.00
SCALE: HORZ: 1" = 20'
VERT: 1" = 4'



CONSTRUCTION NOTES

1. CONSTRUCT 15" DIAMETER EXTRA STRENGTH VCP SEWER. TRENCH PER EMWD STD DWG SB-158.
3. CONSTRUCT 48" PRECAST POLYMER CONCRETE MANHOLE WITH 24" COMPOSITE FRAME AND COVER AND PER DETAILS ON EMWD STD DWG SB-53. INSTALL STUB WHERE SHOWN.
18. COLD MILL AND OVERLAY WITH C2-PG 70-10 ASPHALT. 0.15' THICK.

LINE AND CURVE DATA

	BEARING/DELTA	RADIUS	LENGTH	TANGENT
A	N 01°49'45" E	–	97.79'	–
B	N 00°22'21" E	–	207.72'	–
C	N 25°48'56" E	–	147.36'	–
D	N 82°06'53" E	–	76.35'	–
E	N 00°55'51" E	–	64.35'	–
F	01°04'57"	320.00'	6.05'	3.02'
G	N 04°45'14" W	–	62.02'	–

FOR MANHOLE DETAILS SEE SHEETS 8, 9, & 10

(*) UTILITY PROFILE BASED ON POTHOLE DATA COMPLETED ON 7/31/2023

0 20 40 80 120 160
SCALE: 1" = 40'

07-12-2024 PROGRESS PRINT

FILENAME: F:\1322\Engineering\tmp_Sewer\7 PLAN AND PROFILE.dwg PLOTTED ON: 7/12/2024 11:17 AM BY: Simon Meneses

Underground Service Alert
CALL BEFORE YOU DIG
Call: TOLL FREE 1-800-227-2600 OR 811
TWO WORKING DAYS BEFORE YOU DIG

PLANS PREPARED BY:
HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759
UNDER THE SUPERVISION OF:
MOHAMMED N. K. ROWTHER 4/12/2023

REGISTERED PROFESSIONAL ENGINEER MOHAMMED NAJEEB KHAN ROWTHER No. 37127 Exp. 6/30/24 CIVIL STATE OF CALIFORNIA

REVISIONS				
NO.	DATE	INITIAL	DESCRIPTION	APP'VD/DATE

APPROVAL BY:
Shaun Stone
SENIOR DIRECTOR OF ENGINEERING DATE
REFERENCES

EASTERN MUNICIPAL WATER DISTRICT
Scott Toland
PROJECT MANAGER DATE

APPROVALS	INITIAL	DATE
PROJECT ENG.	NLK	
INSPECTION	BM	
WATER RECLAMATION	KT	
MAINTENANCE	DB	

	DATE
DESIGNED: MR	
DRAWN: SM	
TRACED:	
DESIGNED:	
SUBMITTED:	

SCALE: AS SHOWN

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA
GOETZ ROAD TRUNK SEWER PROJECT
PLAN AND PROFILE
FROM STA 77+00.00 TO 82+70.00

SPEC NO.	1521S
I.D.	IJ-35
S.A.	33
W.O.	477936
C.O.	
COORD.	22-B-5
SHEET:	7 OF 14
	D-71448

APPENDIX L – DRAFT 30% DESIGN PLANS

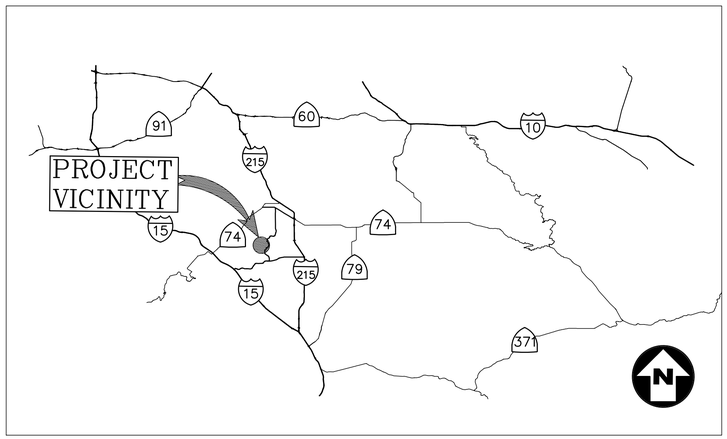
EASTERN MUNICIPAL WATER DISTRICT

RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4

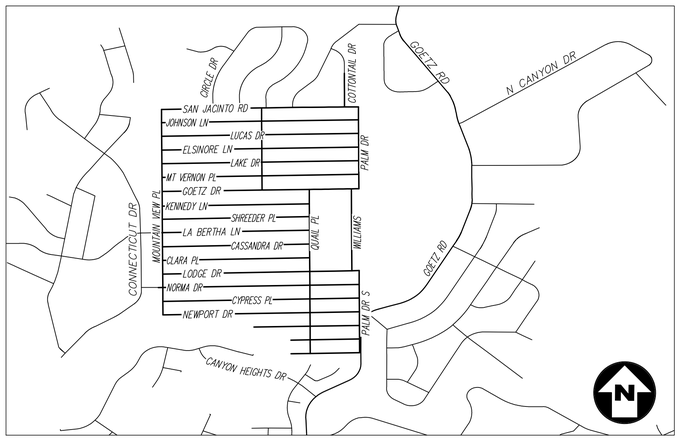
SEWER IMPROVEMENT PLANS

emwd EASTERN MUNICIPAL WATER DISTRICT



VICINITY MAP

N.T.S.



LOCATION MAP

N.T.S.

NOTIFICATIONS

AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION, CONTRACTOR SHALL NOTIFY:

1. EASTERN MUNICIPAL WATER DISTRICT: FIELD ENGINEERING SERVICES - (951) 928-3777 EXT. 4372
2. PERMIT AGENCY: A. CITY OF MURRIETA - (951) 698-1040
   B. CITY OF MENIFEE - XX
3. UNDERGROUND SERVICE ALERT (USA): 811
4. ALL OTHER AFFECTED AGENCIES THAT ARE NOT MEMBERS OF USA ALERT.

SEWER CERTIFICATION

I CERTIFY THAT THE DESIGN OF THE SEWER SYSTEM IS IN ACCORDANCE WITH THE EASTERN MUNICIPAL WATER DISTRICT'S SEWER SYSTEM MASTER PLAN, AND THE DISTRICT HAS PROGRAMMED ADEQUATE CAPACITY TO TREAT WASTES FROM THE PROPOSED DEVELOPMENT.

EASTERN MUNICIPAL WATER DISTRICT

BY _____ _____

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

BENCHMARK:

HORIZONTAL DATUM:

VERTICAL DATUM:

THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY AND ACCEPTABILITY OF THE DESIGN HEREON. IN THE EVENT OF DISCREPANCIES ARISING AFTER COUNTY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE COUNTY.

DECLARATION OF ENGINEER OF RECORD

I HEREBY DECLARE THAT THE DESIGN OF THE IMPROVEMENTS AS SHOWN ON THESE PLANS COMPLIES WITH PROFESSIONAL ENGINEERING STANDARDS AND PRACTICES. AS THE ENGINEER IN RESPONSIBLE CHARGE OF THE DESIGN OF THESE IMPROVEMENTS, I ASSUME FULL RESPONSIBLE CHARGE FOR SUCH DESIGN. I UNDERSTAND AND ACKNOWLEDGE THAT THE PLAN CHECK OF THESE PLANS BY EASTERN MUNICIPAL WATER DISTRICT (EMWD) IS A REVIEW FOR THE LIMITED PURPOSE OF ENSURING THAT THE PLANS COMPLY WITH EMWD PROCEDURES, APPLICABLE POLICES AND ORDINANCES. THE PLAN CHECK IS NOT A DETERMINATION OF THE TECHNICAL ADEQUACY OF THE DESIGN OF THE IMPROVEMENTS. SUCH PLAN CHECK DOES NOT, THEREFORE, RELIEVE ME OF MY RESPONSIBILITY FOR THE DESIGN OF THESE IMPROVEMENTS. AS ENGINEER OF RECORD, I AGREE TO INDEMNIFY AND HOLD EMWD, IT'S OFFICERS, AGENTS, AND EMPLOYEES HARMLESS FROM ANY AND ALL LIABILITY, CLAIMS, DAMAGES OR INJURIES TO ANY PERSON OR PROPERTY WHICH MIGHT ARISE FROM THE NEGLIGENT ACTS, ERRORS OR OMISSIONS OF THE ENGINEER OF RECORD. I HAVE READ AND INFORMED THE PROJECT APPLICANT/DEVELOPER THAT APPROVAL OF THESE PLANS DO NOT RELIEVE THEM FROM THE REQUIREMENTS OF THE DESIGN CONDITIONS.

BY _____ _____

R.C.E. DATE

ENGINEER'S DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER DESIGN OF THIS PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.
I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY EASTERN MUNICIPAL WATER DISTRICT IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

BY _____ _____

R.C.E. DATE

UNDERGROUND UTILITIES NOTE

ALL UNDERGROUND STRUCTURES OR UTILITIES REPORTED BY THE OWNER OR OTHERS AND THOSE SHOWN ON THE RECORDS EXAMINED ARE INDICATED WITH THEIR APPROXIMATE LOCATION AND EXTENT.

THE OWNER, BY ACCEPTING THESE PLANS OR PROCEEDING WITH THE IMPROVEMENTS PURSUANT THERETO AGREES TO ASSUME LIABILITY AND TO HOLD THE UNDERSIGNED HARMLESS FOR ANY DAMAGES RESULTING FROM THE EXISTENCE OF UNDERGROUND UTILITIES OR STRUCTURES NOT REPORTED TO THE UNDERSIGNED, NOT INDICATED ON THE PUBLIC RECORDS EXAMINED, LOCATED AT VARIANCE WITH THAT REPORTED OR SHOWN ON THE RECORDS EXAMINED.

THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OR STRUCTURES SHOWN AND ANY OTHER UTILITIES OR STRUCTURES FOUND AT THE SITE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNERS OF THE UTILITIES OR STRUCTURES CONCERNED BEFORE STARTING WORK.

CALL UNDERGROUND SERVICE ALERT (U.S.A.) 1-800-227-2600 OR 811 AT LEAST 2 WORKING DAYS PRIOR TO EXCAVATION.

TIME LIMITATION

THE TIME LIMIT ON DRAWING(S) APPROVAL SHALL BE SIX (6) MONTHS FROM THE DATE ON THE CERTIFICATION. IF CONSTRUCTION HAS NOT COMMENCED WITHIN STATED TIME, EMWD REQUIRES DRAWING(S) TO BE REVIEWED BY THE DEVELOPER/DESIGN ENGINEER AND RESUBMITTED TO EMWD FOR POSSIBLE CHANGES IN MASTER PLANNED SIZING AND CHANGES IN SPECIFICATIONS AND STANDARDS.

30% SUBMITTAL

RECORD PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.		

DIG ALERT

Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

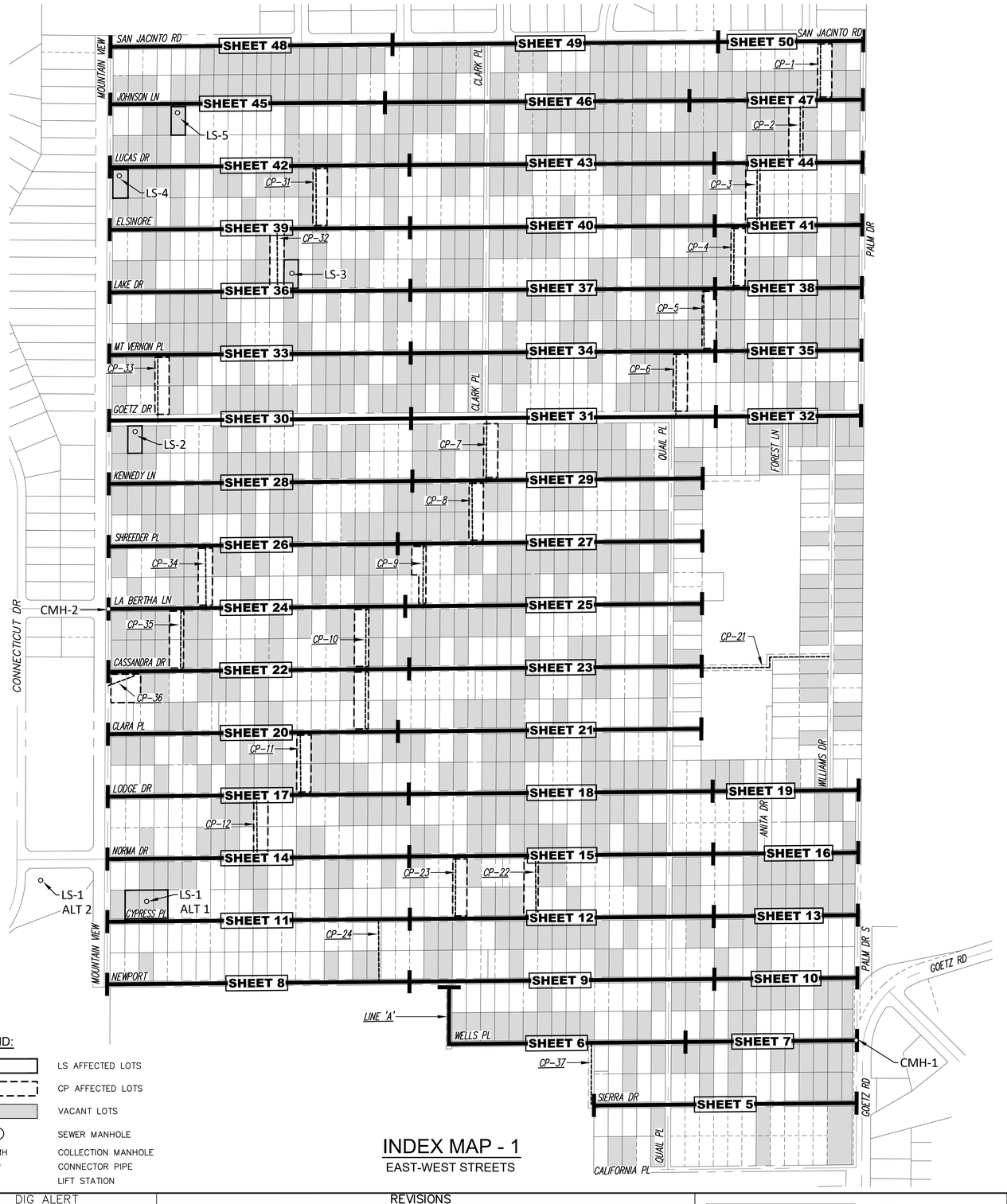
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

TITLE SHEET

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	1 OF 70
	D—

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-001-TITLE.DWG SHEVCHENKO, OLGA 12/30/2024 4:20 PM



LEGEND:

- LS AFFECTED LOTS
- CP AFFECTED LOTS
- VACANT LOTS
- SEWER MANHOLE
- CMH COLLECTION MANHOLE
- CP CONNECTOR PIPE
- LS LIFT STATION

INDEX MAP - 1
EAST-WEST STREETS

DRAWING INDEX

EAST-WEST STREETS

SHEET NO.	DWG NO.	DESCRIPTION
1	D–XXXXXX	COVER SHEET
2		INDEX MAP 1 – EAST/WEST STREETS
3		INDEX MAP 2 – NORTH/SOUTH STREETS, CONNECTOR PIPES, LIFT STATION SITE PLANS, SITE BORINGS
4		GENERAL NOTES, CONSTRUCTION NOTES, AND QUANTITIES
5		SIERRA DRIVE – PLAN AND PROFILE STA: 10+00.00 TO 20+00.00
6		LINE 'A' – PLAN AND PROFILE STA: 10+00.00 TO 20+60.00
7		LINE 'A' – 20+60.00 TO 20+60.00, WELLS PLACE – PLAN AND PROFILE STA: 22+45.00 TO 24+25.00,
8		NEWPORT DRIVE – PLAN AND PROFILE STA: 10+00.00 TO 20+50.00
9		NEWPORT DRIVE – PLAN AND PROFILE STA: 20+50.00 TO 31+50.00
10		NEWPORT DRIVE – PLAN AND PROFILE STA: 31+50.00 TO 36+50.00
11		CYPRESS PLACE – PLAN AND PROFILE STA: 10+00.00 TO 20+50.00
12		CYPRESS PLACE – PLAN AND PROFILE STA: 20+50.00 TO 31+50.00
13		CYPRESS PLACE – PLAN AND PROFILE STA: 31+50.00 TO 36+50.00
14		NORMA DRIVE – PLAN AND PROFILE STA: 10+00.00 TO 20+50.00
15		NORMA DRIVE – PLAN AND PROFILE STA: 20+50.00 TO 31+50.00
16		NORMA DRIVE – PLAN AND PROFILE STA: 31+50.00 TO 36+50.00
17		LODGE DRIVE – PLAN AND PROFILE STA: 10+00.00 TO 20+30.00
18		LODGE DRIVE – PLAN AND PROFILE STA: 20+30.00 TO 31+30.00
19		LODGE DRIVE – PLAN AND PROFILE STA: 31+30.00 TO 36+50.00
20		CLARA PLACE – PLAN AND PROFILE STA: 10+00.00 TO 20+40.00
21		CLARA PLACE – PLAN AND PROFILE STA: 20+40.00 TO 30+00.00
22		CASSANDRA DRIVE – PLAN AND PROFILE STA: 10+00.00 TO 20+60.00
23		CASSANDRA DRIVE – PLAN AND PROFILE STA: 20+60.00 TO 30+00.00
24		LA BERTHA LANE – PLAN AND PROFILE STA: 10+00.00 TO 20+50.00
25		LA BERTHA LANE – PLAN AND PROFILE STA: 20+50.00 TO 30+00.00
26		SHREEDER PLACE – PLAN AND PROFILE STA: 10+00.00 TO 20+30.00
27		SHREEDER PLACE – PLAN AND PROFILE STA: 20+30.00 TO 30+00.00
28		KENNEDY LANE – PLAN AND PROFILE STA: 10+00.00 TO 20+90.00
29		KENNEDY LANE – PLAN AND PROFILE STA: 20+90.00 TO 32+85.00
30		GOETZ DRIVE – PLAN AND PROFILE STA: 10+00.00 TO 20+50.00
31		GOETZ DRIVE – PLAN AND PROFILE STA: 20+50.00 TO 31+40.00
32		GOETZ DRIVE – PLAN AND PROFILE STA: 31+40.00 TO 36+50.00, FOREST LANE – STA: 10+00.00 TO 12+00.00
33		MOUNT VERNON PLACE – PLAN AND PROFILE STA: 10+00.00 TO 20+50.00
34		MOUNT VERNON PLACE – PLAN AND PROFILE STA: 20+50.00 TO 31+50.00
35		MOUNT VERNON PLACE – PLAN AND PROFILE STA: 31+50.00 TO 36+50.00
36		LAKE DRIVE – PLAN AND PROFILE STA: 10+00.00 TO 20+50.00
37		LAKE DRIVE – PLAN AND PROFILE STA: 20+50.00 TO 31+50.00
38		LAKE DRIVE – PLAN AND PROFILE STA: 31+50.00 TO 36+50.00
39		ELSINORE LANE – PLAN AND PROFILE STA: 10+00.00 TO 20+50.00
40		ELSINORE LANE – PLAN AND PROFILE STA: 20+50.00 TO 31+50.00
41		ELSINORE LANE – PLAN AND PROFILE STA: 31+50.00 TO 36+50.00
42		LUCAS DRIVE – PLAN AND PROFILE STA: 10+00.00 TO 20+40.00
43		LUCAS DRIVE – PLAN AND PROFILE STA: 20+40.00 TO 31+30.00
44		LUCAS DRIVE – PLAN AND PROFILE STA: 31+30.00 TO 36+50.00
45		JOHNSON LANE – PLAN AND PROFILE STA: 10+00.00 TO 19+90.00
46		JOHNSON LANE – PLAN AND PROFILE STA: 19+90.00 TO 30+50.00
47		JOHNSON LANE – PLAN AND PROFILE STA: 30+50.00 TO 36+50.00
48		SAN JACINTO ROAD – PLAN AND PROFILE STA: 10+00.00 TO 20+00.00
49		SAN JACINTO ROAD – PLAN AND PROFILE STA: 20+00.00 TO 31+50.00
50		SAN JACINTO ROAD – PLAN AND PROFILE STA: 31+50.00 TO 36+50.00

30% SUBMITTAL

SCALE: 1"=200'

DIG ALERT
Call: TOLL FREE
1–800–227–2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES T. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

INDEX MAP - 1
EAST/WEST STREETS

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 2 OF 70
D–

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

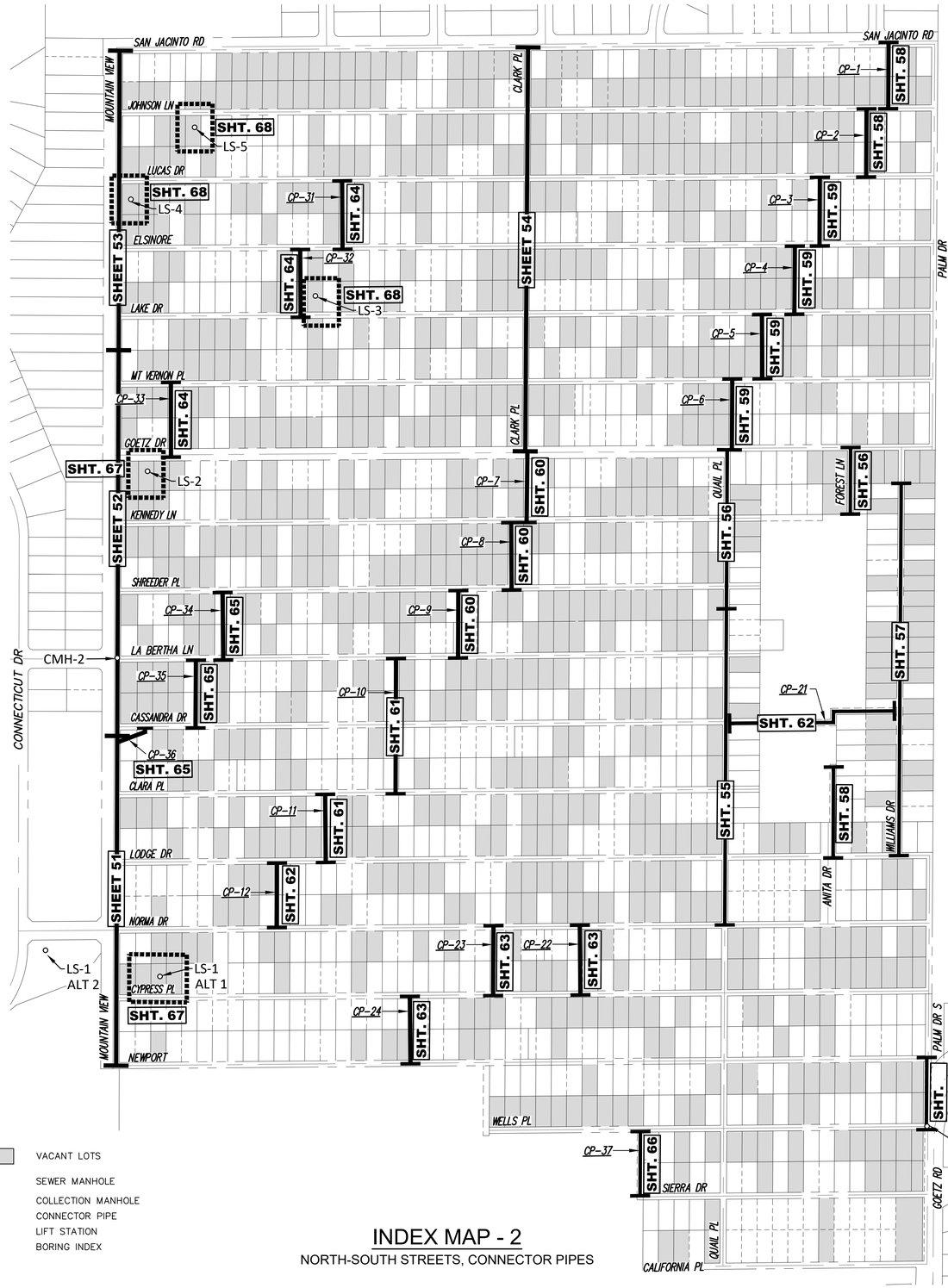
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-002-STREETS.DWG SHEVCHENKO, OLGA 12/30/2024 4:21 PM

DRAWING INDEX

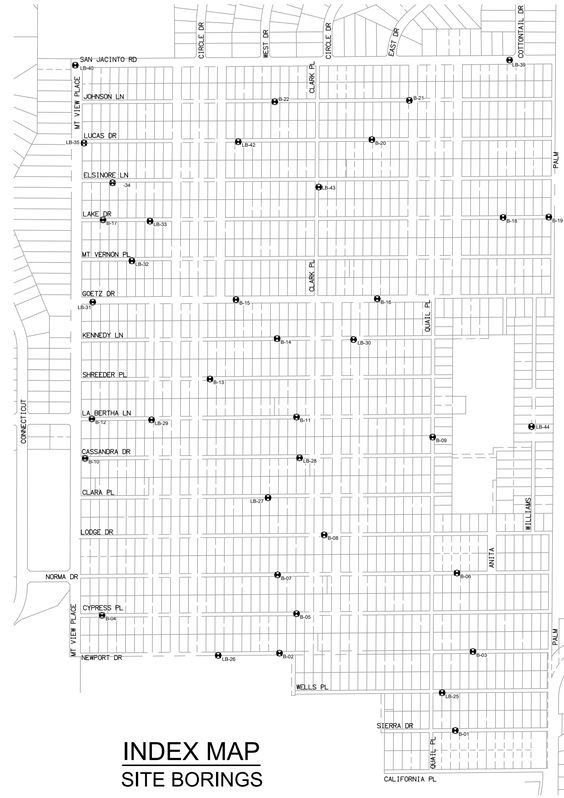
NORTH-SOUTH STREETS, CONNECTOR PIPES, LIFT STATIONS SITE PLANS

SHEET NO.	DWG NO.	DESCRIPTION
51		MOUNTAIN VIEW PLACE – PLAN AND PROFILE STA: 10+00.00 TO 20+80.00
52		MOUNTAIN VIEW PLACE – PLAN AND PROFILE STA: 20+80.00 TO 33+00.00
53		MOUNTAIN VIEW PLACE – PLAN AND PROFILE STA: 33+00.00 TO 43+00.00
54		CLARK PLACE – PLAN AND PROFILE STA: 10+00.00 TO 17+00.00
55		QUAIL PLACE – PLAN AND PROFILE STA: 21+00.00 TO 31+50.00
56		QUAIL PLACE – PLAN AND PROFILE STA: 31+50.00 TO 36+50.00, FOREST STREET – PLAN AND PROFILE STA: 10+00 TO 12+50.00
57		WILLIAMS DRIVE – PLAN AND PROFILE STA: 11+00.00 TO 22+10.00
58		ANITA DRIVE – PLAN AND PROFILE STA: 12+00.00 TO 15+50.00, CP–1, CP–2 – PLAN AND PROFILE
59		CONNECTOR PIPES CP–3, CP–4, CP–5, & CP–6
60		CONNECTOR PIPES CP–7, CP–8, & CP–9
61		CONNECTOR PIPES CP–10 & CP–11
62		CONNECTOR PIPES CP–12 & CP–21
63		CONNECTOR PIPES CP–22, CP–23, & CP–24
64		CONNECTOR PIPES CP–31, CP–32, & CP–33
65		CONNECTOR PIPES CP–34, CP–35, & CP–36
66		PALM DRIVE (SOUTH), CONNECTOR PIPE CP–37
67		SITE PLAN – LIFT STATION LS1 & LS2
68		SITE PLAN – LIFT STATION LS3, LS4 & LS5
69		CONSTRUCTION DETAILS
70		CONSTRUCTION DETAILS



INDEX MAP - 2

NORTH-SOUTH STREETS, CONNECTOR PIPES



INDEX MAP
SITE BORINGS

LEGEND:

- VACANT LOTS
- SEWER MANHOLE
- CMH — COLLECTION MANHOLE
- CP — CONNECTOR PIPE
- LS — LIFT STATION
- B–02 — BORING INDEX

30% SUBMITTAL

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Michael Baker INTERNATIONAL

40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER — MILES W. COSTANZA — No. 87843 — CIVIL — STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

INDEX MAP - 2
NORTH - SOUTH STREETS, CONNECTOR PIPES, LIFT STATION SITE PLANS, SITE BORINGS

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 3 OF 70
D–

RECOMD | PLAN CHECK | OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\ULV\196454-SWR-003-STREETS NS.DWG SHEVCHENKO, OLGA 12/30/2024 4:24 PM

EMWD SEWER NOTES:

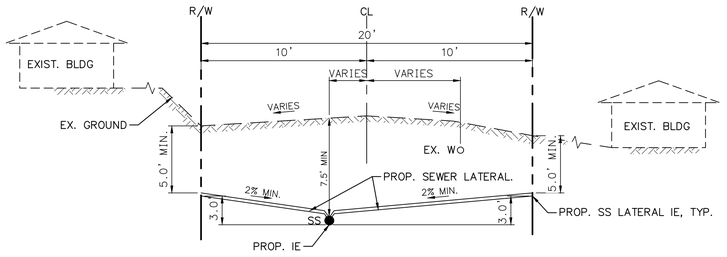
1. SEWER SYSTEM CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH EMWD'S STANDARDS AND SPECIFICATIONS.
2. GRAVITY SEWER PROFILE ELEVATIONS ARE TO FLOW LINE (CONDUIT INVERT) FORCE MAIN PROFILE ELEVATIONS ARE TO CENTIGRADE (C.G.)
3. CONTRACTOR HAS THE OPTION TO INSTALL PLASTIC OR VCP SEWER EXCEPT WHERE SPECIFICALLY DESIGNATED ON PLANS PER EMWD STANDARDS AND SPECIFICATIONS.
4. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD DRAWINGS SB-53, SB-58 AND SB-61, AS APPLICABLE, SEWER MAINS MAY BE LAID THROUGH THE MANHOLES AND USED AS A FORM FOR THE INVERT.
5. MANHOLES OF DEPTHS LESS THAN FIVE FEET FROM FINISH STREET GRADE TO SEWER PIPE SHELF ARE TO BE CONSTRUCTED IN ACCORDANCE WITH STANDARD DRAWING SB-30.
6. ALL LATERALS SHALL HAVE AN ON-SITE CLEANOUT IN ACCORDANCE WITH STANDARD DRAWINGS SB-52. IN ADDITION, FOR LATERALS SERVING INDUSTRIAL AND/OR COMMERCIAL DEVELOPMENTS, THE REQUIREMENTS FOR SAMPLING AND/OR PRETREATMENT FACILITIES SHALL BE DETERMINED BY CONTACTING EMWD'S SOURCES CONTROL DIVISION AT (951) 928-3777, EXT. 6209.
7. MAINLINE CLEANOUTS, WHERE CALLED FOR ON THE PLANS, SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD DRAWING SB-52.
8. PRIOR TO CONSTRUCTION OF SEWER, CONTRACTOR SHALL EXPOSE ANY EXISTING SEWER AND ALL SEPTIC SYSTEM COMPONENTS AND VERIFY EXISTING ELEVATIONS AND LOCATIONS. WHERE CALLED CONNECTING TO EXISTING MANHOLES AND INLET STUB OF PROPER SIZE EXISTS, NO ALTERATIONS SHALL BE MADE TO EXISTING MANHOLES BASE OR STUB EXCEPT AS SPECIFICALLY AUTHORIZED BY EMWD.
9. ALL SEWER INLETS AT THE MANHOLE SHALL BE SUCH THAT ITS CROWN SHALL BE LEVEL WITH THE CROWN OF THE OUTLET PIPE, AT THEIR PROJECTIONS TO THE MANHOLE CENTERLINE.
10. RECONSTRUCTION OF EXISTING MANHOLES SHALL BE SCHEDULED AT THE CONVENIENCE OF EMWD AND SHALL BE COMPLETED WITHIN FIVE WORKING DAYS FOLLOWING ITS COMMENCEMENT.
11. PRIVATE LOWER SEWER SERVICE SHALL BE CONSTRUCTED IN ACCORDANCE WITH SB-117. LOCATIONS OF WYES AND LATERALS WHERE NOT SHOWN ON THE PLANS, ARE TO BE DETERMINED IN THE FIELD PRIOR TO CONSTRUCTION TO MISS DRIVEWAYS. ALL LATERALS ARE TO BE 4" IN DIAMETER UNLESS OTHERWISE SHOWN ON PLANS. CONNECTIONS OF NEW PRIVATE LOWER SEWER SERVICE LATERALS TO EXISTING SEWER ARE TO BE PER STANDARD DRAWING SB-176.
12. THE CONTRACTOR IS ADVISED THAT THE WORK ON THIS PROJECT MAY INVOLVED WORKING IN A CONFINED AIR SPACE. CONTRACTOR SHALL BE RESPONSIBLE FOR "CONFINED AIR SPACE" ARTICLE 108, TITLE 8, CALIFORNIA ADMINISTRATIVE CODE. "CONFINED AIR SPACE" ARTICLE 108, TITLE 8, CALIFORNIA ADMINISTRATIVE CODE. CONTRACTOR SHALL ALSO FOLLOW EMWD'S CONFINED SPACE POLICY.
13. BACKWATER VALVES SHALL BE INSTALLED PER SECTION 710.1 OF THE UNIFORM PLUMBING CODE.
14. ALL PIPE ZONE BEDDING AND TRENCH BACKFILL ARE TO BE PER STANDARD DRAWING SB-157, SB-158 AND SB-159.
15. REQUIREMENTS TO REMOVE EXISTING SEWER MANHOLE STUB AND JOIN WITH NEW SEWER. REMOVE EXISTING SEWER STUB, INSTALL SIKA HYDROPHILIC LEAKMASTER WATERSTOP, AND SEAL OPENING WITH SIKATOP 122 PLUS MORTAR. JOIN NEW SEWER BY CORING MANHOLE BASE (CORE SIZED TO ACCOMMODATE WATER STOPS). INSTALL SIKA HYDROTITE WATERSTOPS BOTH ON THE PIPE AND OUTSIDE DIAMETER OF THE CUTOUT. FILL THE ANNULUS SPACE WITH NON-SHRINK GROUT PER EMWD STANDARD DETAIL PROVISION SECTION 03300. COAT OUTER AFFECTED SURFACE AREAS OF MANHOLE WITH CARLISLE "BARRICOAT-R" PHONE NO. 800-527-7092 OR W.R. MEADOWS "MEL-ROL-LM" PHONE NO. 800-342-5976. RECHANNEL MANHOLE BOTTOM.

GENERAL NOTES:

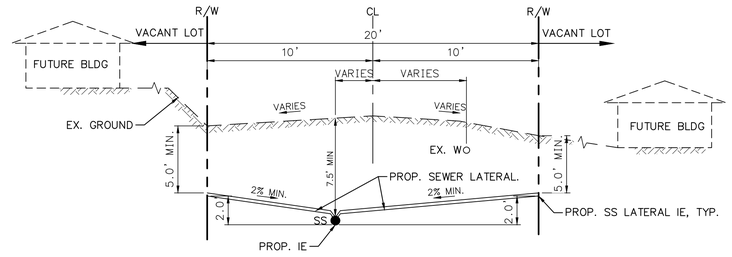
1. PERMITS FROM OTHER AGENCIES: APPROVAL BY EMWD IMPLIES NO PERMISSION OTHER THAN THAT WITHIN THE DISTRICT'S JURISDICTION. ALL PERMITS REQUIRED BY LAW SHALL BE ACQUIRED BY THE DEVELOPER OR HIS CONTRACTOR. REQUIREMENTS OF EMWD SHALL TAKE PRECEDENCE OVER REQUIREMENTS OF OTHER AGENCIES ONLY WHERE EMWD REQUIREMENTS ARE GREATER.
2. COORDINATION OF WORK: THE PROPOSED WORK SHALL BE SUBORDINATED TO ANY OPERATIONS EMWD MAY CONDUCT, AND SHALL BE COORDINATED WITH SUCH OPERATIONS AS DIRECT BY EMWD.
3. APPROVAL OF GRADES: APPROVAL BY EMWD OF A PROPOSED CONNECTION TO AN EMWD FACILITY DOES NOT IMPLY APPROVAL OF THE CORRECTNESS OF THE ELEVATIONS SHOWN ON THE PLAN.
4. STANDARDS OF CONSTRUCTION: ALL WORK SHALL CONFORM TO RECOGNIZED STANDARDS OF CONSTRUCTION, AS REQUIRED AND APPROVED BY EMWD.
5. WATER AND SEWER SEPARATION SHALL CONFORM TO STATE HEALTH CODE STANDARDS.
6. THE TYPES, LOCATIONS, SIZES AND/OR DEPTHS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE IMPROVEMENT PLANS WERE OBTAINED FROM SOURCES OF VARYING RELIABILITY. THE CONTRACTOR IS RESPONSIBLE FOR ALL EXCAVATION TO REVEAL THE TYPES. EXTENT, SIZES, LOCATIONS AND DEPTHS OF SUCH UNDERGROUND UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING FACILITIES.
7. THE CONTRACTOR IS HEREBY NOTIFIED THAT PRIOR TO COMMENCING CONSTRUCTION HE IS RESPONSIBLE FOR CONTACTING THE UTILITY COMPANIES INVOLVED AND REQUESTING A VERIFICATION AT THE CONSTRUCTION SITE OF THE LOCATION OF THEIR UNDERGROUND UTILITIES WHERE SUCH FACILITIES MAY POSSIBLY CONFLICT WITH PLACEMENT OF IMPROVEMENTS AS SHOWN ON THESE IMPROVEMENT PLANS. THE CONTRACTOR OR ANY SUBCONTRACTOR FOR THIS CONTRACT WILL BE REQUIRED TO NOTIFY MEMBERS OF UNDERGROUND SERVICE ALERT (USA) 48 HOURS IN ADVANCE OF PERFORMING WORK, BY CALL 811.
8. DESIGN ENGINEER SHALL BE RESPONSIBLE FOR ALL PROJECT SPECIFIC REQUIREMENTS AND DATA. DESIGN ENGINEER SHALL REFER TO THE DISTRICT'S SMALL SEWAGE LIFT STATION GUIDELINES AND SPECIFICATIONS, AND INFORMATION PROVIDED HEREIN TO DEVELOP THE PROJECT SPECIFIC REQUIREMENTS AND SUMMARIZE SAME IN THE ABOVE TABLE.

DESIGN ENGINEER SHALL BE A PROFESSIONAL CIVIL ENGINEER REGISTERED IN THE STATE OF CALIFORNIA.

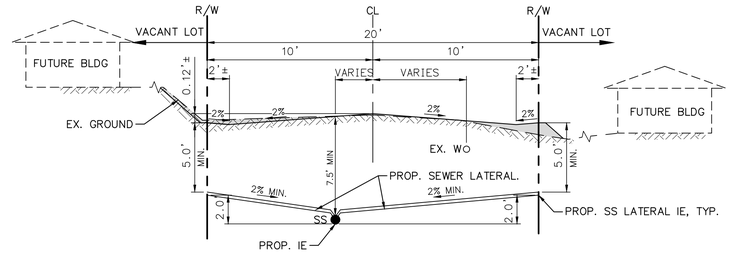
9. PROJECT SEISMIC DESIGN PARAMETERS SHALL BE PROVIDED IN ACCORDANCE WITH THE CALIFORNIA BUILDING CODE, LATEST EDITION. REFER TO SPECIFICATIONS FOR EQUIPMENT REQUIRING SEISMIC DESIGN CALCULATIONS.



EXISTING HOUSE
SEWER LATERAL - TYPICAL SECTION
MODIFIED PER STD. NO. XXX
N.T.S



VACANT LOT
SEWER LATERAL - TYPICAL SECTION
MODIFIED PER STD. NO. XXX
N.T.S



VACANT LOT
SEWER LATERAL - TYPICAL SECTION
WITH STREET FUTURE SURFACE REPAIR
MODIFIED PER STD. NO. XXX
N.T.S

LEGEND

EXISTING	PROPOSED	
		RIGHT-OF-WAY
		PROPERTY LINE
		STREET CENTERLINE
		FLOW LINE
8"W 8"W		WATER
8"ABND		ABANDONED WATER
S S		GRAVITY SEWER
		FORCE MAIN SEWER
G G		GAS
E		ELECTRIC
CATV CATV		CABLE
X X X		WALL
		RETAINING WALL
		GUARD RAIL
		FENCE
		EDGE CONCRETE
		EDGE ASPHALT
		DIRT ROAD
		CONCRETE
		ASPHALT CONCRETE
		DECOMPOSED GRANITE
		ENERGY DISSIPATOR RIP-RAP
		AWNING
		BUILDING
		FORCE MAIN AIR RELEASE VALVE
		FORCE MAIN BLOW OFF
		DIRECTION OF FLOW
	CO	SEWER MH
		FORCE MAIN CLEAN OUT
		HOUSE CLEAN OUT
		HOUSE LATERAL
		STORM DRAIN MH
		WATER VALVE
	WM	FIRE HYDRANT
		METER
		VAULT
		CATCH BASIN
		POWER POLE & GUY WIRE
		MAILBOX
		TREES
		STREET LIGHT POWER POLE
		STREET LIGHT
		SIGN

ABBREVIATION

ABAND	ABANDONED
ASPH	ASPHALT
CONC	CONCRETE
CL	CENTERLINE
CMH	COLLECTING MANHOLE
FM	FORCE MAIN
FM CO	FORCE MAIN CLEANOUT
EX, EXIST.	EXISTING
IE	INVERT ELEVATION
INV	INVERT
LAT	LATERAL
LF	LINEAR FEET
LS	LIFT STATION
LT	LEFT
MH	MANHOLE
No	NUMBER
OBS	OBSTACLE
OH	OVERHEAD
PROP.	PROPOSED
PVC	POLYVINYL CHLORIDE
RT	RIGHT
RW, ROW	RIGHT OF WAY
SD	STORM DRAIN
SS	SANITARY SEWER
STA	STATION
TG	TOP OF GRATE
VCP	VITRIFIED CLAY PIPE

30% SUBMITTAL

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-004-NOTES.DWG SHEVCHENKO, OLGA 1/2/2025 2:11 PM

RECOMD	PLAN CHECK	OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

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REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:
MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER — MILES I. COSTANZA — No. 87843 — CIVIL — STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA
QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS
GENERAL NOTES, CONSTRUCTION NOTES, AND QUANTITIES

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	4 OF 70
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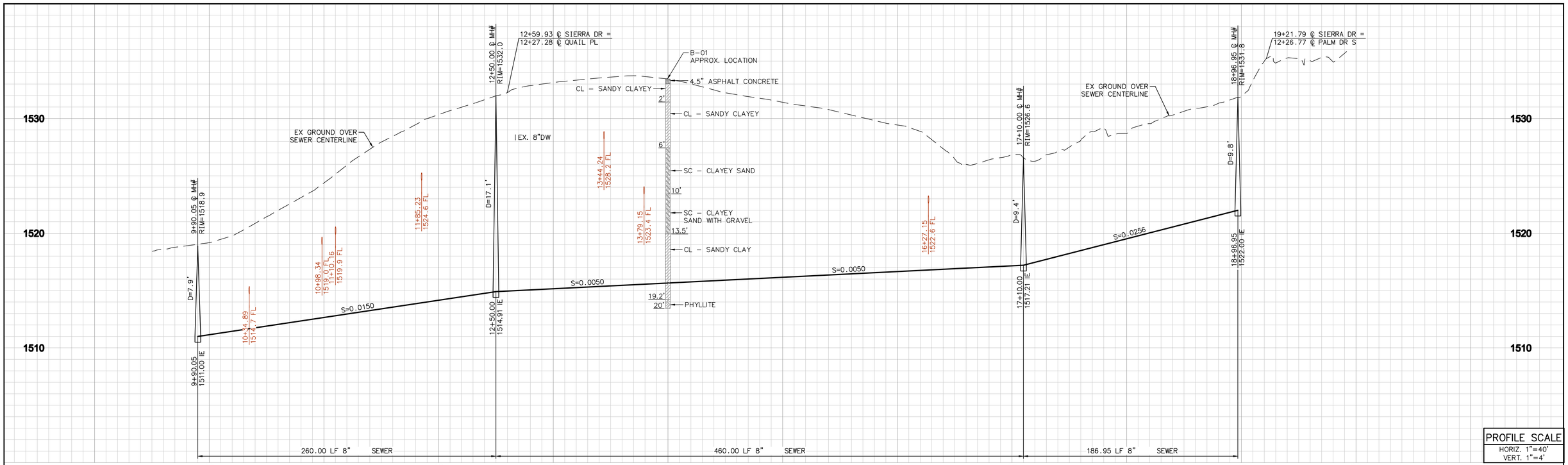
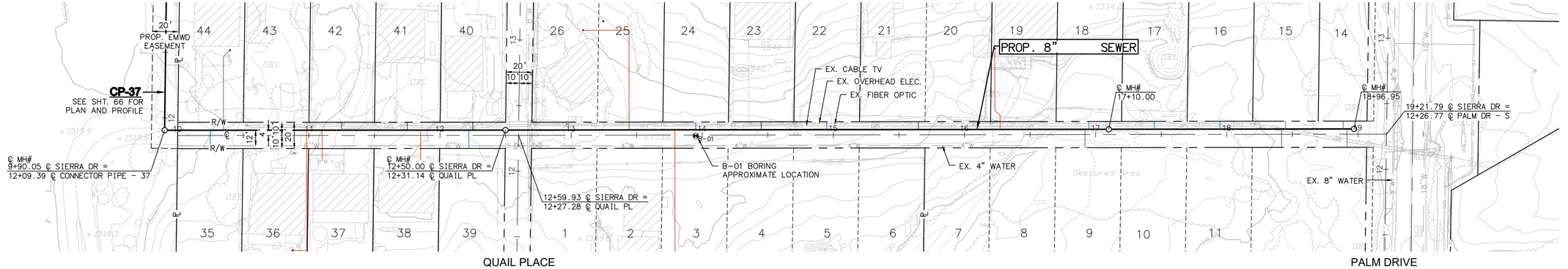


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SIERRA DRIVE



LEGEND:

- EMPTY LOTS SEWER LATERAL
- EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

RECORD PLAN CHECK OVERSIGHT ENGINEER REGISTRATION NUMBER DATE SIGNED

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UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER
MILES T. COSTANZA
No. 87843
CIVIL
STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

SIERRA DRIVE
PLAN AND PROFILE STA. 10+00.00 TO 20+00.00

I.D.	
S.A.	
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C.O.	
COORD.	
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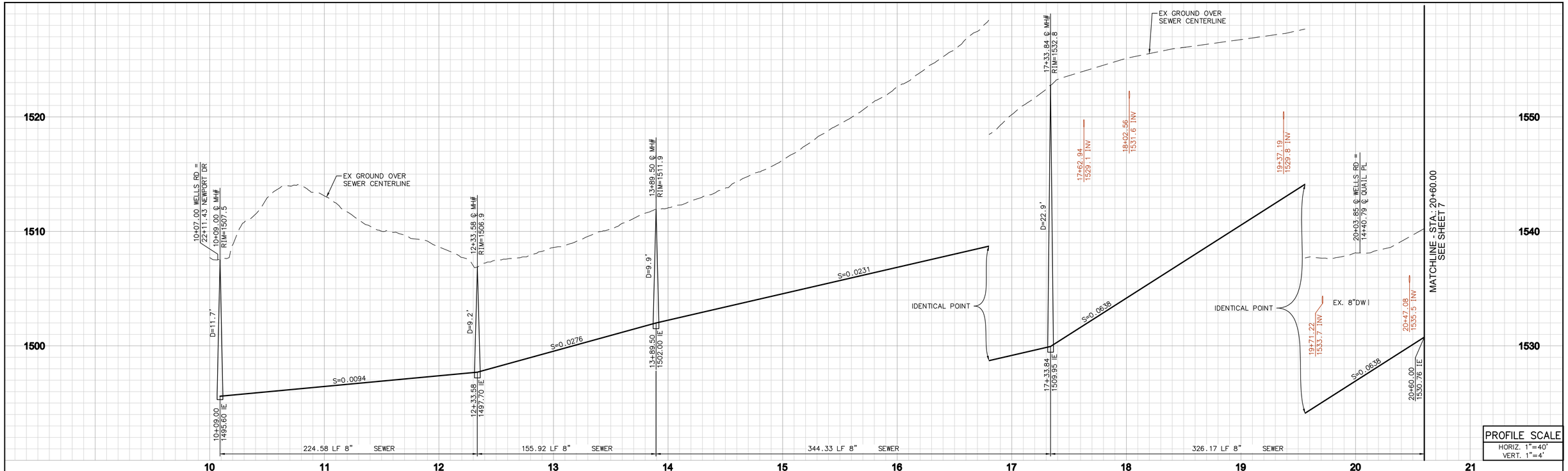

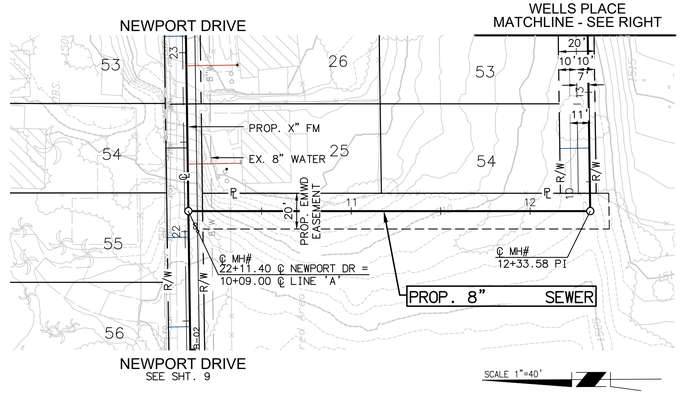

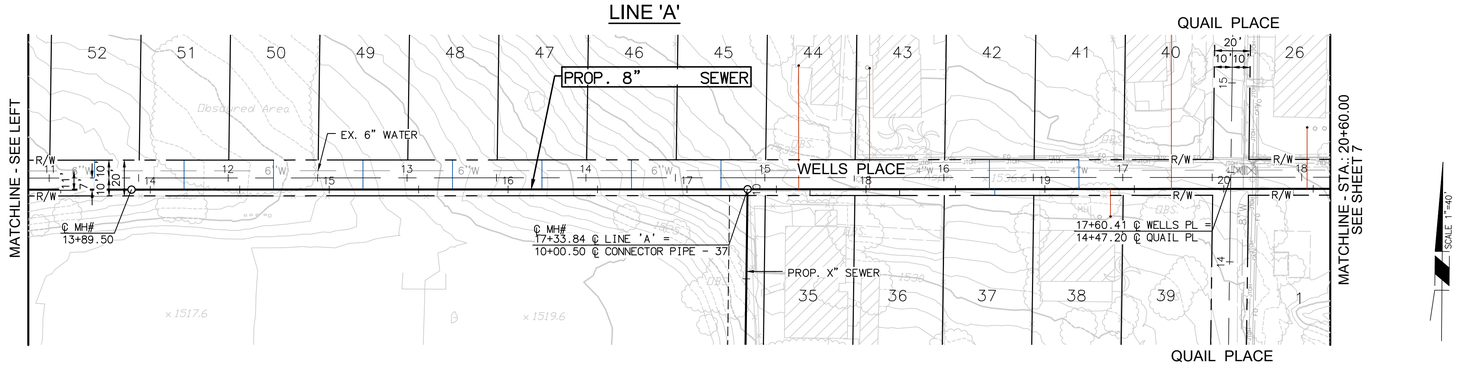

LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\DLV\196454-SWR-006-PL PRF-LINE A - 1.DWG SHEVCHENKO, OLGA 12/30/2024 4:55 PM

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REGISTERED PROFESSIONAL ENGINEER MILES T. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

LINE 'A'
PLAN AND PROFILE
STA. 10+00.00 TO 20+60.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	6 OF 70
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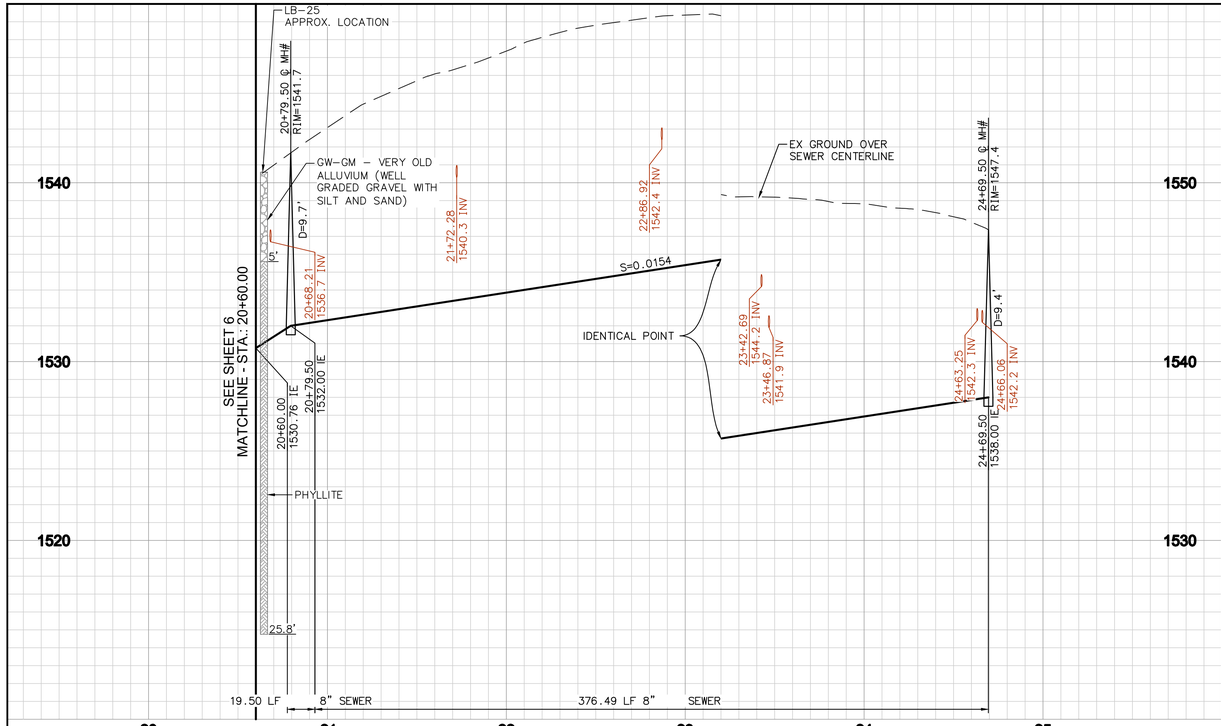
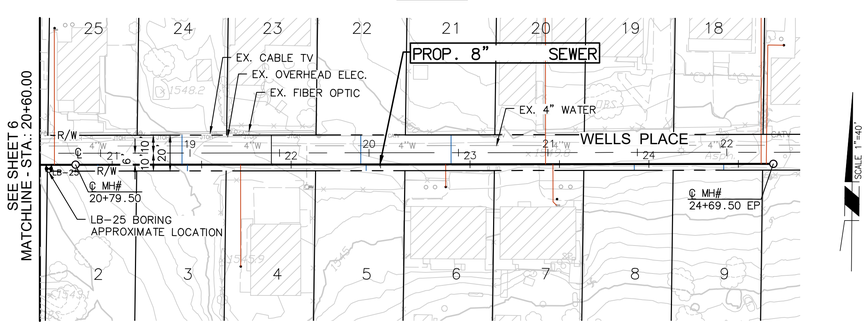
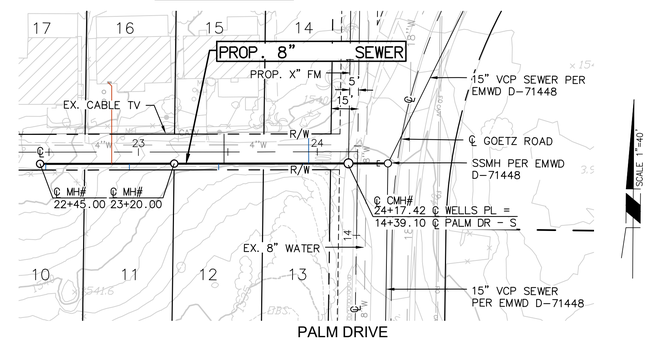
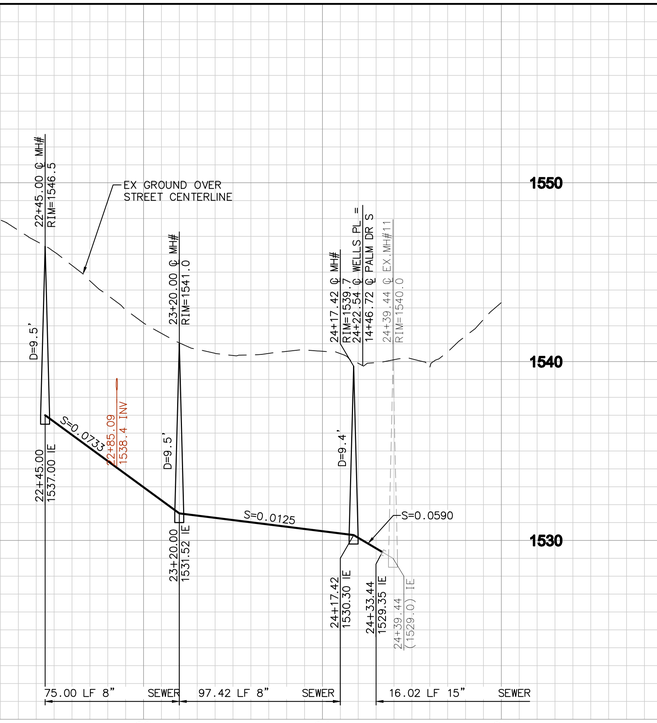


LINE 'A'





WELLS PLACE



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

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	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS
LINE 'A'
PLAN AND PROFILE STA. 20+60.00 TO 20+60.00
WELLS PLACE
PLAN AND PROFILE STA. 22+45.00 TO 24+25.00

I.D.	
S.A.	
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COORD.	
SHEET:	7 OF 70
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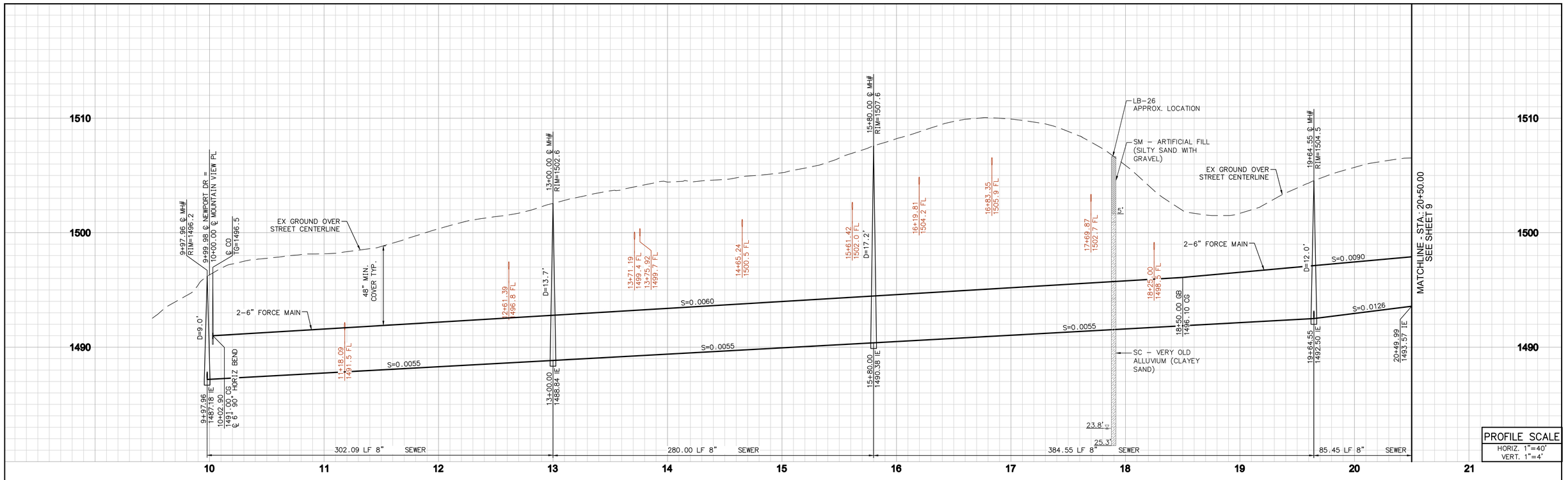
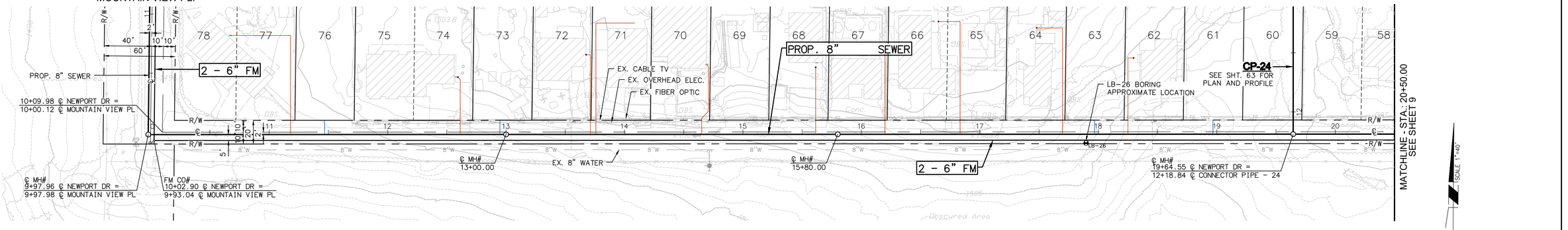


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

NEWPORT DRIVE



LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\DLV\196454-SWR-008-PL PRF-NEWPORT - 1.DWG SHEVCHENKO, OLGA 12/30/2024 5:01 PM

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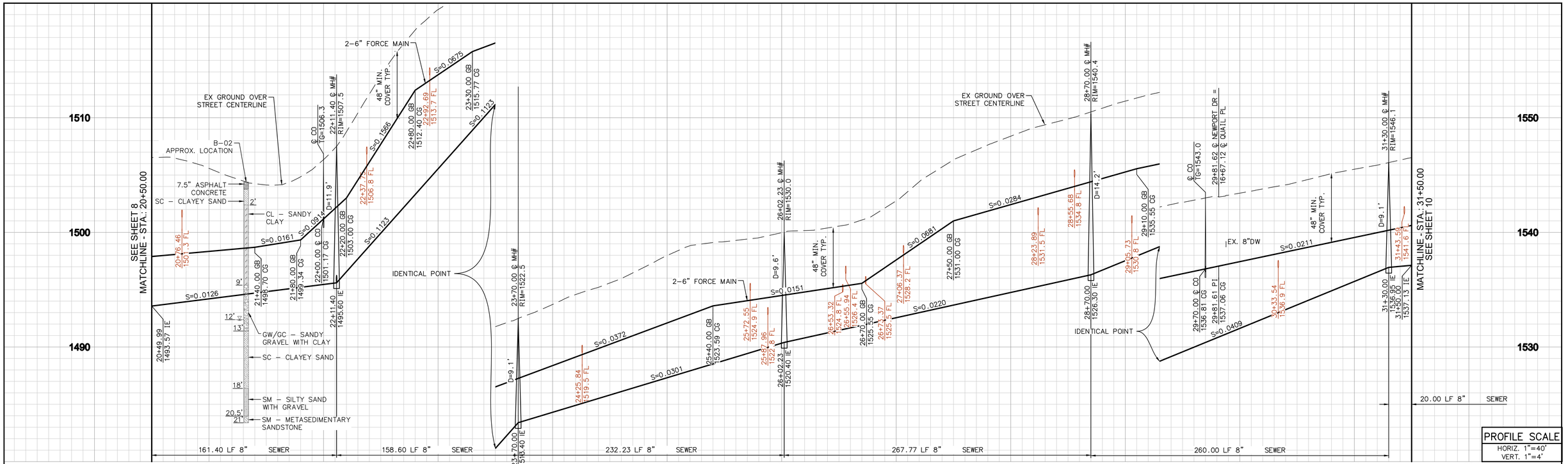
CONST. ADMIN.		

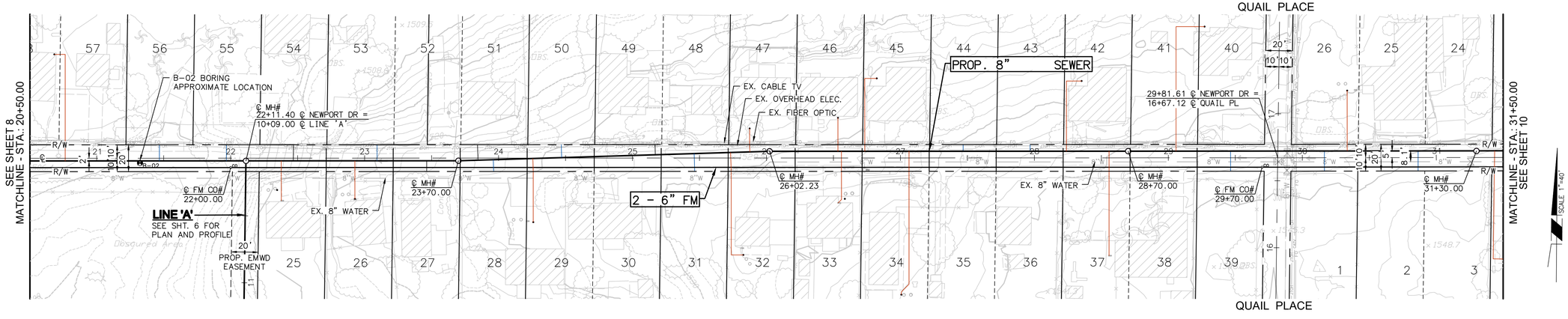
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

NEWPORT DRIVE
PLAN AND PROFILE
STA. 10+00.00 TO 20+50.00

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 8 OF 70
D-





LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT
Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:
MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES T. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

NEWPORT DRIVE
PLAN AND PROFILE
STA. 20+50.00 TO 31+50.00

I.D.	
S.A.	
W.O.	
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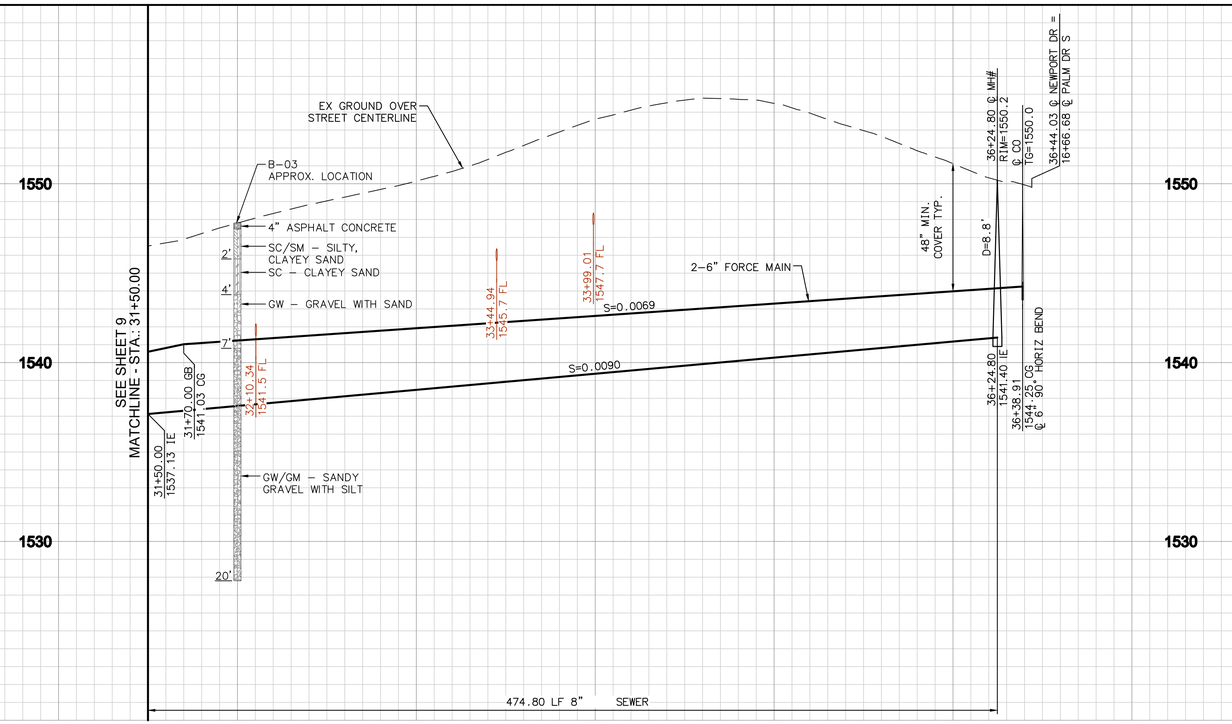
COORD.	
SHEET:	9 OF 70
	D-

RECMD | PLAN CHECK | OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

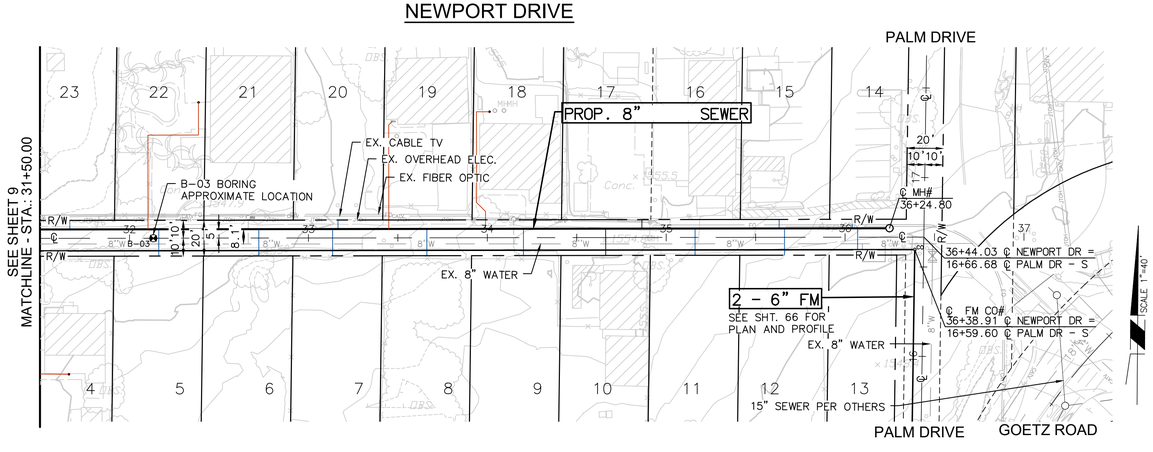
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\DLV\196454-SWR-009-PL PRF-NEWPORT - 2.DWG SHEVCHENKO, OLGA 12/30/2024 5:05 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

NEWPORT DRIVE



LEGEND:

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RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

NEWPORT DRIVE
PLAN AND PROFILE
STA. 31+50.00 TO 36+50.00

I.D.	
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SHEET:	10 OF 70
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RECMD	PLAN CHECK	OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

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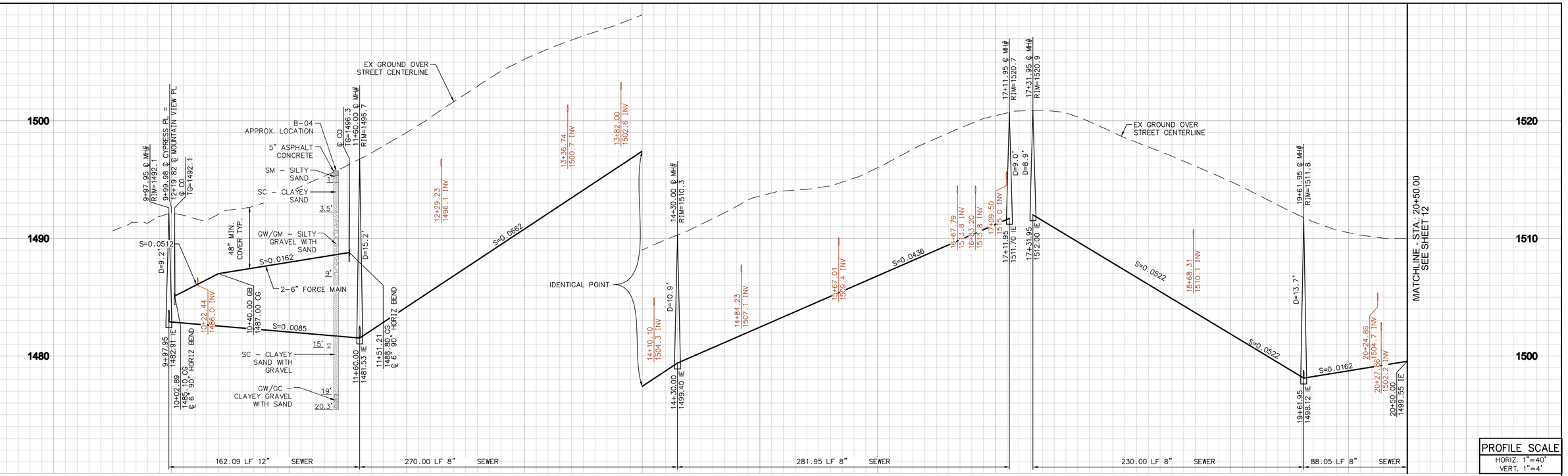
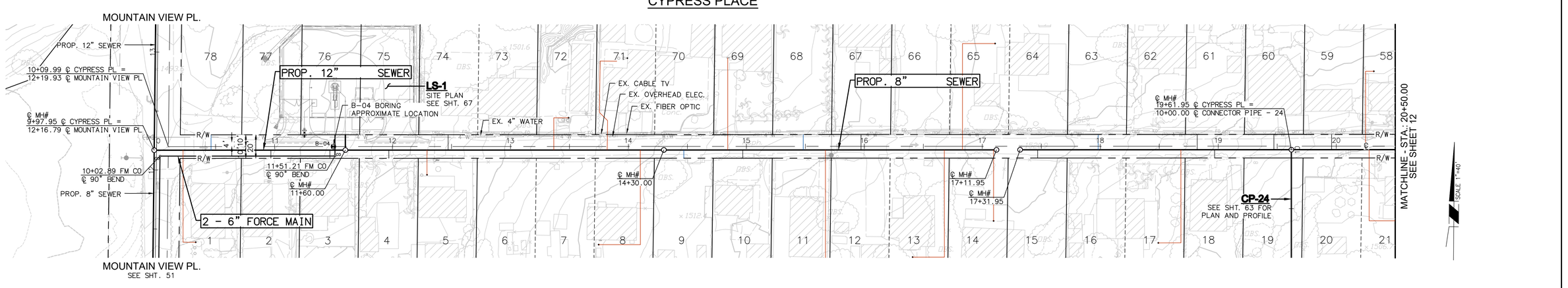


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

CYPRESS PLACE



LEGEND:

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EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

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RIVERSIDE COUNTY, CALIFORNIA

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C.O.	
COORD.	
SHEET:	11 OF 70
	D—

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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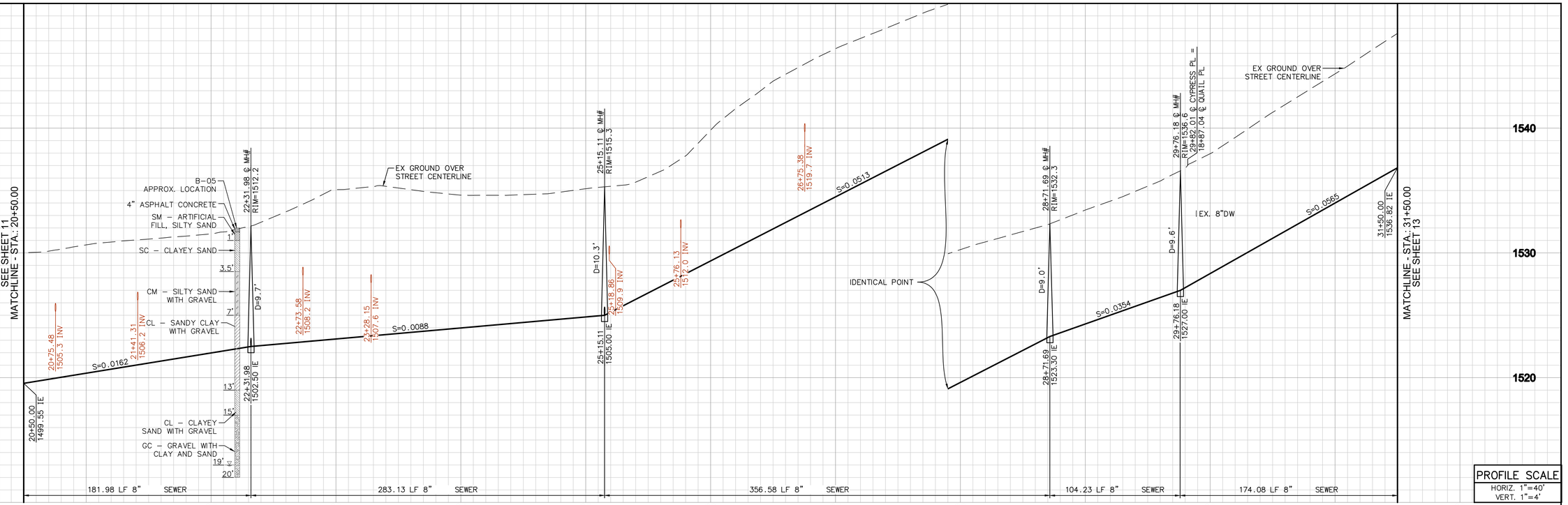
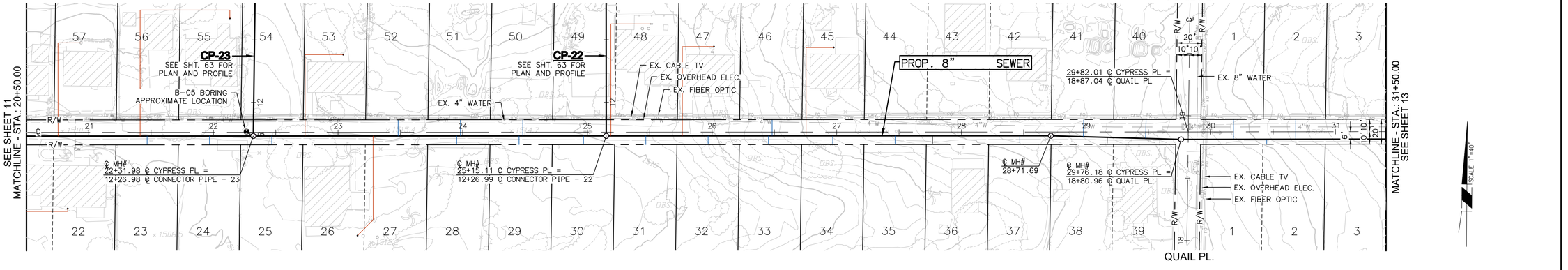


CYPRESS PLACE



LEGEND:

- EMPTY LOTS SEWER LATERAL
- EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT

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RIVERSIDE COUNTY, CALIFORNIA

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SEWER IMPROVEMENT PLANS

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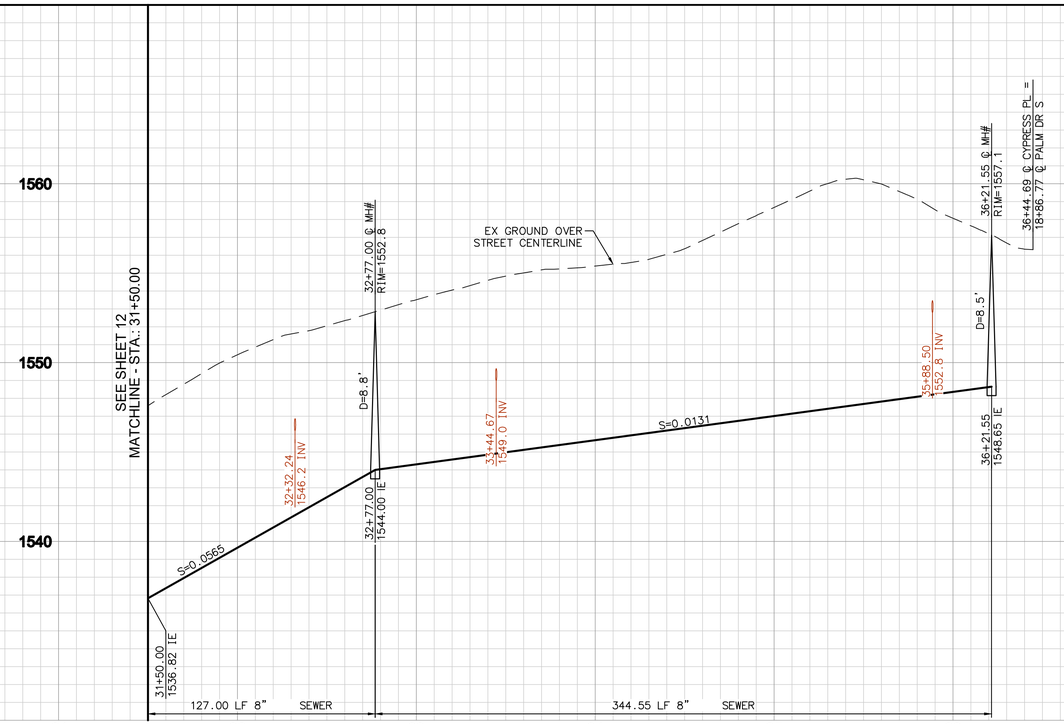
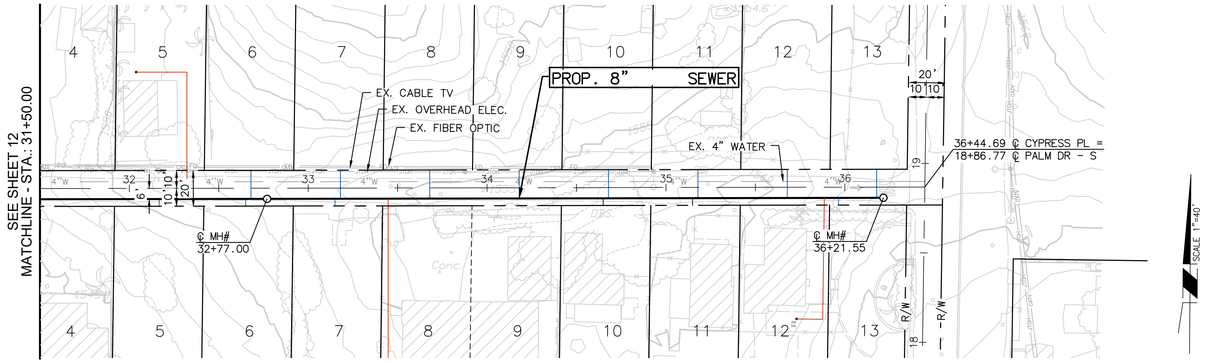


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

CYPRESS PLACE

PALM DR. S



PALM DR. S

LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\ULV\196454-SWR-013-PL PRF-CYPRESS - 3.DWG SHEVCHENKO, OLGA 12/31/2024 8:29 AM

RECORD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
	APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.		

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UNDER THE SUPERVISION OF:

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REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

CYPRESS PLACE
PLAN AND PROFILE
STA. 31+50.00 TO 36+50.00

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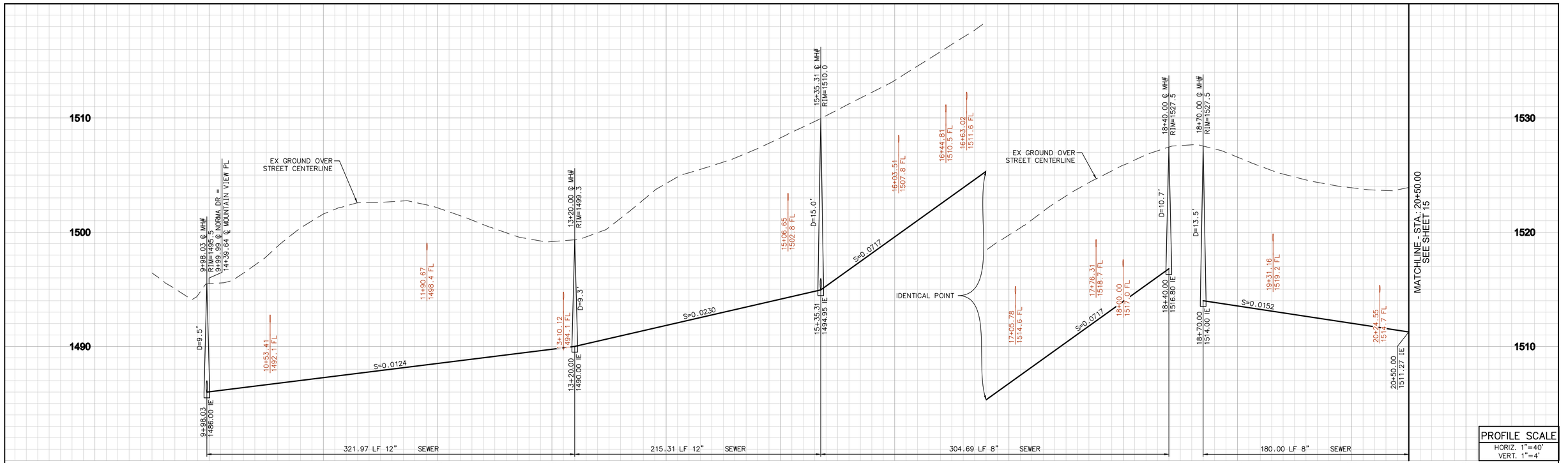
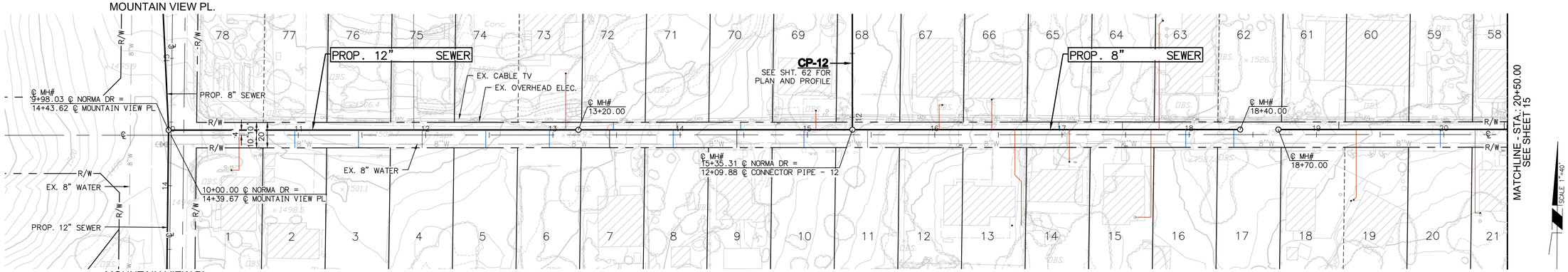


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

NORMA DRIVE



30% SUBMITTAL

SCALE: 1"=40'

RECORD PLAN CHECK OVERSIGHT ENGINEER REGISTRATION NUMBER DATE SIGNED

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UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

NORMA DRIVE
PLAN AND PROFILE
STA. 10+00.00 TO 20+50.00

I.D.	
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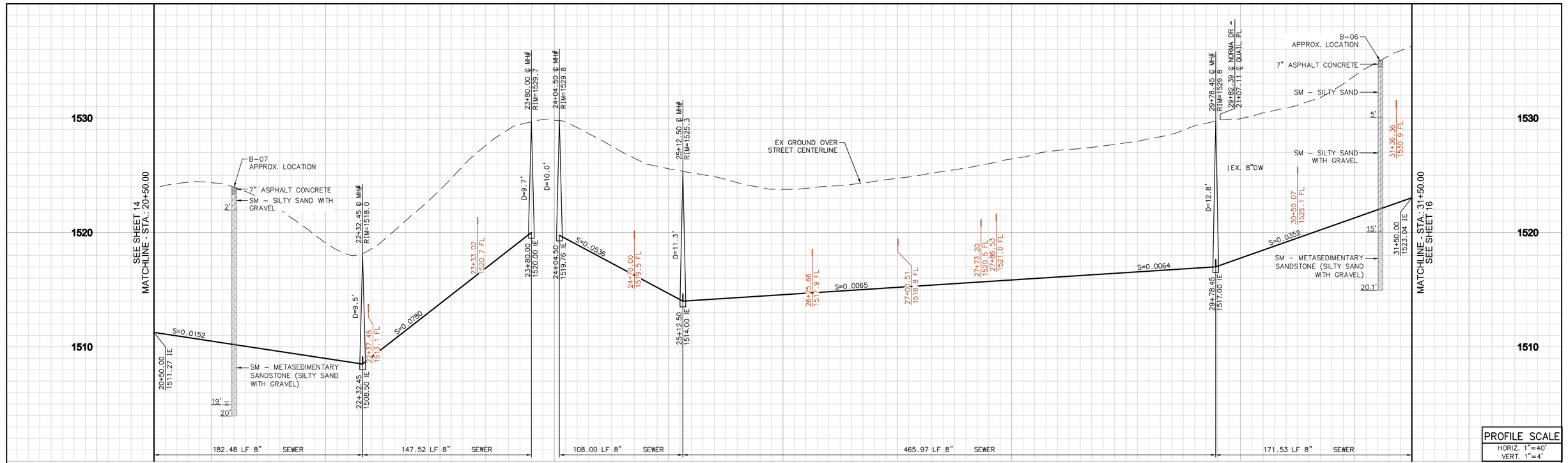
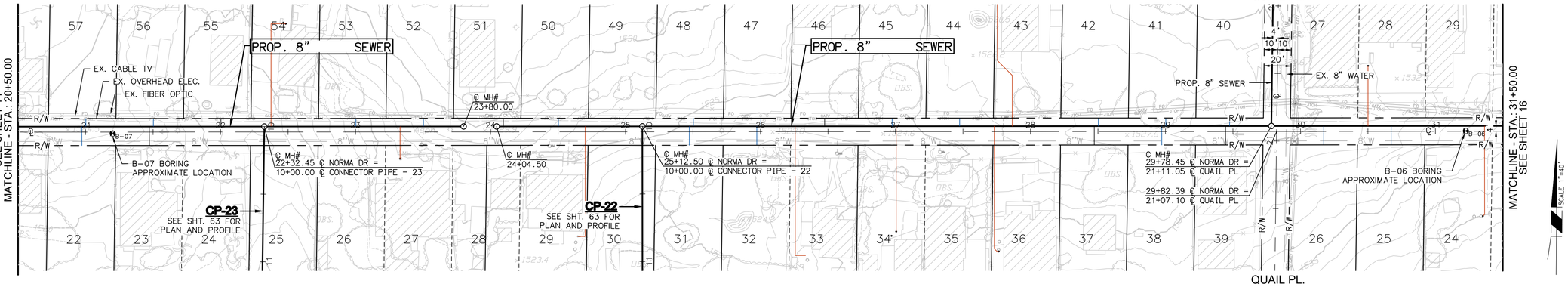


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

NORMA DRIVE



30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

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RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

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MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER – MILES W. COSTANZA – No. 87843 – CIVIL – STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

NORMA DRIVE
PLAN AND PROFILE
STA. 20+50.00 TO 31+50.00

I.D.	
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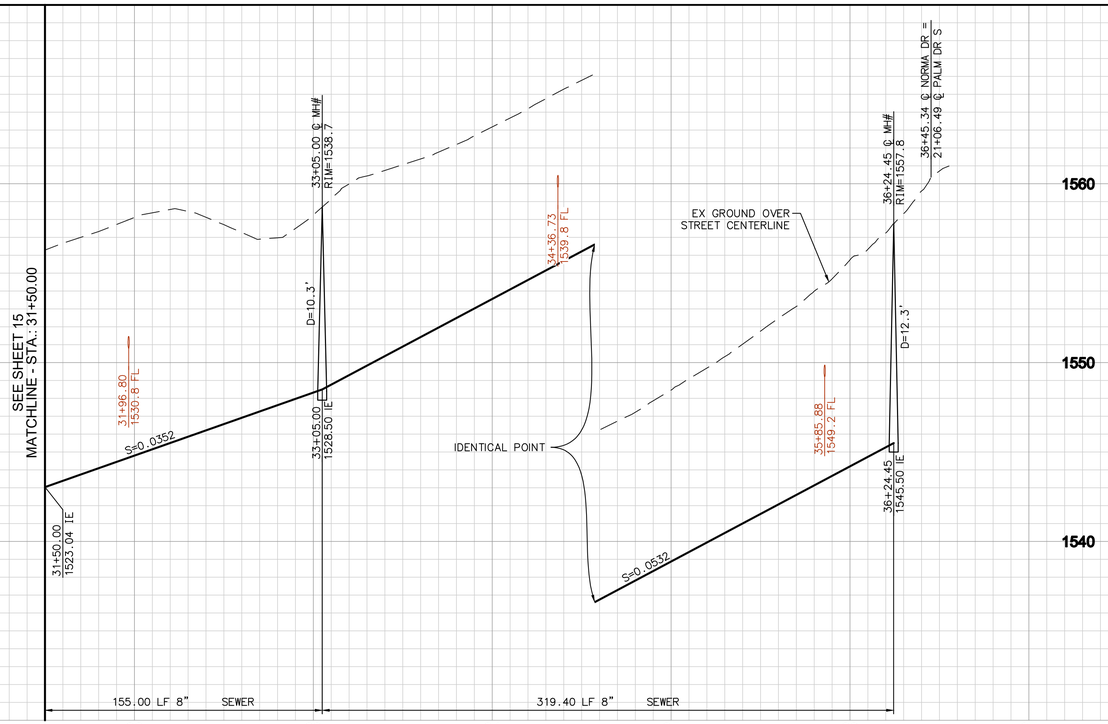

PROFILE SCALE
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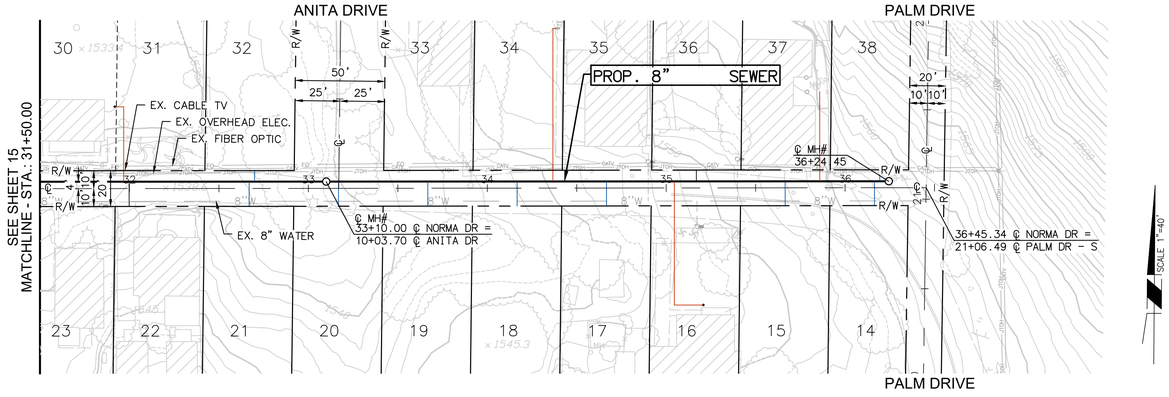
VERT. 1"=4'

NORMA DRIVE



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EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

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EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

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I.D.	
S.A.	
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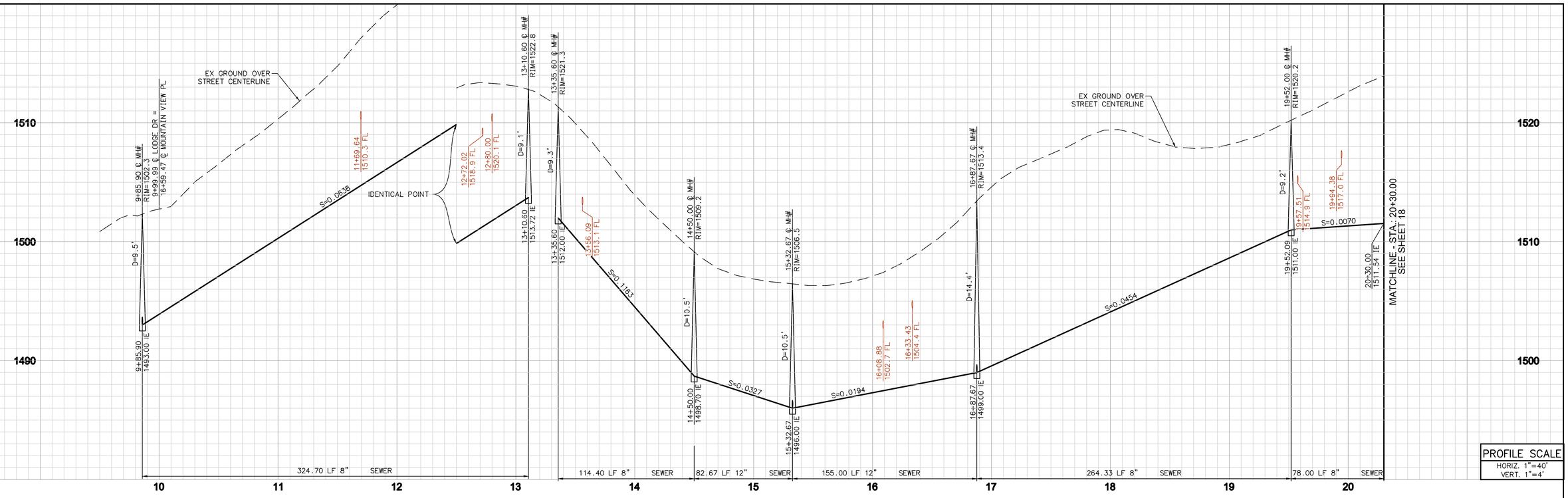
SHEET:	16 OF 70
	D—

RECMD | PLAN CHECK | OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

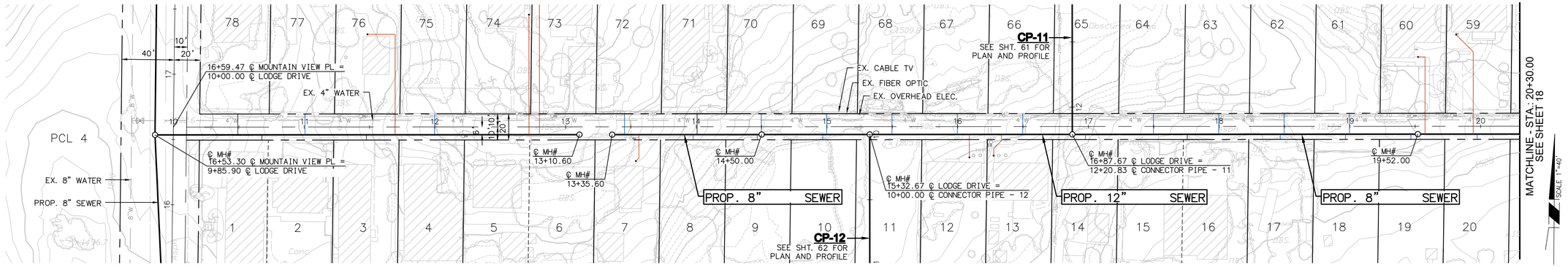
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-016-PL PRF-NORMA - 3.DWG SHEVCHENKO, OLGA 12/31/2024 9:23 AM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

LODGE DRIVE



30% SUBMITTAL

SCALE: 1"=40'

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RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

LODGE DRIVE
PLAN AND PROFILE
STA. 10+00.00 TO 20+30.00

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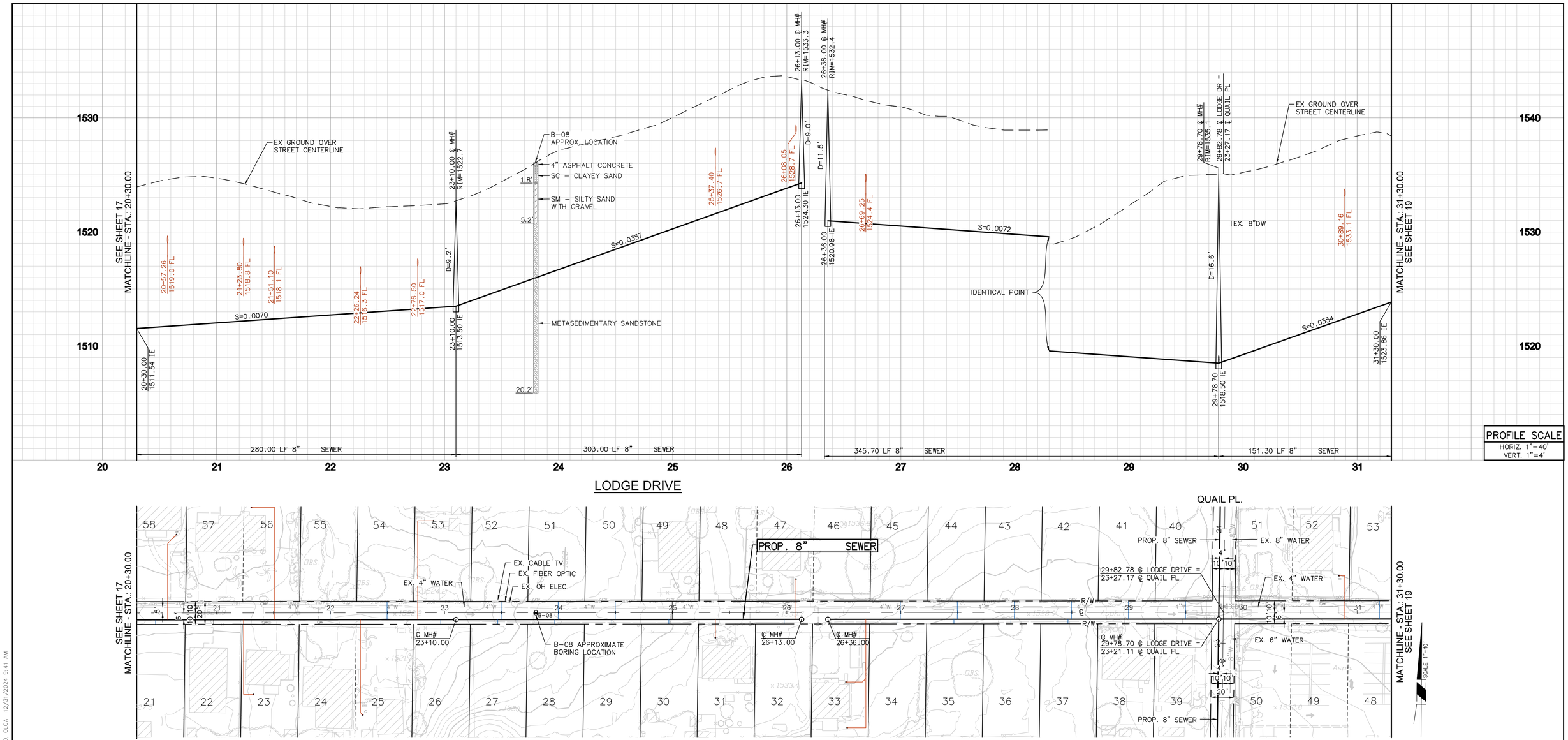

LODGE DRIVE

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

SCALE: 1"=40'

RECOMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
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EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

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	CONST. ADMIN.		

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RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
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STA. 20+30.00 TO 31+30.00

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C.O.	
COORD.	
SHEET:	18 OF 70
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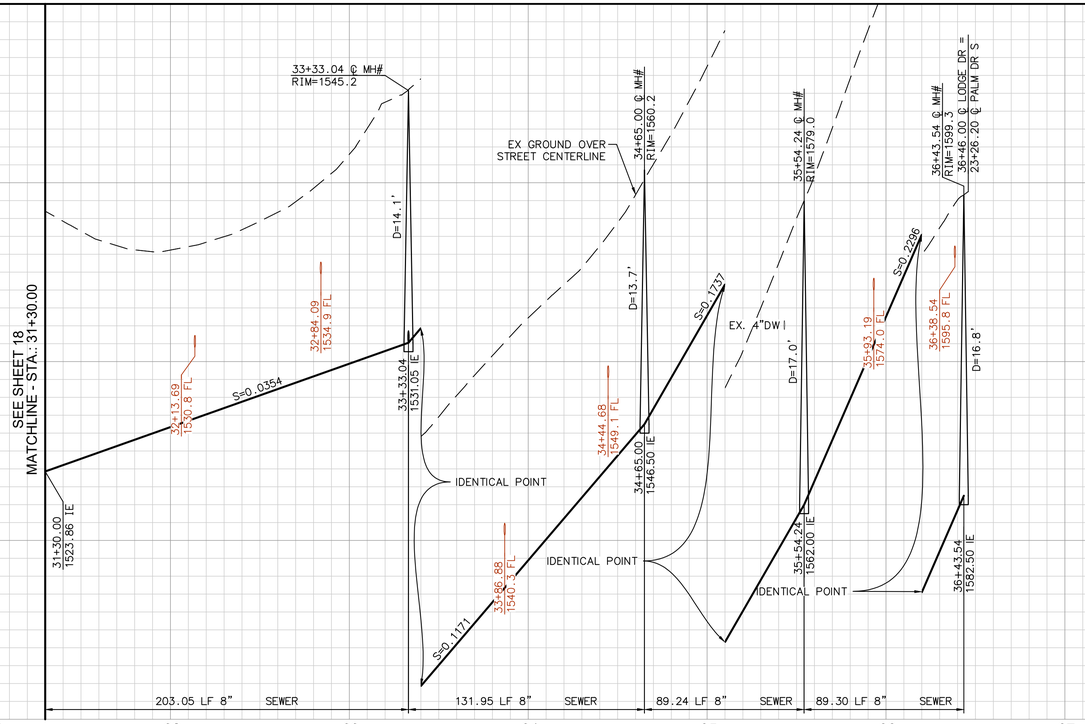
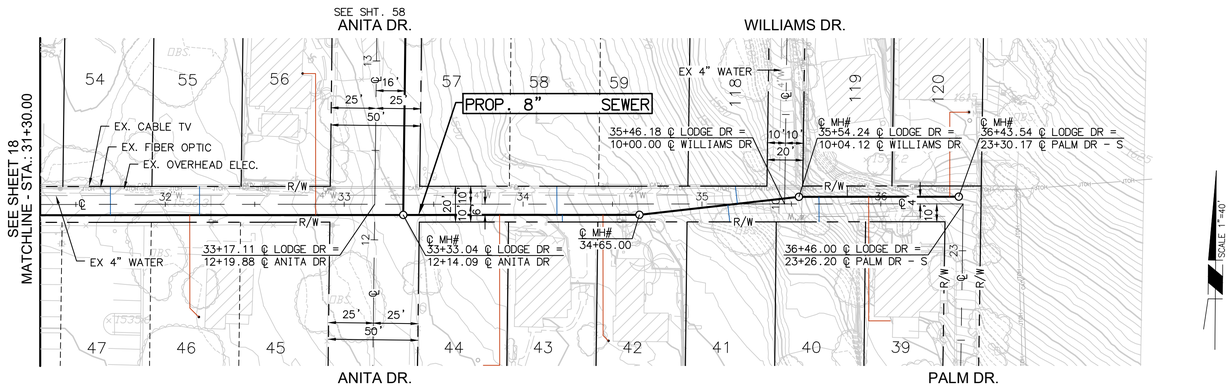
H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SMR-018-PL PRF-LODGE - 2.DWG SHEVCHENKO, OLGA 12/31/2024 9:41 AM



LODGE DRIVE

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'



30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT
Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

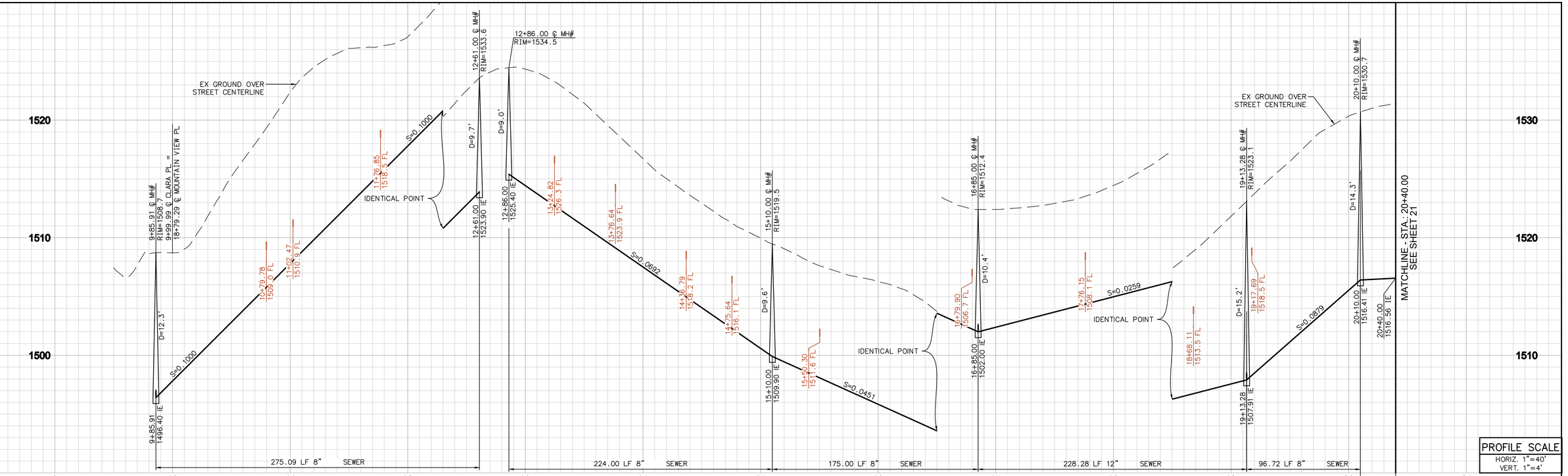
LODGE DRIVE
PLAN AND PROFILE
STA. 31+30.00 TO 36+50.00

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 19 OF 70
D—

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

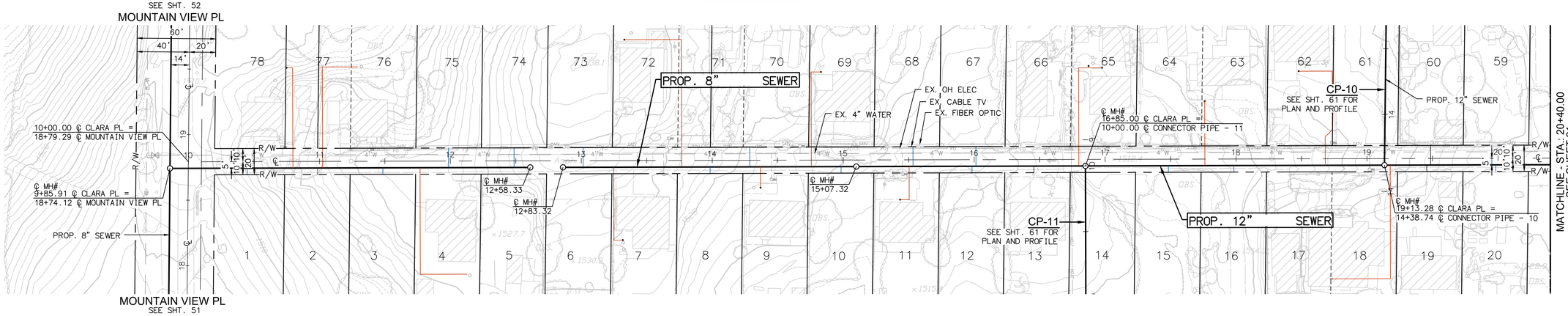
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\RDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-019-PL PRF-LODGE - 3.DWG SHEVCHENKO, OLGA 12/31/2024 10:28 AM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

CLARA PLACE



30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\LV\196454-SWR-020-PL PRF-CLARA - 1.DWG SHEVCHENKO, OLGA 12/31/2024 10:25 AM

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
	APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.		

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MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
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TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER — MILES T. COSTANZA — No. 87843 — CIVIL — STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

CLARA PLACE
PLAN AND PROFILE
STA. 10+00.00 TO 20+40.00

I.D.	
S.A.	
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SHEET:	20 OF 70
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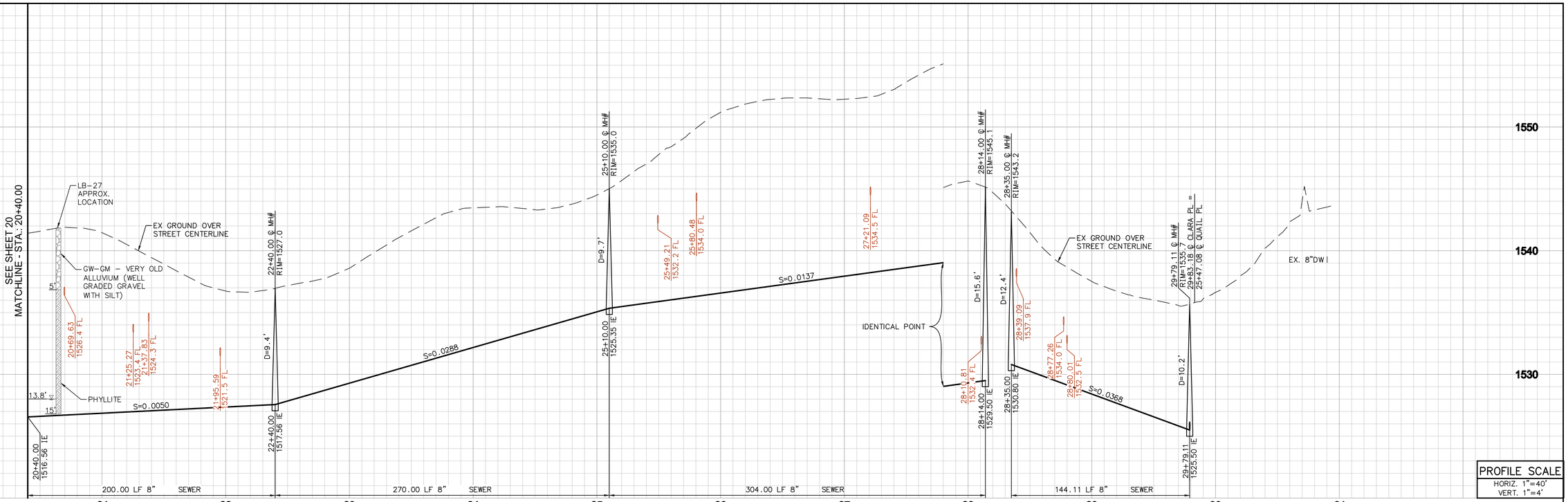
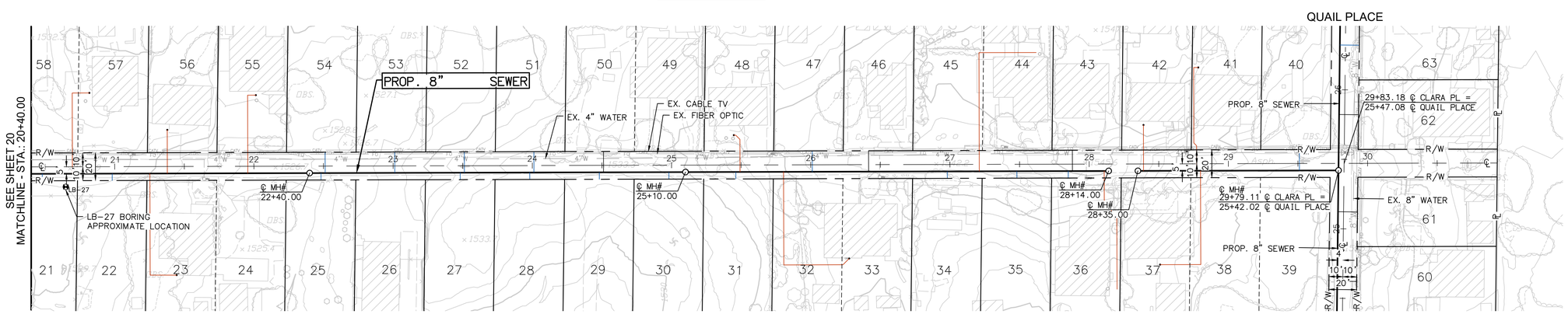


CLARA PLACE



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\LV\196454-SWR-021-PL PRF-CLARA - 2.DWG SHEVCHENKO, OLGA 1/2/2025 4:31 PM

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER — MILES T. COSTANZA — No. 87843 — CIVIL — STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

CLARA PLACE
PLAN AND PROFILE
STA. 20+40.00 TO 30+00.00

I.D.	
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SHEET:	21 OF 70
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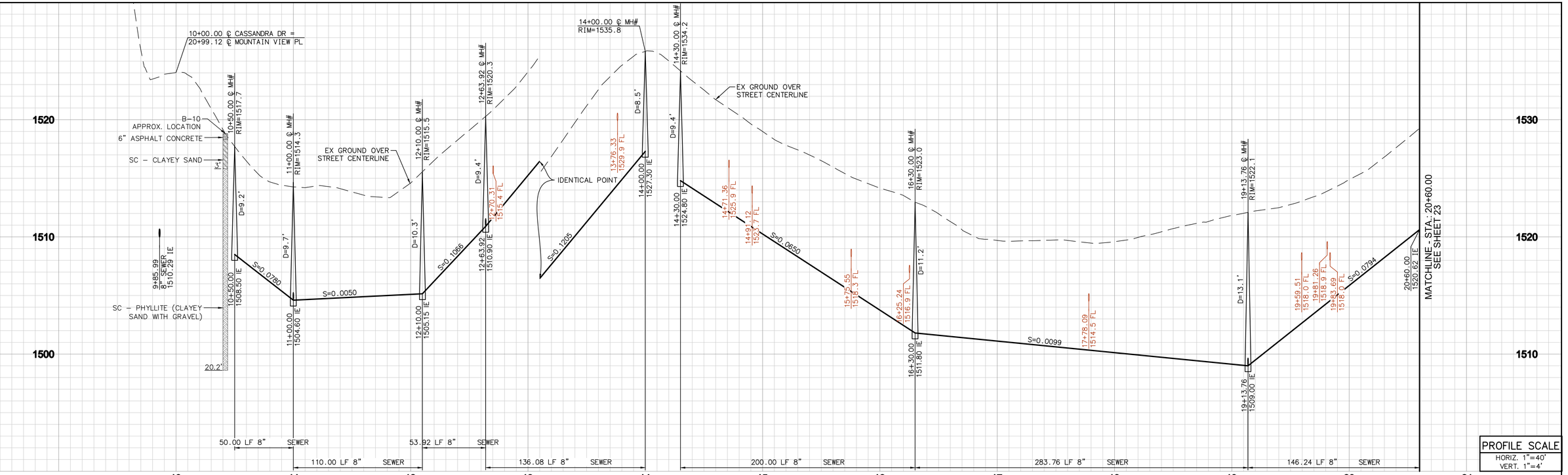
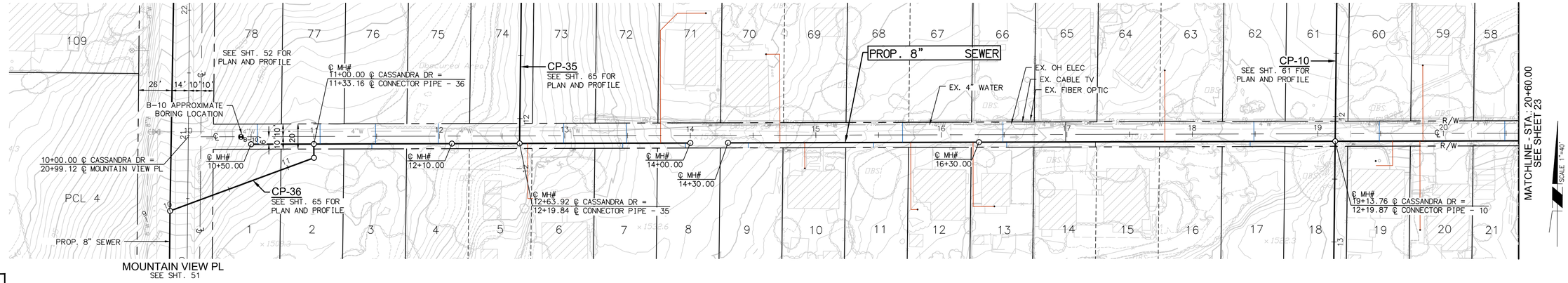


CASSANDRA DRIVE



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-022-PL PRF-CASSANDRA - 1.DWG SHEVCHENKO, OLGA 1/2/2025 4:43 PM

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
	APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.		

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UNDER THE SUPERVISION OF:
MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER - MILES T. COSTANZA - No. 87843 - CIVIL - STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA
QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS
CASSANDRA DRIVE
PLAN AND PROFILE
STA. 10+00.00 TO 20+60.00

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SHEET:	22 OF 70
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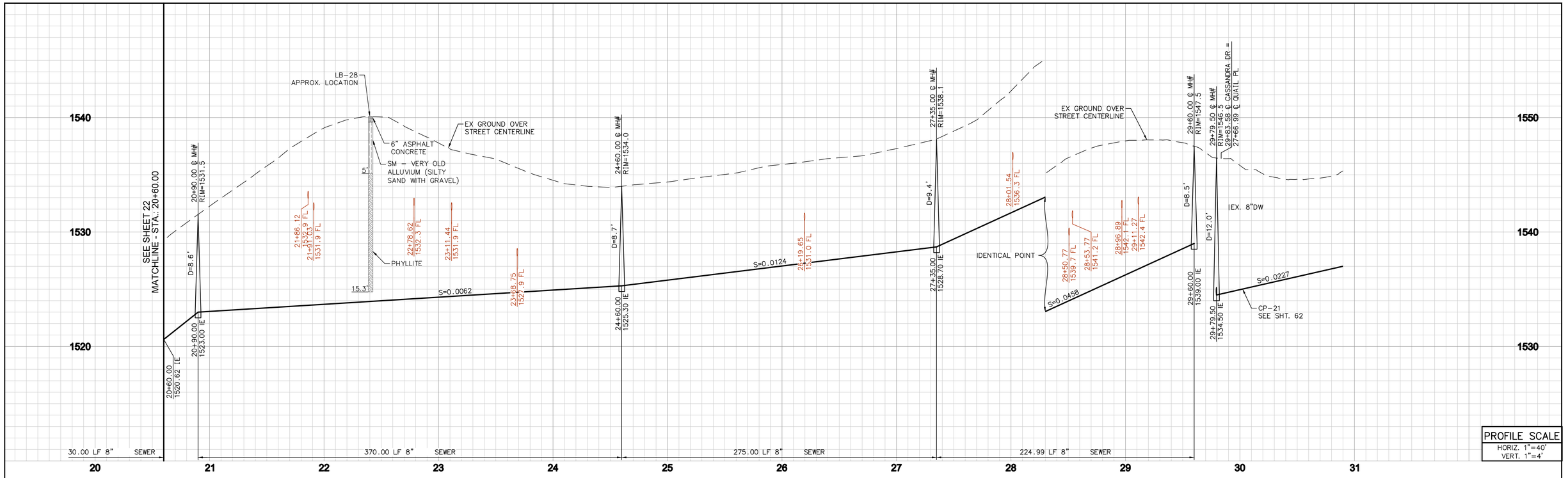
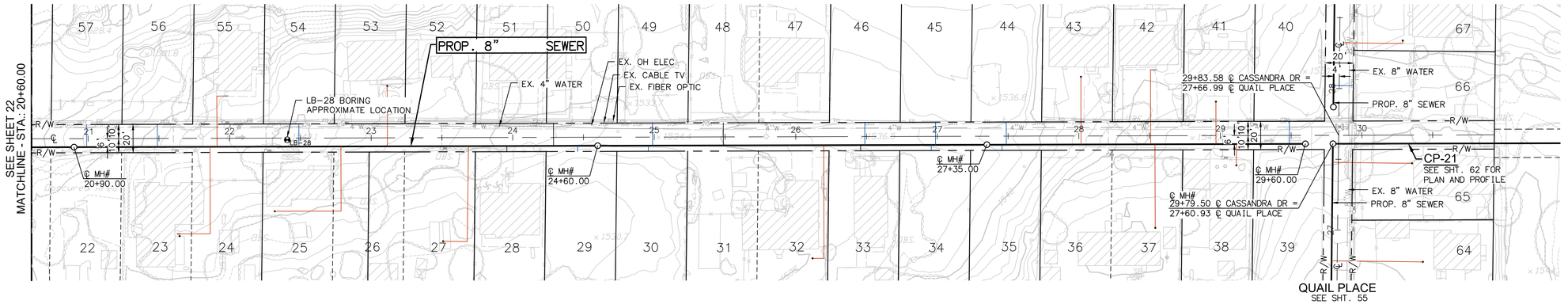


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

CASSANDRA DRIVE



30% SUBMITTAL

SCALE: 1"=40'

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REVISIONS

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UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES L. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

CASSANDRA DRIVE
PLAN AND PROFILE
STA. 20+60.00 TO 30+00.00

I.D.	
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SHEET:	23 OF 70
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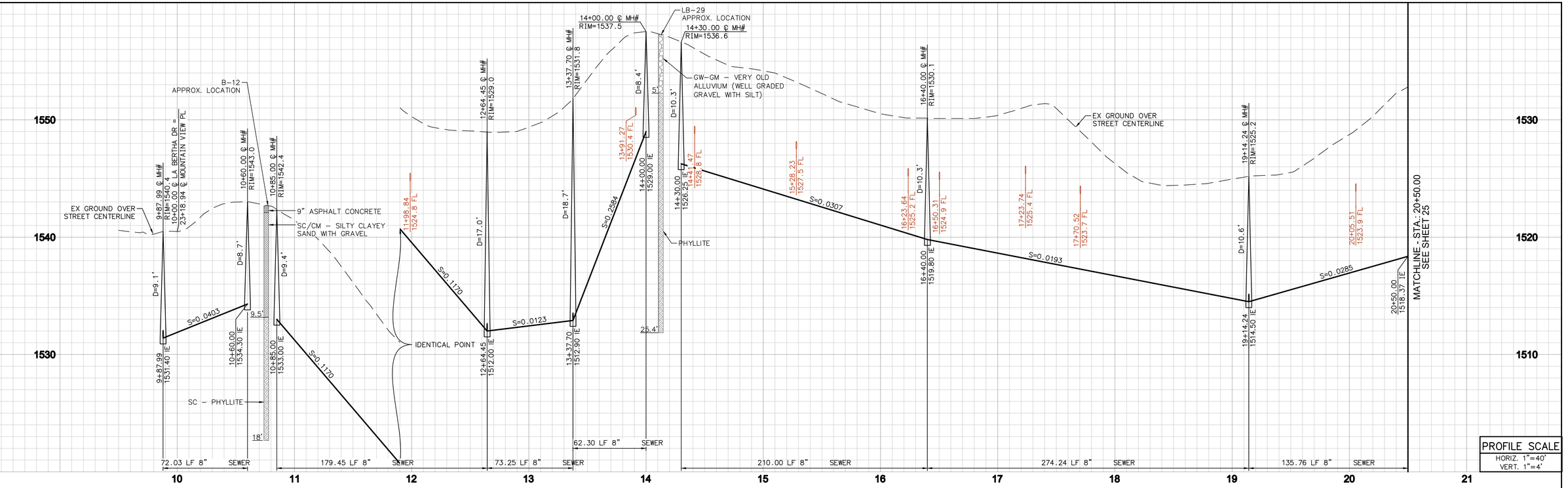
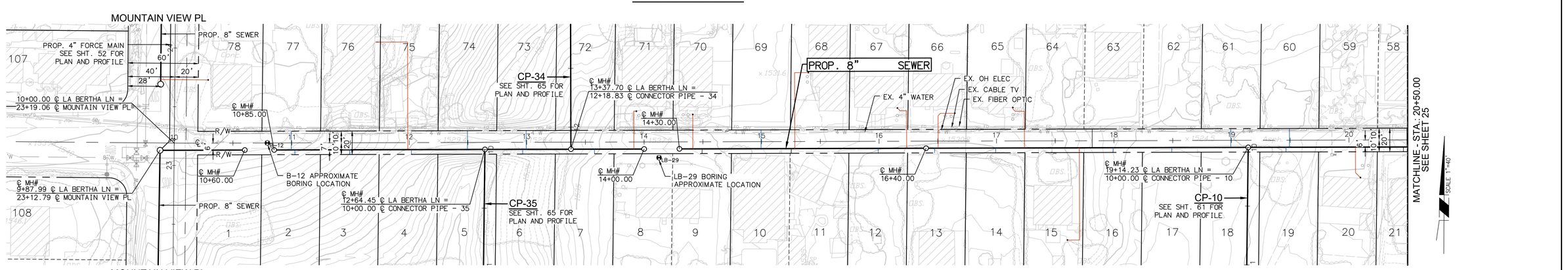
RECOMD	PLAN CHECK	OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
	APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.			

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\ULV196454-SWR-023-PL PRF-CASSANDRA - 2.DWG SHEVCHENKO, OLGA 1/2/2025 4:45 PM



LA BERTHA LANE



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT
Call: TOLL FREE
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REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

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UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

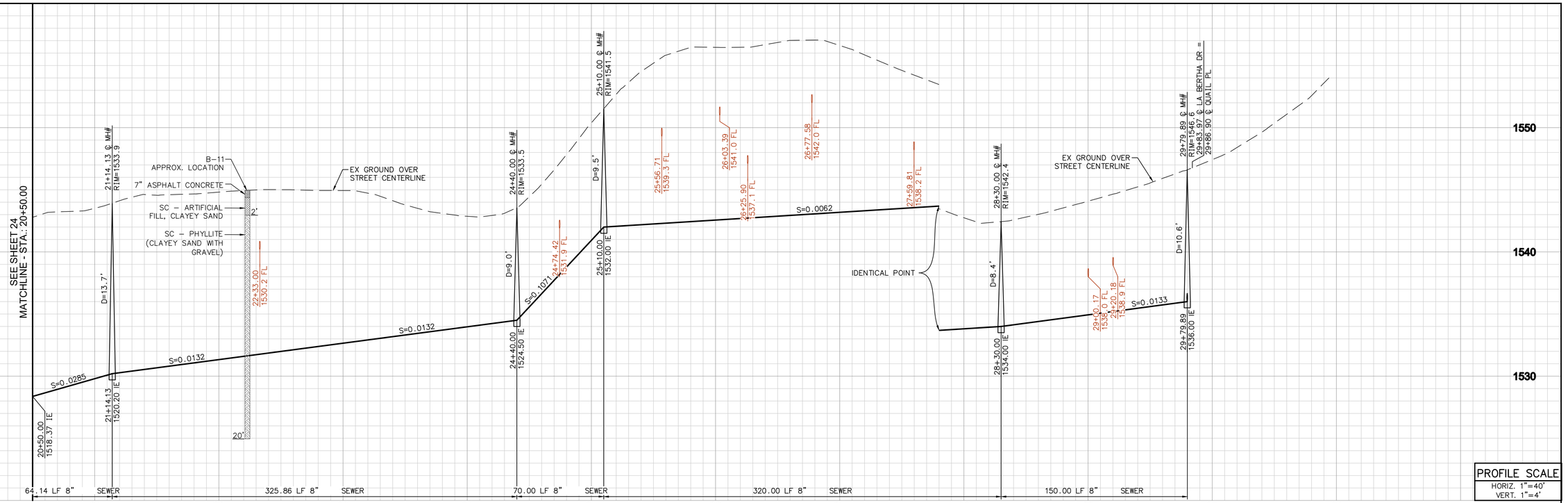
LA BERTHA LANE
PLAN AND PROFILE
STA. 10+00.00 TO 20+50.00

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 24 OF 70
D—

RECORD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

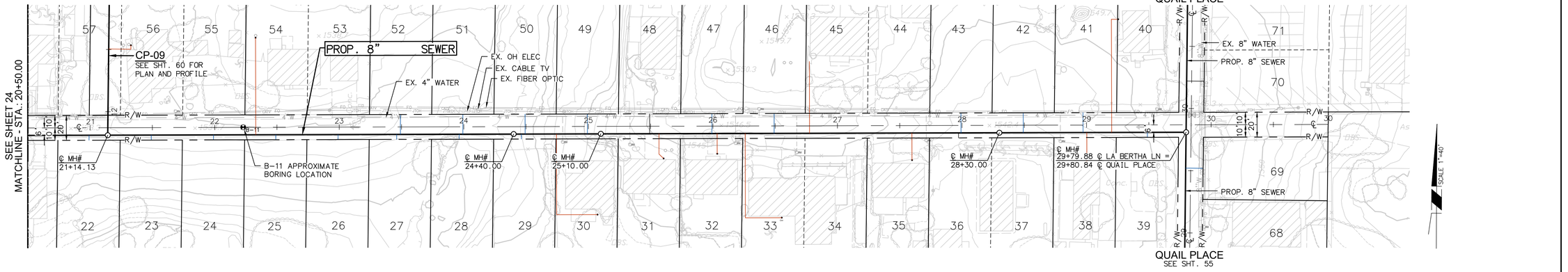
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-024-PL PRF-LA BERTHA - 1.DWG SHEVCHENKO, OLGA 1/9/2025 11:35 AM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

LA BERTHA LANE



30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT
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1-800-227-2600 OR 811
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REVISIONS					
MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

RECORD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.			

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PHONE: (951) 676-8042
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UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER — MILES W. COSTANZA — No. 87843 — CIVIL — STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

LA BERTHA LANE
PLAN AND PROFILE
STA. 20+50.00 TO 30+00.00

I.D.	
S.A.	
W.O.	
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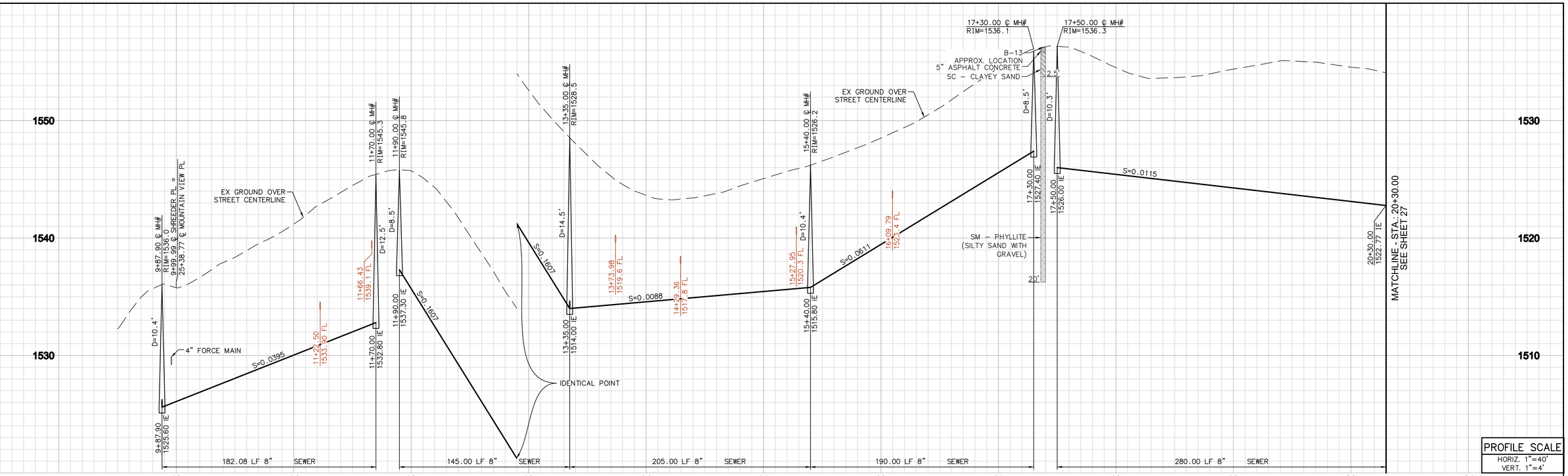
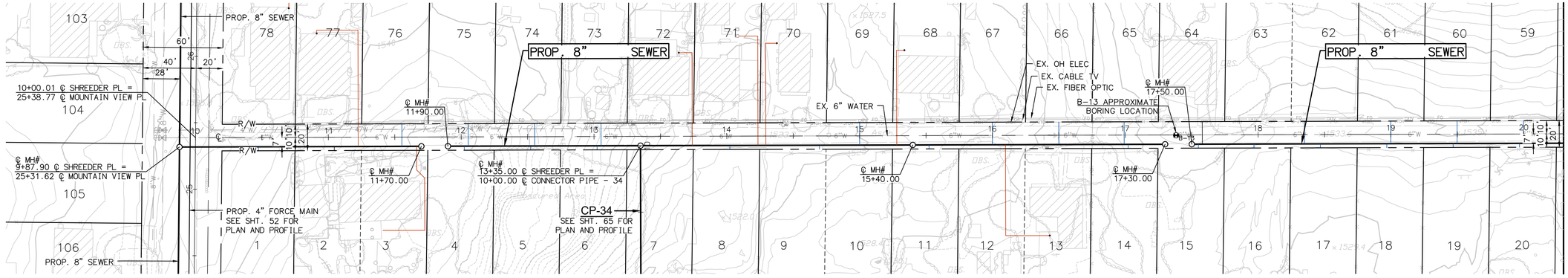
SHEET:	25 OF 70
	D—

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\QUV\196454-SMR-025-PL PRF-LA BERTHA — 2.DWG SHEVCHENKO, OLGA 12/31/2024 11:20 AM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SHREEDER PLACE



30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\LV\196454-SWR-026-PL PRF-SHREEDER - 1.DWG SHEVCHENKO, OLGA 1/9/2025 11:46 AM

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
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REVISIONS

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40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
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UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES T. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

SHREEDER PLACE
PLAN AND PROFILE
STA. 10+00.00 TO 20+30.00

I.D.	
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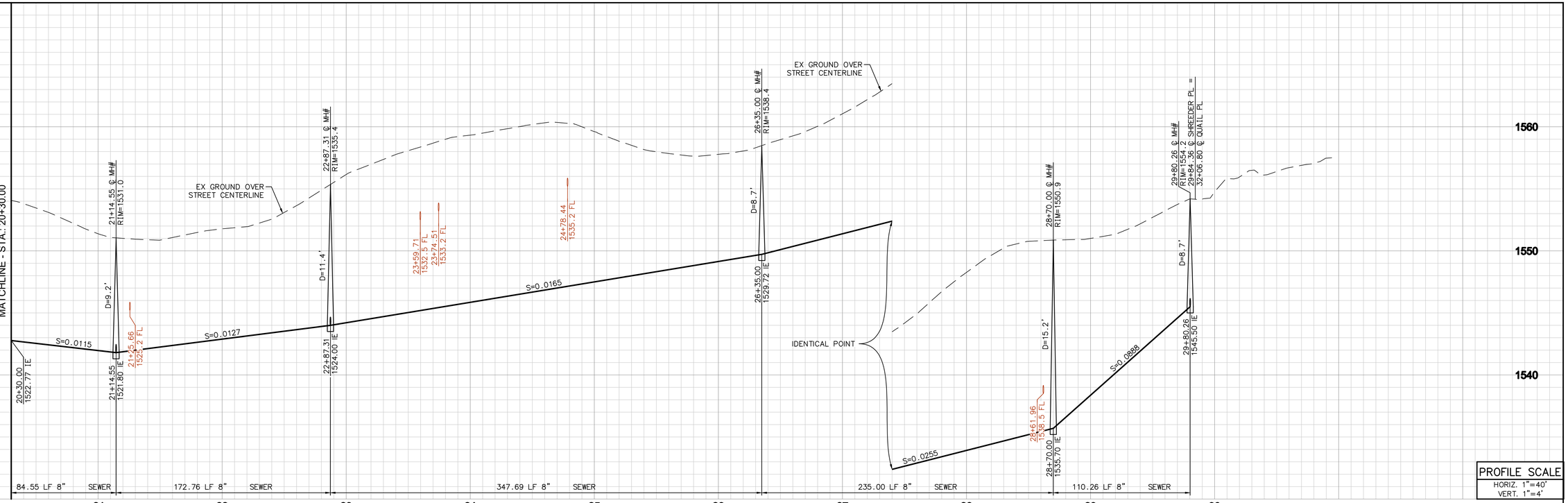
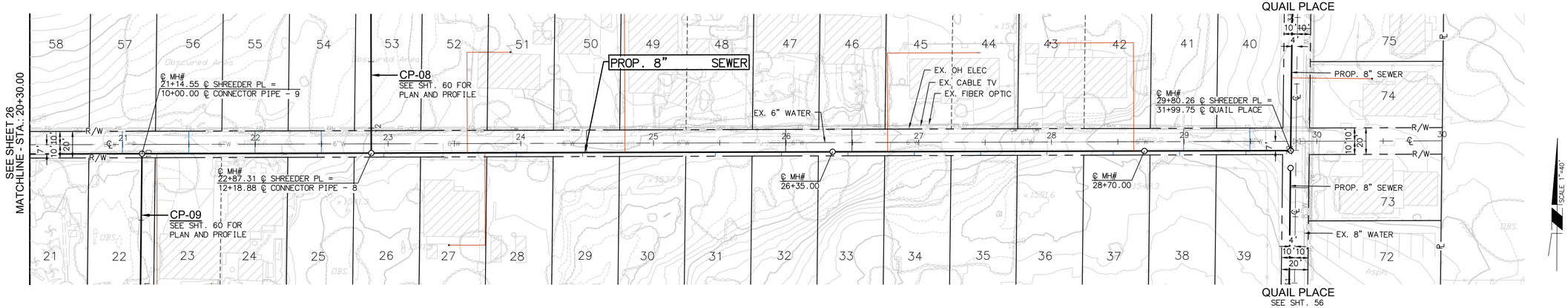


SHREEDER PLACE



30% SUBMITTAL

SCALE: 1"=40'

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REVISIONS					
MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

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MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES T. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

SHREEDER PLACE
PLAN AND PROFILE
STA. 20+30.00 TO 30+00.00

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SHEET:	27 OF 70
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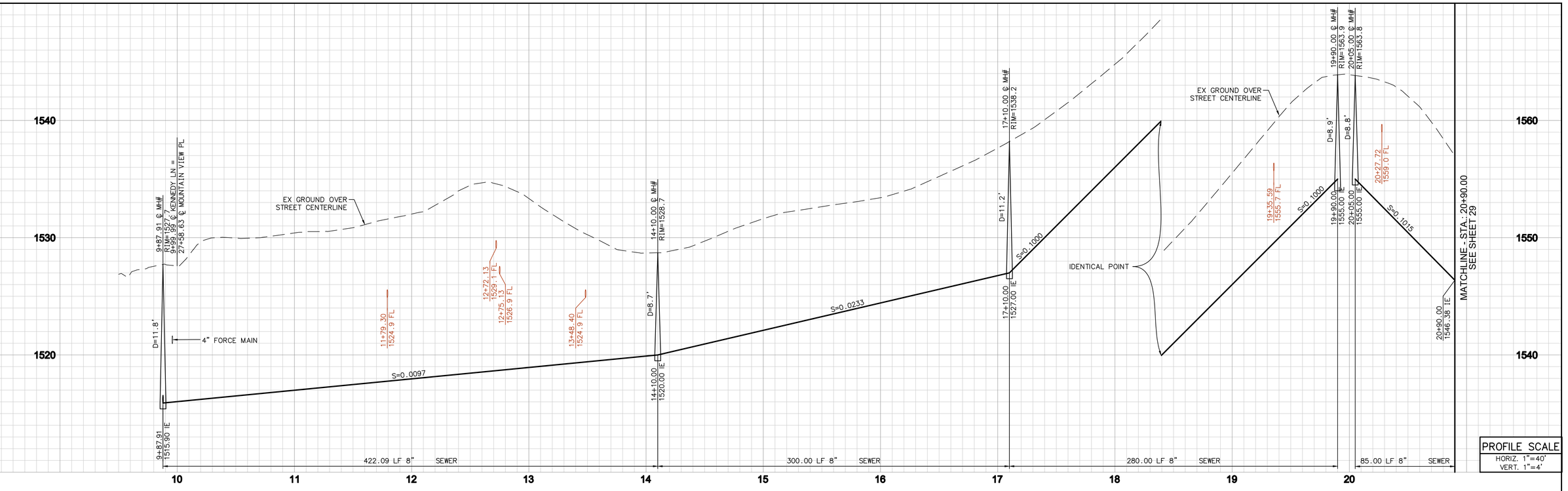
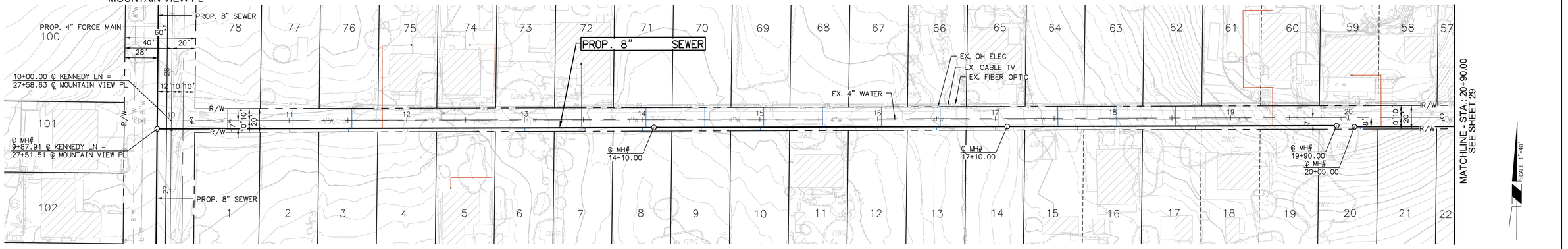
RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
	APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.		

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\DLV\196454-SWR-027-PL PRF-SHREEDER - 2.DWG SHEVCHENKO, OLGA 12/31/2024 11:32 AM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

KENNEDY LANE



30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT

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UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER * MILES L. COSTANZA * No. 87843 * CIVIL * STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

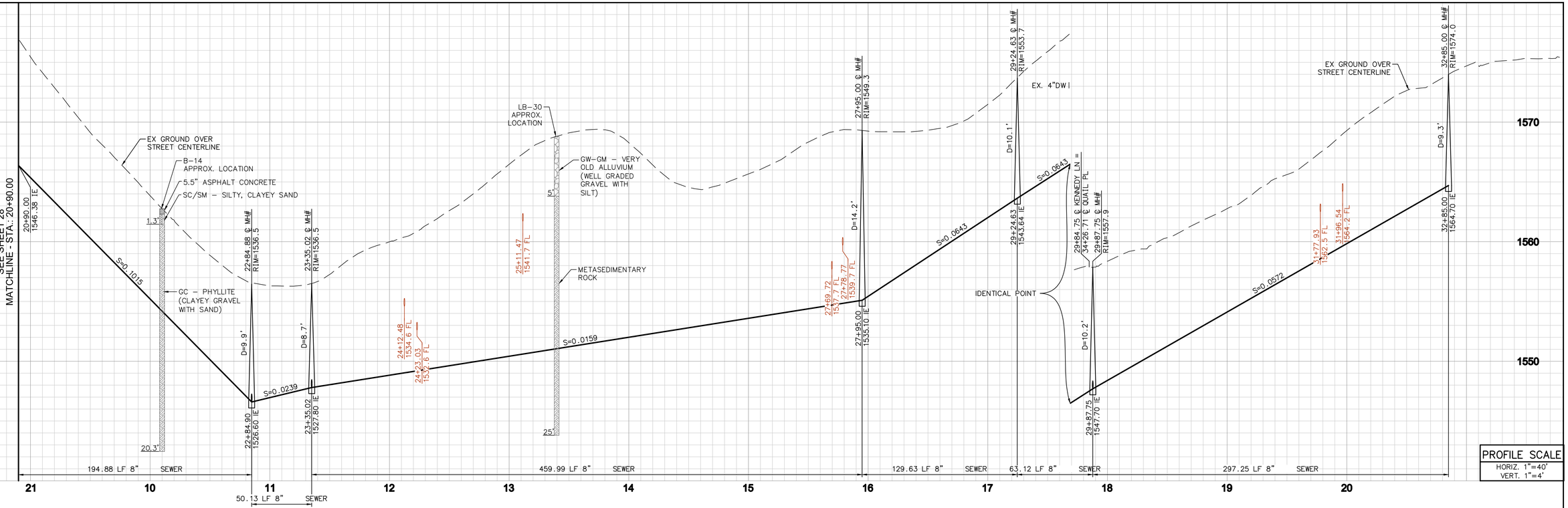
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

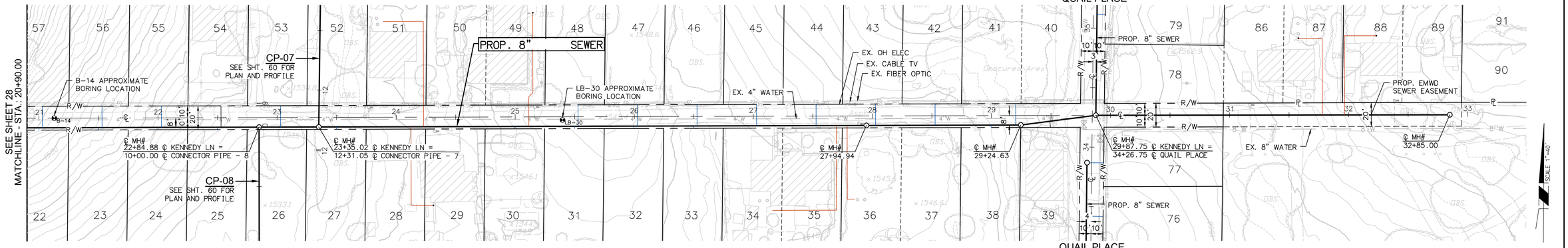
KENNEDY LANE
PLAN AND PROFILE
STA. 10+00.00 TO 20+90.00

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 28 OF 70
D—

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-028-PL PRF-KENNEDY - 1.DWG SHEVCHENKO, OLGA 1/9/2025 11:50 AM



KENNEDY LANE



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT
Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:
MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES L. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

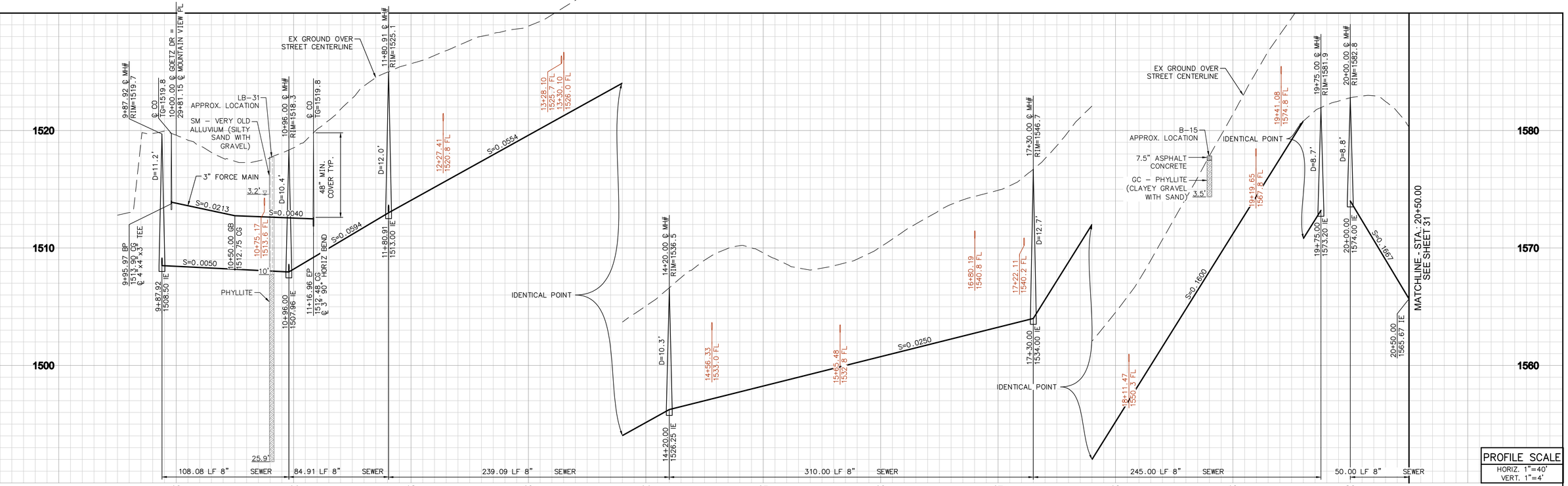
KENNEDY LANE
PLAN AND PROFILE
STA. 20+90.00 TO 32+85.00

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 29 OF 70
D—

RECORD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

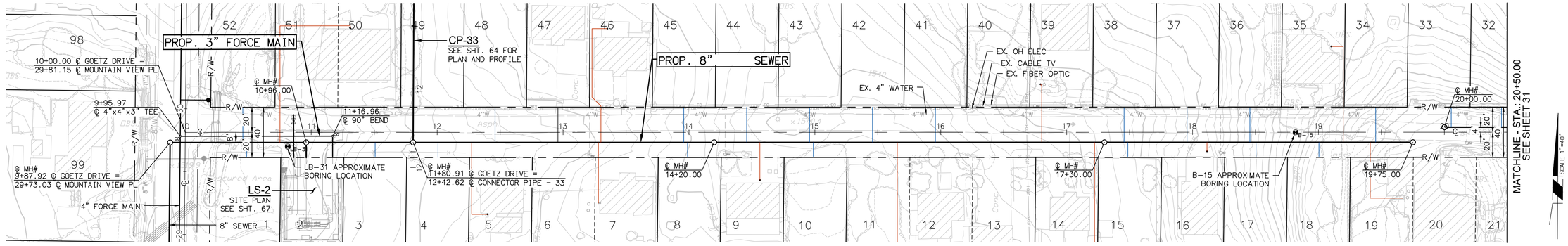
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-029-PL PRF-KENNEDY - 2.DWG SHEVCHENKO, OLGA 1/2/2025 4:59 PM



GOETZ DRIVE

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'



30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-030-PL PRF-GOETZ - 1.DWG SHEVCHENKO, OLGA 1/9/2025 2:46 PM

RECMD	PLAN CHECK	OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
	APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.			

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MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
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TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER – MILES W. COSTANZA – No. 87843 – CIVIL – STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

GOETZ DRIVE
PLAN AND PROFILE
STA. 10+00.00 TO 20+50.00

I.D.	
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COORD.	
SHEET:	30 OF 70
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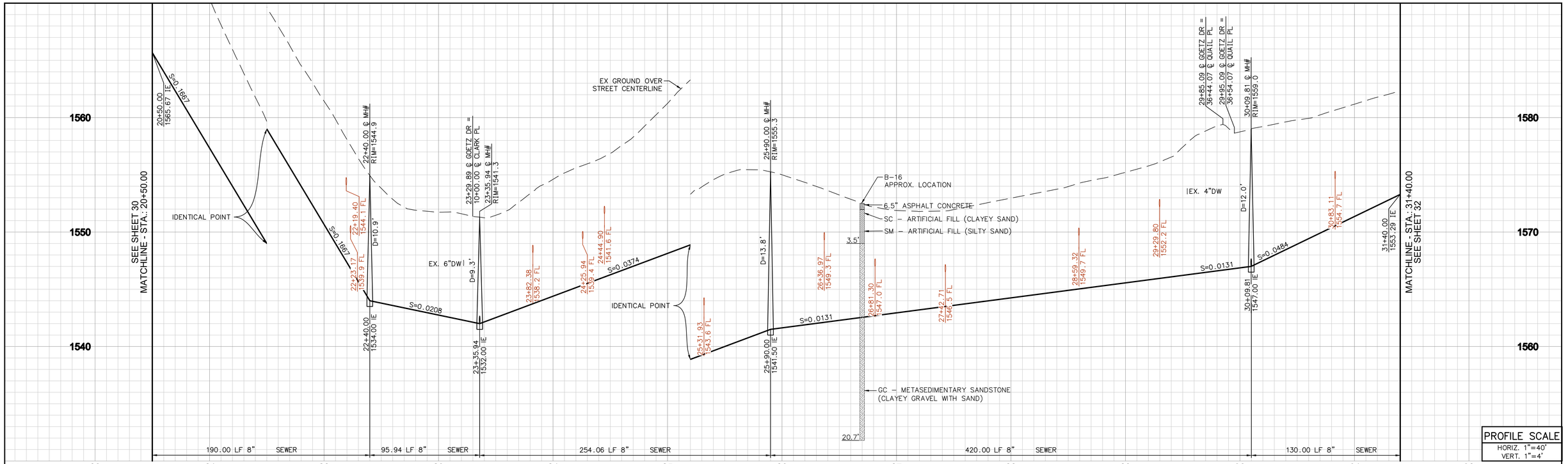
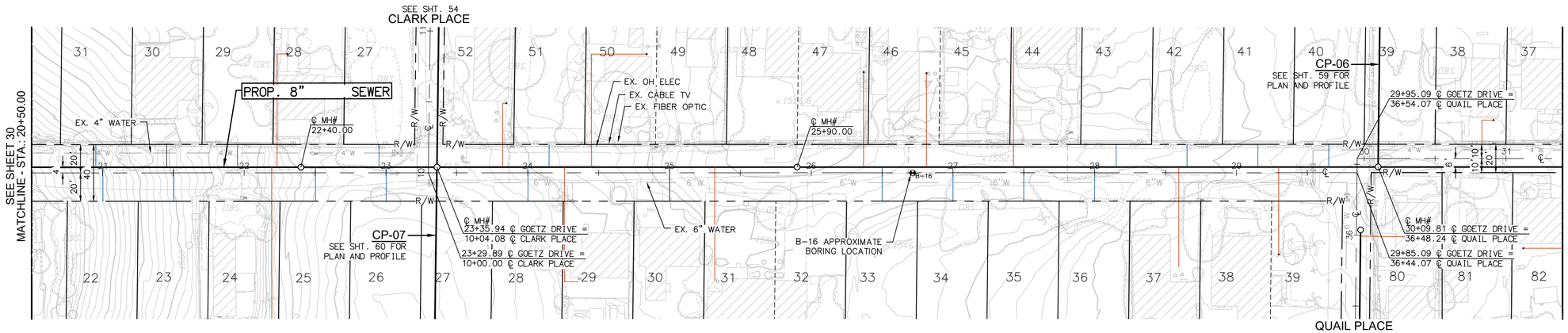


GOETZ DRIVE



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT

Call: TOLL FREE
1-800-227-2600 OR 811
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RECMD	PLAN CHECK	OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
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REGISTERED PROFESSIONAL ENGINEER — MILES T. COSTANZA — No. 87843 — CIVIL — STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

GOETZ DRIVE
PLAN AND PROFILE
STA. 20+50.00 TO 31+40.00

I.D.	
S.A.	
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C.O.	
COORD.	
SHEET:	31 OF 70
	D—

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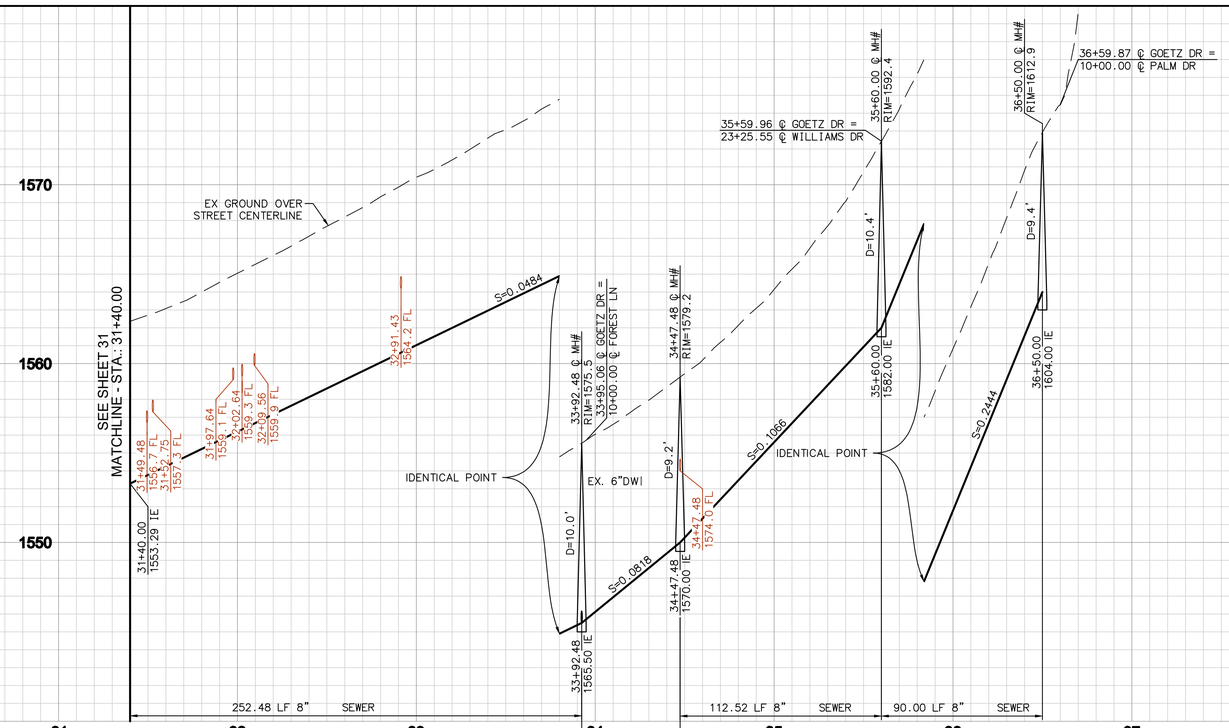
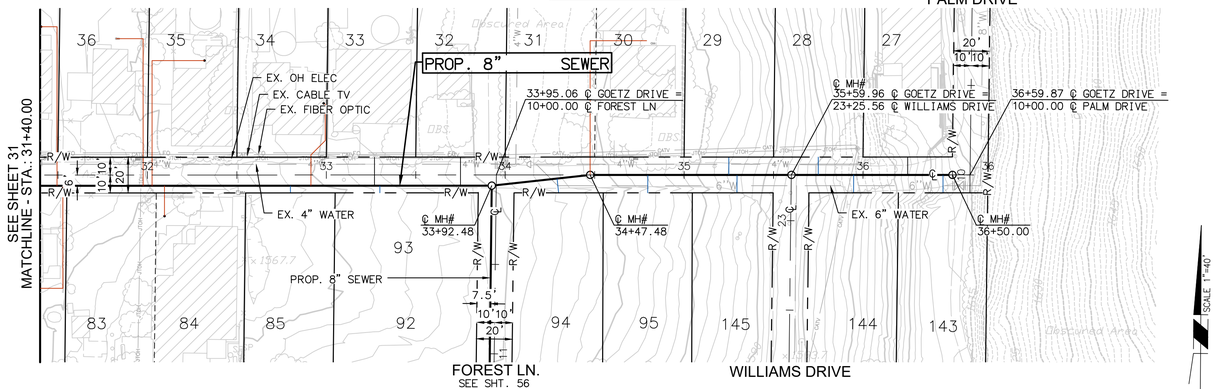


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

GOETZ DRIVE

PALM DRIVE



30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

DIG ALERT
Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

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REGISTERED PROFESSIONAL ENGINEER
MILES W. COSTANZA
No. 87843
CIVIL
STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS
GOETZ DRIVE
STA. 31+40.00 TO 36+50.00
FOREST LANE
STA. 10+00.00 TO 12+00.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	32 OF 70
D—	

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
	APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.		

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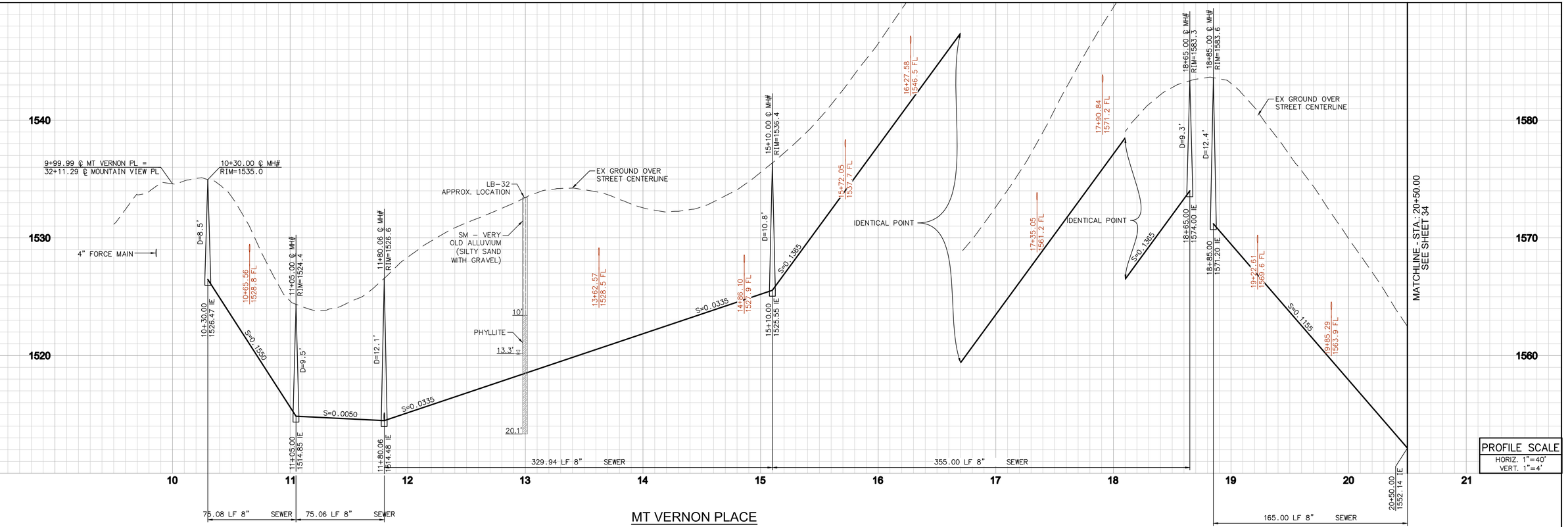
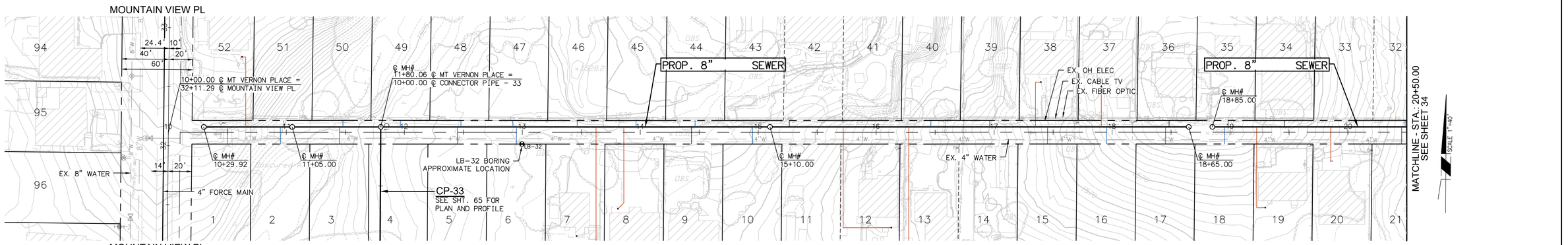


MT VERNON PLACE



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

SCALE: 1"=40'

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RECORD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

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Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR.,
SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER
MILES W. COSTANZA
No. 87843
CIVIL
STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

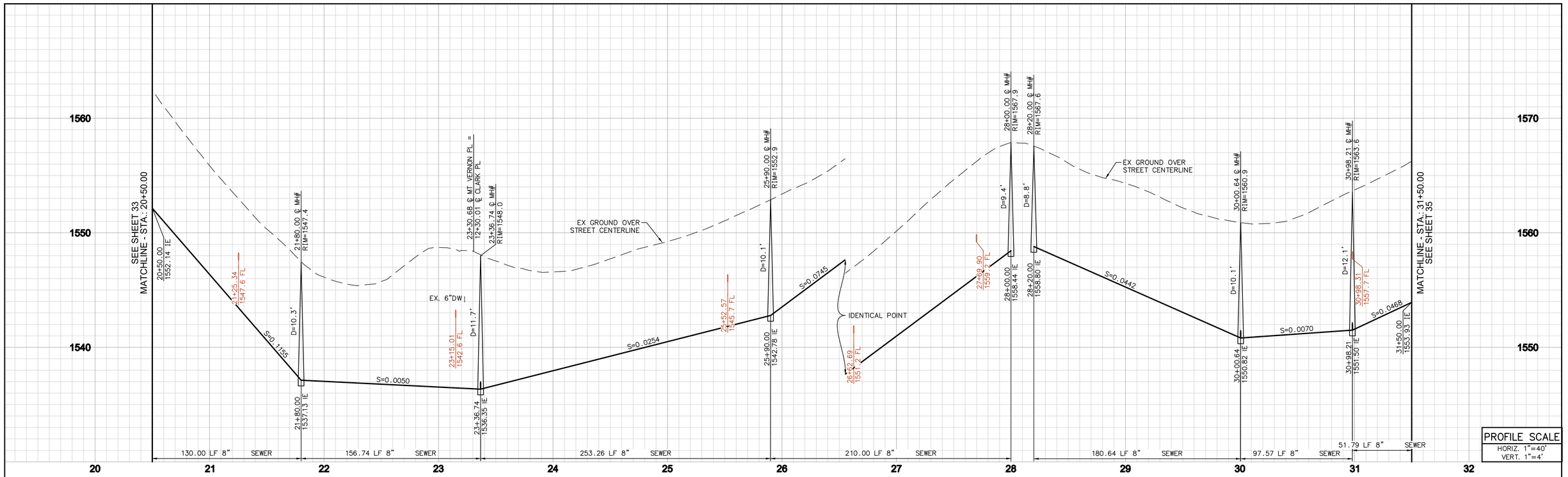
	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

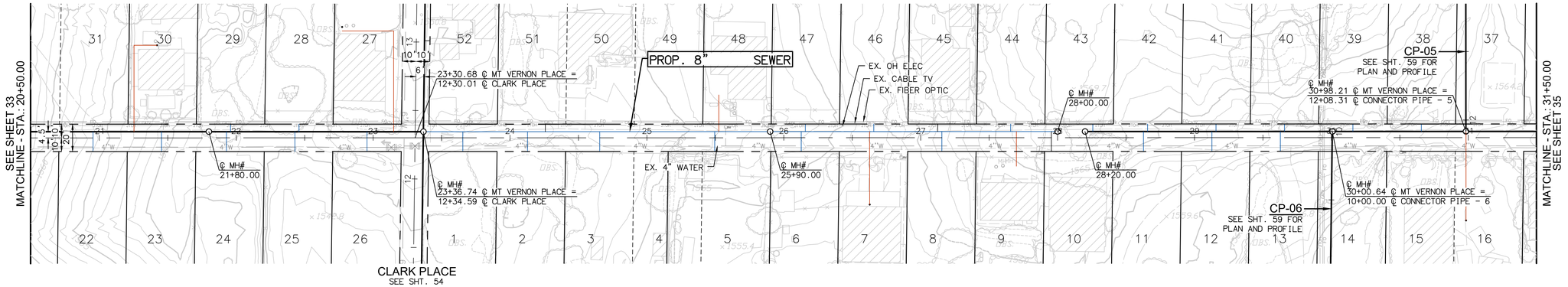
MT VERNON PLACE
PLAN AND PROFILE
STA. 10+00.00 TO 20+50.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	33 OF 70
	D—



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

MT VERNON PLACE



30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

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MILES W. COSTANZA
No. 87843
CIVIL
STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

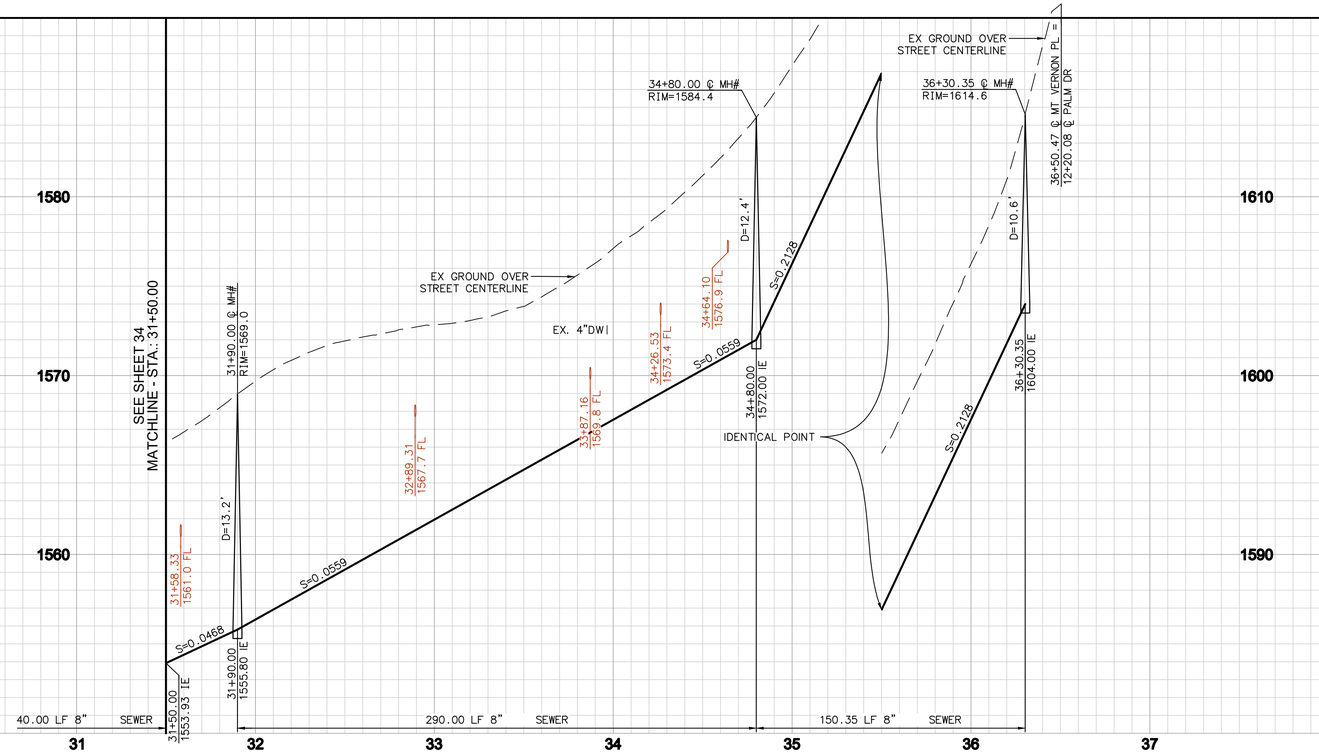
QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

MT VERNON PLACE
PLAN AND PROFILE
STA. 20+50.00 TO 31+50.00

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 34 OF 70
D—

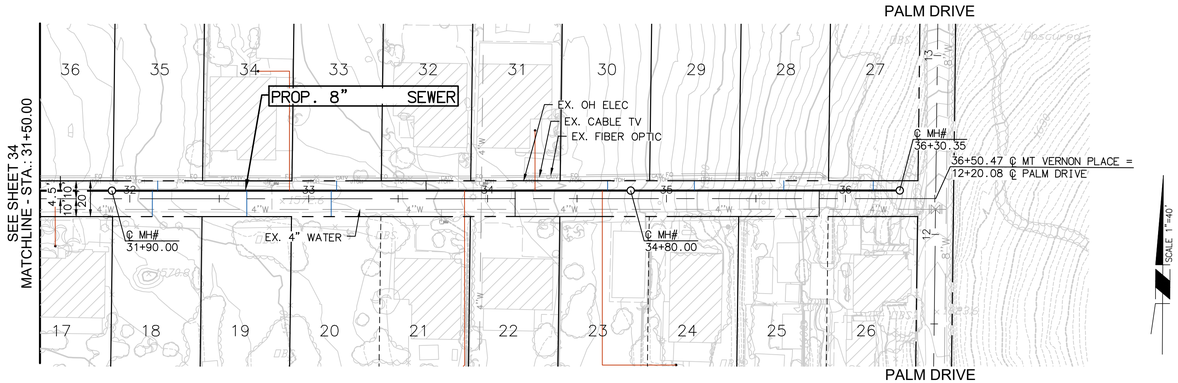
RECMD	PLAN CHECK	OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
	APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.			

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-034-PL PRF-MT VERNON - 2.DWG SHEVCHENKO, OLGA 1/2/2025 5:25 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

MT VERNON PLACE



30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\ULV\196454-SWR-035-PL PRF-MT VERNON - 3.DWG SHEVCHENKO, OLGA 12/31/2024 12:36 PM

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
	APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.		

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REVISIONS

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Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER * MILES W. COSTANZA * No. 87843 * CIVIL * STATE OF CALIFORNIA *

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

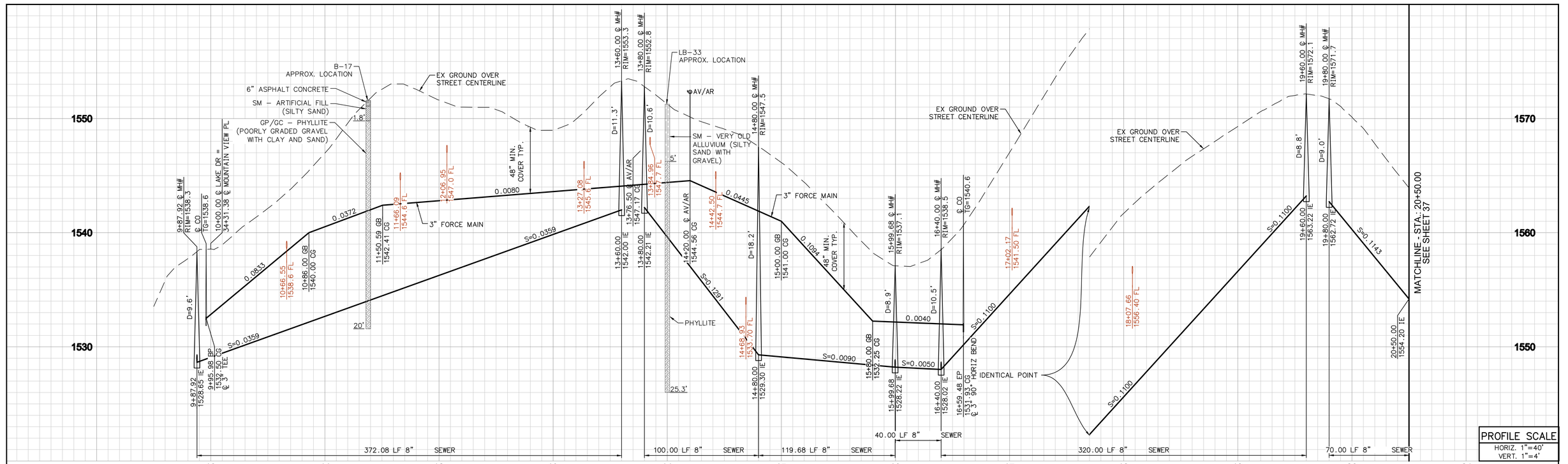
APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

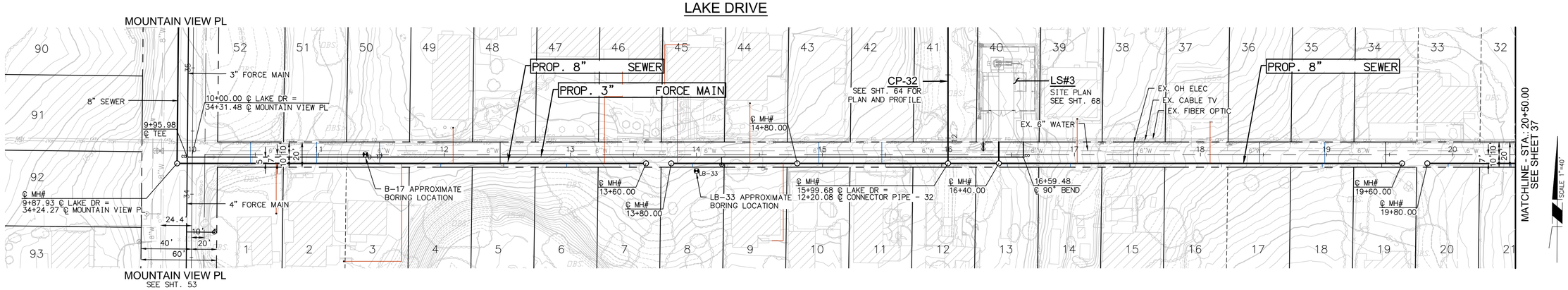
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

MT VERNON PLACE
PLAN AND PROFILE
STA. 31+50.00 TO 36+50.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	35 OF 70
	D—





PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

DIG ALERT
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REVISIONS

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UNDER THE SUPERVISION OF:
MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

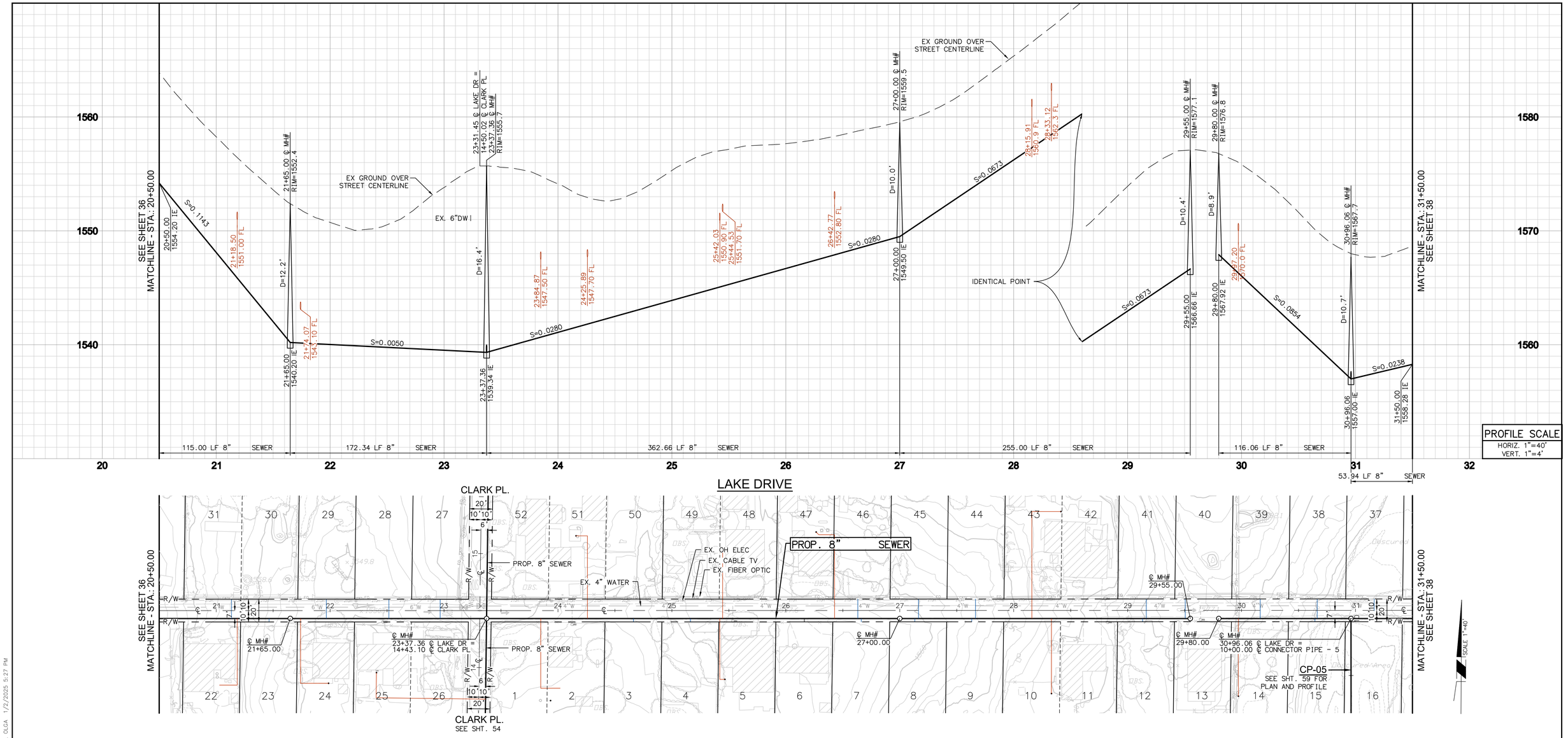
LAKE DRIVE
PLAN AND PROFILE
STA. 10+00.00 TO 20+50.00

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 36 OF 70
D—

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-036-PL PRF-LAKE - 1.DWG SHEVCHENKO, OLGA 1/9/2025 3:13 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SMR-037-PL PRF-LAKE - 2.DWG SHEVCHENKO, OLGA 1/2/2025 5:27 PM

RECOND | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER
MILES W. COSTANZA
No. 87843
CIVIL
STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

LAKE DRIVE
PLAN AND PROFILE
STA. 20+50.00 TO 31+50.00

I.D.	
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COORD.	
SHEET:	37 OF 70
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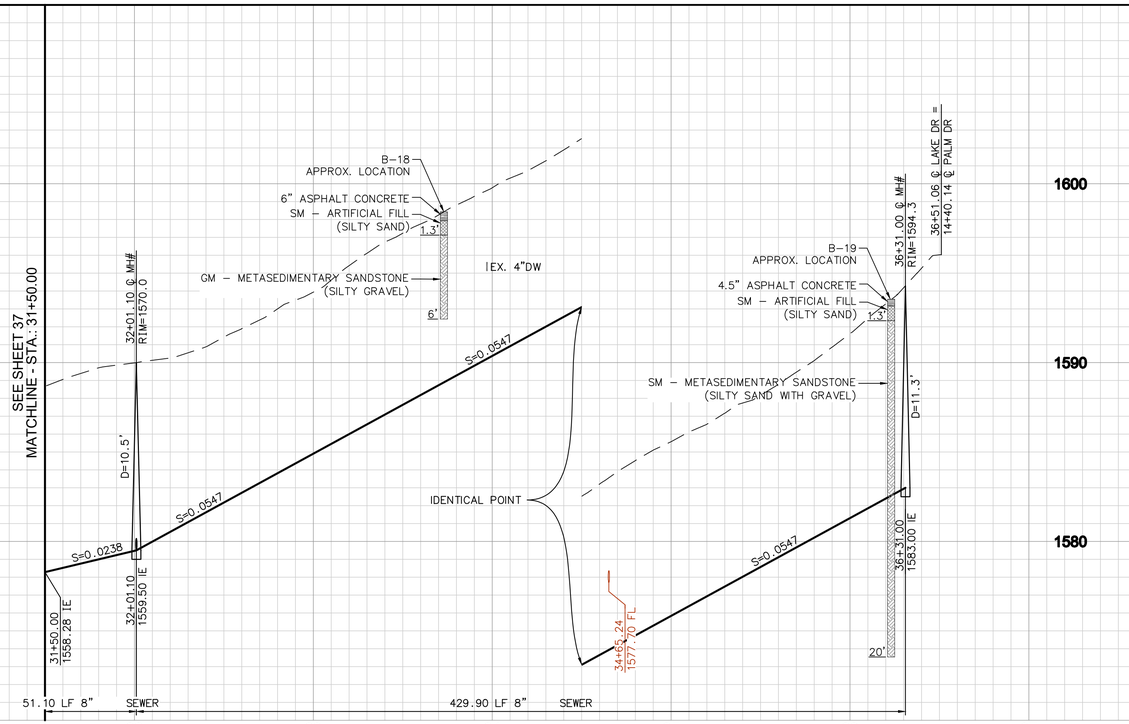
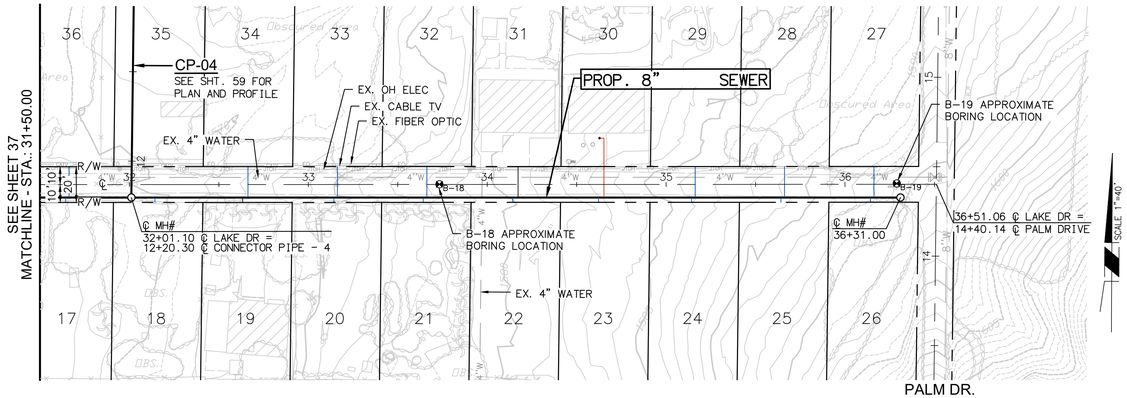


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

LAKE DRIVE



30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SMR-038-PL PRF-LAKE - 3.DWG SHEVCHENKO, OLGA 12/31/2024 1:25 PM

RECORD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
	APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.		

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No. 87843
CIVIL
STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

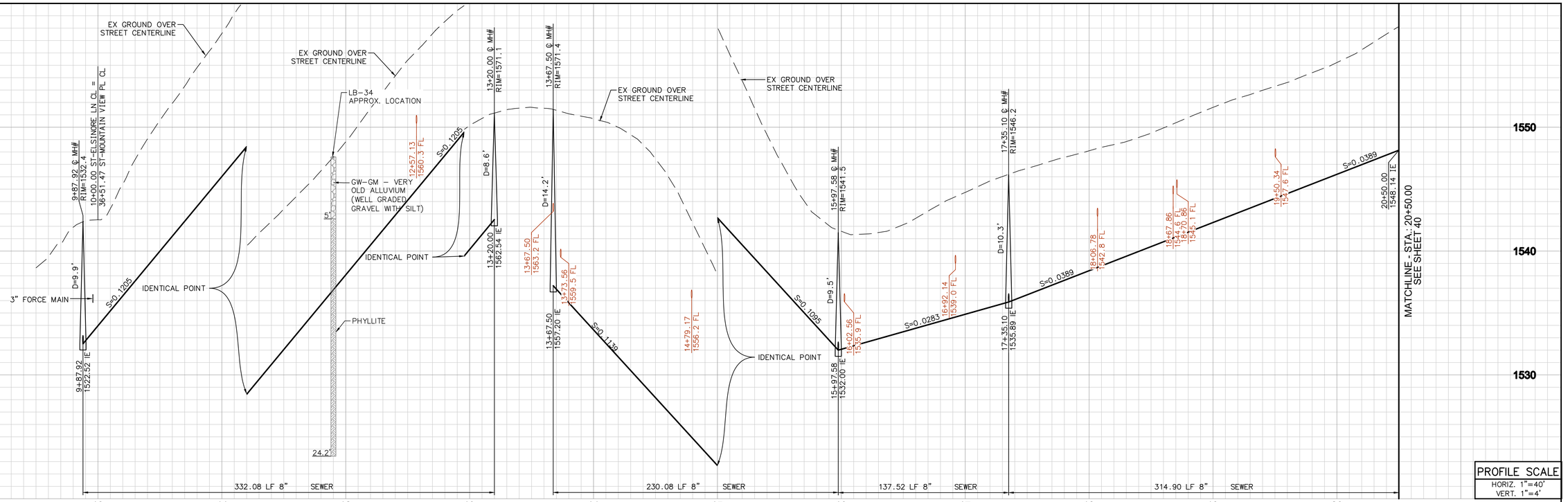
	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

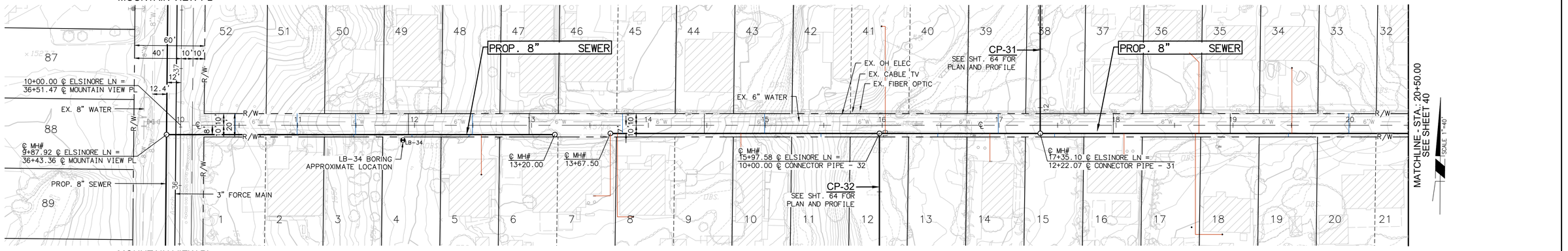
LAKE DRIVE
PLAN AND PROFILE
STA. 31+50.00 TO 36+50.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	38 OF 70
	D–



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

ELSINORE LANE



30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT
Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

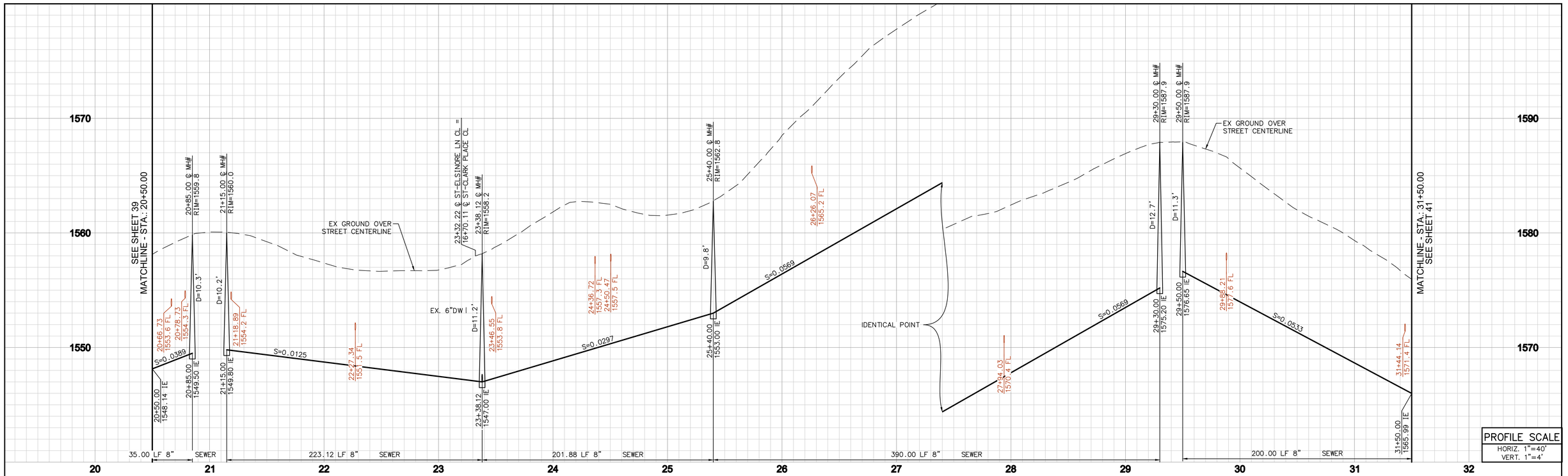
ELSINORE LANE
PLAN AND PROFILE
STA. 10+00.00 TO 20+50.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	39 OF 70
	D—

RECMD PLAN CHECK OVERSIGHT ENGINEER REGISTRATION NUMBER DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-039-PL PRF-ELSINORE - 1.DWG SHEVCHENKO, OLGA 1/9/2025 3:31 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-PAD-PL PRF-ELSINORE - 2.DWG SHEVCHENKO, OLGA 12/31/2024 1:52 PM

RECMD	PLAN CHECK OVERSIGHT ENGINEER REGISTRATION NUMBER	DATE SIGNED
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EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

ELSINORE LANE
PLAN AND PROFILE
STA. 20+50.00 TO 31+50.00

I.D.	
S.A.	
W.O.	
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COORD.	
SHEET:	40 OF 70
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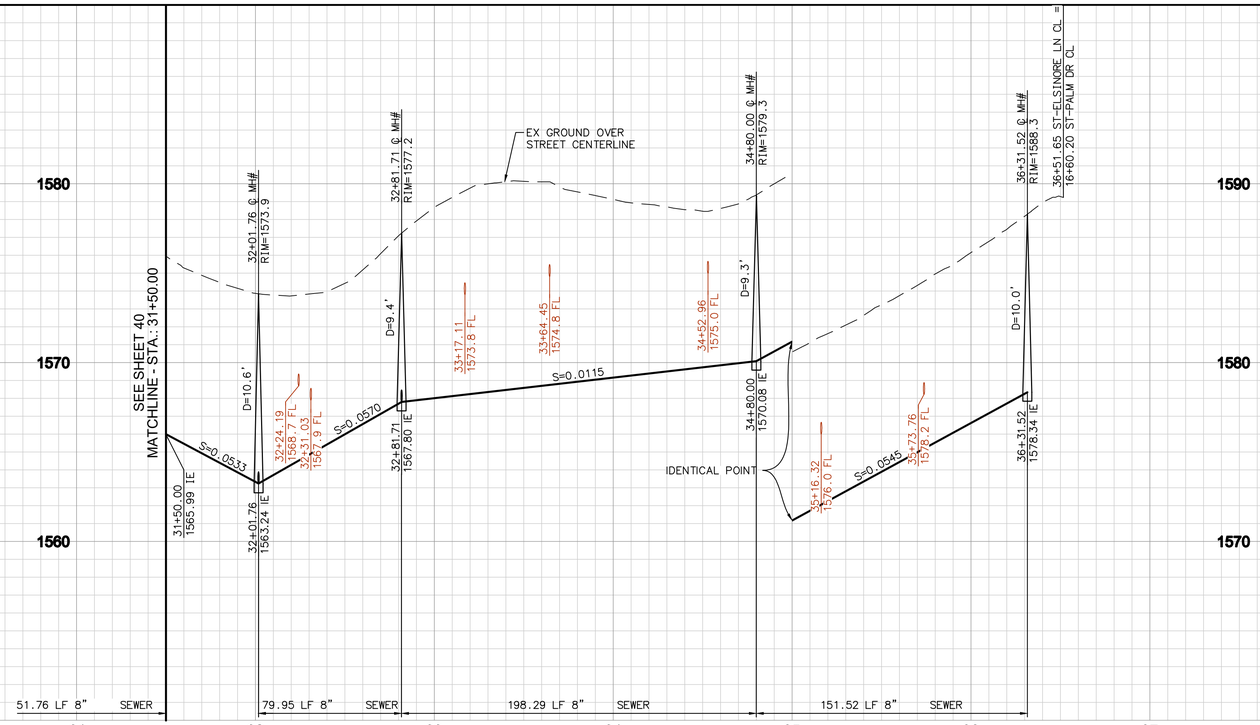
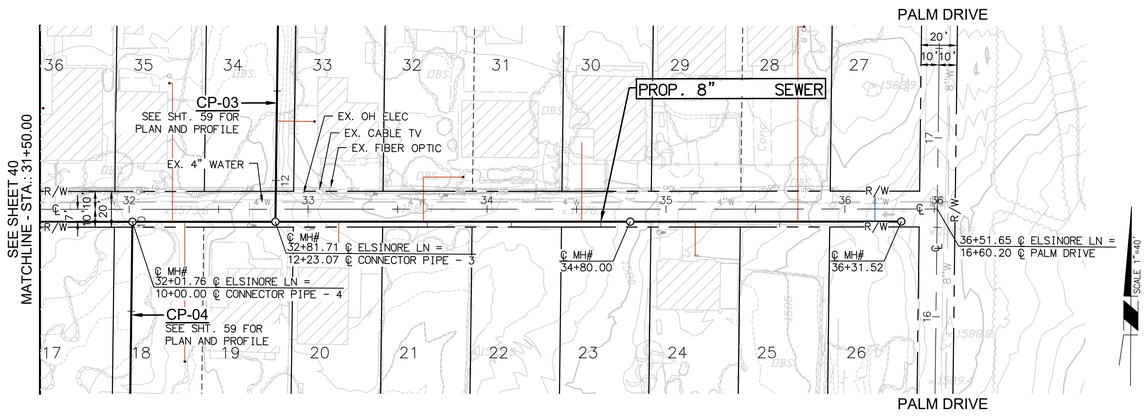


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

ELSINORE LANE



30% SUBMITTAL

SCALE: 1"=40'

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RECMD | PLAN CHECK OVERSIGHT ENGINEER REGISTRATION NUMBER | DATE SIGNED

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No. 87843
CIVIL
STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

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PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

ELSINORE LANE
PLAN AND PROFILE
STA. 31+50.00 TO 36+50.00

I.D.	
S.A.	
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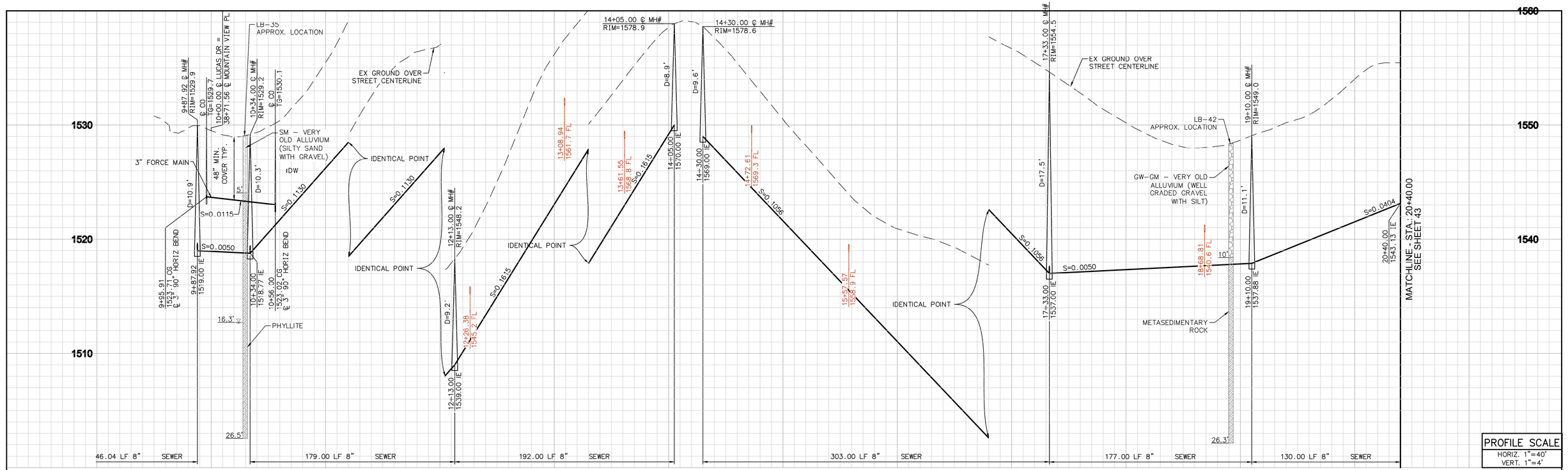
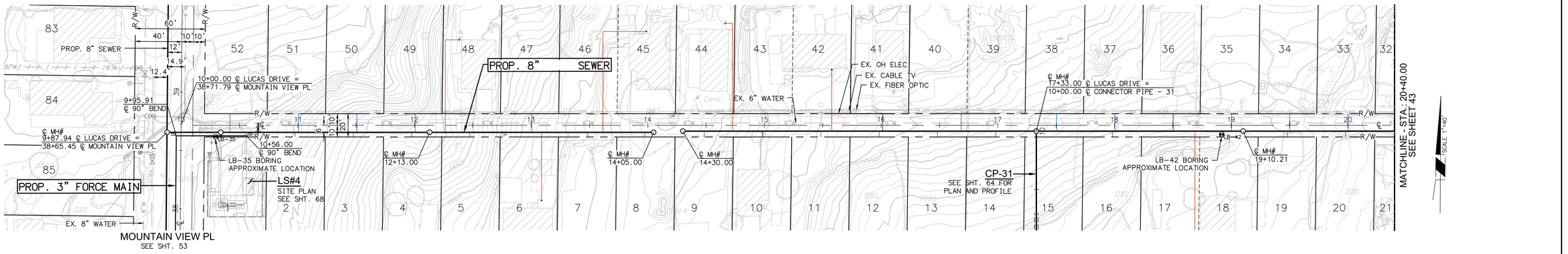
COORD.	
SHEET:	41 OF 70
	D—



LUCAS DRIVE



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

RECOMD | PLAN CHECK | OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

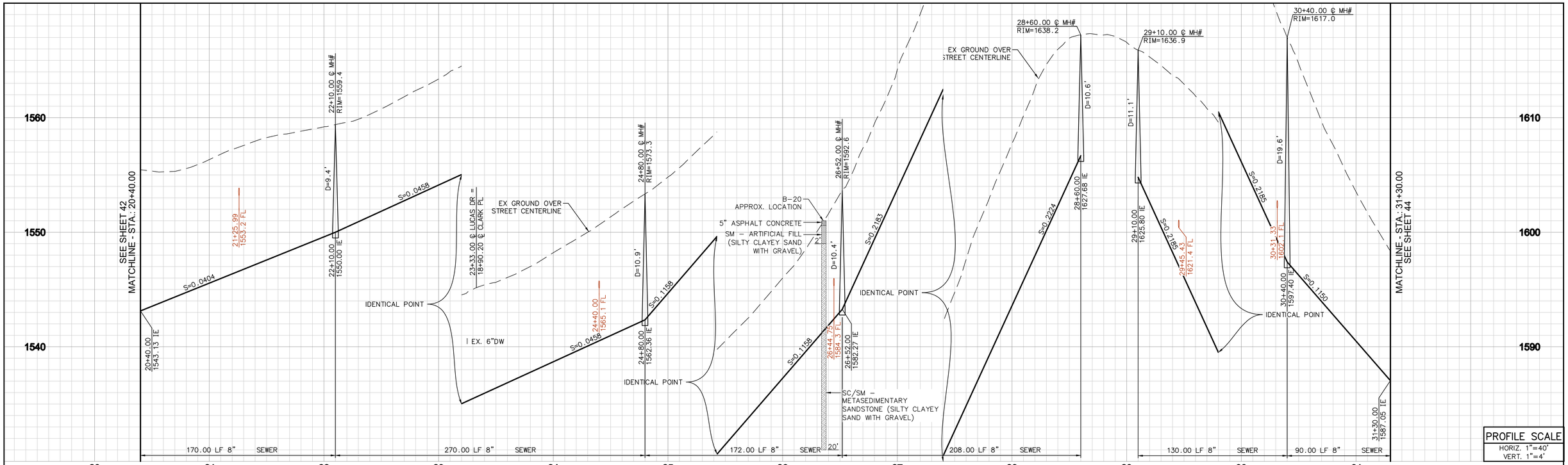
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

LUCAS DRIVE
PLAN AND PROFILE
STA. 10+00.00 TO 20+40.00

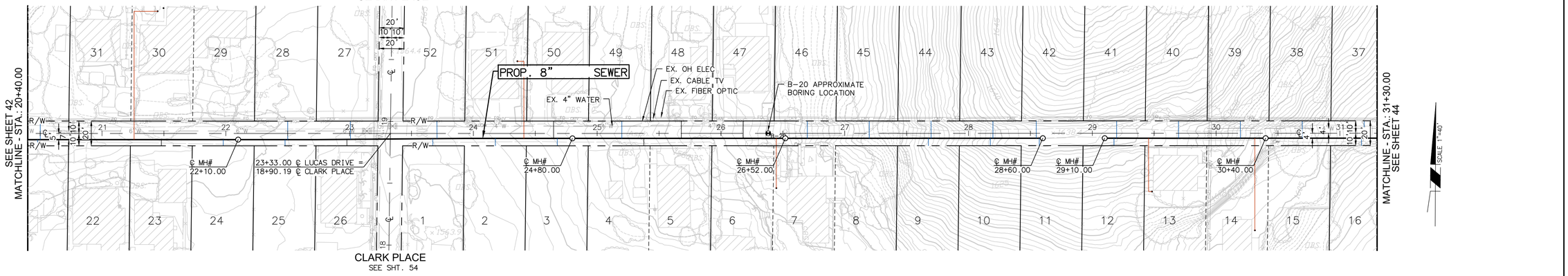
I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 42 OF 70
D—

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-042-PL PRF-LUCAS - 1.DWG SHEVCHENKO, OLGA 1/2/2025 5:42 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

LUCAS DRIVE



30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT
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REVISIONS					
MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

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EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

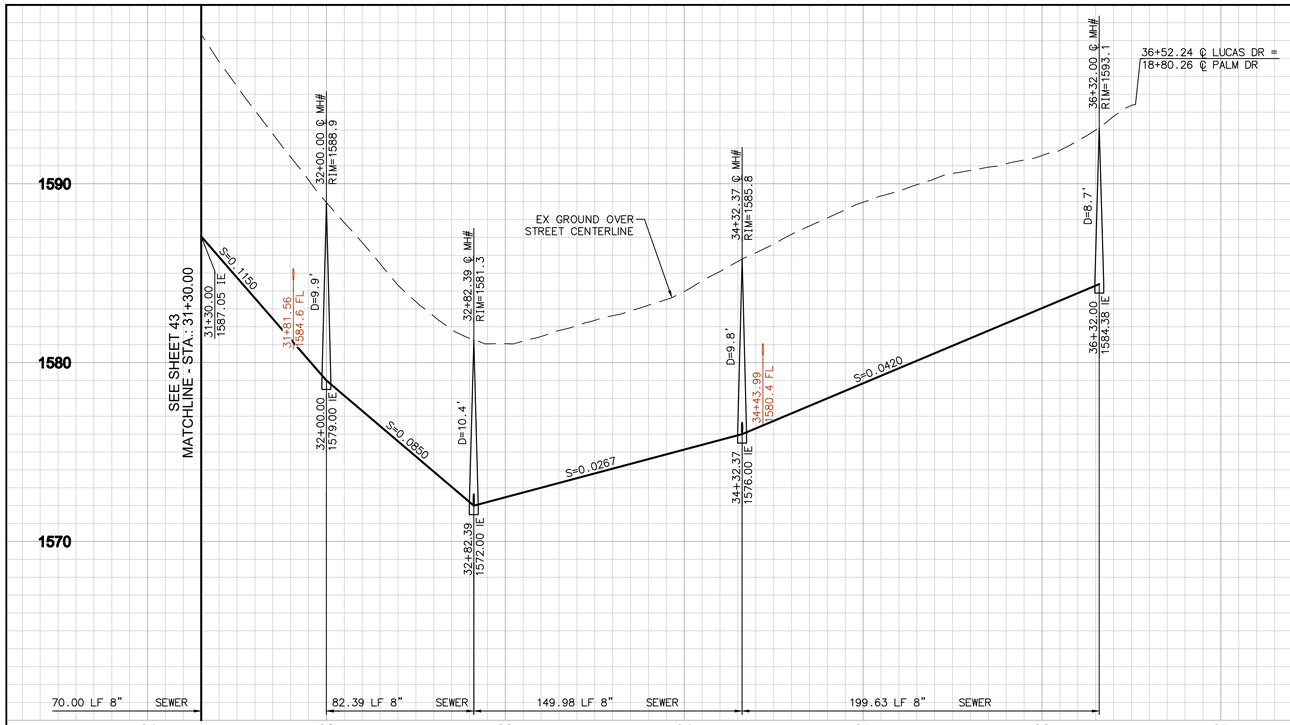
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA
QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS
LUCAS DRIVE
PLAN AND PROFILE
STA. 20+40.00 TO 31+30.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	43 OF 70
	D—

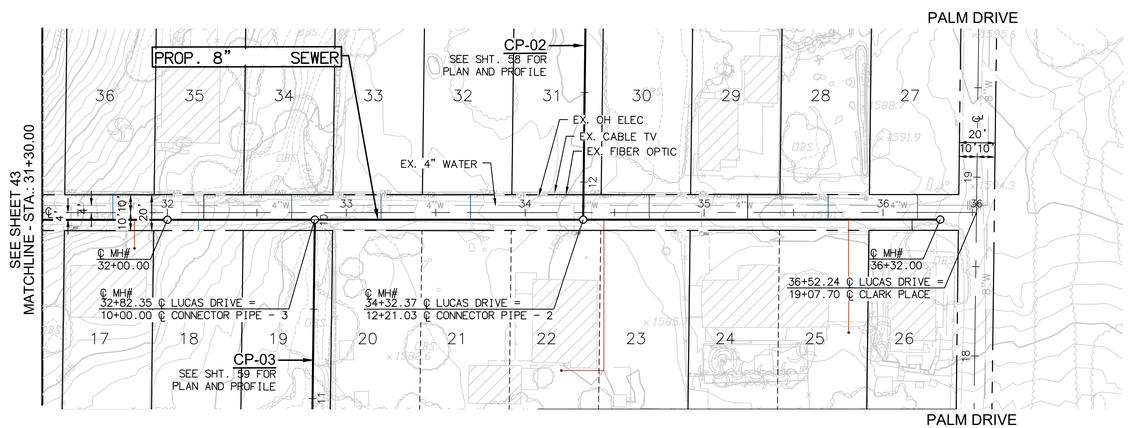
RECOMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-043-PL PRF-LUCAS - 2.DWG SHEVCHENKO, OLGA 1/2/2025 6:10 PM



LUCAS DRIVE



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-044-PL PRF-LUCAS - 1.DWG SHEVCHENKO, OLGA 12/31/2024 2:03 PM

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

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TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

LUCAS DRIVE
PLAN AND PROFILE
STA. 31+30.00 TO 36+50.00

I.D.	
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C.O.	
COORD.	
SHEET:	44 OF 70
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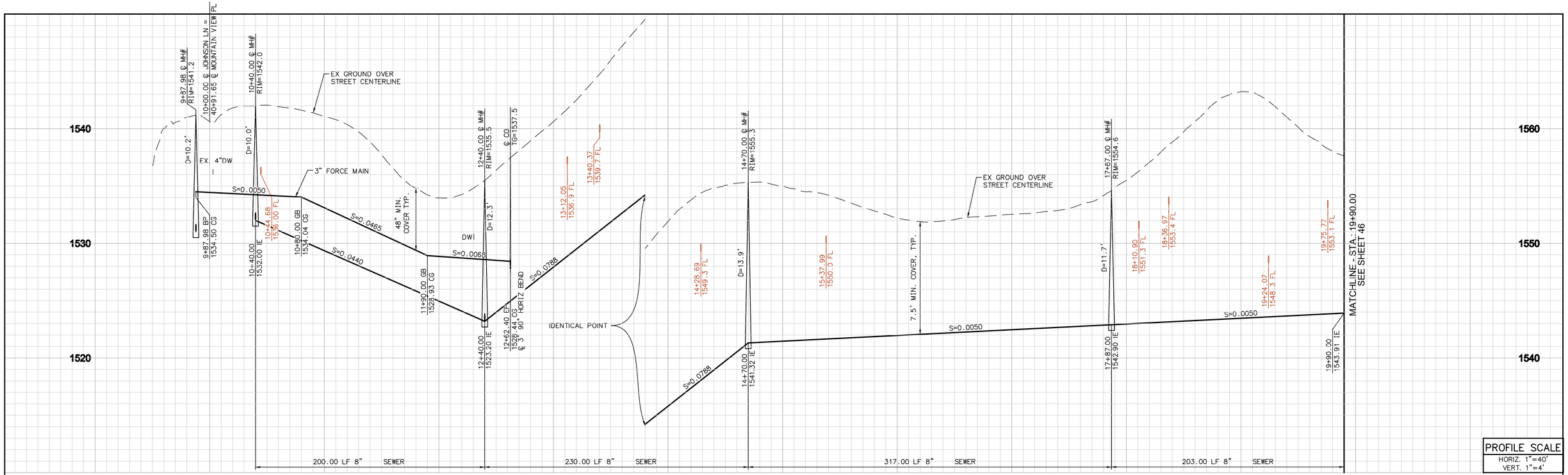
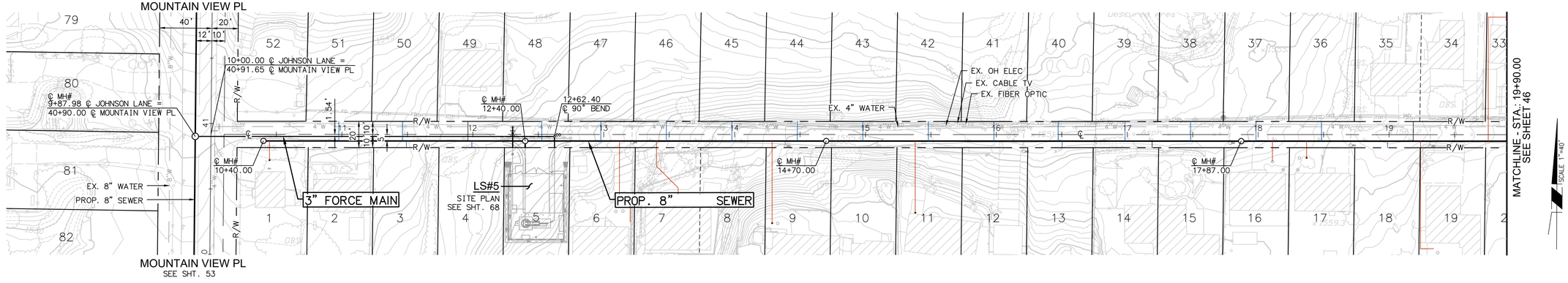


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

JOHNSON LANE



30% SUBMITTAL

SCALE: 1"=40'

RECORD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.			

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REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

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40810 COUNTY CENTER DR., SUITE 200
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PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER
MILES T. COSTANZA
No. 87843
CIVIL
STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

JOHNSON LANE
PLAN AND PROFILE
STA. 10+00.00 TO 19+90.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	45 OF 70
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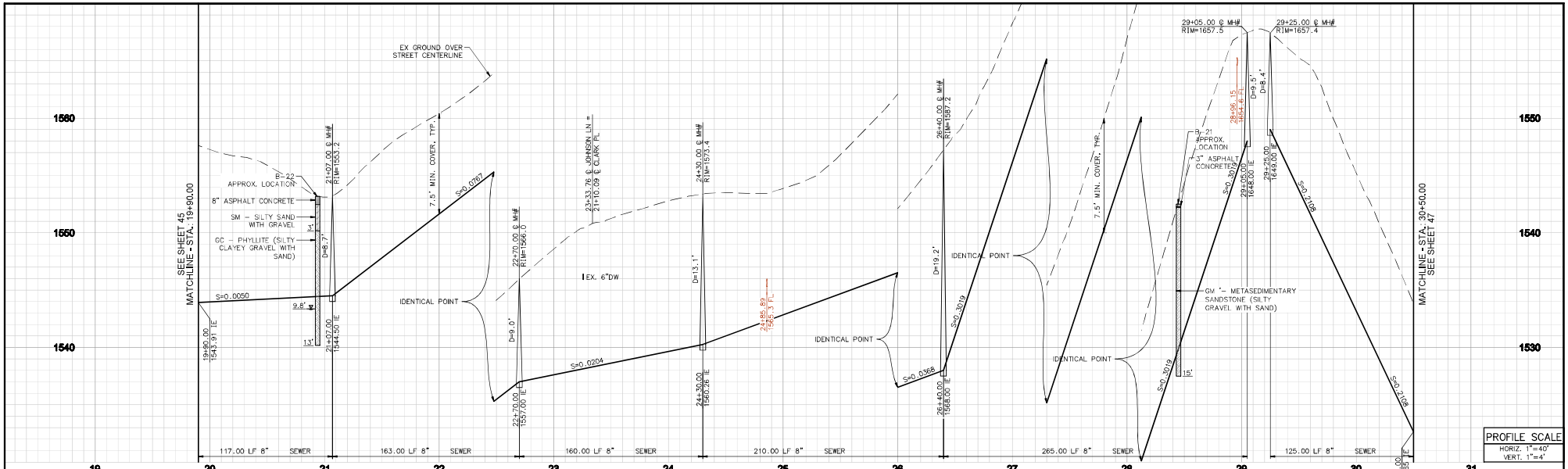
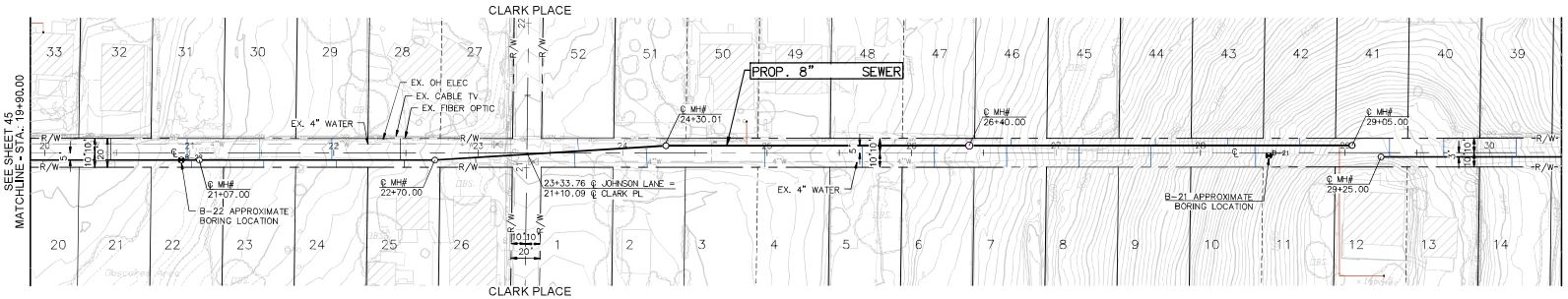
H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\DLV\196454-SWR-045-PL PRF-JOHNSON - 1.DWG SHEVCHENKO, OLGA 12/31/2024 2:01 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

JOHNSON LANE



30% SUBMITTAL

SCALE: 1"=40'

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REVISIONS					
MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

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EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

JOHNSON LANE
PLAN AND PROFILE
STA. 19+90.00 TO 30+50.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	46 OF 70
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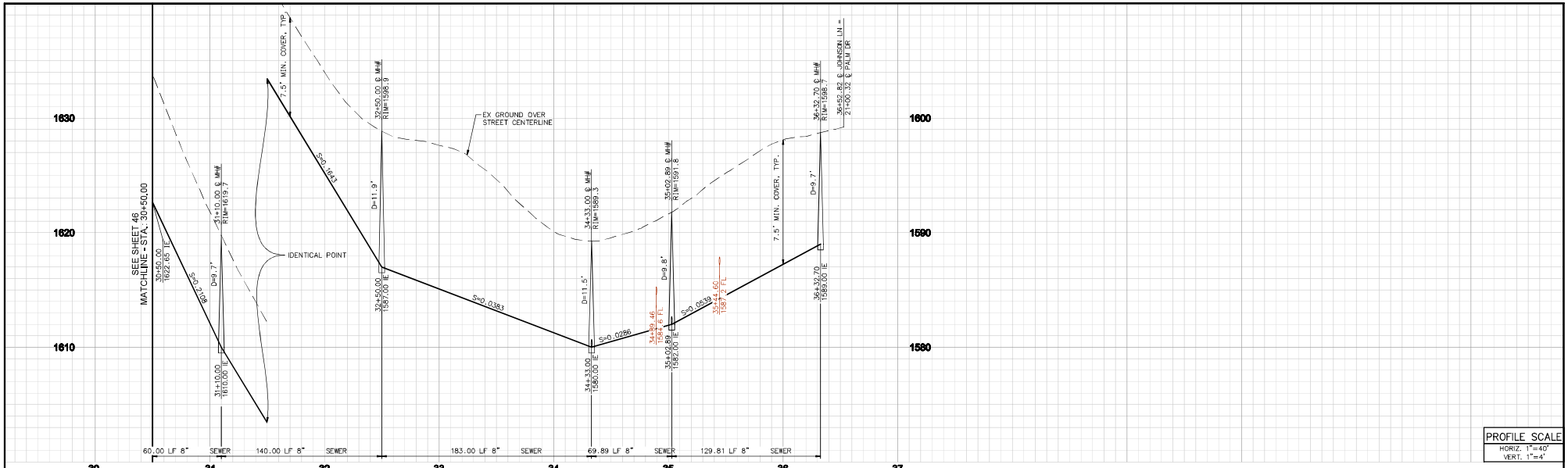
RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

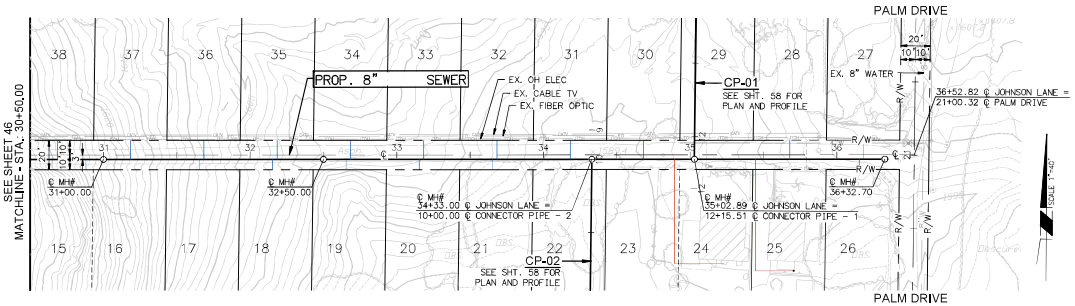
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\VL196454-SWR-S46-PL PRF-JOHNSON - 2.DWG MCCARTHY, FIONA 12/30/2024 1:02 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

JOHNSON LANE



30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

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EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

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PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

JOHNSON LANE
PLAN AND PROFILE
STA. 30+50.00 TO 36+50.00

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 47 OF 70
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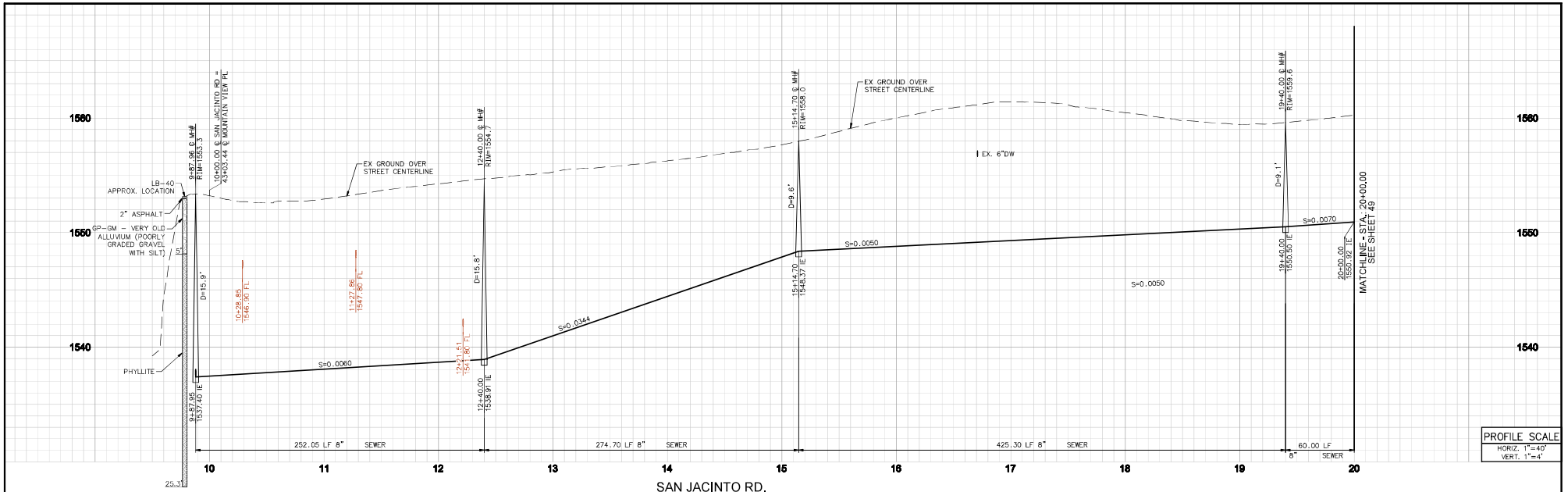
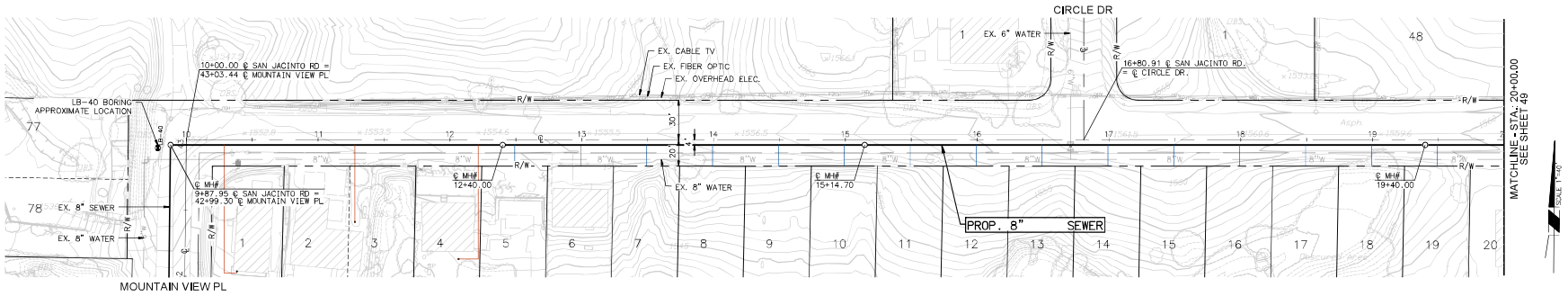


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SAN JACINTO RD.



30% SUBMITTAL

SCALE: 1"=40'

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CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

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CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

SAN JACINTO RD.
PLAN AND PROFILE
STA. 10+00.00 TO 20+00.00

I.D.
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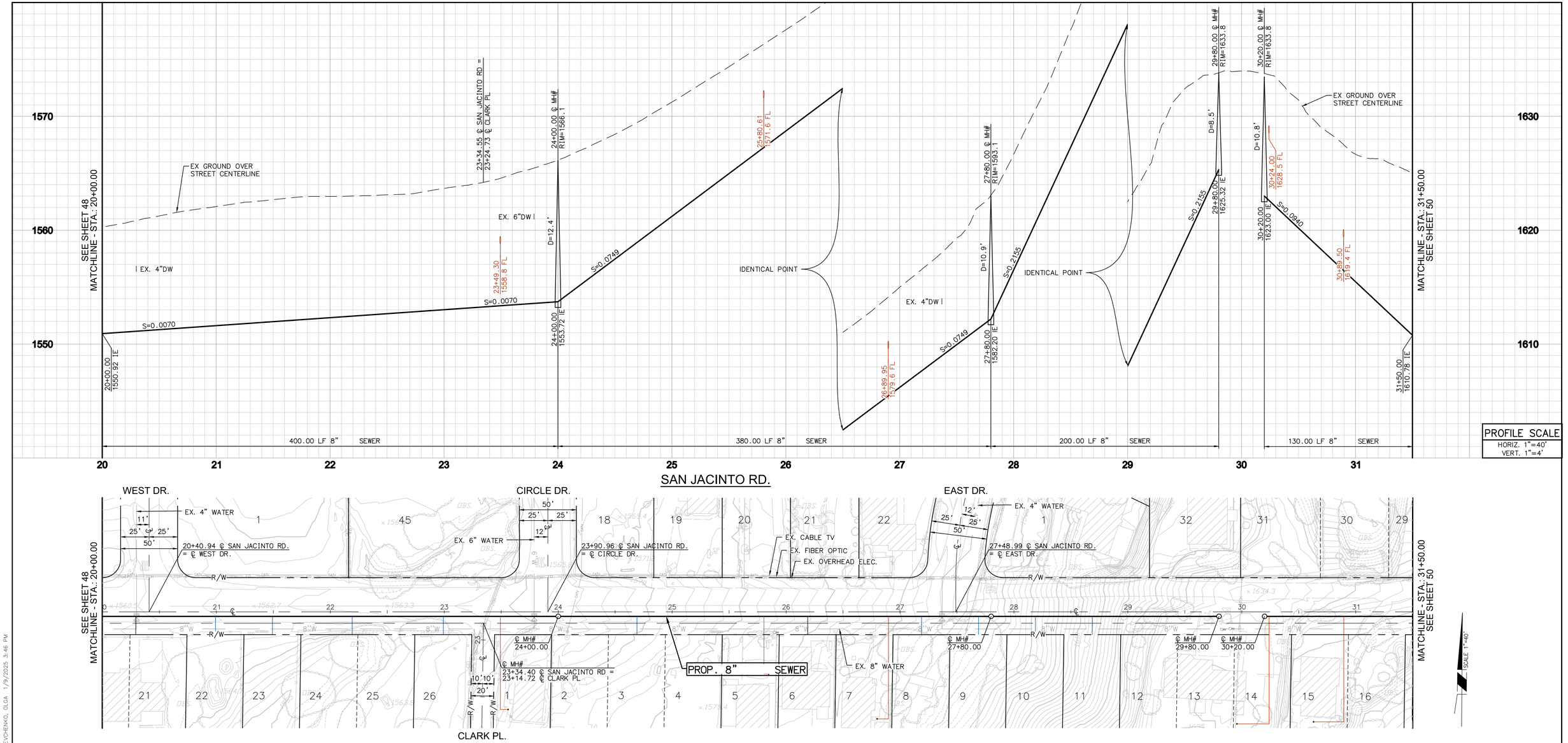
C.O.
COORD.
SHEET: 48 OF 70
D—

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\EVL\196454-SWR-SA8-PL PRF-SAN JACINTO - 1.DWG MCCARTHY, FIONA 12/30/2024 1:10 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

DIG ALERT
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REVISIONS					
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CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
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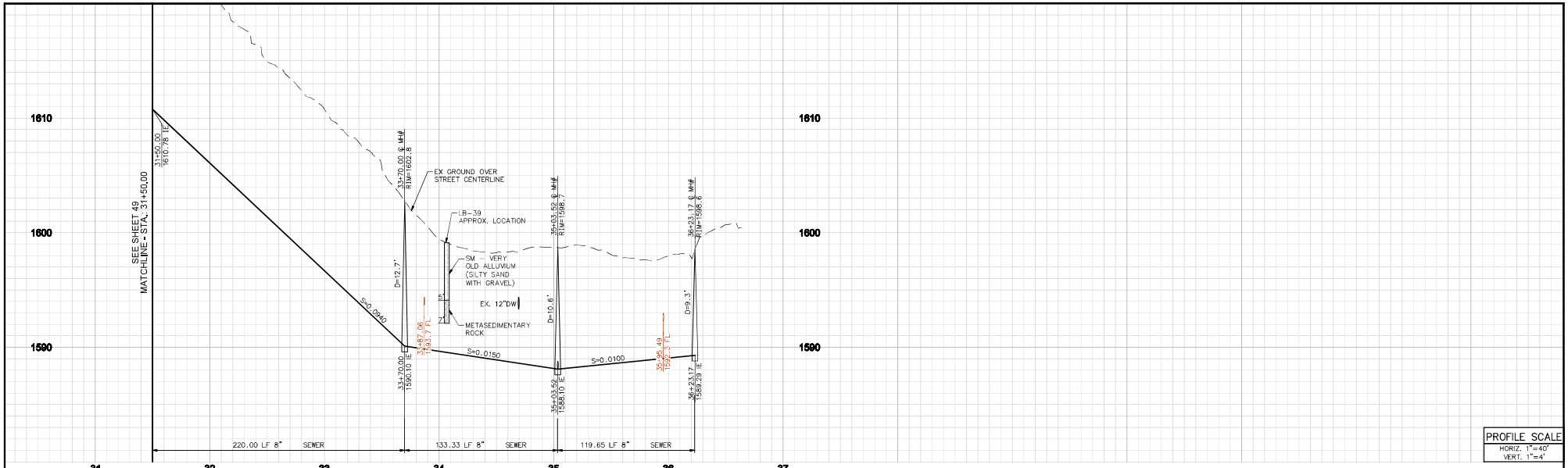
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA
QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS
SAN JACINTO RD.
PLAN AND PROFILE
STA. 20+00.00 TO 31+50.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	49 OF 70
	D—

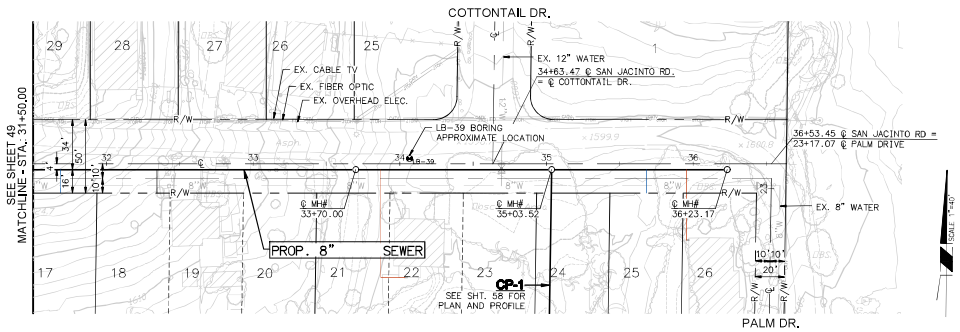
RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
	APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.		

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\DLV\196454-SWR-049-PL PRF-SAN JACINTO - 2.DWG SHEVCHENKO, OLGA 1/9/2025 3:46 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SAN JACINTO RD.



30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT
Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

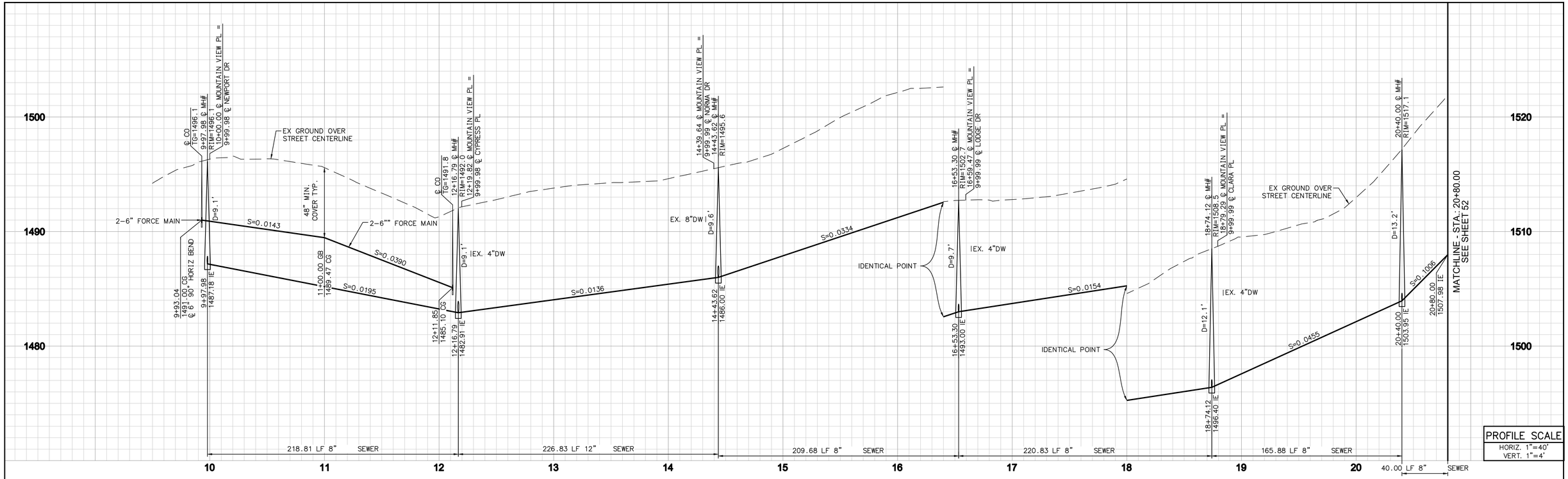
SAN JACINTO RD.
PLAN AND PROFILE
STA. 31+50.00 TO 36+50.00

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 50 OF 70
D—

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

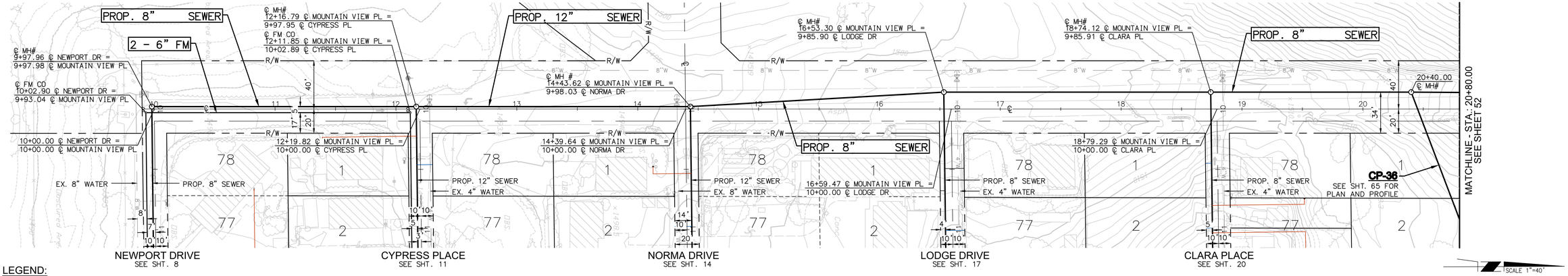
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\EVV\196454-SWR-050-PL PRF-SAN JACINTO - 3.DWG MCCARTHY, FIONA 12/30/2024 1:17 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

MOUNTAIN VIEW PLACE



LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT
Call: TOLL FREE
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EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

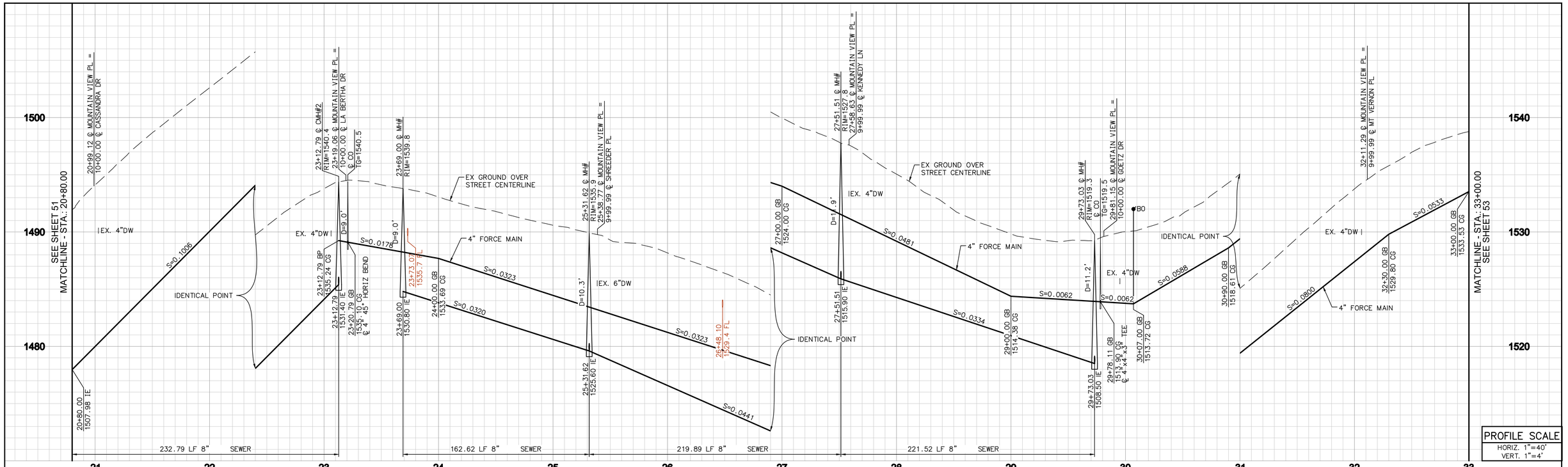
QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

MOUNTAIN VIEW PLACE
PLAN AND PROFILE STA. 10+00.00 TO 20+80.00

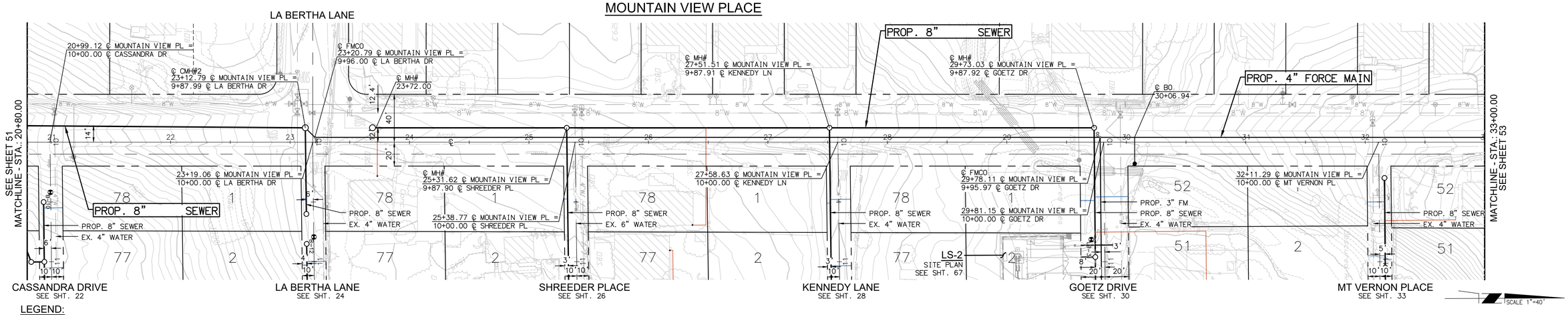
I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	51 OF 70
	D—

RECORD PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-051-PL PRF-MT VIEW - 1.DWG SHEVCHENKO, OLGA 1/9/2025 3:55 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'



LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT
Call: TOLL FREE
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REVISIONS					
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EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

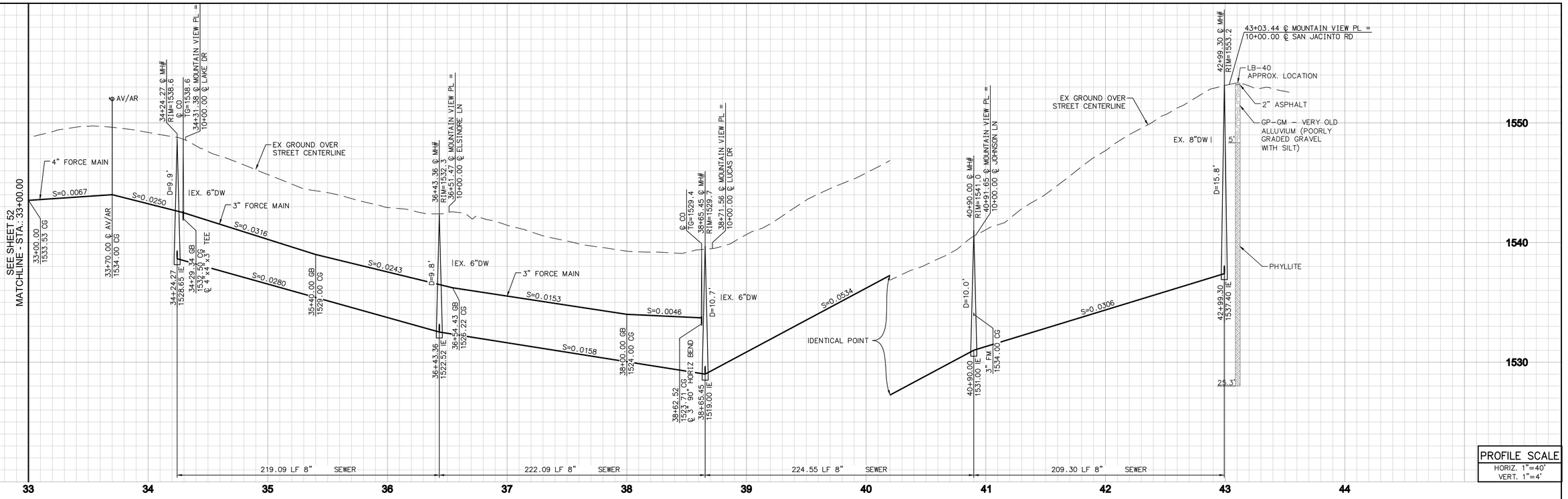
MOUNTAIN VIEW PLACE
PLAN AND PROFILE STA. 20+80.00 TO 33+00.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	52 OF 70
	D-

RECORD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

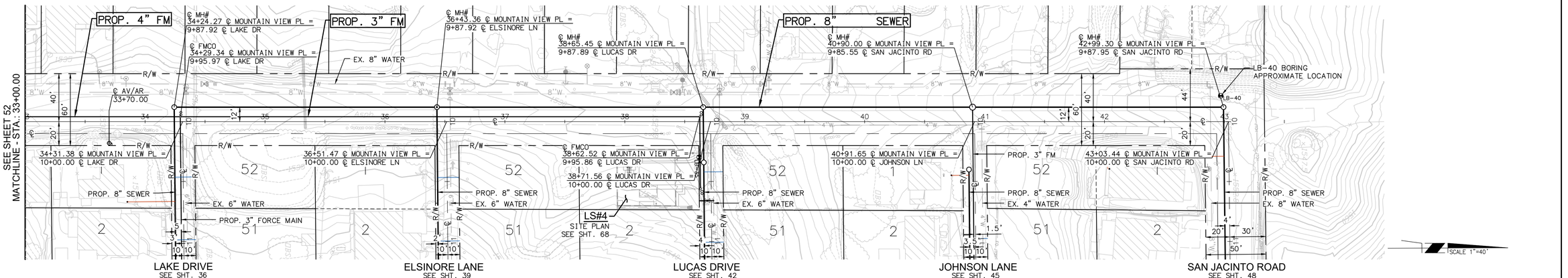
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-052-PL PRF-MT VIEW - 2.DWG SHEVCHENKO, OLGA 1/2/2025 6:34 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

MOUNTAIN VIEW PLACE



LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

DIG ALERT
Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

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REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

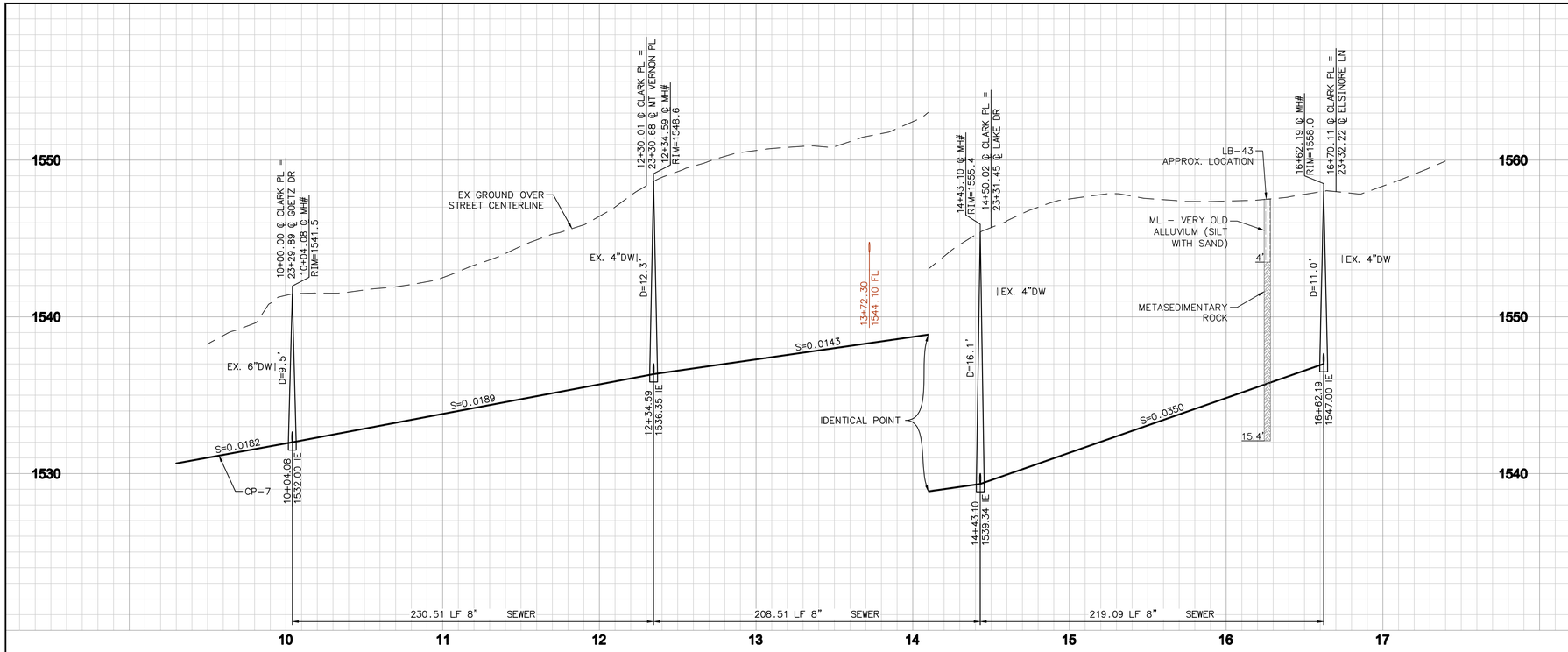
MOUNTAIN VIEW PLACE
PLAN AND PROFILE STA. 33+00.00 TO 43+00.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	53 OF 70
	D-

RECORD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

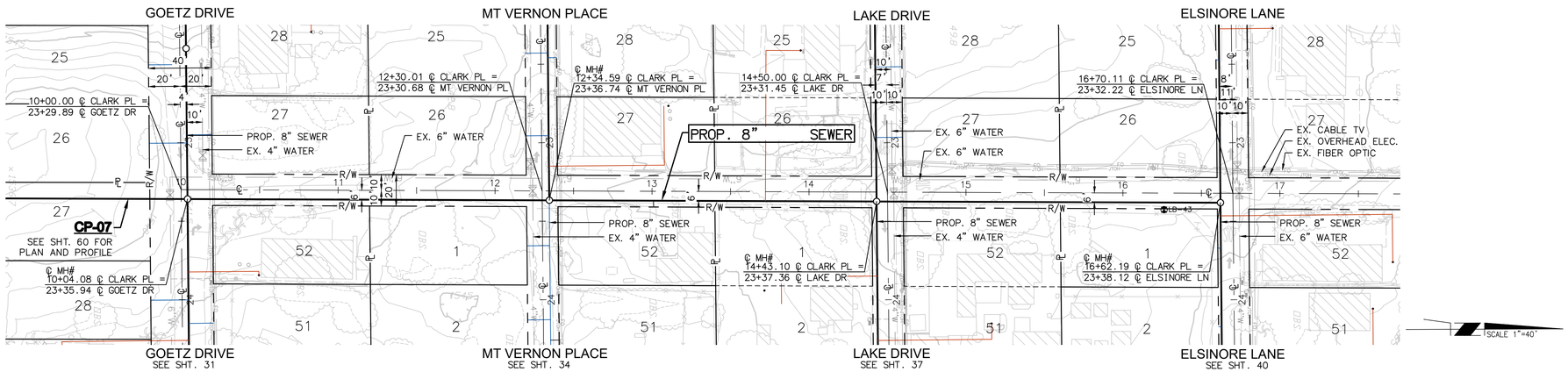
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SMR-053-PL PRF-MT VIEW - 3.DWG SHEVCHENKO, OLGA 1/9/2025 3:57 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

CLARK PLACE



LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\ULV\196454-SWR-054-PL PRF-CLARK - 1.DWG SHEVCHENKO, OLGA 1/9/2025 4:02 PM

RECORD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIG ALERT

Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER – MILES COSTANZA – No. 87843 – CIVIL – STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

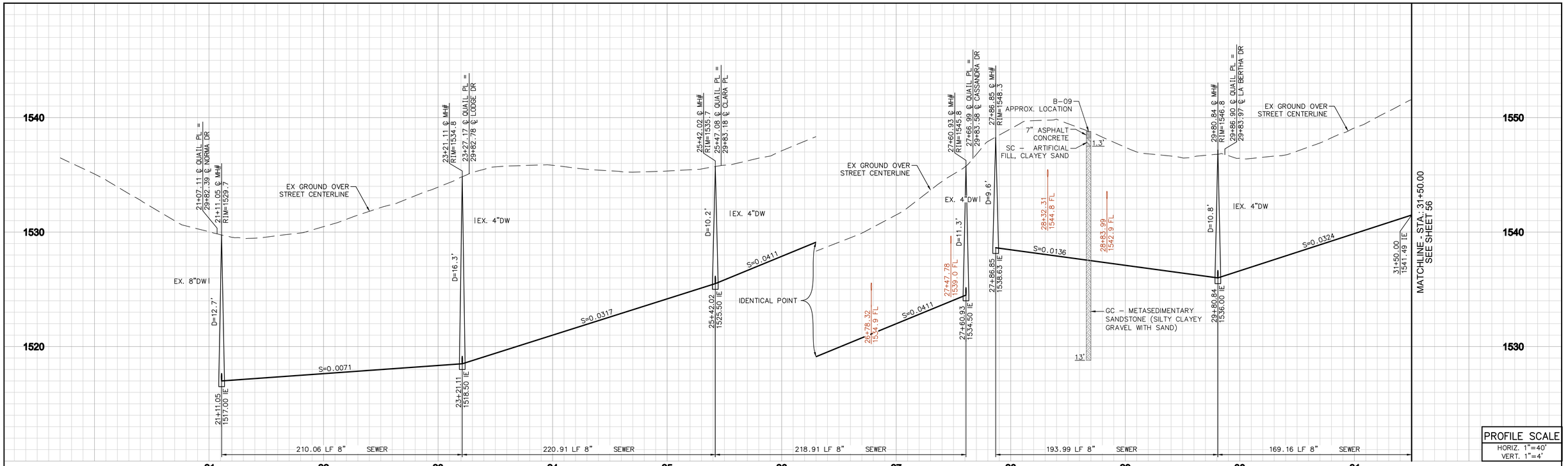
	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

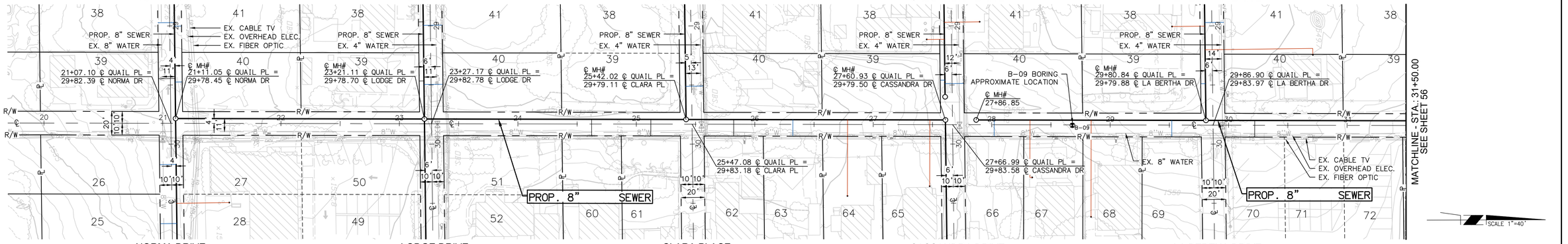
CLARK PLACE
PLAN AND PROFILE STA. 10+00.00 TO 17+00.00

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 54 OF 70
D—



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

QUAIL PLACE



NORMA DRIVE SEE SHT. 22 | LODGE DRIVE SEE SHT. 15 | CLARA PLACE SEE SHT. 21 | CASSANDRA DRIVE SEE SHT. 23 | LA BERTHA DRIVE SEE SHT. 25

LEGEND:

- EMPTY LOTS SEWER LATERAL
- EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

DIG ALERT
Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:
MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

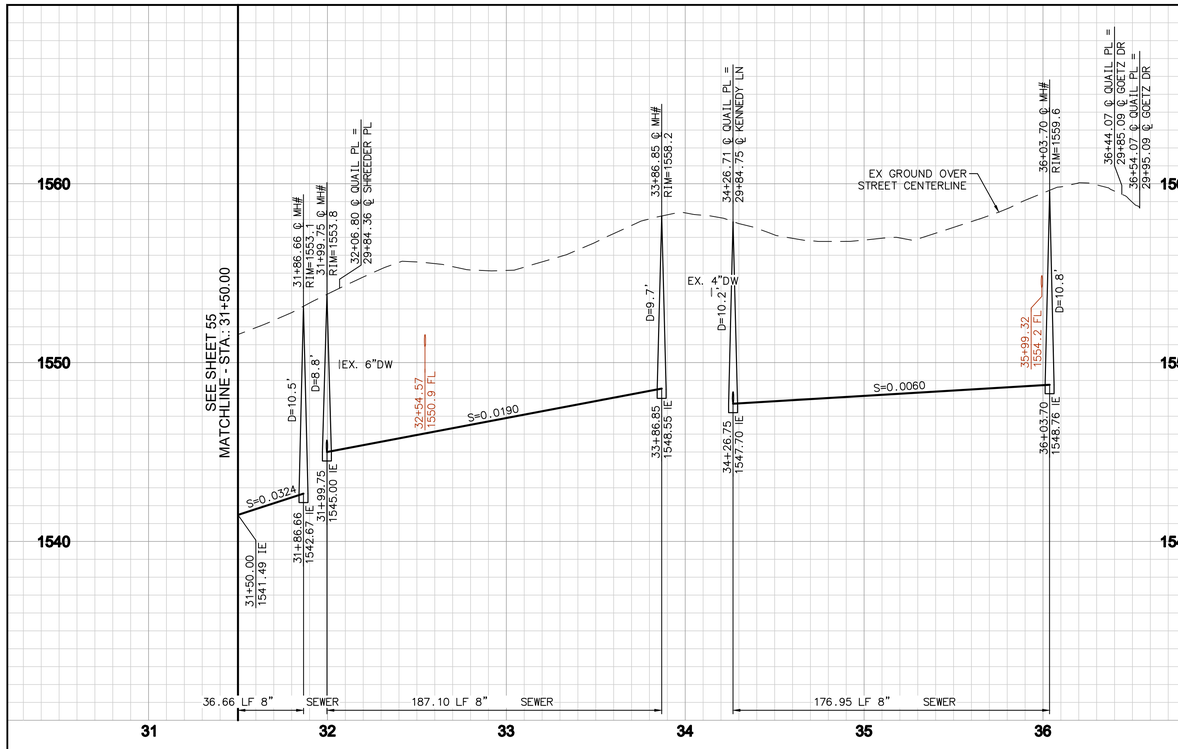
EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA
QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS
QUAIL PLACE
PLAN AND PROFILE STA. 21+00.00 TO 31+50.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	55 OF 70
	D-

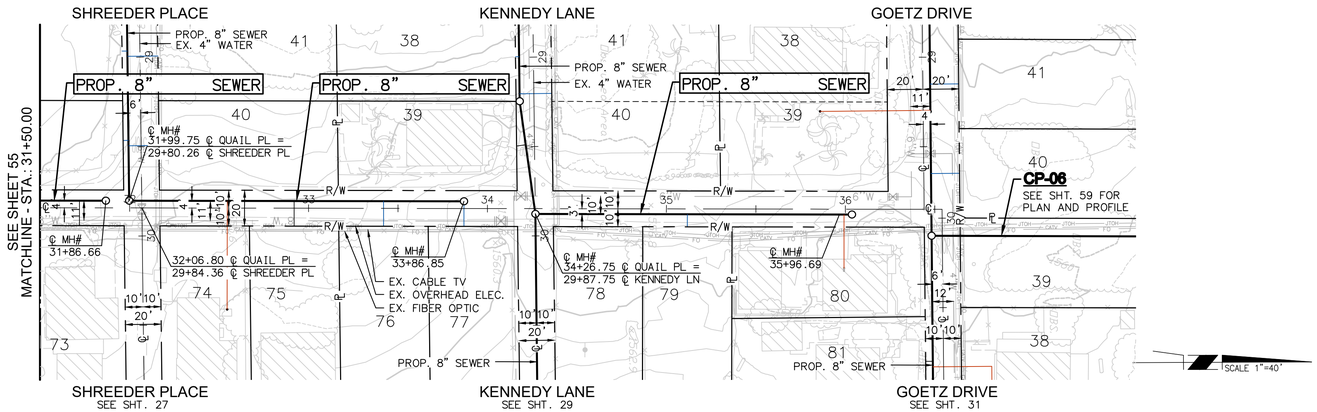
H:\RDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-055-PL PRF-QUAIL - 1.DWG SHENCHENKO, OLGA 1/9/2025 4:03 PM

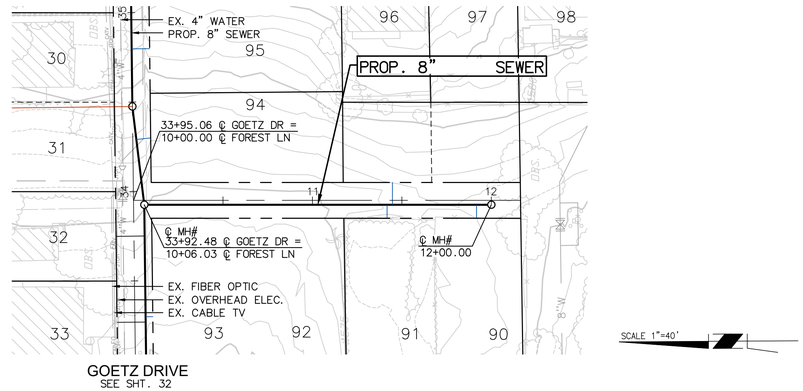


PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

QUAIL PLACE

FOREST LANE





LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

RECORD | PLAN CHECK OVERSIGHT ENGINEER REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIG ALERT
Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER · MILES W. COSTANZA · No. 87843 · CIVIL · STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

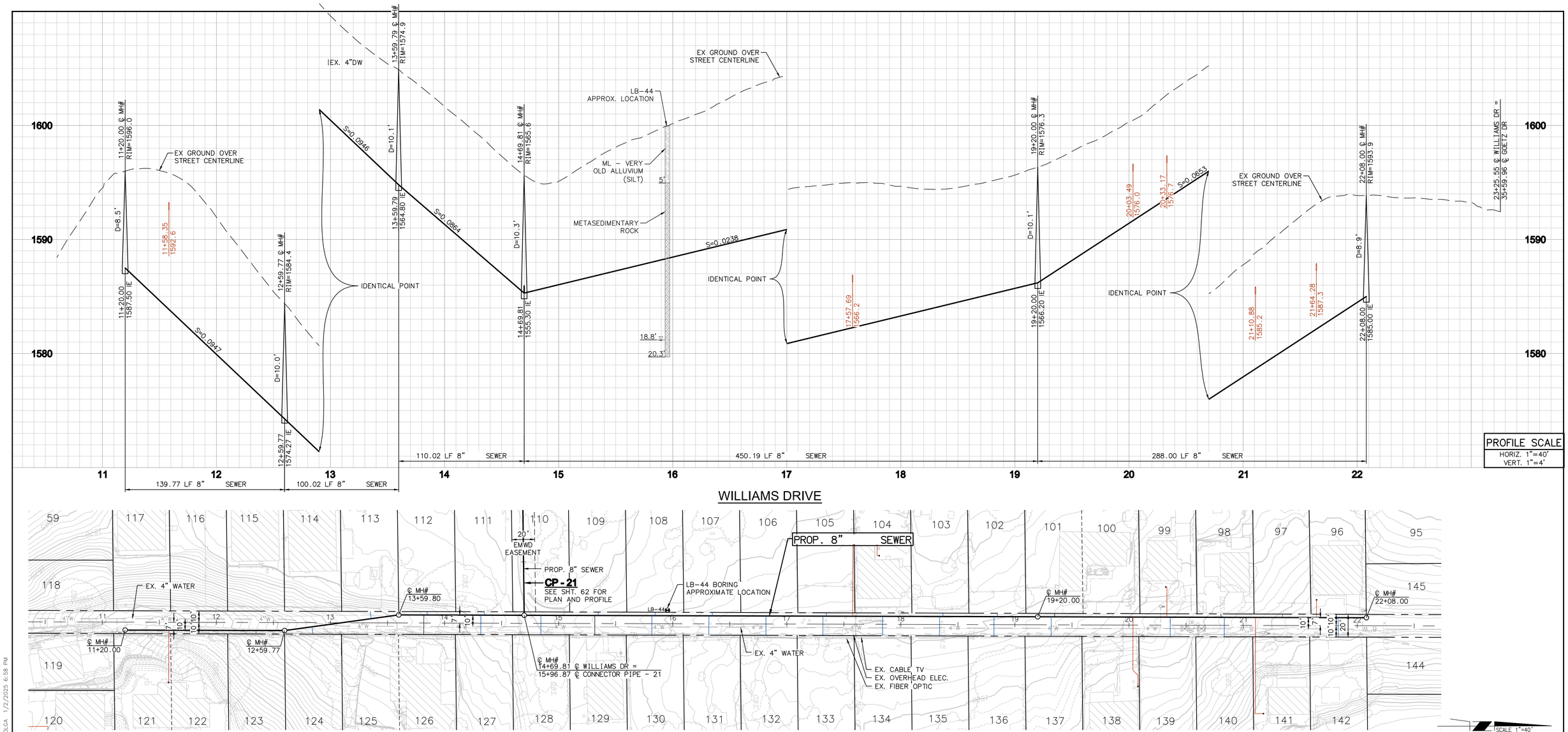
APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS
QUAIL PLACE
PLAN AND PROFILE STA. 31+50.00 TO 36+50.00
FOREST STREET
PLAN AND PROFILE STA. 10+00.00 TO 12+50.00

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	56 OF 70
	D—

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-056-PL PRF-QUAIL - 2_FOREST.DWG SHEVCHENKO, OLGA 1/2/2025 6:19 PM



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

WILLIAMS DRIVE

LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

RECORD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIG ALERT

Call: TOLL FREE
1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

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UNDER THE SUPERVISION OF:

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REGISTERED PROFESSIONAL ENGINEER MILES I. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

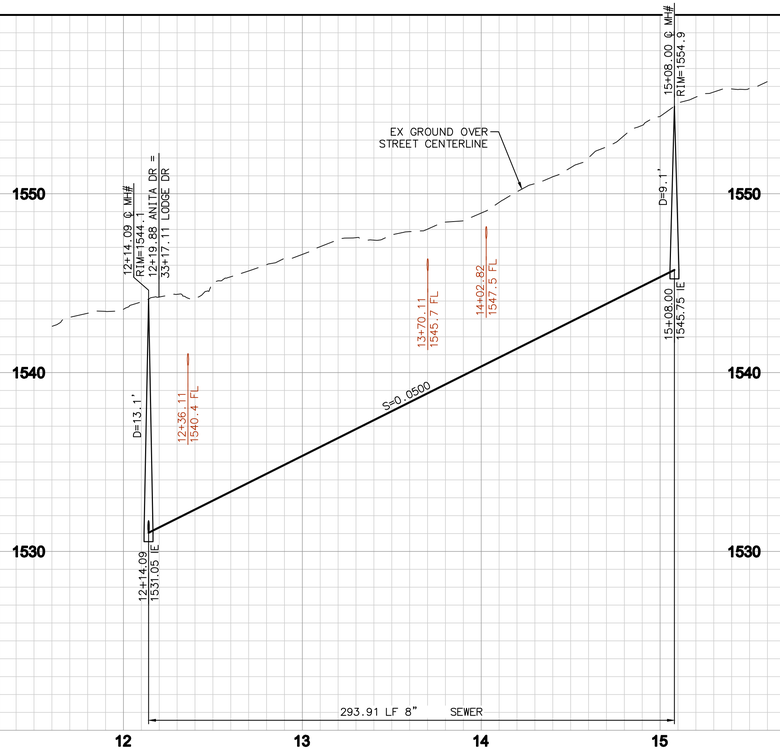
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

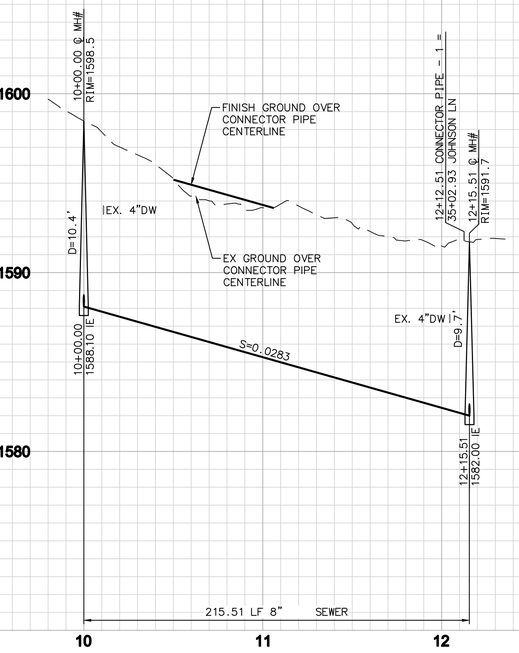
WILLIAMS DRIVE
PLAN AND PROFILE STA. 11+00.00 TO 22+10.00

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 57 OF 70
D-

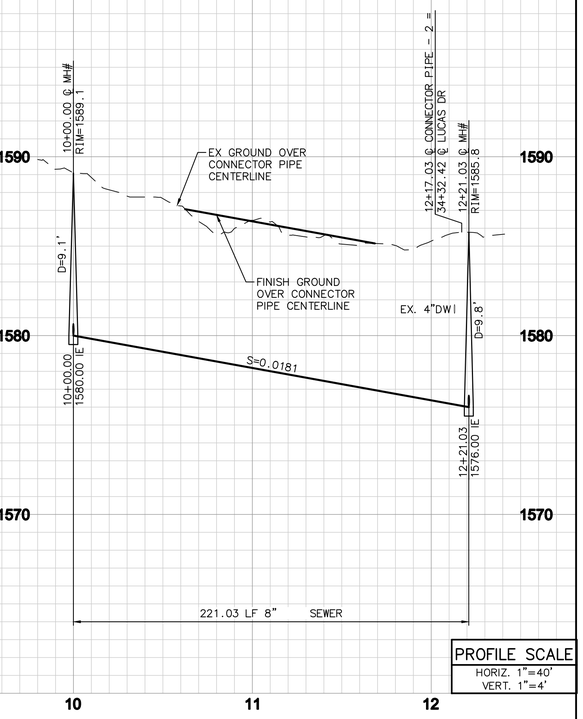
H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-057-PL PRF-WILLIAMS - 1.DWG SHEVCHENKO, OLGA 1/2/2025 6:58 PM



ANITA DRIVE

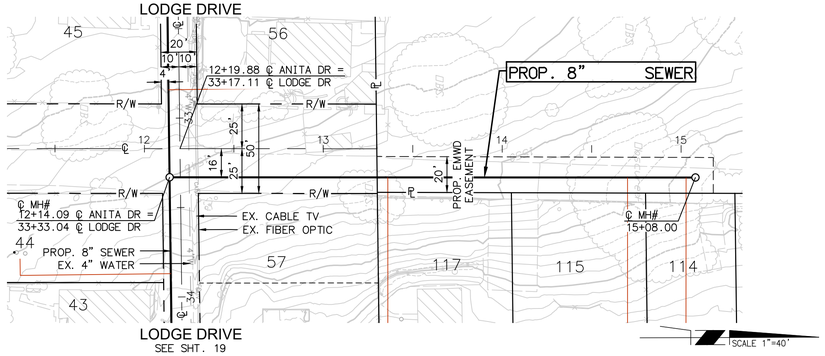


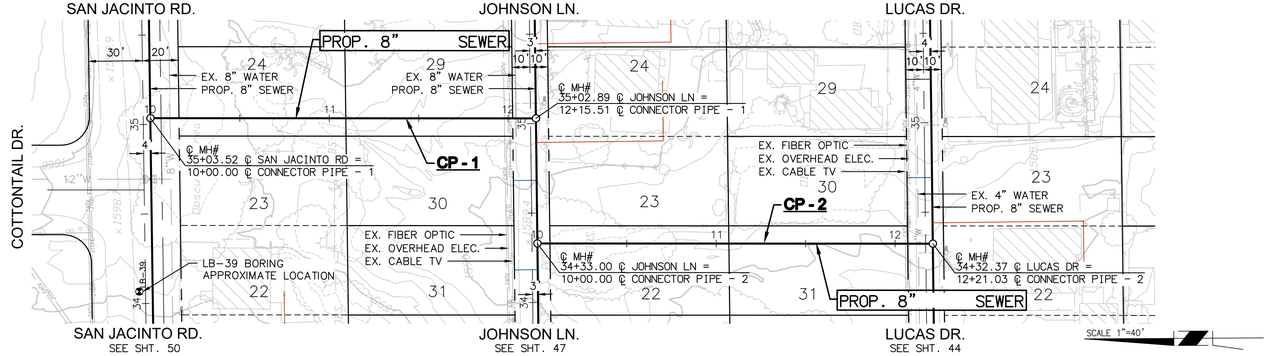
CP - 1



CP - 2

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'





LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

RECORD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES T. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

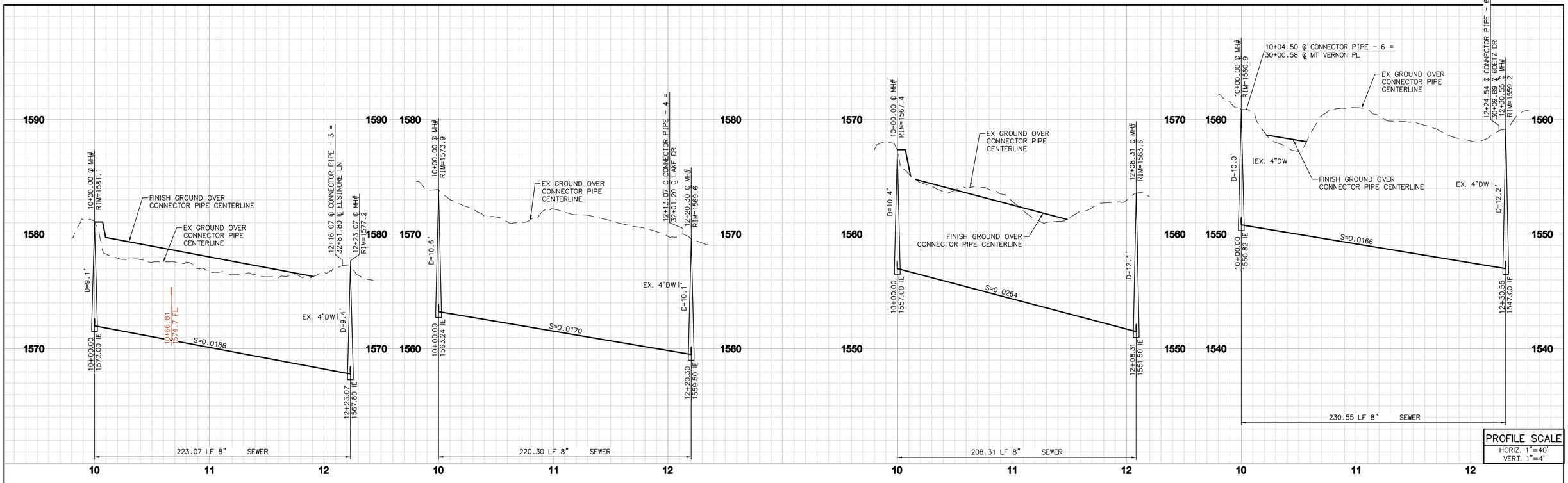
APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

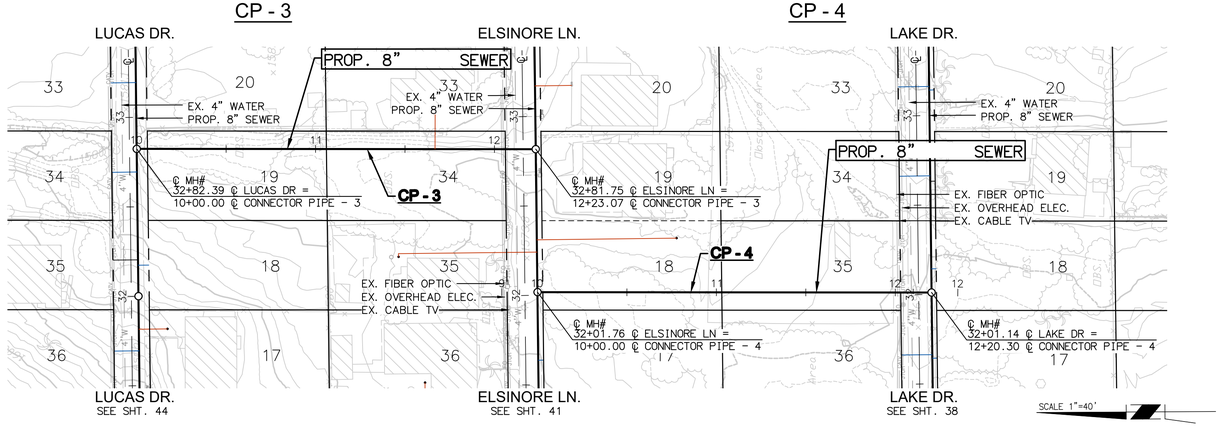
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

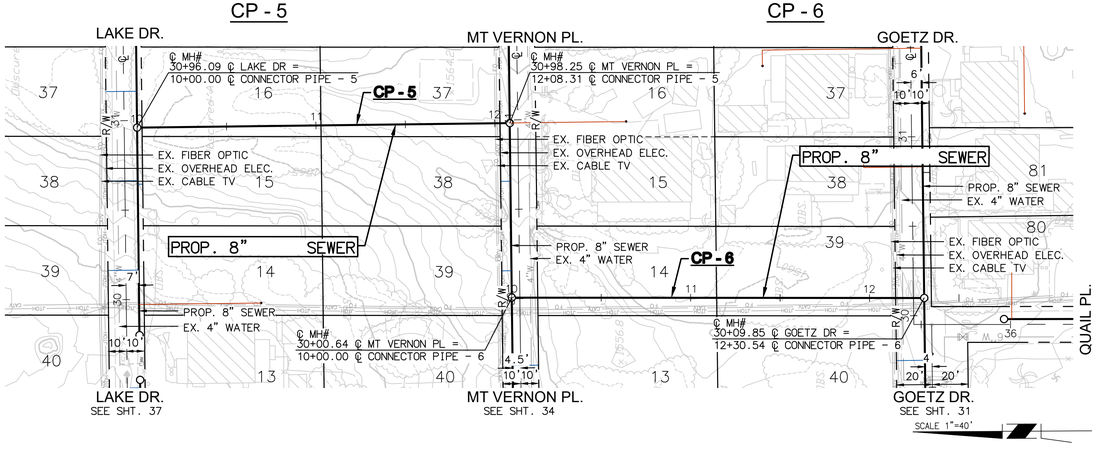
QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS
ANITA DRIVE
PLAN AND PROFILE STA. 12+00.00 TO 15+50.00
CP - 1, CP - 2
PLAN AND PROFILE

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	58 OF 70
	D—

H:\PDATA\196454 QUAIL VALLEY SUB4\CADD\DLV\196454-SWR-058-PL PRF-ANITA - CP1&2.DWG SHEVCHENKO, OLGA 1/2/2025 9:59 AM







LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=##'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-059-PL PRF-CP03_06.DWG SHEVCHENKO, OLGA 1/2/2025 10:05 AM

RECORD	PLAN CHECK	OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.				

DIG ALERT

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REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

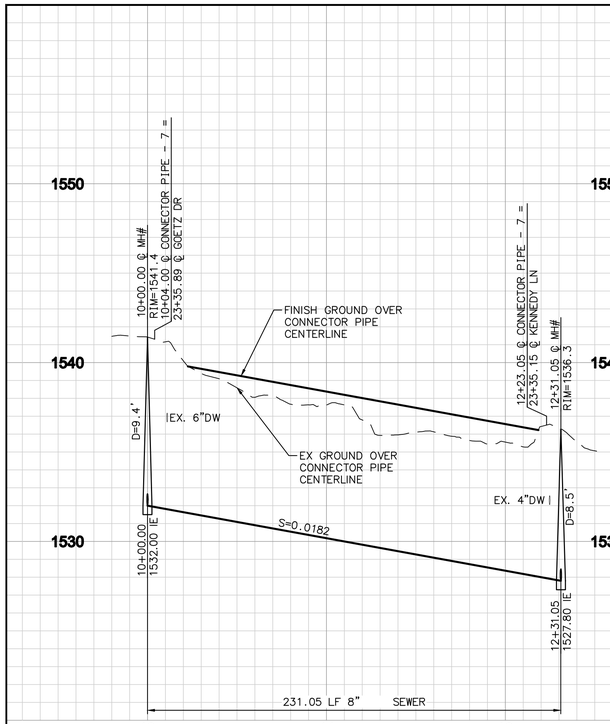
	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

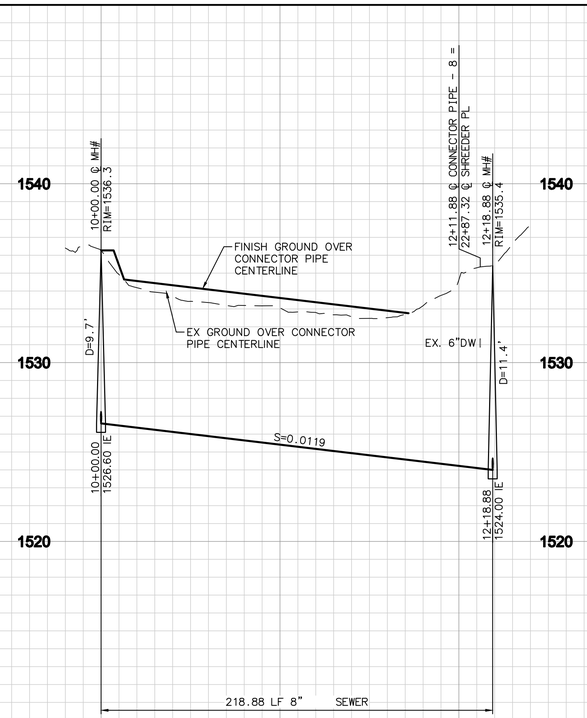
QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

CONNECTOR PIPES
CP - 3, CP - 4, CP-5 & CP-6

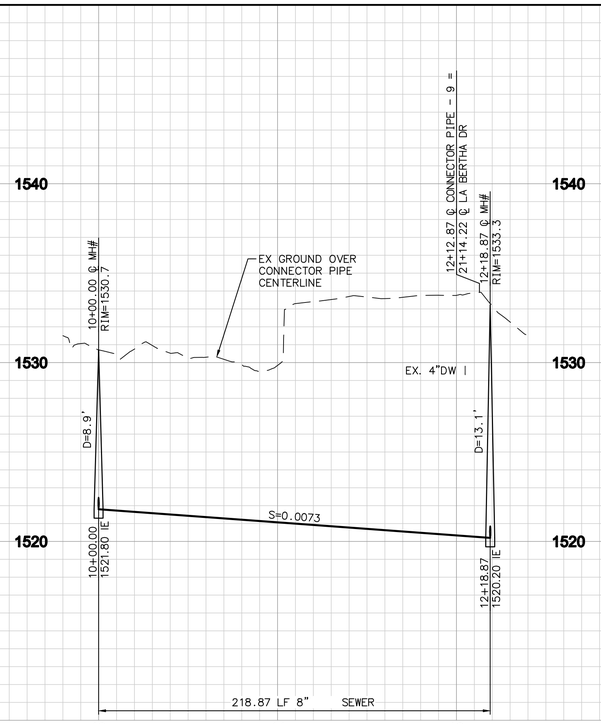
I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	59 OF 70
	D—



CP - 7

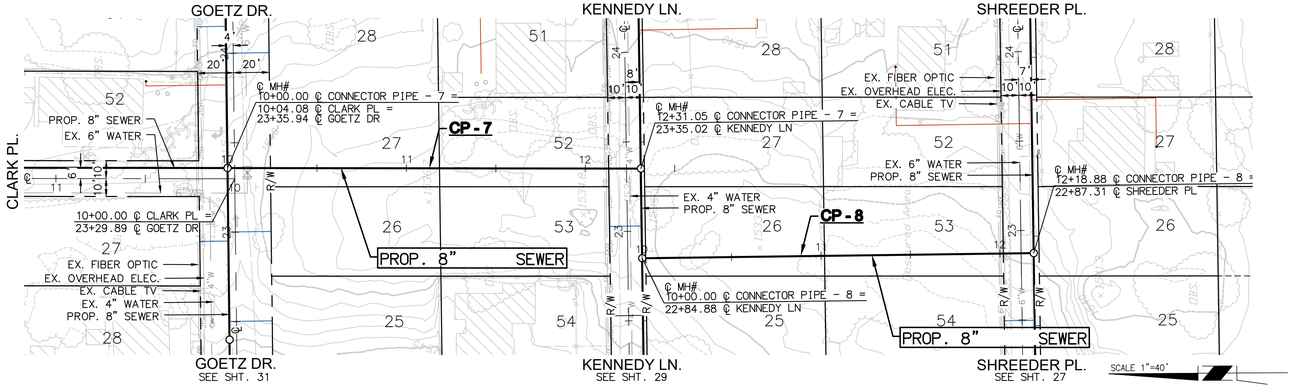


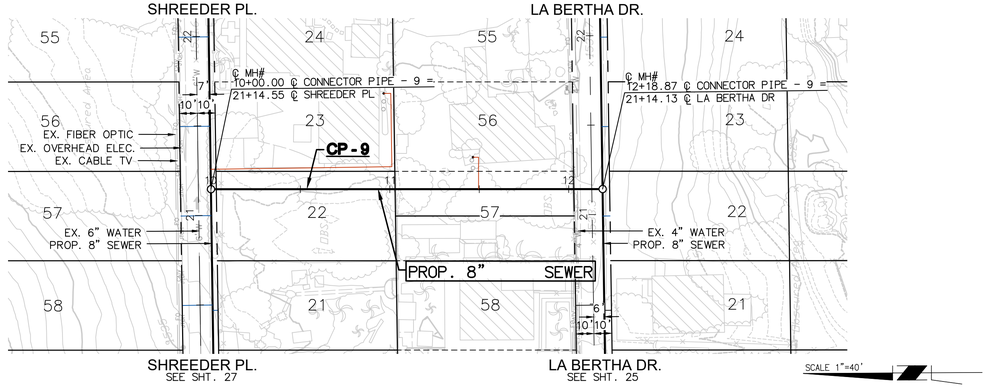
CP - 8



CP - 9

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'





LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=##'

DIG ALERT

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REVISIONS

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REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

CONNECTOR PIPES
CP - 7, CP - 8 & CP-9

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 60 OF 70
D—

RECORD | PLAN CHECK | OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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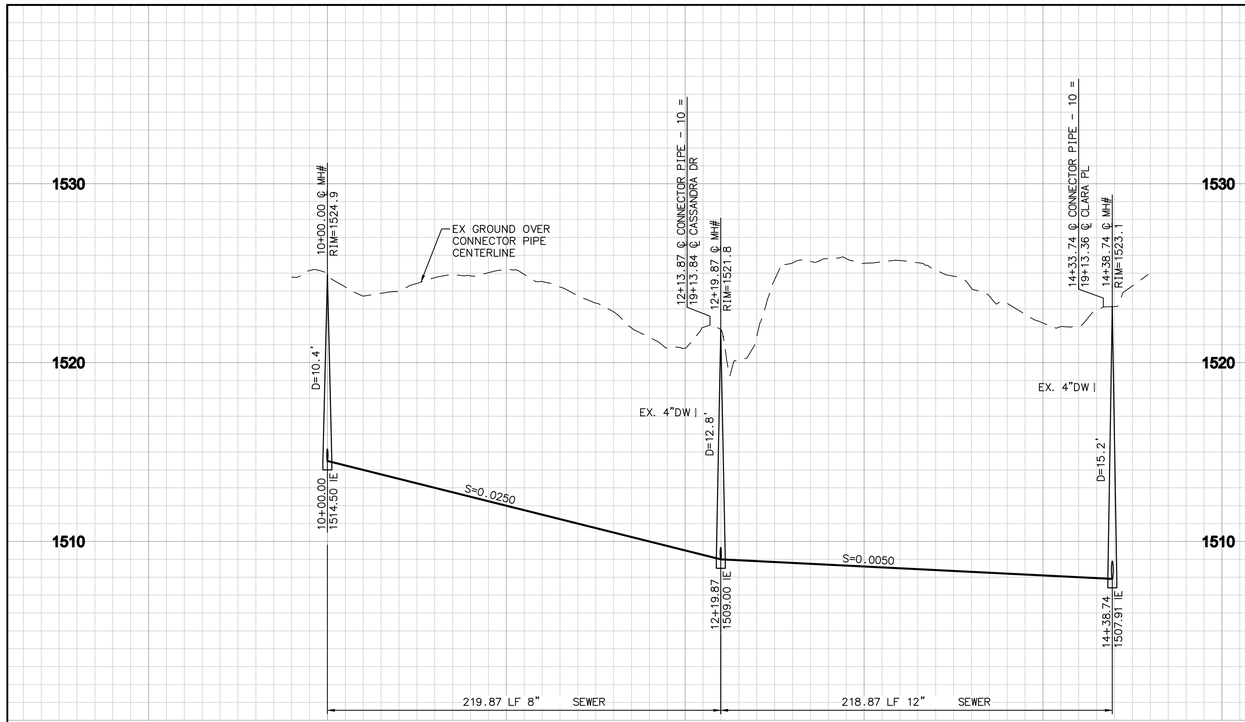
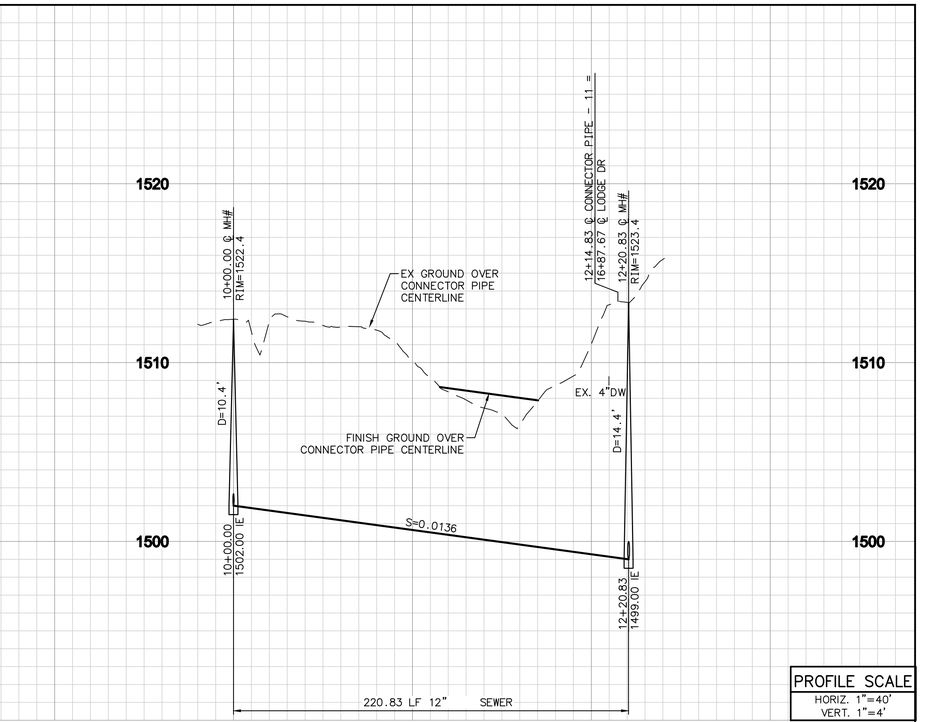
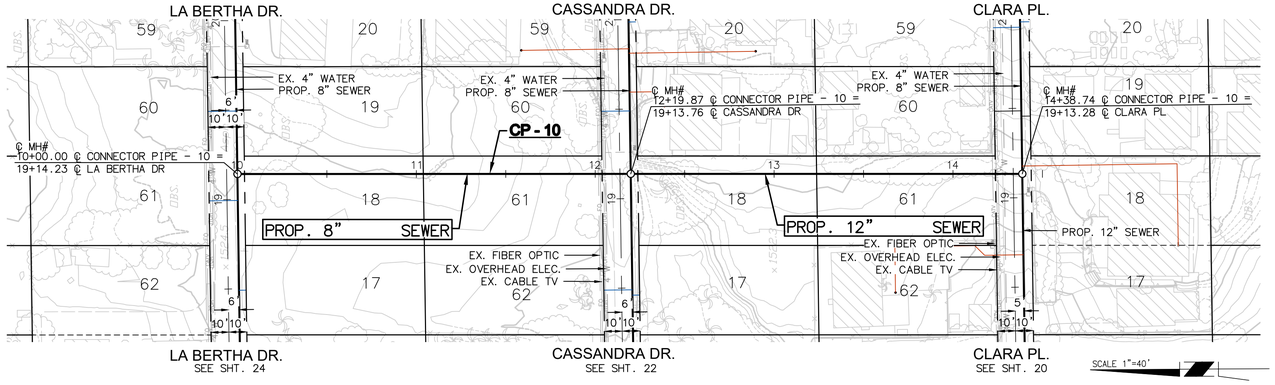


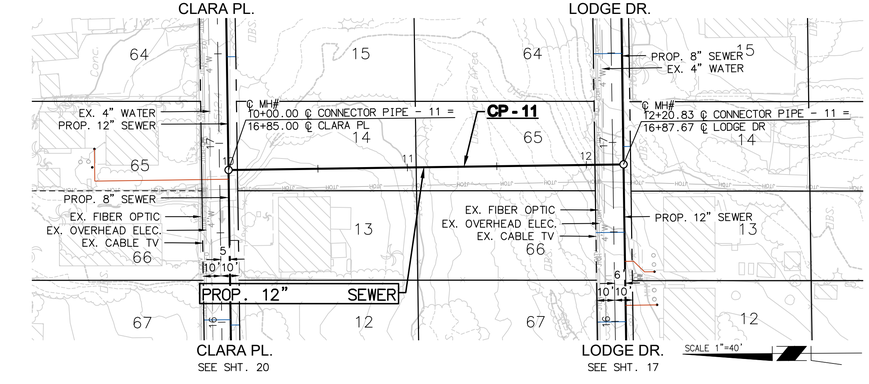
CP - 10



CP - 11

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'





LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SMR-061-PL PRF-CP10_11.DWG SHEVCHENKO, OLGA 1/2/2025 10:25 AM

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER * MILES W. COSTANZA * No. 87843 * CIVIL * STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

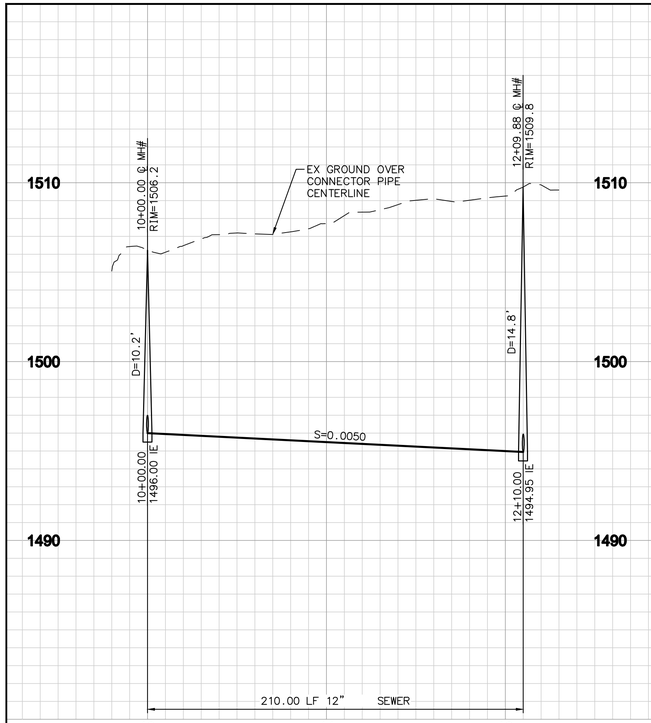
	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

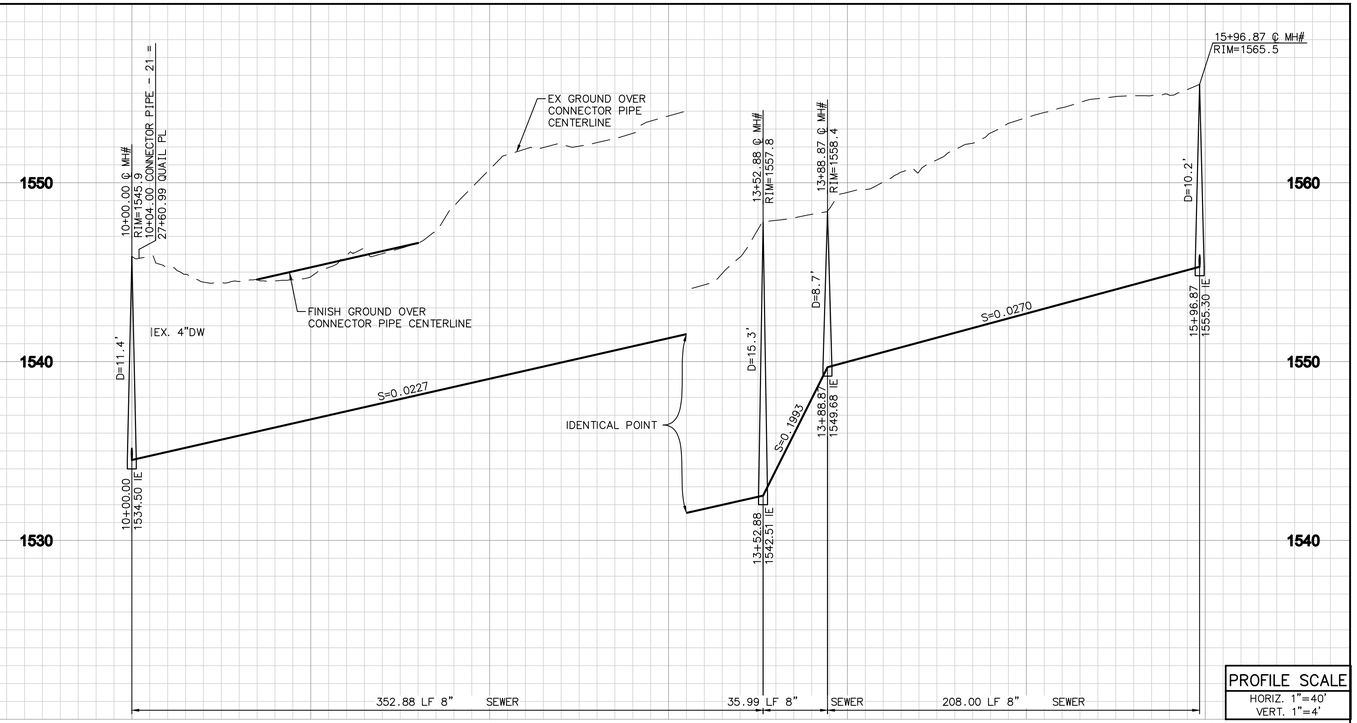
QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

CONNECTOR PIPES
CP - 10 & CP - 11

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 61 OF 70
D—

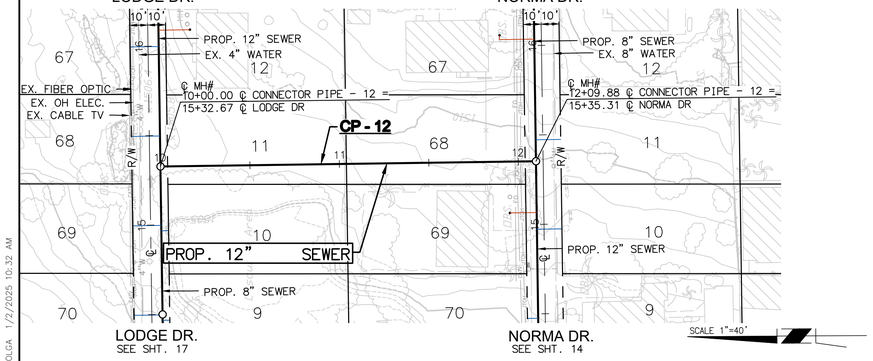


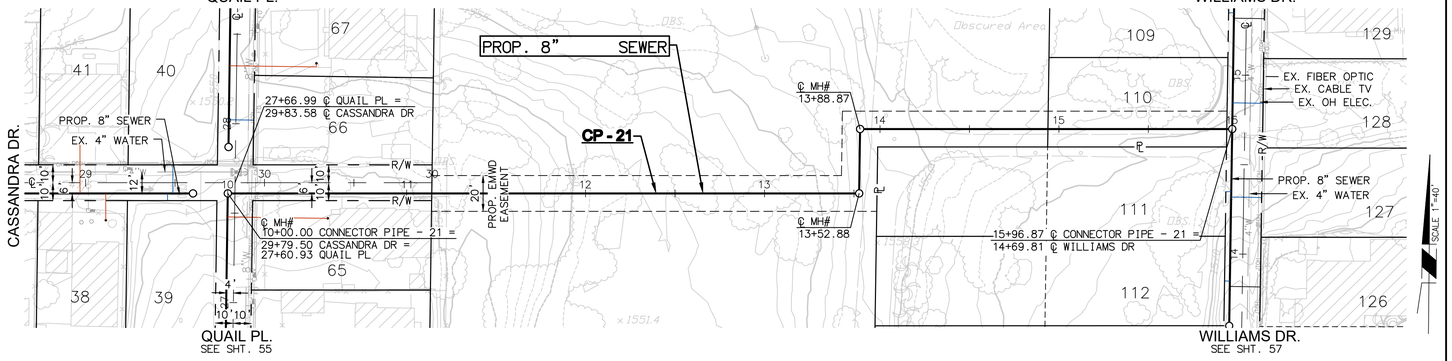
CP - 12



CP - 21

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'





LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

RECORD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER — MILES W. COSTANZA — No. 87843 — CIVIL — STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

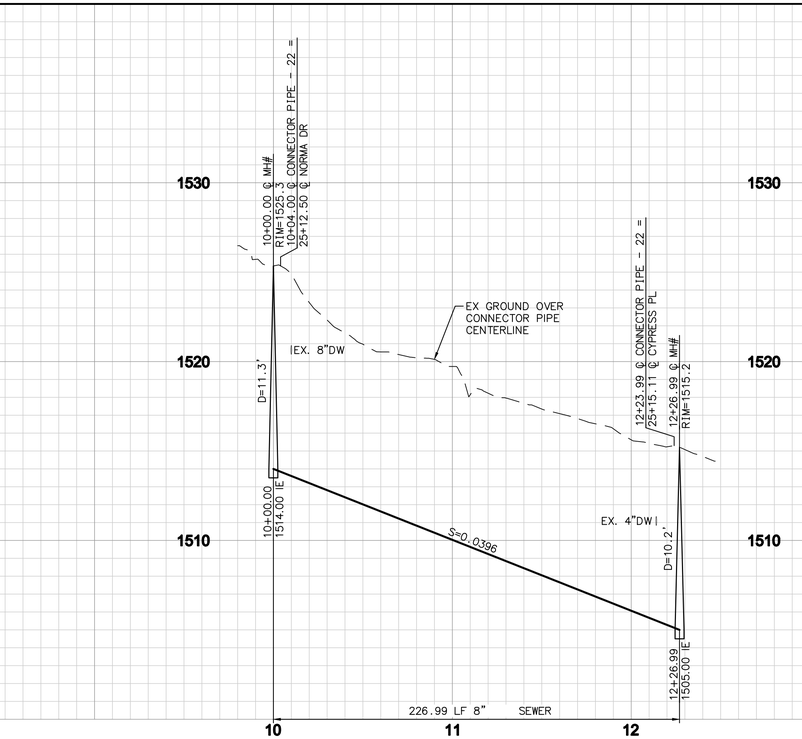
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

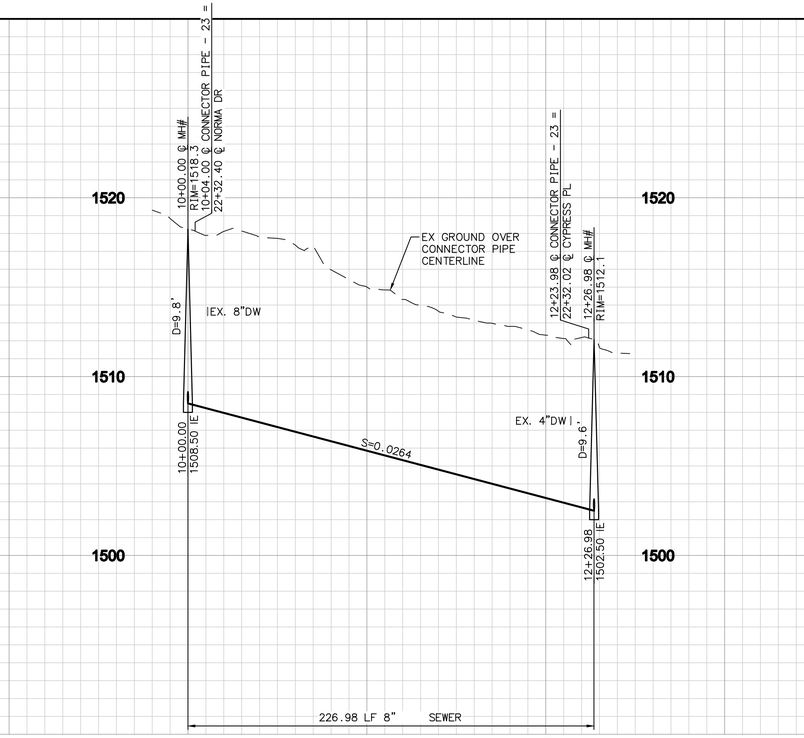
CONNECTOR PIPES
CP - 12 & CP - 21

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 62 OF 70
D—

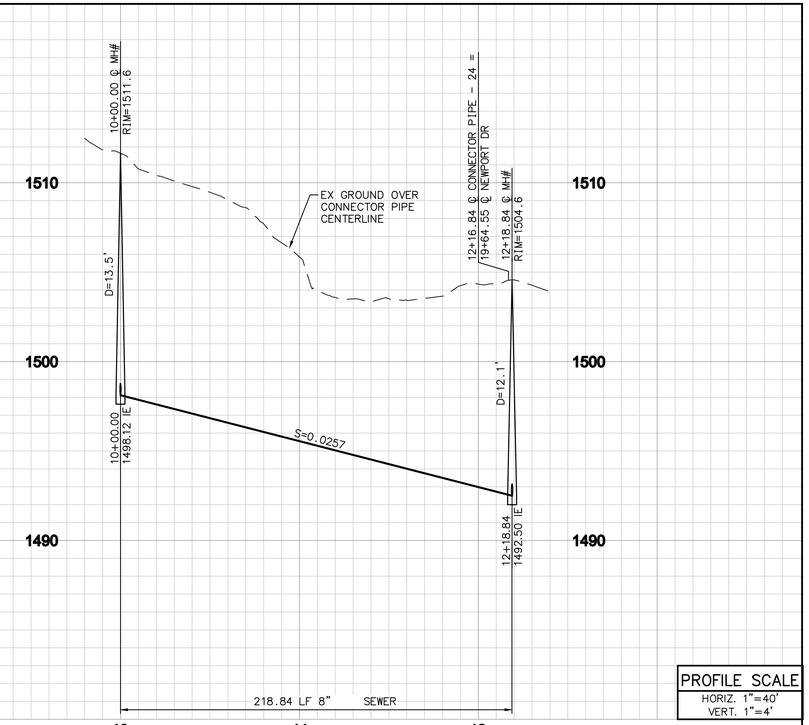
H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\QUV\196454-SMR-062-PL PRF-CP12_21.DWG SHEVCHENKO, OLGA 1/2/2025 10:32 AM



CP - 22

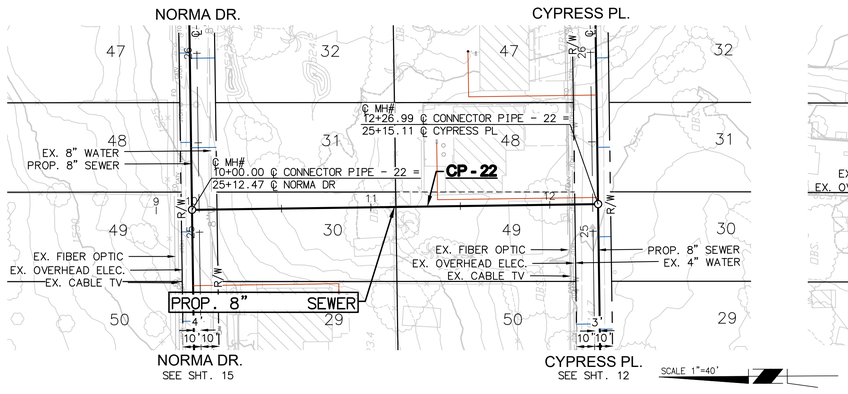


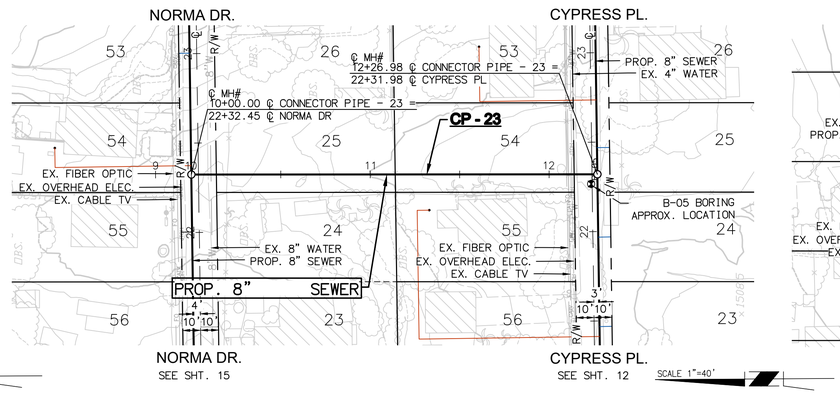
CP - 23

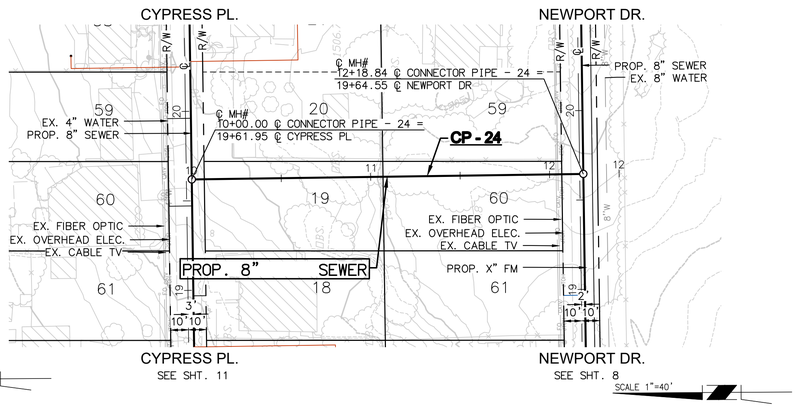


CP - 24

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'







LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

40 20 0 40 80 120
SCALE: 1"=40'

DIG ALERT
Call: TOLL FREE
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TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS					
MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER — MILES W. COSTANZA — No. 87843 — CIVIL — STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT
CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

CONNECTOR PIPES
CP - 22, CP - 23 & CP - 24

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 63 OF 70
D—

RECORD | PLAN CHECK | OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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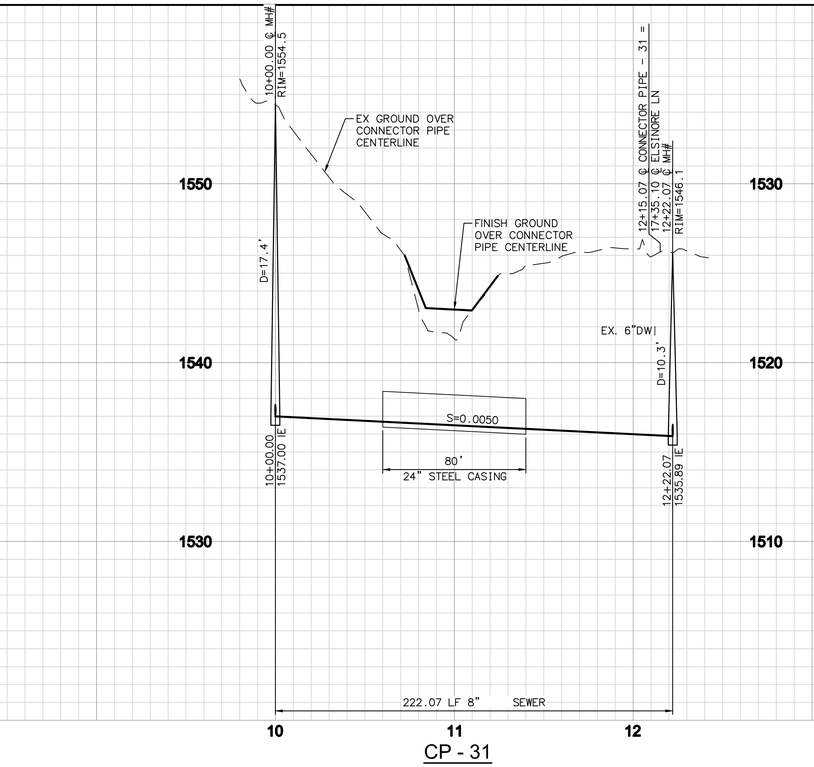
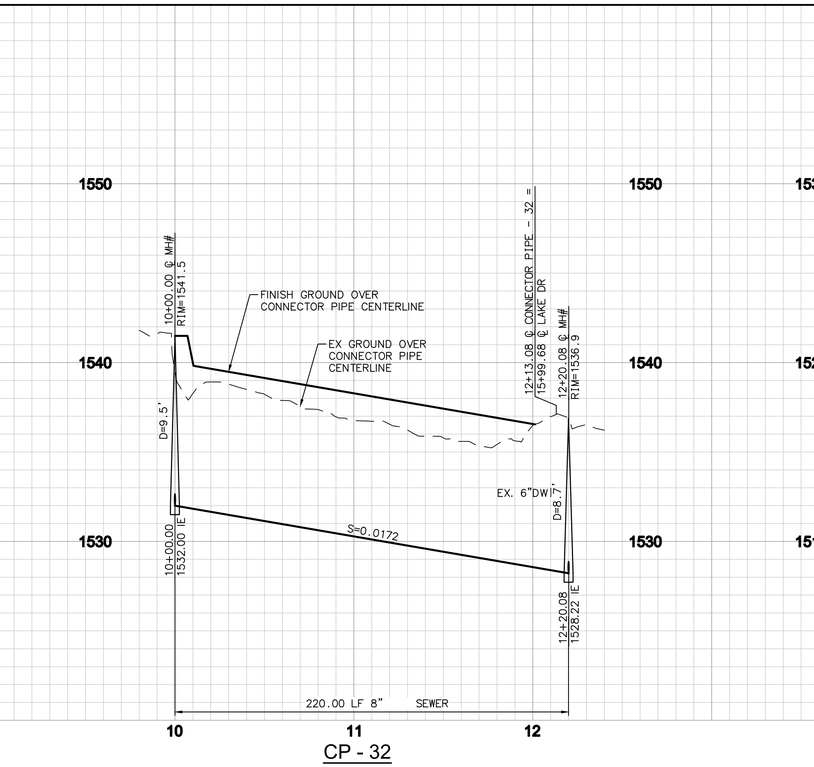
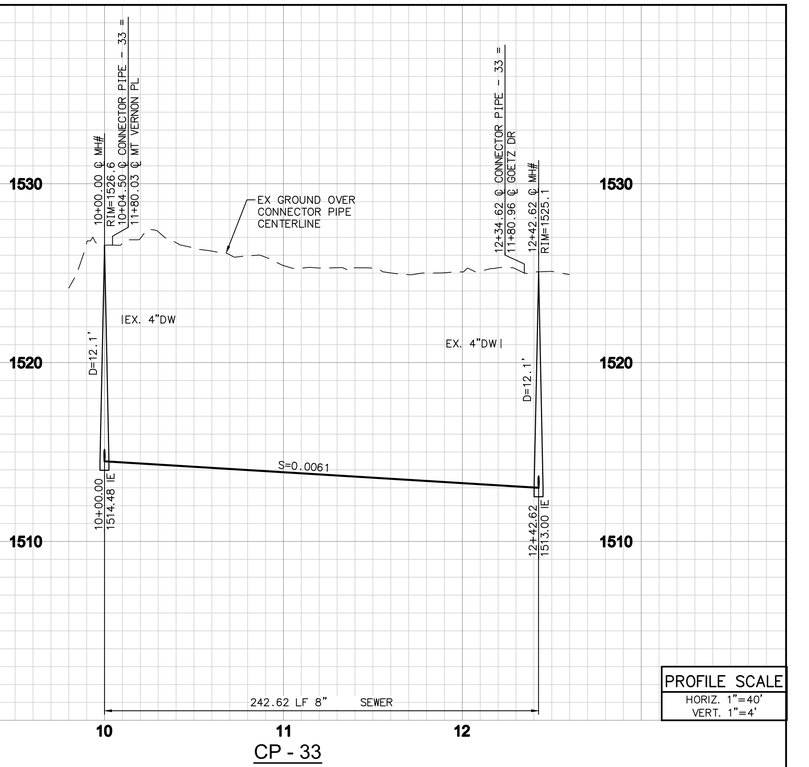


CP - 31

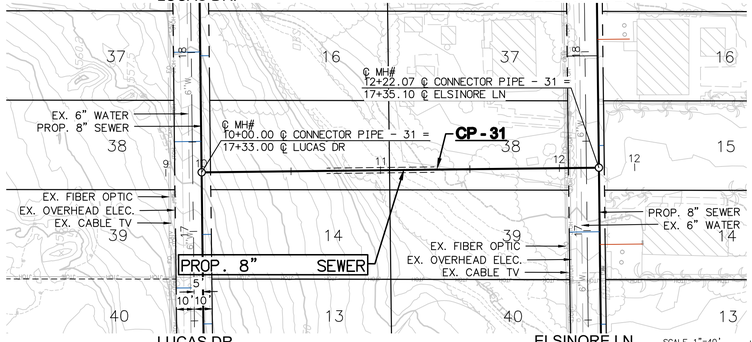


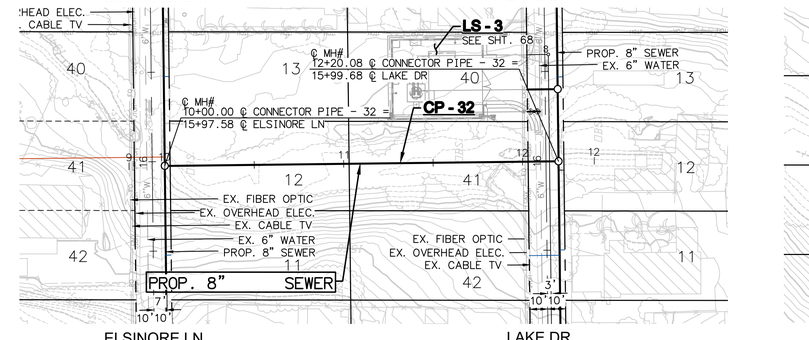
CP - 32

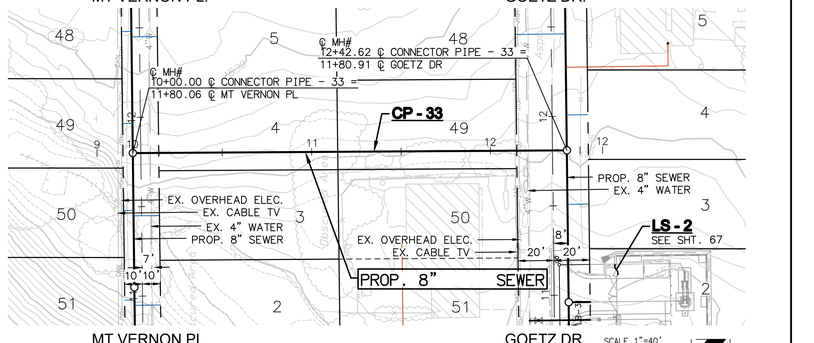


CP - 33

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'







LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-064-PL PRF-CP31-33.DWG SHEVCHENKO, OLGA 1/2/2025 10:54 AM

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

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MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

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UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

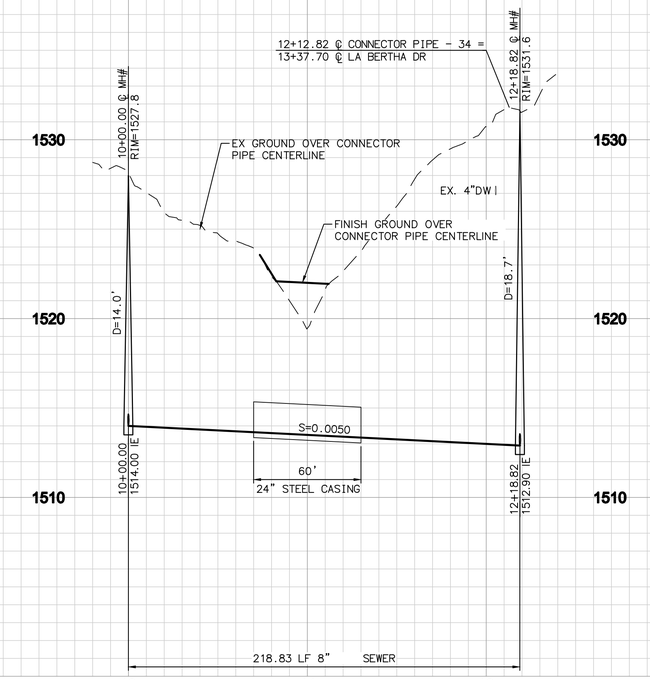
	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

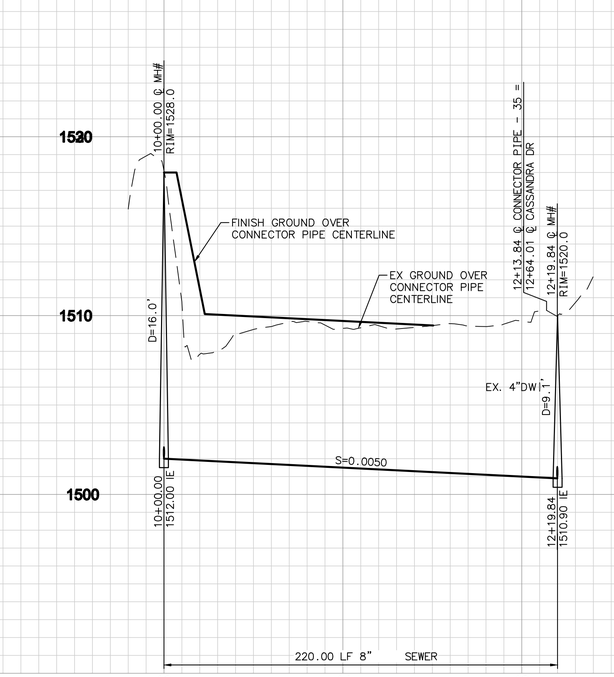
QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

CONNECTOR PIPES
CP - 31, CP - 32 & CP - 33

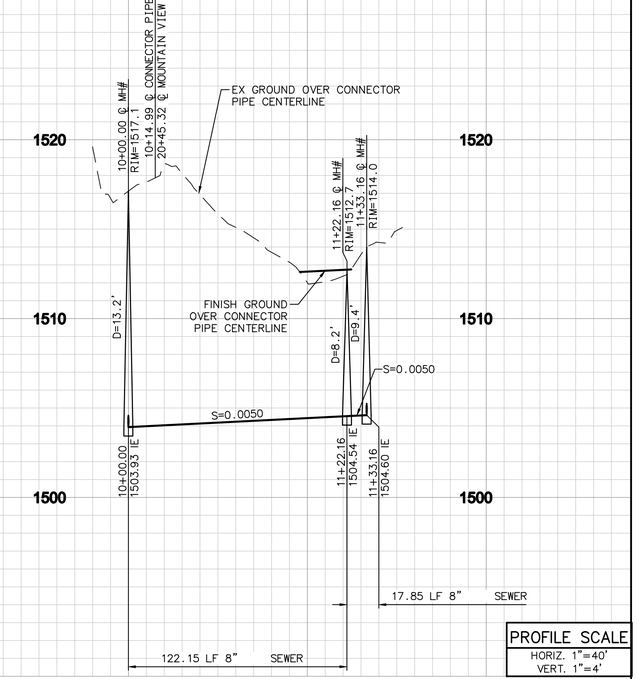
I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 64 OF 70
D—



CP - 34

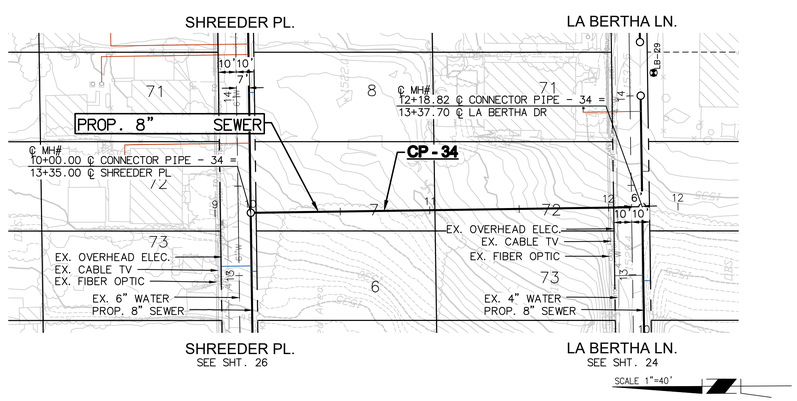


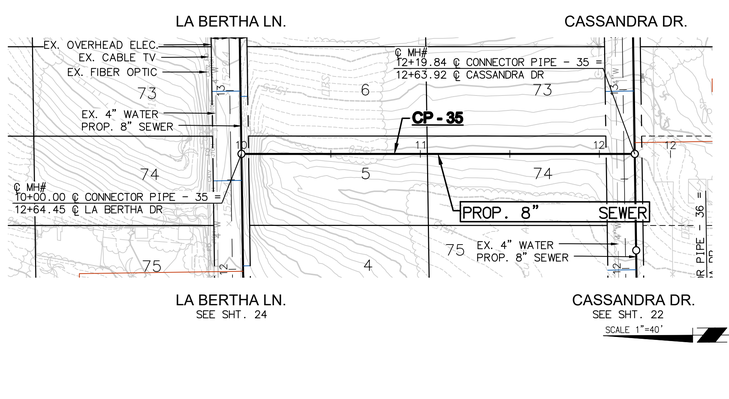
CP - 35

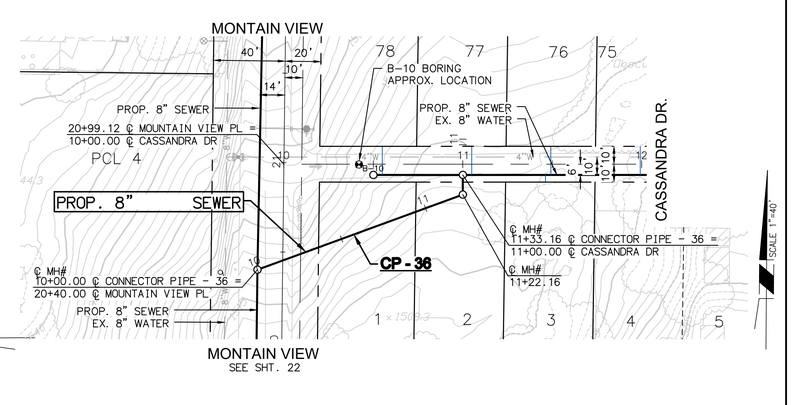


CP - 36

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'







LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

RECOMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER — MILES W. COSTANZA — No. 87843 — CIVIL — STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

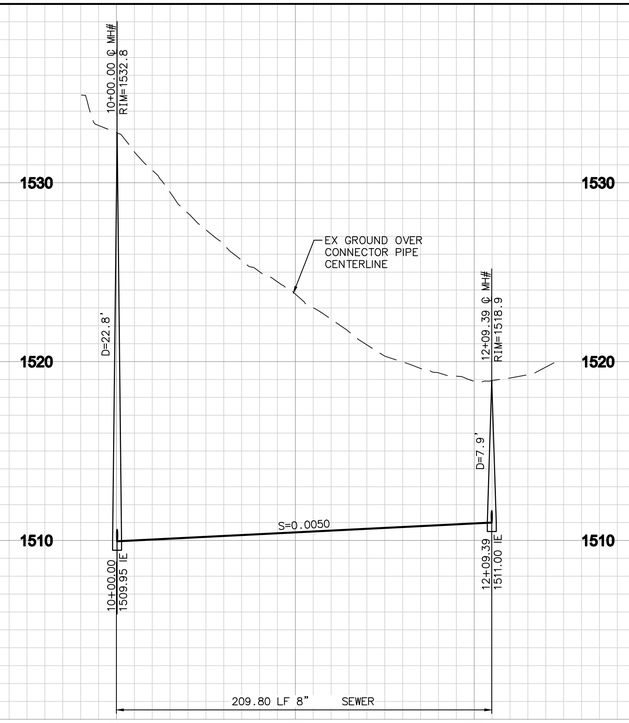
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

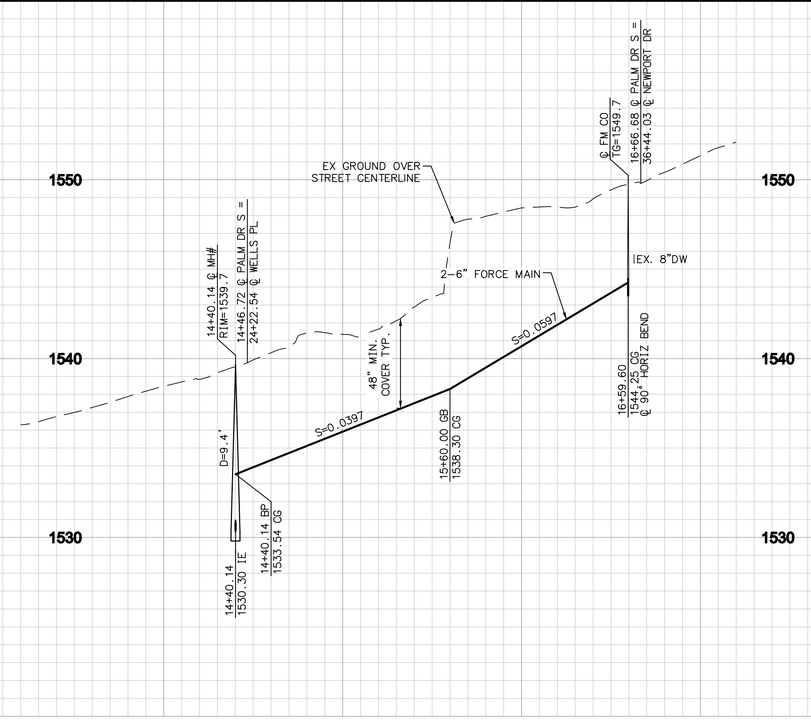
CONNECTOR PIPES
CP - 34, CP - 35 & CP - 36

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	65 OF 70
	D—

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\QUV\196454-SMR-065-PL PRF-CP 34-36.DWG SHEVCHENKO, OLGA 1/2/2025 11:26 AM

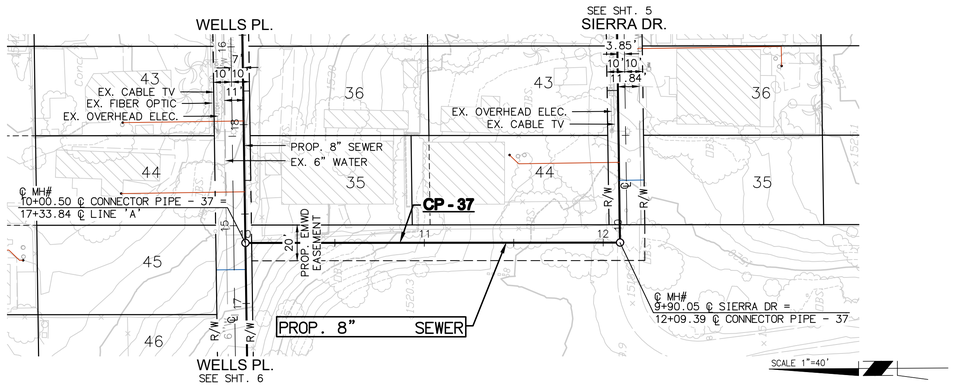


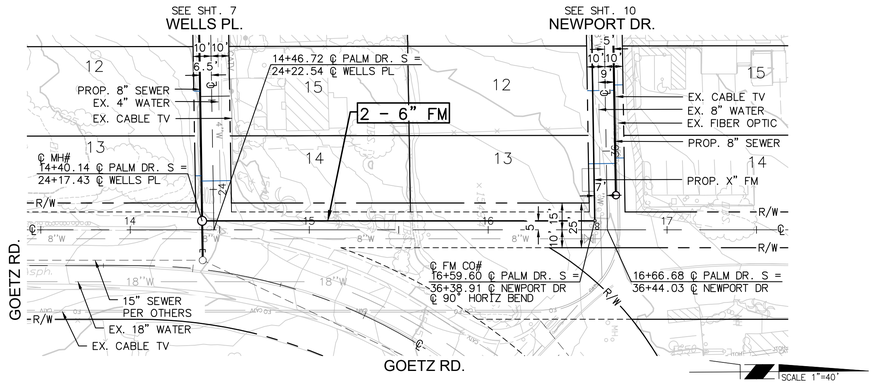
CP - 37



PALM DR.

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'





LEGEND:

EMPTY LOTS SEWER LATERAL

EXISTING HOUSE SEWER LATERAL

30% SUBMITTAL

SCALE: 1"=40'

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIG ALERT

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REGISTERED PROFESSIONAL ENGINEER MILES T. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS		INITIAL	DATE
	PROJECT ENG.		
	CONST. ADMIN.		

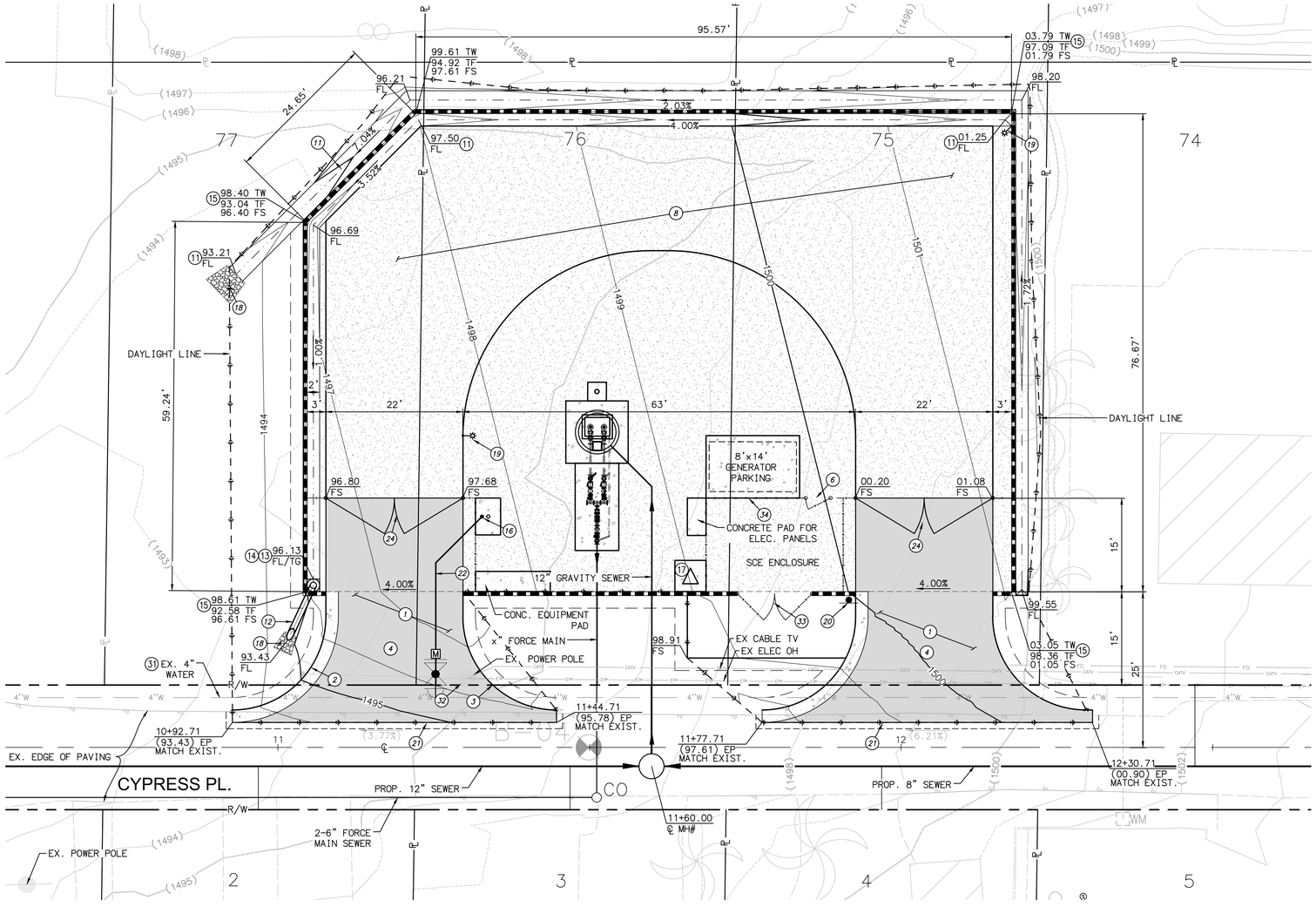
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

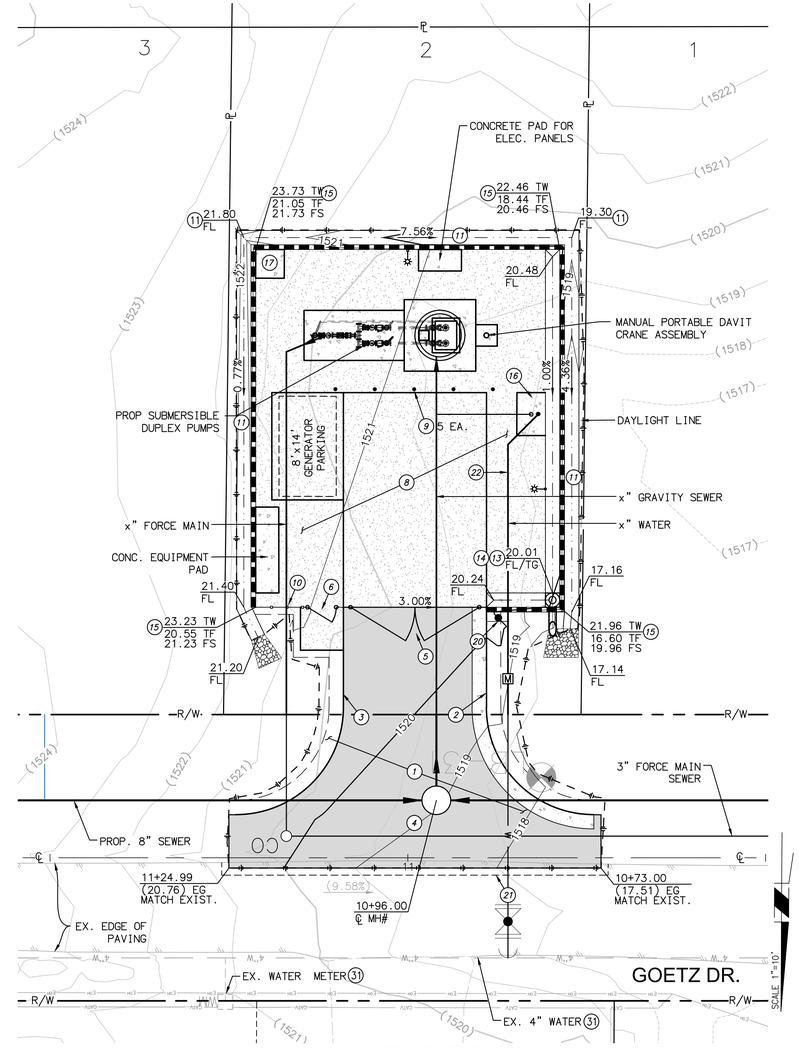
PALM DRIVE (SOUTH),
CONNECTOR PIPE CP - 37

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	66 OF 70
	D—

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-066-PL PRF-CP37_PALM.DWG SHEVCHENKO, OLGA 1/2/2025 11:31 AM



LIFT STATION #1



LIFT STATION #2

EARTHWORK LS #1

CUT = 2 CUBIC YARDS
FILL = 1242 CUBIC YARDS

NET RAW = 1240 CUBIC YARDS (FILL)

EARTHWORK LS #2

CUT = 1 CUBIC YARDS
FILL = 144 CUBIC YARDS

NET RAW = 143 CUBIC YARDS (FILL)

CONSTRUCTION NOTES

1. CONSTRUCT ASPHALT CONCRETE PAVEMENT PER DTL. ON SHT. 69
2. CONSTRUCT 6" CONCRETE CURB AND GUTTER PER RCTD STD. 200
3. CONSTRUCT 6" CONCRETE CURB PER RCTD STD. 204
4. CONSTRUCT MODIFIED CONCRETE DRIVEWAY PER RIVERSIDE COUNTY STD. 207A
5. CONSTRUCT 18' WIDE IRON DOUBLE SWING GATE
6. CONSTRUCT 4' WIDE MAN GATE PER EMWD STD. B-1075
8. CONSTRUCT 3" THICK DECOMPOSED GRANITE AREA PER DTL. ON SHT. 69
9. CONSTRUCT REMOVABLE GUARD POST PER DTL. ON SHT. 69 (OR PER EMWD STD DTL. B-665)
10. CONSTRUCT 8' HIGH PERIMETER WROUGHT IRON FENCE
11. CONSTRUCT INTERCEPTOR DRAIN PER DTL. ON SHT. 69
12. INSTALL 12" ADS N-12 STORM PIPE WITH FLARED END SECTION, BEDDING AND BACKFILL PER MANUFACTURERS RECOMMENDATIONS
13. CONSTRUCT ADS NYLOPLAST 18" DRAIN BASIN WITH 2'x2' STEEL BAR GRATE PER DTL. ON SHT. 70 OR APPROVED EQUAL
14. INSTALL BIOCLEAN DROP INLET FILTER PER DTL. ON SHT. 70
15. CONSTRUCT RETAINING MASONRY BLOCK PERIMETER WALL TYPE 'B' PER DTL. ON SHT. 70 WITH 6' HIGH FENCING ABOVE WALL, SIZE PER PLAN
16. CONSTRUCT EMERGENCY EYE WASH AND SHOWER PER DTL. ON SHT. 69
17. CONSTRUCT CONCRETE BASE FOR SCADA ANTENNA PER DTL. ON SHT. XX, SIZE PER PLAN
18. CONSTRUCT ENERGY DISSIPATOR 1/4 TON RIP-RAP METHOD A PLACEMENT PER SECTION 72 CALTRANS STANDARD SPECIFICATIONS AND DTL. ON SHT. 69, SIZE PER PLAN
19. CONSTRUCT AREA LIGHT
20. INSTALL PRIVATE PROPERTY SIGN PER DTL. ON SHT. 69
21. SAWCUT, COLDPLANE AND OVERLAY PER PLAN AND DTL. ON SHT. 69
22. 3/4" WATER SERVICE W/ METER AND BFP
24. CONSTRUCT 22' WIDE IRON DOUBLE SWING GATE
31. PROTECT IN PLACE EXISTING
32. REMOVE AND RELOCATE EXIST. POWER POLE
33. CONSTRUCT 12' WIDE CHAIN LINK DOUBLE GATE PER EMWD STD B-1075
34. CONSTRUCT 6' HIGH CHAIN LINK FENCE PER EMWD STD. D-672

ROCK DISPOSAL NOTE

ROCKS ARE TO BE DISPOSED OF PER THE METHODS DESCRIBED IN THE SOILS REPORT.

NOTE:

CONTOURS SHOWN ON THESE PLANS ARE THE PROPOSED FINISH GRADE CONTOURS.

30% SUBMITTAL

10 5 0 10 20 30
SCALE: 1"=10'

RECORD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

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EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

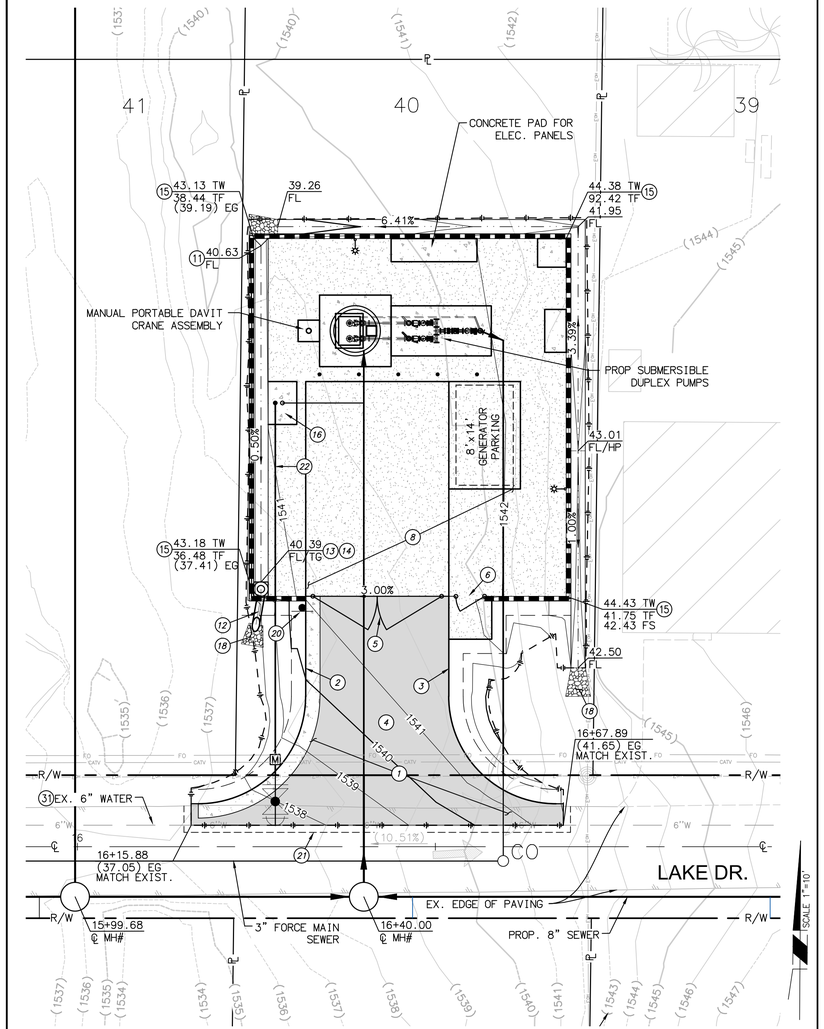
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

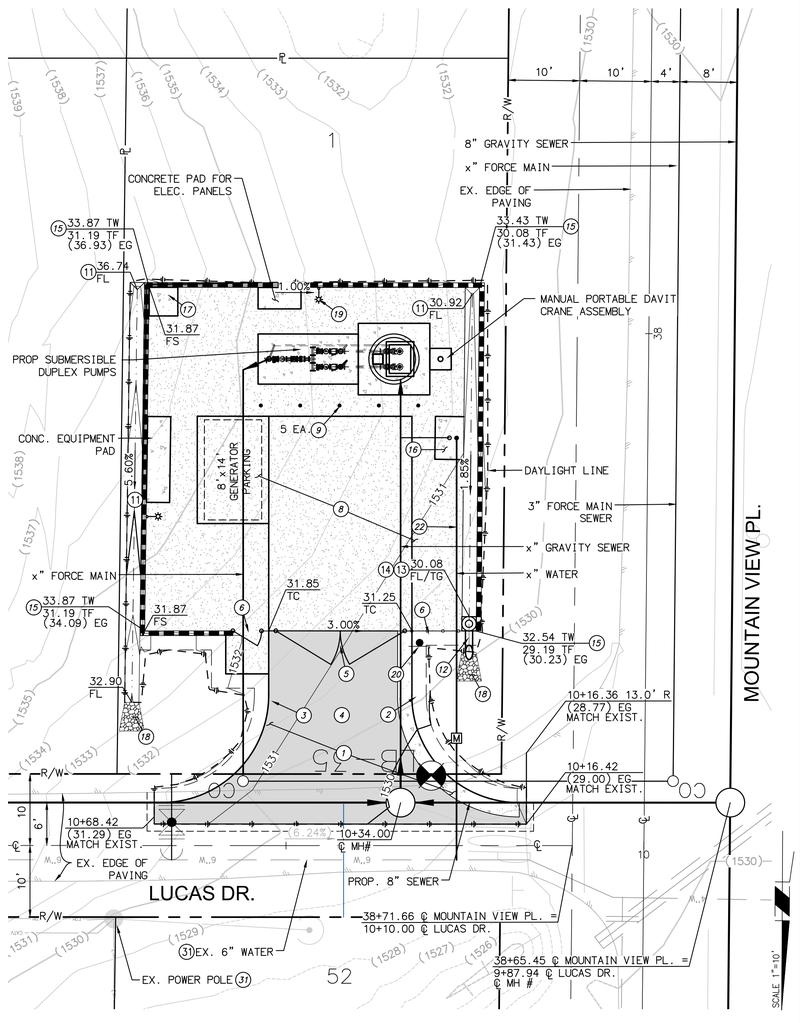
SITE PLAN
LIFT STATION #1 & #2

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 67 OF 70
D—

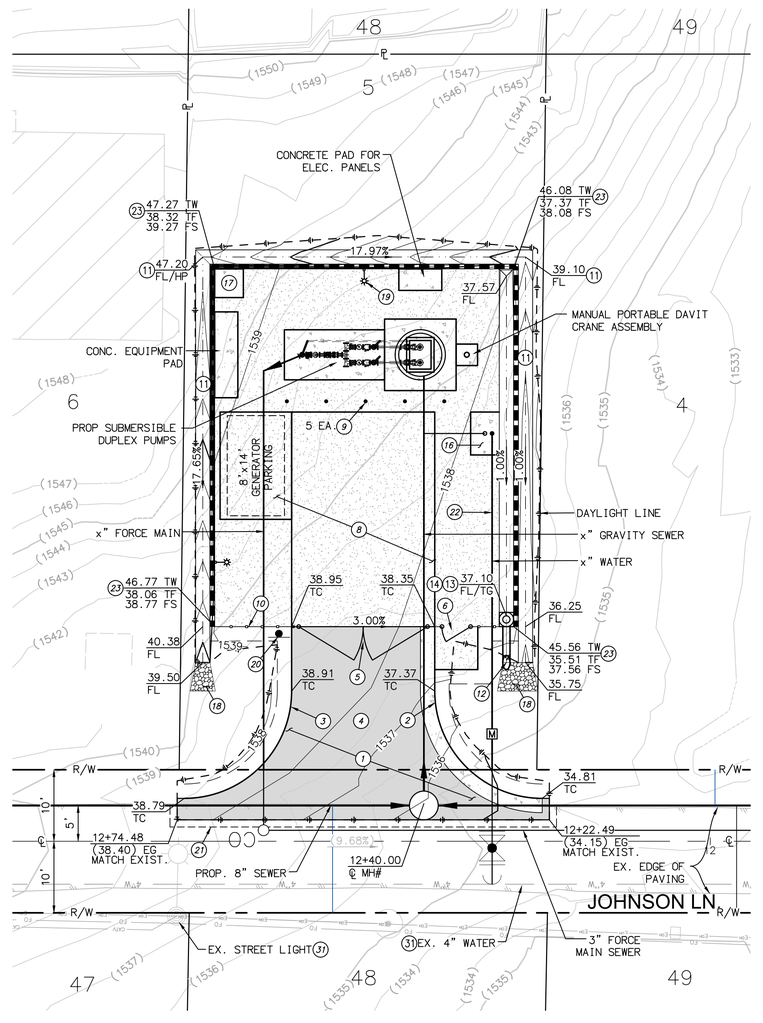
H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-067-LS SITE PLDWG SHEVCHENKO, OLGA 1/2/2025 11:50 AM



LIFT STATION #3



LIFT STATION #4



LIFT STATION #5

EARTHWORK LS #3

CUT = 0 CUBIC YARDS
FILL = 225 CUBIC YARDS
NET RAW = 225 CUBIC YARDS (FILL)

EARTHWORK LS #4

CUT = 181 CUBIC YARDS
FILL = 9 CUBIC YARDS
NET RAW = 172 CUBIC YARDS (CUT)

EARTHWORK LS #5

CUT = 186 CUBIC YARDS
FILL = 17 CUBIC YARDS
NET RAW = 169 CUBIC YARDS (CUT)

CONSTRUCTION NOTES

1. CONSTRUCT ASPHALT CONCRETE PAVEMENT PER DTL. ON SHT. 69
2. CONSTRUCT 6" CONCRETE CURB AND GUTTER PER RCTD STD. 200
3. CONSTRUCT 6" CONCRETE CURB PER RCTD STD. 204
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14. INSTALL BIOCLEAN DROP INLET FILTER PER DTL. ON SHT. 70
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16. CONSTRUCT EMERGENCY EYE WASH AND SHOWER PER DTL. ON SHT. 69
17. CONSTRUCT CONCRETE BASE FOR SCADA ANTENNA PER DTL. ON SHT. XX, SIZE PER PLAN
18. CONSTRUCT ENERGY DISSIPATOR 1/4 TON RIP-RAP METHOD A PLACEMENT PER SECTION 72 CALTRANS STANDARD SPECIFICATIONS AND DTL. ON SHT. 69, SIZE PER PLAN
19. CONSTRUCT AREA LIGHT
20. INSTALL PRIVATE PROPERTY SIGN PER DTL. ON SHT. 69
21. SAWCUT, COLDPLANE AND OVERLAY PER PLAN AND DTL. ON SHT. 69
22. 3/4" WATER SERVICE W/ METER AND BFP
23. CONSTRUCT 8' HIGH RETAINING MASONRY BLOCK PERIMETER WALL TYPE 'B' PER DTL. ON SHT. 70
31. PROTECT IN PLACE EXISTING

ROCK DISPOSAL NOTE

ROCKS ARE TO BE DISPOSED OF PER THE METHODS DESCRIBED IN THE SOILS REPORT.

NOTE:

CONTOURS SHOWN ON THESE PLANS ARE THE PROPOSED FINISH GRADE CONTOURS.

30% SUBMITTAL

SCALE: 1"=##'

RECORD | PLAN CHECK | OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

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EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

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PROJECT ENG.		
CONST. ADMIN.		

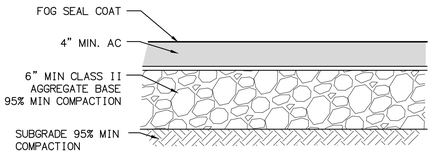
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

SITE PLAN
LIFT STATION #3, 4 & 5

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	68 OF 70
	D—

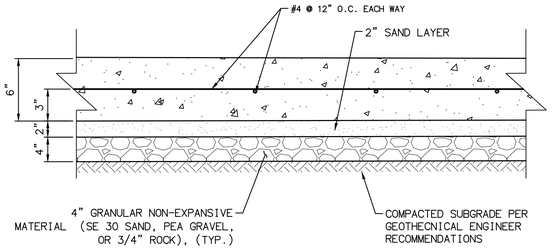
H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DUV\196454-SMR-068-LS SITE PLDWG SHEVCHENKO, OLGA 1/2/2025 12:00 PM



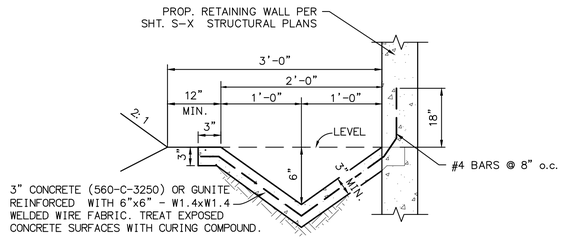
NOTE:

ASPHALT CONCRETE, FOG SEAL COAT, AND AGGREGATE BASE SHALL BE FURNISHED AND PLACED IN ACCORDANCE WITH THE REQUIREMENTS OF THE COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT SPECIFICATIONS AND GEOTECHNICAL RECOMMENDATIONS.

1 ASPHALT CONCRETE PAVEMENT
N. T. S.



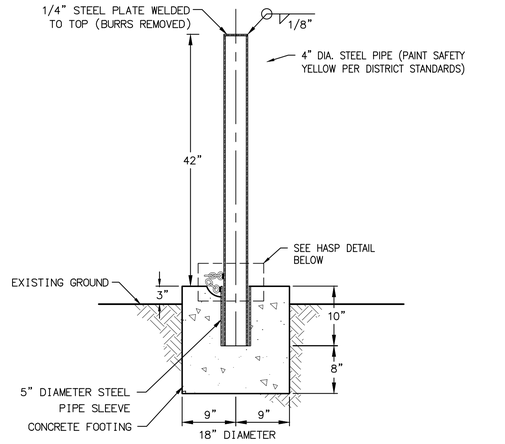
7 CONCRETE PAD
N. T. S.



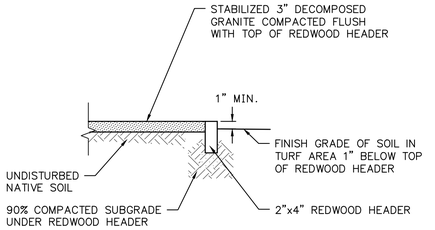
NOTES:

1. GROUND TO BE PRE-WETTED TO THE SATISFACTION OF THE GRADING INSPECTOR PRIOR TO PLACEMENT OF CONCRETE OR GUNITE.

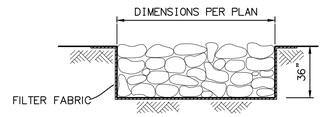
11 INTERCEPTOR DRAIN
N. T. S.



9 REMOVABLE GUARD POST
N. T. S.



8 DECOMPOSED GRANITE WITH REDWOOD HEADER
NOT TO SCALE



TYPICAL SECTION RIP-RAP

RIP-RAP SHALL CONSIST OF ROCK HAVING A DRY WEIGHT NOT LESS THAN 160 LBS. PER CU. FT. ALL RIP-RAP SHALL BE PLACED TO FORM A ROUGH UNEVEN SURFACE WITH PORTIONS EXTENDING 6"± ABOVE FINISHED SURFACE.

RIP-RAP

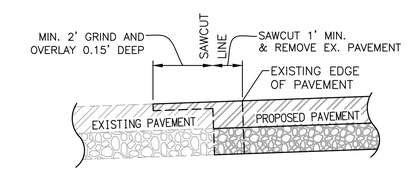
% LIGHTER BY WEIGHT	*WT. LBS.*
100	*1800*
90-100	*700*
50-90	*500*
0-15	*200*

18 RIP-RAP ENERGY DISSIPATOR
N. T. S.

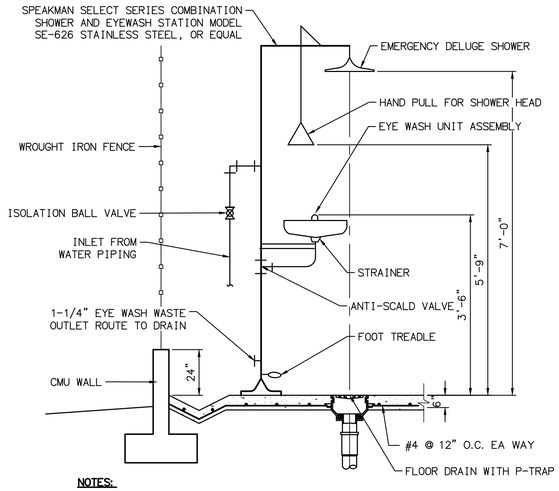
PRIVATE PROPERTY
NO
TRESPASSING

1. SIGN SHALL HAVE UV-RESISTANT INK ON 18"x12", 0.08"-THICK HEAVY-DUTY ALUMINUM WITH REFLECTIVE SURFACE (PER GEMPLER'S OR EQUAL).
2. BOTTOM OF SIGN SHALL BE MOUNTED 7-FT ABOVE FINISHED GRADE ON A U-CHANNEL STEEL POST WITH HOLES ON 1" CENTERS, WHERE SHOWN ON PLAN.

20 PRIVATE PROPERTY SIGN
N. T. S.



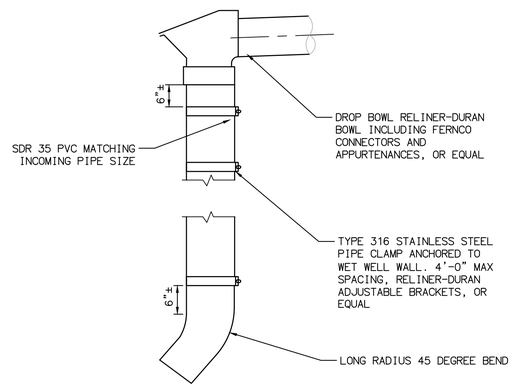
21 COLDPLANE AND OVERLAY JOIN DETAIL
NOT TO SCALE



NOTES:

1. *ALL PIPE AND FITTING TO BE 316 SS SCH 40 AS PER SPECIFICATIONS.*
2. *ROUTE ALL OVERFLOW LINE TO NEAREST FLOOR DRAINS AS SHOWN ON DRAWINGS.*
3. *SHOWER AND EYEWASH SHALL BE RATED FOR OUTDOOR INSTALLATION.*

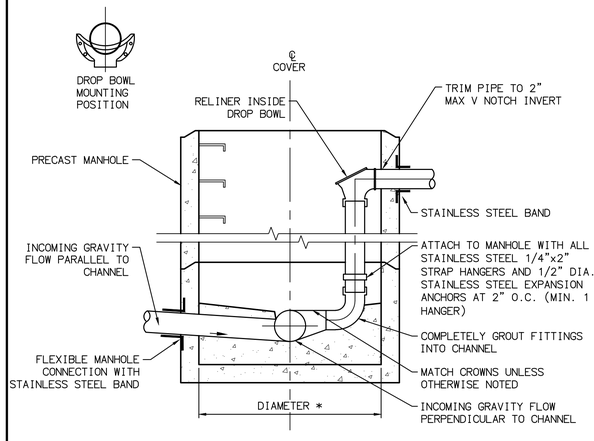
16 EMERGENCY EYEWASH/ SHOWER DETAIL
NOT TO SCALE



NOTES:

1. DROP INLET SHALL BE SIZED TO MATCH INCOMING SEWER.
2. CONTRACTOR TO VERIFY LENGTH BASED ON FIELD CONDITIONS.

25 DROP MANHOLE DETAIL
N.T.S.



*
1. FOR MANHOLE WITH 12" DIA. DROP PIPE, USE 5' DIAMETER, OR AS INDICATED.
2. FOR MANHOLE WITH TWO OR MORE DROP STRUCTURES, USE 6' DIAMETER, OR AS INDICATED.

X FORCE MAIN TO MANHOLE CONNECTION DETAIL
N.T.S.

30% SUBMITTAL

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-069-CIVIL DTLS.DWG SHEVCHENKO, OLGA 1/2/2025 11:59 AM

RECMD	PLAN CHECK	OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
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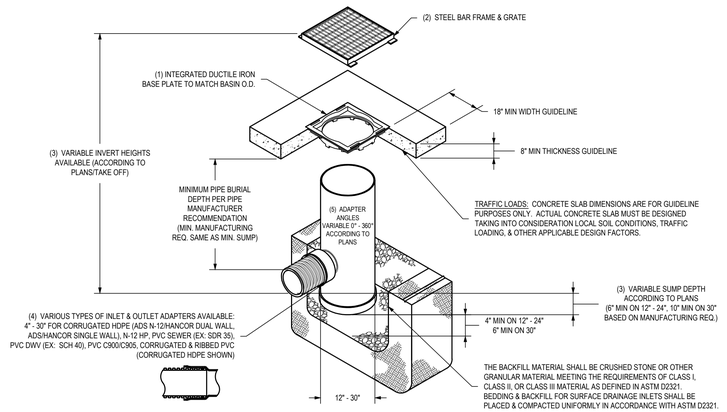
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

CONSTRUCTION DETAILS

I.D.	
S.A.	
W.O.	
C.O.	
COORD.	
SHEET:	69 OF 70
	D—

NYLOPLAST DRAIN BASIN WITH 2 FT X 2FT STEEL BAR GRATE



1 - 12" - 30" BASE PLATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
2 - FRAME & GRATE SHALL BE STEEL PER ASTM A36.
3 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS.
4 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP, & PVC SEWER (4" - 24").
5 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.
6 - STEEL BAR GRATE SHALL MEET H-20 LOAD RATING.

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DRAWN BY	EBC	MATERIAL	
DATE	03-22-10		
REVISED BY	NMH	PROJECT NO./NAME	
DATE	03-16-16		
DWG SIZE	A	SCALE 1:40	SHEET 1 OF 1

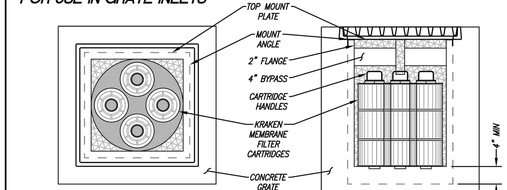
ADS Nyloplast
3130 VERONA AVE
BUFORD, GA 30518
PHN (770) 932-2443
FAX (770) 932-2490
www.nyloplast-us.com

TITLE: DRAIN BASIN WITH 2 FT X 2 FT STEEL BAR GRATE QUICK SPEC INSTALLATION DETAIL

DWG NO. 7001-110-394 REV D

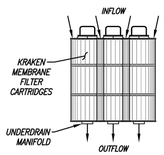
13 NYLOPLAST DRAIN BASIN WITH 2 FT X 2FT STEEL BAR GRATE
NOT TO SCALE

BIO CLEAN KRAKEN FILTER FOR USE IN GRATE INLETS



PLAN VIEW
(GRATE NOT SHOWN)

ELEVATION VIEW



FLOW DIAGRAM

INSTALLATION NOTES:
1. ALL HARDWARE, FLANGE, FRAME, SCREENS SHALL BE STAINLESS STEEL.
2. SEE PERFORMANCE REPORTS IN MANUFACTURER'S SPECIFICATIONS.
3. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE – CONTACT BIO CLEAN FOR MORE INFORMATION.
4. CONSIDERS A SAFETY FACTOR OF 2.0.
5. CONSIDERS A LOCAL DEPRESSION PONDING DEPTH OF 6 INCHES.
6. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
7. MINIMUM BASIN HEIGHT OF 33" FOR 20" TALL KRAKEN FILTERS.
8. CONCRETE STRUCTURE SOLD SEPARATELY.

NOT TO SCALE

MODEL #	WQ FLOW RATE (CFS)	BYPASS FLOW (CFS)	STORAGE CAPACITY (CF)	CARTRIDGE COUNT
BIO-GRATE-KMF 12-12-29	0.024	0.52	0.39	1
BIO-GRATE-KMF 18-18-29	0.024	2.51	1.21	1
BIO-GRATE-KMF 24-24-29	0.094	5.31	1.77	4
BIO-GRATE-KMF 24-40-29	0.17	10.39	3.05	7
BIO-GRATE-KMF 36-36-29	0.17	12.53	4.10	7

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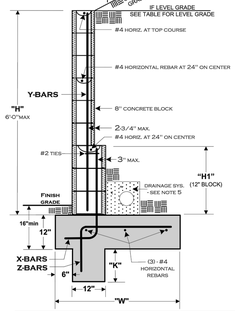
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com

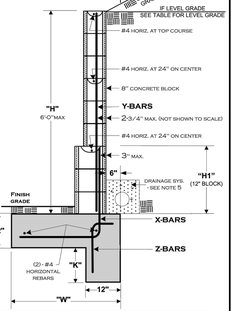
GRATE INLET FILTER
KRAKEN 20" CARTRIDGE
STANDARD DETAIL

14 BIOCLEAN GRATE INLET FILTER DETAIL
N. T. S.

TYPE 1: 6" TOE



TYPE 2: 6" HEEL



TYPE 1: 6" TOE

GRADE CONDITION	"H" (WALL HEIGHT)	"H1" (12" BLOCK)	"W" (FOOTING WIDTH)	X BARS	Y BARS	ZBARS	"K" (KEY DEPTH)
SLOPING GRADE AT TOP OF WALL (2:1 MAX)	5'- 1" to 6'- 0"	24"	69"	#4 @ 16"	#4 @ 32"	#4 @ 11"	38"
	4'- 1" to 5'- 0"	N/R	48"	#4 @ 16"	#4 @ 16"	#4 @ 12"	25"
	3'- 1" to 4'- 0"	N/R	30"	#4 @ 32"	#4 @ 32"	#4 @ 32"	16"
	Up to 3'- 0"	N/R	18"	#4 @ 32"	#4 @ 32"	#4 @ 32"	8"
LEVEL GRADE AT TOP OF WALL	5'- 1" to 6'- 0"	24"	45"	#4 @ 24"	#4 @ 32"	#4 @ 24"	8"
	4'- 1" to 5'- 0"	N/R	36"	#4 @ 24"	#4 @ 24"	#4 @ 24"	7"
	3'- 1" to 4'- 0"	N/R	24"	#4 @ 32"	#4 @ 32"	#4 @ 32"	5"
	Up to 3'- 0"	N/R	21"	#4 @ 32"	#4 @ 32"	#4 @ 32"	N/R

TYPE 2: 6" HEEL

GRADE CONDITION	"H" (WALL HEIGHT)	"H1" (12" BLOCK)	"W" (FOOTING WIDTH)	X BARS	Y BARS	ZBARS	"K" (KEY DEPTH)
SLOPING GRADE AT TOP OF WALL (2:1 MAX)	5'- 1" to 6'- 0"	24"	39"	#4 @ 16"	#4 @ 32"	#4 @ 12"	28"
	4'- 1" to 5'- 0"	N/R	29"	#4 @ 16"	#4 @ 16"	#4 @ 12"	22"
	3'- 1" to 4'- 0"	N/R	24"	#4 @ 32"	#4 @ 32"	#4 @ 32"	15"
	Up to 3'- 0"	N/R	18"	#4 @ 32"	#4 @ 32"	#4 @ 32"	8"
LEVEL GRADE AT TOP OF WALL	5'- 1" to 6'- 0"	24"	33"	#4 @ 24"	#4 @ 32"	#4 @ 24"	18"
	4'- 1" to 5'- 0"	N/R	26"	#4 @ 24"	#4 @ 24"	#4 @ 24"	13"
	3'- 1" to 4'- 0"	N/R	20"	#4 @ 32"	#4 @ 32"	#4 @ 32"	7"
	Up to 3'- 0"	N/R	20"	#4 @ 32"	#4 @ 32"	#4 @ 32"	N/R

N/R = NOT REQUIRED

SEE PAGE 2 FOR ADDITIONAL INFORMATION

DISCLAIMER:
ALTERNATE RETAINING WALL DESIGNS MAY BE POSSIBLE WHEN PROVIDED WITH AN ENGINEERED ANALYSIS. USE OF THIS STANDARD DESIGN IS AT THE USER'S RISK AND CARRIES NO IMPLIED OR INFERRED GUARANTEE AGAINST FAILURE OR DEFECTS.

WESTERN RIVERSIDE COUNTY CODE UNIFORMITY PROGRAM
COUNTY OF RIVERSIDE BUILDING DEPARTMENT
RETAINING WALLS

(951) 955-1800	4080 LEMON ST, 2ND FL * P.O. Box 1629 * RIVERSIDE, CA 92501	
FAX (951) 955-1806	2/24/2014	RCLMNRTNWALLFNL.V80 PAGE 1 OF 2

15 MASONRY BLOCK PERIMETER WALL
N. T. S.

GENERAL NOTES:
1) ALL WORK SHALL CONFORM TO THE ADOPTED CODES AND ZONING REGULATIONS.

2) CONCRETE BLOCK MASONRY SHALL COMPLY WITH THE FOLLOWING:
A. CONCRETE MASONRY SHALL CONFORM TO ASTM C-90, GRADE - N.
B. MORTAR: TYPE M OR S.
C. GROUT ALL CELLS W/ 2000 PSI PORTLAND CEMENT GROUT.

3) THE ULTIMATE COMPRESSIVE STRENGTH REQUIRED FOR FOUNDATION CONCRETE SHALL BE 2500 PSI.

4) ALL REINFORCING STEEL SHALL BE INTERMEDIATE GRADE ASTM A615-40 AND OVERLAP SPLICES SHALL BE 40 BAR DIAMETERS MINIMUM. ALL REBAR HOOKS SHALL BE A MINIMUM OF 12 TIMES THE REBAR DIAMETER (12bd) IN LENGTH.

5) PROVIDE RETAINING WALL DRAINAGE SYSTEM AS FOLLOWS:
PROVIDE 1 CF/FT OF CLEAN COARSE GRAVEL WITH 4" DIAMETER PERFORATED PVC DRAINAGE PIPE WITH 1% GRADIENT TO DRAIN - OR OMIT HEAD JOINTS IN FIRST COURSE.

6) OPTIONAL: INSTALLATION OF A MOISTURE BARRIER ON THE FILL SIDE OF THE WALL WILL HELP TO PREVENT MOISTURE FROM PENETRATING THE VISIBLE SIDE OF THE WALL, RESULTING IN DISCOLORATION.

7) THIS RETAINING WALL STANDARD IS NOT DESIGNED TO SUPPORT SURCHARGE LOADS FROM MOTOR VEHICLES OR OTHER STRUCTURES.

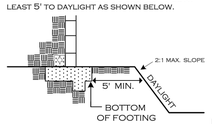
8) CLEANOUTS SHALL BE PROVIDED FOR ALL GROUT POURS OVER 5 FEET IN HEIGHT. WHERE REQUIRED, CLEANOUTS SHALL BE PROVIDED IN THE BOTTOM COURSE AT EVERY VERTICAL BAR AND SHALL BE SEALED AFTER INSPECTION AND BEFORE GROUTING.

REQUIRED INSPECTIONS:
1) FOOTING:
EXCAVATION TRENCH CLEAN WITH STEEL IN PLACE AND SUPPORTED 3" ABOVE AND AWAY FROM THE SURROUNDING EARTH/DIRT.

2) REBAR/PRE-GROUT AND DRAINAGE SYSTEM:
BOND BEAM REBAR AND VERTICAL REBAR IN PLACE - INSPECTION PRIOR TO PLACING GROUT. DRAINAGE SYSTEM COMPLETE.

3) FINAL:
AFTER GROUT IS PLACED AND BACKFILL COMPLETED - PRIOR TO ANY DECORATIVE CAP PLACEMENT.

SETBACK FROM TOP OF SLOPE:
ALL FOOTINGS ADJACENT TO SLOPES TO BE AT LEAST 5' TO DAYLIGHT AS SHOWN BELOW.



DESIGN PARAMETERS:
ACTIVE SOIL PRESSURE (PSF)
LEVEL BACKFILL = 30
SLOPING (2:1 MAX) = 43
PASSIVE SOIL BEARING (PSF) = 150
COEFFICIENT OF FRICTION = 0.25
ALLOWABLE SOIL BEARING PRESSURE (PSF) = 1500
(NO INCREASES TAKEN FOR DEPTH OR WIDTH OF FOOTING)

DISCLAIMER:
ALTERNATE RETAINING WALL DESIGNS MAY BE POSSIBLE WHEN PROVIDED WITH AN ENGINEERED ANALYSIS. USE OF THIS STANDARD DESIGN IS AT THE USER'S RISK AND CARRIES NO IMPLIED OR INFERRED GUARANTEE AGAINST FAILURE OR DEFECTS.

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(951) 955-1800	4080 LEMON ST, 2ND FL * P.O. Box 1629 * RIVERSIDE, CA 92501	
FAX (951) 955-1806	2/24/2014	RCLMNRTNWALLFNL.V80 PAGE 2 OF 2

30% SUBMITTAL

H:\PDATA\196454 QUAIL VALLEY SUBA\CADD\DLV\196454-SWR-070-CIVIL DTLS.DWG SHEVCHENKO, OLGA 1/2/2025 12:09 PM

RECORD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIG ALERT
Call: TOLL FREE 1-800-227-2600 OR 811
TWO FULL WORKING DAYS BEFORE YOU DIG

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	APPR.	DATE

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

UNDER THE SUPERVISION OF:

MILES W. COSTANZA R.C.E. No. 87843 DATE

REGISTERED PROFESSIONAL ENGINEER MILES W. COSTANZA No. 87843 CIVIL STATE OF CALIFORNIA

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENGINEER OF DEVELOPMENT SERVICES DATE

APPROVALS

	INITIAL	DATE
PROJECT ENG.		
CONST. ADMIN.		

EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

QUAIL VALLEY - SUBAREA 4
SEWER IMPROVEMENT PLANS

CONSTRUCTION DETAILS

I.D.
S.A.
W.O.
C.O.
COORD.
SHEET: 70 OF 70
D—

APPENDIX M – QUAIL VALLEY SUBAREA 4 LIFT STATION EVALUATION REPORT

Michael Baker INTERNATIONAL

We Make a Difference

LIFT STATION EVALUATION REPORT

Quail Valley Subarea 4
Public Sewer Improvements and Septic to Sewer Conversion

PREPARED FOR

EASTERN MUNICIPAL WATER DISTRICT

2270 Trumble Road
Perris, California 92572-8300

Michael Baker Project No.: 196454

REV. DATE	SUMMARY
10/18/2024	Progress Draft
1/10/2025	Final

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1. PROJECT OVERVIEW

1.1 Introduction

This report is a supplementary section of the *Quail Valley Sub-Area 4 Public Sewer Improvements and Septic to Sewer Conversion Preliminary Design Report* (PDR). It evaluates pre-packaged small lift station systems, including the E/One system, for Subarea 4's smaller lift stations. It also evaluates various design alternatives for Subarea 4's regional lift station. This included estimating the incoming current and future flows, determining head requirements for each lift station, evaluating the hydraulic performance, residence time and the preliminary design for each lift station facility. Alternative systems that meet the hydraulic conditions and performance needs of the station were evaluated and a final recommendation is provided.

1.2 Project Background

The Quail Valley community, within the Eastern Municipal Water District (EMWD) service area, has historically relied on septic systems for wastewater disposal, and there are currently no facilities for collecting and conveying wastewater to the EMWD regional treatment facility. Furthermore, these septic systems are failing, which can create public health and water quality risks to nearby ground and surface water and the downstream Canyon Lake. EMWD plans to expand its sanitary sewer collection system to integrate Quail Valley. This expansion includes dividing Quail Valley into subareas, with Subarea 4 (SA4) playing a central role.

Previous work performed in the 2022 Feasibility Study recommended a *Hybrid System – Force Main* collection system for SA4 that used clustered, low-pressure grinder pump stations. Packaged lift stations manufactured by E/One served as the design basis for these small, low-pressure pump stations. The hybrid system recommended 12 small low-pressure systems, and a single regional lift station. During the course of this preliminary design, efforts have been made to minimize the number of lift stations in an effort to minimize the number of lots that require purchase by EMWD. The result of this outcome presents a solution that is similar to the *Conventional Gravity with Lift Stations* alternative outlined in the feasibility study. It uses deeper gravity sewer in some areas to reduce the total number of lift stations.

The preliminary gravity collection system design presented in this report identified a need for five (5) sewer lift stations of differing capacities. The locations of these lift stations and their associated tributary areas are shown in the Lift Station Tributary Exhibit, which is referred to as Exhibit 6 in the overall PDR and presented again here. As shown in Exhibit 6, some of the lift station discharge flows will cascade into other lift stations. Lift station LS-5 will discharge into a manhole within the tributary area of lift station LS-4. Lift stations LS-2, LS-3, and LS-4 will share a force main that discharges into a collection manhole upstream of Lift Station 1. Ultimately, nearly 100% of the lots in SA4 will flow into a regional lift station by gravity or through smaller downstream lift stations, with the exception of lots along California Place and seven lots on Wells Place. The regional lift station will convey SA4 flows to the trunk sewer in Goetz Road.

Given that Lift Station 1 functions as a regional lift station and handles significantly higher flow rates compared to Lift Stations 2 through 4, it will be analyzed separately from the smaller lift stations. The design for Lift Station 1 can be found in Section 6 of this supplementary lift station report.

1.3 Design Approach Overview

This section provides an overview of the process used for the design, evaluation, and selection of the lift stations. Separate design approaches were developed for the smaller lift stations (LS-2, LS-3, LS-4, and LS-5) and the regional lift station (LS-1). The outlines for each approach are detailed below.

Smaller Lift Stations Design Approach (LS-2 through LS-5)

Due to their interconnection and shared force main system, the smaller lift stations were designed using the same approach. The design approach was as follows:

1. Defined tributary areas.
2. Determined wastewater inflows based on existing and buildout conditions.
3. Evaluated forcemain velocities to establish size of the forcemains.
4. Perform forcemain residence time calculations for existing and buildout conditions.
5. Calculated flow projections, pump size requirements, force main velocities and residence times for various developed conditions to determine basis of design.
6. Determined required pumping capacities based on the selected development condition.
7. Determined required pumping head based on the selected development condition.
8. Determined preliminary wet well capacities based on the selected development condition.
9. Used the criteria above to evaluate the prepackaged smaller lift station systems.
10. Evaluated the prepackaged lift station systems using a defined scoring matrix and selected the most suitable system for recommendation.

Regional Lift Station Design Approach (LS-1)

The regional lift station receives most of the flows from SA4 and operates its own force main system. As a result, a different design approach was implemented. The design approach was as follows:

1. Defined tributary areas based on phased construction.
2. Determined wastewater inflows for each phase under existing and buildout conditions.
3. Established range of design flow conditions.
4. Evaluated forcemain velocities to establish preliminary sizing of the forcemains.
5. Determined required pumping head at each phase for initial pump selection.
6. Determined preliminary wet well capacities for each phase under existing and buildout conditions.
7. Explored lift station system options, including pump size, wet well configuration and force main sizing. Adjusted forcemain sizes to optimize lift station performance, providing multiple options for the same pump and wet well configuration.
8. Analyzed system curves for each option and assessed duty points and wet well conditions.
9. Evaluated each option to ensure it met the desired flow range and maintained wet well conditions within criteria. Also, assessed if the option provided system redundancy.
10. Provided a recommended option.

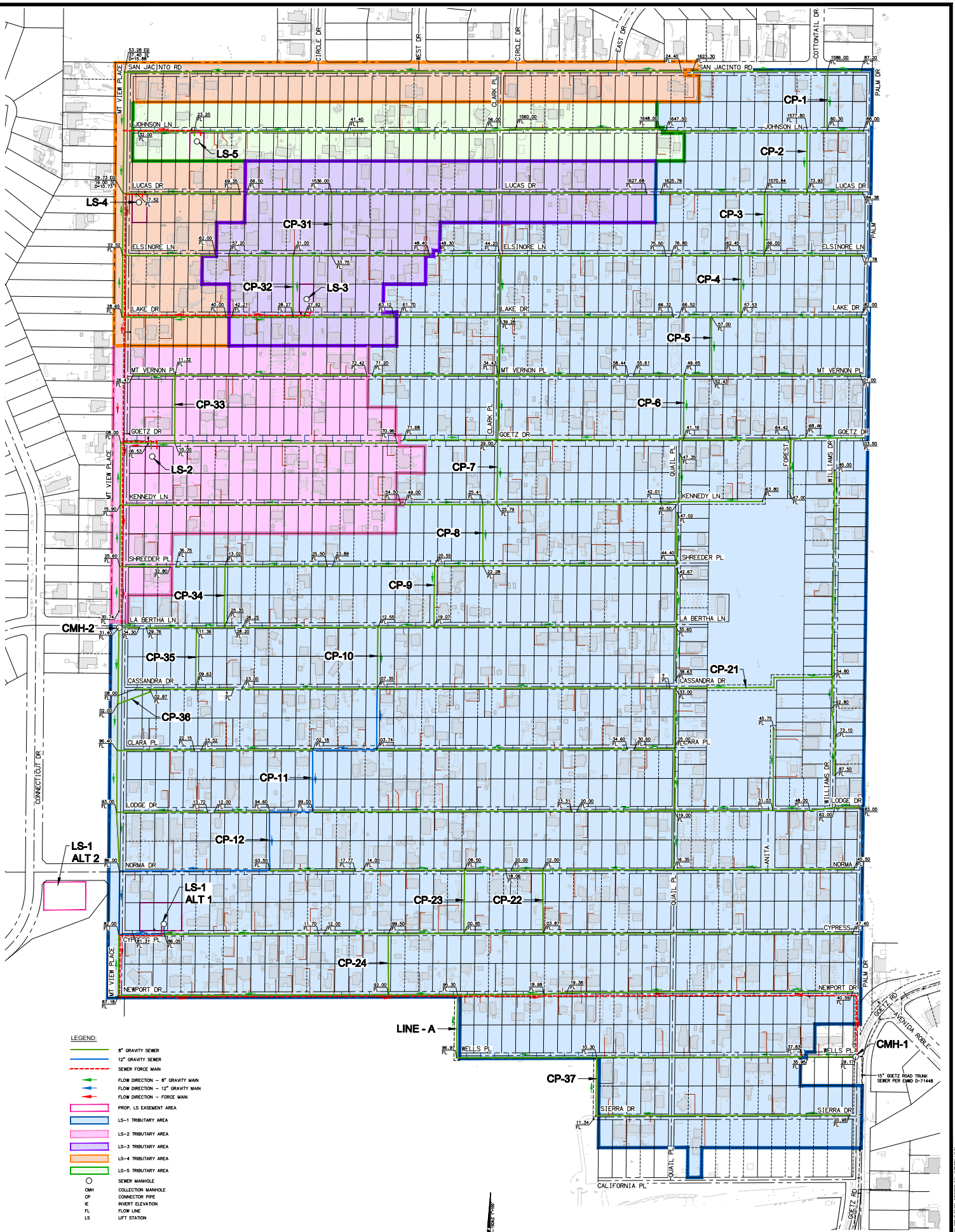

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EXHIBIT - 6

QUAIL VALLEY SUBAREA 4

LIFT STATION - TRIBUTARY AREA

2. LIFT STATION DESIGN METHODOLOGY

2.1 General

The lift station designs must adhere to various requirements to ensure they effectively serve their tributary areas while remaining cost-effective and efficient. These requirements include determining wastewater flow rates, meeting head requirements, optimizing pump cycle times, minimizing residence times, and facilitating simplified maintenance to reduce the need for excess labor from EMWD or its staff. To achieve these goals, the following EMWD Standards were followed:

- Development Services Department & Facility Design Guide (Rev 2023)
- Small Sewage Lift Station Guidelines, Standard Drawings, and Specifications

2.2 Wastewater Flow Generation

SA4 is a residential area that comprises parcels that are typically between 5,000 SF to 5,500 SF. Based on EMWD's land use descriptions for residential areas, the SA4 would be best classified as medium-high density. Based on the equivalent dwelling unit factors EMWD uses for residential areas, medium-high density areas will require an average dry weather flow (ADWF) of 211.5 gpd/DU. Due to the relatively small flows each lift station is expected to receive, the maximum peaking factor of 2.87 was used to determine the peak design flows. To ensure the lift stations can sustain all flows, an additional 20% safety factor was included as the peak design flow as described in the EMWD Small Sewage Lift Station Guidelines, Section IV,A.

The calculated ADWF in this report varies from the estimated ADWF in the 2022 Feasibility Study. The feasibility study determined that subareas 2, 3, 5 and 7 were medium high or very high-density residential buildings. These buildings were given a ADWF per dwelling unit of 210 gpd, similar to the project ADWF in this report. However, the feasibility study determined that SA4 was more densely populated and resembled land use closer to very high-density residential development. The feasibility study also analyzed the water use data from 2019. Assuming an 85% water returning to the sewer system, a yield of 150 gpd/du was found to be suitable. While the estimated flows from the feasibility study are reasonable, the information provided to the Michael Baker Team and the development of SA4 suggest that using medium-high density flows would provide a more conservative approach. The medium-high density flows better reflects the growth and buildout conditions of SA4 compared to the very-high density flow rate proposed in the feasibility study. It is also important to note that the peaking factor was not accounted for in the feasibility study.

A comparison of the design flow criteria used in this preliminary design report versus the 2022 Feasibility Study is provided in Table 2.1.

Table 2.1: Design Flow Parameters Comparison

Report	Method Used	Land Use	ADWF	Peaking Factor	Design Flow Used
Preliminary Design Report	Development Services Dept & Facility Design Guidelines	Medium High Density	211.5 gpd/du	2.87[1]	607 gpd per development
2022 Feasibility Study	2019 Water Usage Data	Very High Density or Mobile Home Park	150 gpd/du	Not mentioned	150 gpd per development

[1] The most conservative peaking factor of 2.87 is used in this report. For reference, peaking factor would be 2.5 if the PF equation from EMWD's Development Services Department & Facility Design Guidelines was used. This would have resulted in a design flow of 528.75 gpd per parcel.

The approach presented in Table 2.1 provides a more conservative assumption that will accommodate flows with additional safety factor. This approach uses a baseline calculation that is approximately 40% higher than the 2019 Water Usage Data.

3. LIFT STATION SIZING

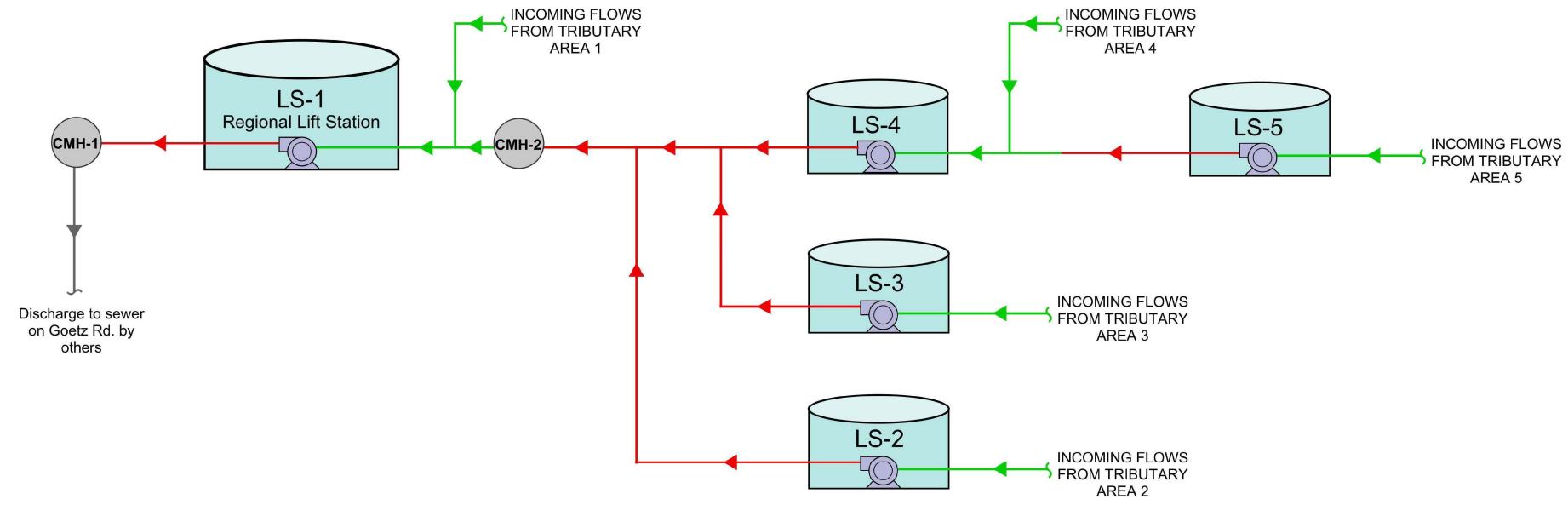
This section details the flow and head requirements for the smaller lift stations – LS-2, LS-3, LS-4 and LS-5. This also includes preliminary calculations for LS-1, the regional lift station of Quail Valley SA4. A detailed analysis of LS-1 is provided in Section 5.

3.1 Tributary Area Parcels

Tributary areas were established and used to quantify sewer flows and determine the required size of the lift stations. The tributary areas for each lift station are delineated in the Lift Station Tributary Area Exhibit (Exhibit 6).

To quantify lift station flows in existing and build out conditions, the numbers of developed and undeveloped parcels in each lift station's tributary area were determined. These are summarized in Table 3.1 below. It is important to note that some larger parcels are composed of several lots. However, for the lift station flow determination, each parcel was considered equivalent to a single dwelling unit, even if that parcel contained multiple lots and was larger than average.

In this sewer system, lift stations will cascade flow into subsequent lift stations. There will be a direct tributary area, where parcel inflows enter the associated lift station directly, and a cascading tributary area, where parcel inflows first enter preceding lift stations before being conveyed to the regional lift station. Figure 3.1 provides a visual schematic of the proposed lift station systems, illustrating how they interconnect and flow into each other hydraulically. Figure 3.2 provides a hydraulic profile schematic of the proposed lift station systems, showing their elevation profiles and vertical relationship with each other.



Legend

- Force Main
- Gravity Sewer
- LS-X — Lift Station
- CMH-x — Manhole

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FIGURE 3.1

HYDRAULIC SCHEMATIC

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QUAIL VALLEY SUBAREA 4
LIFT STATION SYSTEMS HYDRAULIC PROFILE SCHEMATICS

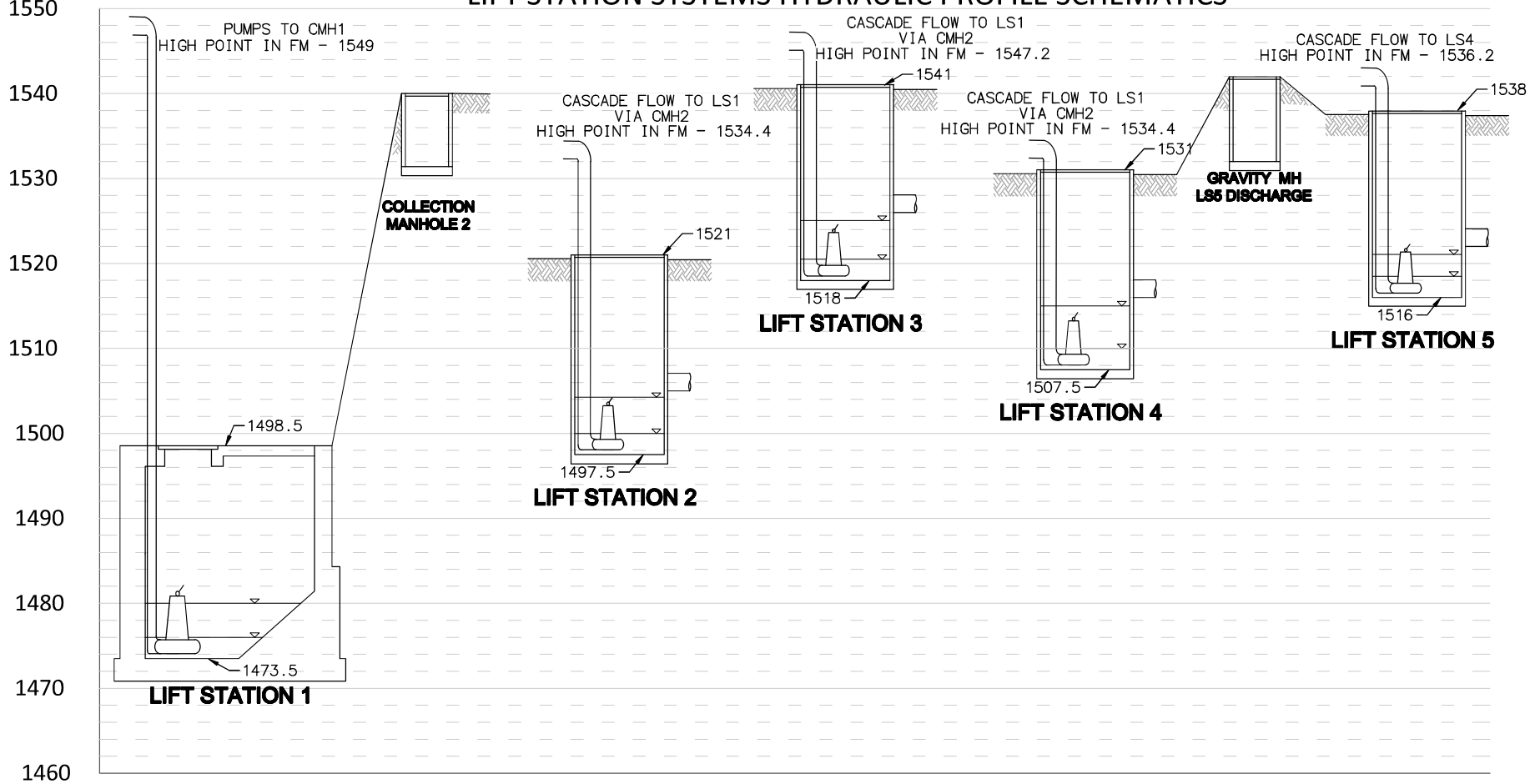

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FIGURE 3.2

HYDRAULIC PROFILE SCHEMATIC

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Table 3.1: Summary of Tributary Area Parcel Data

Lift Station	Tributary Area		Cascading Tributary Area		Total Tributary Area	
	Developed	Undeveloped	Developed	Undeveloped	Developed	Undeveloped
LS-5	28	40	None		28	40
LS-4	29	43	28	40	57	83
LS-3	49	46	None		49	46
LS-2	43	61	None		43	61
LS-1 (Regional LS)	509	502	149	190	658	692

Note: This parcel data was compiled based on the attribute ParcelTyp in the GIS tracking tool. If Parcel_Typ is characterized as not included, the parcel was deemed as undeveloped. For all other characterization, the parcel was deemed as developed.

3.2 Lift Station Capacity

The required lift station capacity was determined by calculating the peak flows into the lift station. The lift station was sized such that the firm capacity of the lift station can pump the incoming peak flow to avoid the potential for back up if peak flows are sustained. The peak flows were calculated using EMWD planning criteria as described in Section 2.2.

It is important to note that some lift stations will cascade into other lift stations. Because other lift stations may operate at peak flow conditions, the upstream lift station design discharge flow rate is added to the receiving lift station required design capacity, ensuring that the lift station can pump peak hour flow from the tributary area and pump incoming flows that cascade from upstream lift stations. The 20% safety factor was not applied to the pumping capacity of any incoming flows because it was already applied to the upstream lift station and the pump sizing will be known. The results for the lift station capacities in existing condition and buildout conditions are shown in Table 3.2 and Table 3.3, respectively.

Table 3.2: Lift Station Design Capacities in Existing Conditions

Existing Conditions							
Lift Station	**Number of Developed Parcels**	**Cascading Lift Station Flows (gpm)**	**Average Day from Tributary Area (gpd)**	**Average Day including Cascading Tributary Area (gpd)**	**Peak Hour Flow for Tributary Area (gpm)**	**Peak Hour Flow for Tributary Area w/ 20% Safety Factor (gpm)**	**Total Design Capacity[1] (gpm)**
LS-5	28	0	5,922	5,922	11.8	15	15
LS-4	29	15	6,134	12,056	12.2	15	30
LS-3	49	0	10,364	10,364	20.7	25	25
LS-2	43	0	9,095	9,095	18.1	22	22
LS-1[2]	509	77	107,654	139,167	214.6	258	335

[1]Total Design Capacity includes the Peak Hour Flow from the Lift Station Tributary Area with a 20% safety factor and the Peak Pump Flow from Cascading Lift Stations.
[2]Lift Station 1 is a regional lift station that is not covered in Sections 3 and 4 for the prepackaged pump station analysis. See Section 6 of this lift station evaluation report for a separate analysis of Lift Station 1.

Table 3.3: Lift Station Design Capacities in Buildout Conditions

Buildout Conditions							
Lift Station	**Number of Developed Parcels**	**Cascading Lift Station Flows (gpm)**	**Average Day from Tributary Area (gpd)**	**Average Day including Cascading Tributary Area (gpd)**	**Peak Hour Flow for Tributary Area (gpm)**	**Peak Hour Flow for Tributary Area w/ 20% Safety Factor (gpm)**	**Total Design Capacity[1] (gpm)**
LS-5	68	0	14,382	14,382	28.7	35	35
LS-4	72	35	15,228	29,610	30.4	37	72
LS-3	95	0	20,093	20,093	40.0	49	49
LS-2	104	0	21,996	21,996	43.8	53	53
LS-1[2]	1011	174	213,827	285,525	426.2	512	686

[1]Total Design Capacity includes the Peak Hour Flow from the Lift Station Tributary Area with a 20% safety factor and the Peak Pump Flow from Cascading Lift Stations.
[2]Lift Station 1 is a regional lift station that is not covered in Section 3 and 4 for the prepackaged pump station analysis. See Section 6 of this lift station evaluation report for a separate analysis of Lift Station 1.

3.2.1 Force Main Velocities

To facilitate scouring, it is recommended to maintain a minimum velocity of 2 feet per second (fps) within force mains. Additionally, the maximum velocity should not exceed 6 fps. A 4-inch force main is the minimum required diameter for the systems. However, the use of a 4-inch force main for lift stations LS-2 through LS-5 will result in a velocity below 2 fps in all force main segments for the existing conditions and most of the force main segments for the buildout conditions. Table 3.4 shows the expected velocities within the 4-inch force mains. This analysis uses the design capacities of the lift stations from Table 3.2 & Table 3.3 and assumes all lift stations are operating simultaneously to evaluate the maximum flow through the shared force main. It is important to note that the velocities within the shared force main segments, Lake-Goetz and Goetz-CMH2, will vary depending on which lift stations are

running within the system. A minimum velocity column has been added to represent the lowest velocity within the shared force main segments when only the smallest capacity lift station is active.

Force main segments LS5, LS4, LS3 and LS2 should be downsized to three inches in diameter to increase their flow velocities and help to prevent solids deposition within the force main. It important to note, however, that the 3-inch force main size is dependent on the selected prepackaged lift station system, as not all systems evaluated are equipped with grinder pumps. Table 3.5 displays the expected velocities using the modified force main sizes. Although the velocities are below 2 fps under existing conditions, reducing the lift station force main segments to three inches results in velocities above two fps for the buildout conditions. The sizes indicated in Table 3.5 will serve as the selected force main sizing for this lift station analysis report. The velocities shown in Table 3.5 are preliminary and were only used to assist in selecting a size for the force mains. The velocities through these force mains will ultimately depend on the flow capacities of the proposed prepackaged lift stations. The flow capacities of the prepackaged lift stations will be detailed in Section 5 of this lift station evaluation report, and the velocities will be adjusted accordingly.

Table 3.4: Force Main Velocities using 4-inch force mains

Force Main Segment	Force Main Diameter (inches)	Existing Conditions			Buildout Conditions		
		Design Flow (gpm)	Velocity (ft/s)	Minimum Velocity (ft/s)	Design Flow (gpm)	Velocity (ft/s)	Minimum Velocity (ft/s)
LS5 Segment	4.0	15	0.38	N/A	35	0.89	N/A
LS4 Segment	4.0	30	0.77	N/A	72	1.84	N/A
LS3 Segment	4.0	25	0.64	N/A	49	1.25	N/A
LS2 Segment	4.0	22	0.56	N/A	53	1.35	N/A
Lake-Goetz Segment (Shared FM – LS 4 & 3)	4.0	55	1.41	0.64	121	3.09	1.25
Goetz-CMH2 Segment (Shared FM – LS 4, 3 & 2)	4.0	77	1.97	0.56	174	4.45	1.35

Table 3.5: Force Main Velocities using 3-inch and 4-inch force mains

Force Main Segment	Force Main Diameter (inches)	Existing Conditions			Buildout Conditions		
		Design Flow (gpm)	Velocity (ft/s)	Minimum Velocity (ft/s)	*Design Flow* (gpm)	Velocity (ft/s)	Minimum Velocity (ft/s)
LS5 Segment	3.0	15	0.68	N/A	35	1.59	N/A
LS4 Segment	3.0	30	1.36	N/A	72	3.27	N/A
LS3 Segment	3.0	25	1.14	N/A	49	2.23	N/A
LS2 Segment	3.0	22	1.00	N/A	53	2.41	N/A
Lake-Goetz Segment (Shared FM – LS 4 & 3)	4.0	55	1.41	0.64	121	3.09	1.25
Goetz-CMH2 Segment (Shared FM – LS 4, 3 & 2)	4.0	77	1.97	0.56	174	4.45	1.35

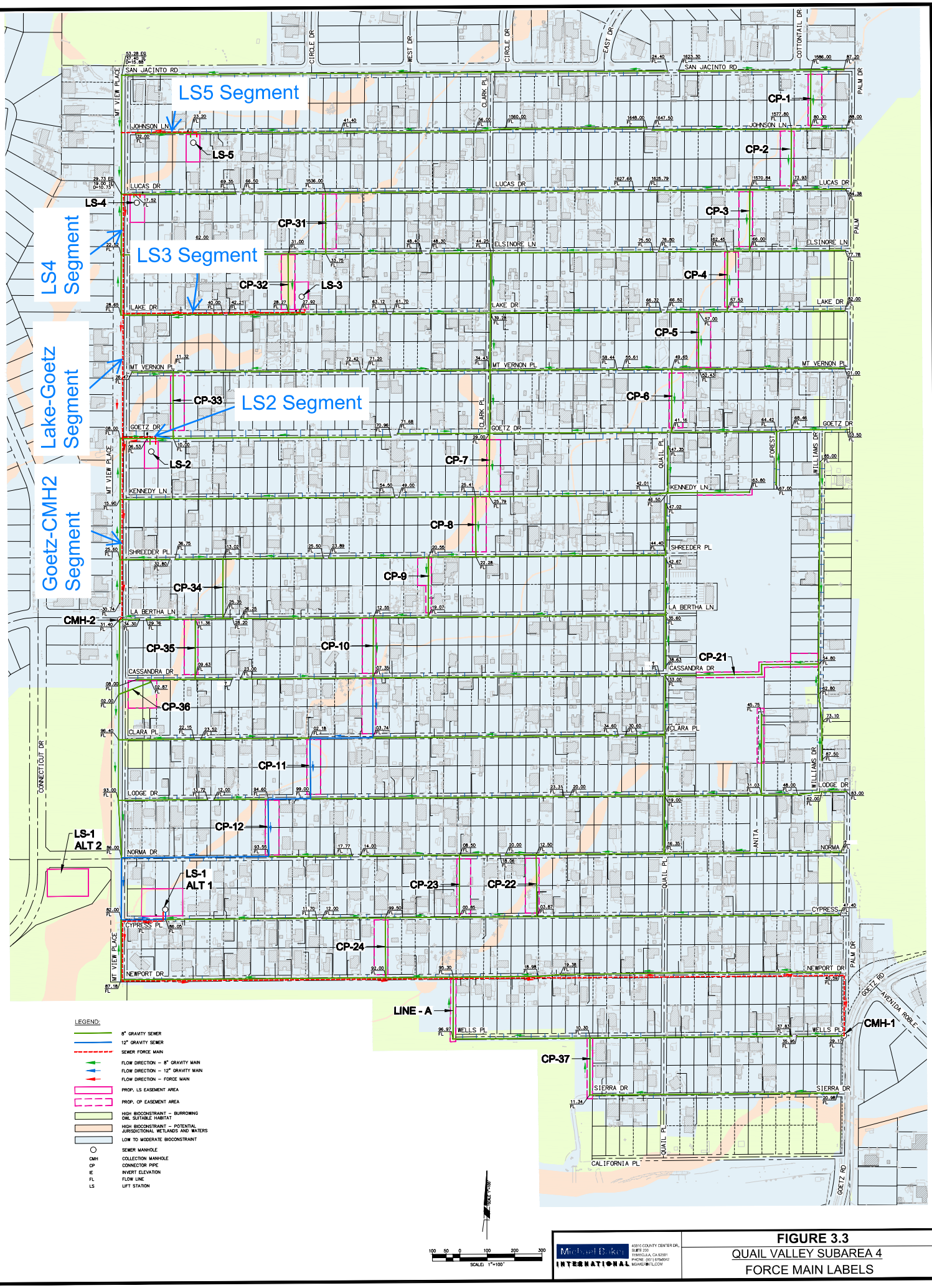

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FIGURE 3.3
QUAIL VALLEY SUBAREA 4
FORCE MAIN LABELS

3.2.1.1 Force Main Material

Force main pipes greater than 4-inch in diameter shall be PVC per ANSI/AWWA C900 (minimum DR-18) and shall be constructed using restrained joints per EMWD's standard drawing B-663. Force main pipes less than 4-inch in diameter shall be PVC Schedule 80 and solvent welded.

3.2.1.2 Pressure Cleanouts

Pressure cleanouts have been proposed at angle points in the force main piping system to facilitate maintenance. These cleanouts allow for the easy removal of built-up debris and grease, which can accumulate over time and cause blockages. The pressure cleanouts allow for periodic maintenance and flushing of the force main system.

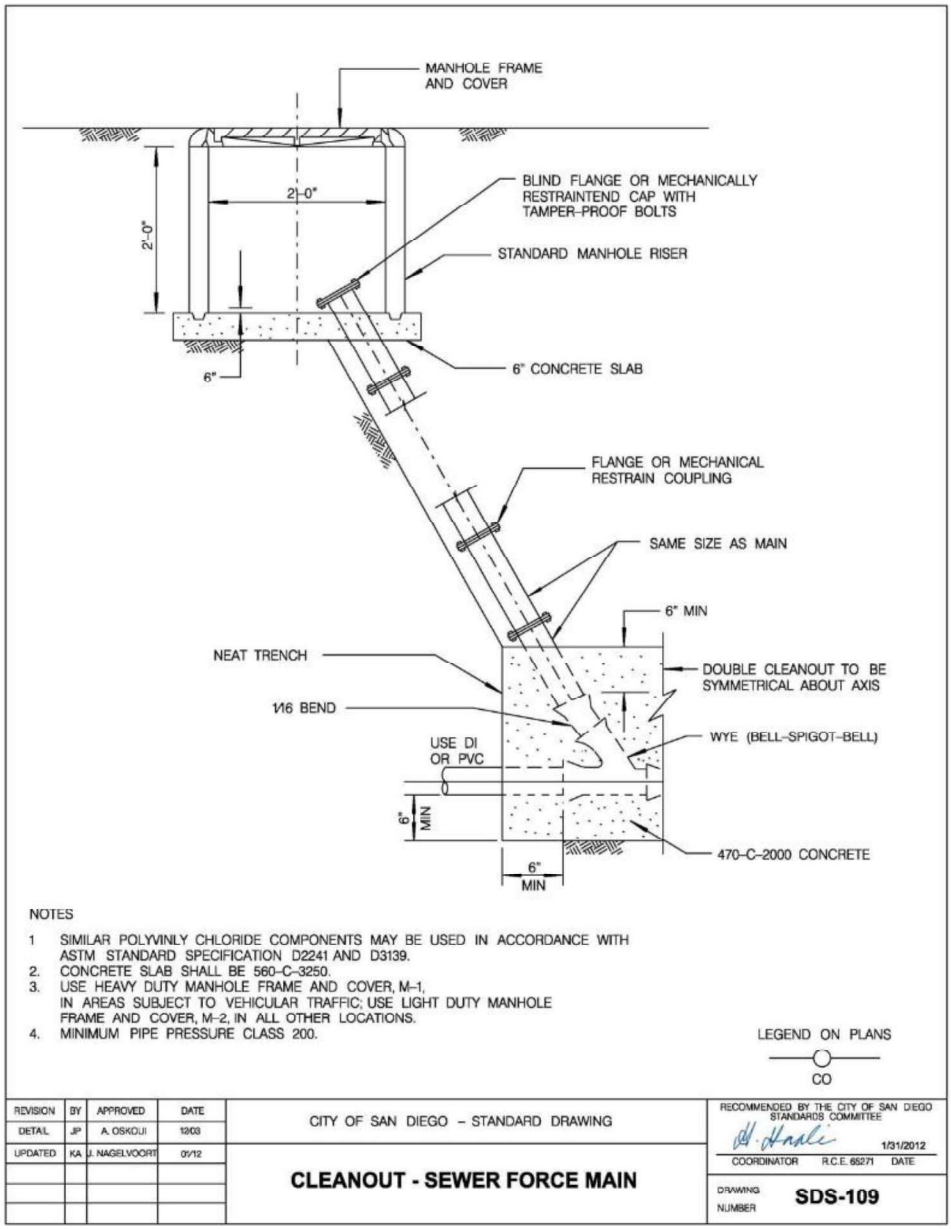

Figure 3.4: Example Pressure Cleanout Detail – Sewer Force Main

3.2.1.3 Collection Manholes

The final design will need to consider oversizing the collection manholes to allow for bypass and maintenance.

3.2.2 Force Main Residence Time

Force main residence time plays a critical role in the design and operation of lift stations. The force main residence time refers to the time duration that wastewater remains within these force main pipelines. Keeping this residence time short is crucial for several reasons. It helps prevent the buildup of odorous gases, such as hydrogen sulfide and reduces the chances of foul odors escaping into the environment. Additionally, shorter flush times mitigate the risk of pipe corrosion due to the high sulfide concentrations in the wastewater. Furthermore, it helps reduce solids deposition, facilitating easier cleaning and maintenance the force main pipelines. Industry practice often recommends limiting the force main residence time to four hours.

Table 3.6, Table 3.7, and Table 3.8 are provided to show a comparison of the force main residence times for three distinct scenarios:

1. Pumps and Wet Well for Existing Conditions: In this scenario, the pumps are sized to handle existing conditions. The wet wells will be sized to accommodate future buildout conditions. However, the float settings will be adjusted to optimize the wet well cycle volume for existing conditions.
2. Pumps and Wet Well for Buildout Conditions with Existing Sewage Inflow: In this scenario, the pumps are sized to handle buildout conditions. The wet well float settings set to accommodate the wet well cycle volume for buildout conditions. However, the sewage inflow remains at existing conditions.
3. Pumps and Wet Wells sized for Buildout Conditions: In this scenario, the pumps are sized to handle buildout conditions. The wet well float settings set to accommodate the wet well cycle volume for buildout conditions with the sewage inflow at buildout.

The key finding from the table below is that force main residence times remain under 4 hours for all three scenarios. However, when pumps and wet wells are sized directly for buildout conditions, residence times are shorter even with sewage inflow at existing conditions. This finding indicates the need for a more thorough evaluation of the design approach for the lift station. It must be determined whether the lift station design should meet existing conditions first or should directly meet buildout conditions before SA4 reaches full development. Further details on this decision will be covered in the upcoming subsections.

Table 3.6: Force Main Residence Times (Pumps and Wet Well for Existing Conditions)

Lift Station	Pumping Rate (gpm)	Pipe Length (ft)	Volume in the Force Mains (gal)	Design Wet Well Cycle Volume (gal)[1]	Average Day Inflow (gpm)	Force Main Residence Time (hrs)
LS-5	15	340 – 3" FM	125	100	4.1	0.6
LS-4	30	550 – 3" FM 1285 – 4" FM	1040	200	8.4	2.6
LS-3	25	740 – 3" FM 1285 – 4" FM	1115	175	7.2	3.3
LS-2	22	190 – 3" FM 835 – 4" FM	615	170	6.3	2.1

[1]Wet well sized to accommodate future buildout conditions. However, the float settings will be adjusted to optimize the wet well cycle volume for existing conditions.

Table 3.7: Force Main Residence Times (Pumps & Wet Well for Buildout with Sewage Inflow under Existing Conditions)

Lift Station	Pumping Rate (gpm)	Pipe Length (ft)	Volume in the Force Mains (gal)	Design Wet Well Cycle Volume (gal)	Average Day Inflow (gpm)[1]	Force Main Residence Time (hrs)
LS-5	35	340 – 3" FM	125	240	4.1	0.6
LS-4	72	550 – 3" FM 1285 – 4" FM	1040	470	8.4	2.3
LS-3	49	740 – 3" FM 1285 – 4" FM	1115	430	7.2	3.0
LS-2	53	190 – 3" FM 835 – 4" FM	615	400	6.3	1.8

[1]Wet well size and floats set to meet buildout conditions. However, day inflow is assumed to be at existing conditions.

Table 3.8: Force Main Residence Times (Pumps and Wet Well for Buildout Conditions)

Lift Station	Pumping Rate (gpm)	Pipe Length (ft)	Volume in the Force Mains (gal)	Design Wet Well Cycle Volume (gal)	Average Day Inflow (gpm)	Force Main Residence Time (hrs)
LS-5	35	340 – 3" FM	125	240	10.0	0.3
LS-4	72	550 – 3" FM 1285 – 4" FM	1040	470	10.6	1.9
LS-3	49	740 – 3" FM 1285 – 4" FM	1115	430	14.0	1.7
LS-2	53	190 – 3" FM 835 – 4" FM	615	400	15.3	0.9

3.2.3 Designing for Existing, Interim or Buildout Conditions

Ultimately, the lift stations will be designed to meet the buildout conditions of Quail Valley SA4. However, to avoid oversizing the lift stations before buildout is achieved, designing the lift stations for existing conditions or an interim condition has been considered. This design condition will need to be carefully considered due to the dynamic conditions of the development of SA4. In this section, the basis for design is selected. The options considered included:

1. Design based on Existing Conditions with future lift station expansion.
2. Design based on Interim Development Conditions with future lift station expansion.

3. Design for Buildout Conditions without future expansion.

3.2.3.1 Existing Condition Design – Option Eliminated

Currently, there is a moratorium on septic systems in Quail Valley which prevents new developments in SA4. However, once the sewer system in SA4 is operational and the moratorium ends, parcel owners may decide to develop their properties, which could cause an immediate increase in the number of developed homes in SA4. Designing solely for today's conditions could lead to the need for rapid lift station upgrades to accommodate potential new developments.

3.2.3.2 Interim Condition Design – Option Considered

As of today, Quail Valley SA4 is approximately 40% developed, with around 550 of 1368 parcels already developed. However, the GIS data suggests a higher percentage of development. When considering the parcels labeled as 'included' in the GIS data and counting those as developed parcels, the data indicates that SA4 is 50% developed, with 658 of 1368 parcels classified as developed. It is important to note that 'included' parcels are *believed* to have septic systems, so these parcels are not necessarily developed. Using this 50% developed condition for lift station sizing may be a prudent approach, as these parcels could be among the first to be developed once the moratorium is lifted. Because of some uncertainty in the data, a sensitivity analysis was conducted to determine whether a better interim condition can be used as the lift station design conditions.

Various scenarios were considered, assuming 40%, 50%, 60%, and 70% of the lift station tributary areas are developed. Figures 3.5 through 3.9 show the required pump design flow for each lift station at the different developed scenarios. As a preliminary approach to the lift station design, the lift station would initially be sized to meet an interim condition in a 1+1 pump configuration. As SA4 develops further, an additional pump would be added, resulting in a 2+1 configuration. Since the additional pump will be identical to the first pump used for interim conditions, it is essential to select a pump that meets interim needs and, when paired with another of the same model, fulfills buildout requirements without oversizing the lift station. The results of this analysis as illustrated in Figures 3.5 through 3.9 will determine which development scenario is adopted for the interim lift stations.

Case 1: Initially sized for 40% Development

Figures 3.5 through 3.9 indicate that initially sizing the lift station for 40% development would result in oversized lift stations for today's conditions. Additionally, this scenario does not accommodate for newly developed homes after the moratorium is lifted.

Case 2: Initially sized for 50% Development

Figures 3.5 through 3.9 indicate that adopting a 50% development scenario for interim purposes would result in lift station sizes that can handle both today's conditions and future buildout conditions without oversizing. However, this approach would only allow for the development of 18 additional parcels from today's conditions (note that this is total is not broken down by tributary area) before needing to upsize the pumps within the lift station.

Case 3: Initially sized for 60% Development

Assuming 60% development scenario for interim purposes offers greater flexibility for the lift stations if a substantial number of new developments are constructed promptly after the moratorium is lifted. This scenario may lead to slightly oversized lift stations in buildout conditions, but it can accommodate more developments in the interim – specifically 811 of 1368 parcels, which is 261 parcel more than today's development count.

Case 4: Initially sized for 70% Development

Initially sizing the lift stations to accommodate an assumed 70% development of SA4 allows for approximately 400 parcels to develop before requiring an upgrade to the lift station. Accommodating for this many parcels seems unnecessary, as such rapid development is unlikely. Additionally, this approach results in significantly oversized lift stations at buildout.

Conclusion:

Designing the four prepackaged lift station systems to initially accommodate 60% development is the best choice among the four cases. It allows for a substantial number of parcels to develop immediately after the moratorium is lifted. Additionally, this approach ensures that lift stations are not excessively oversized at buildout.

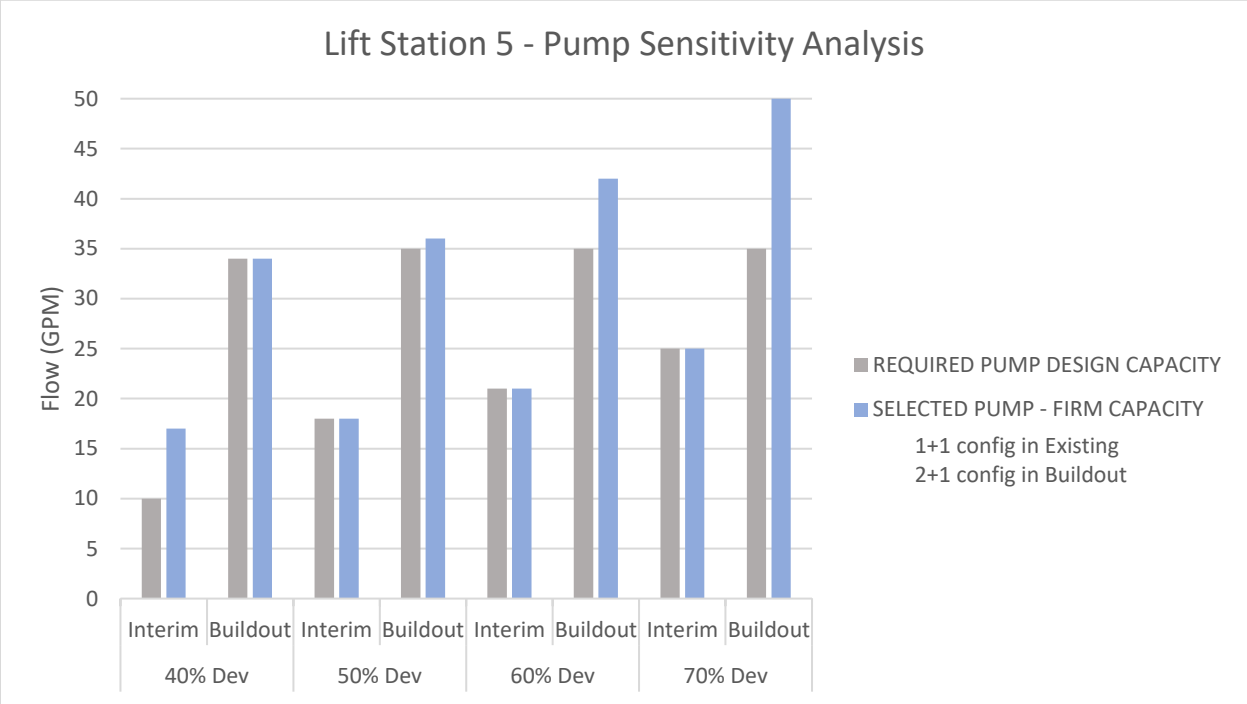

Figure 3.5: Lift Station LS-5 – Pump Sensitivity Analysis for Interim Scenarios

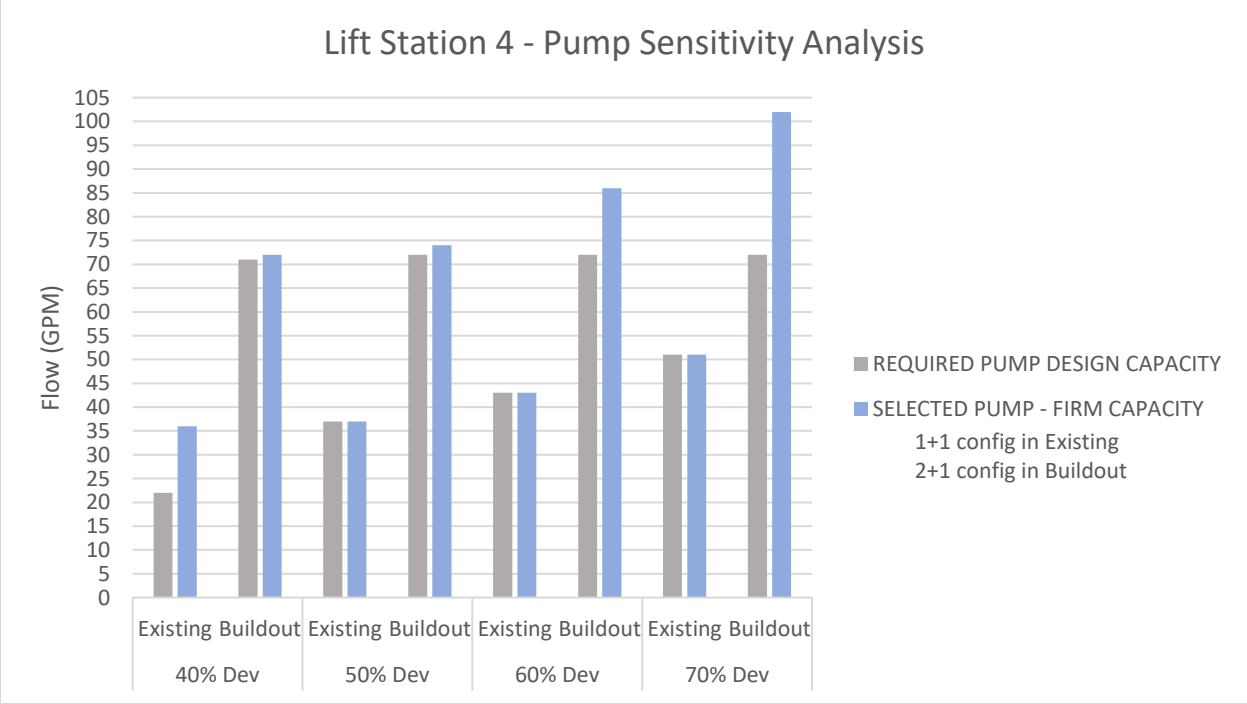

Figure 3.6: Lift Station LS-4 – Pump Sensitivity Analysis for Interim Scenarios

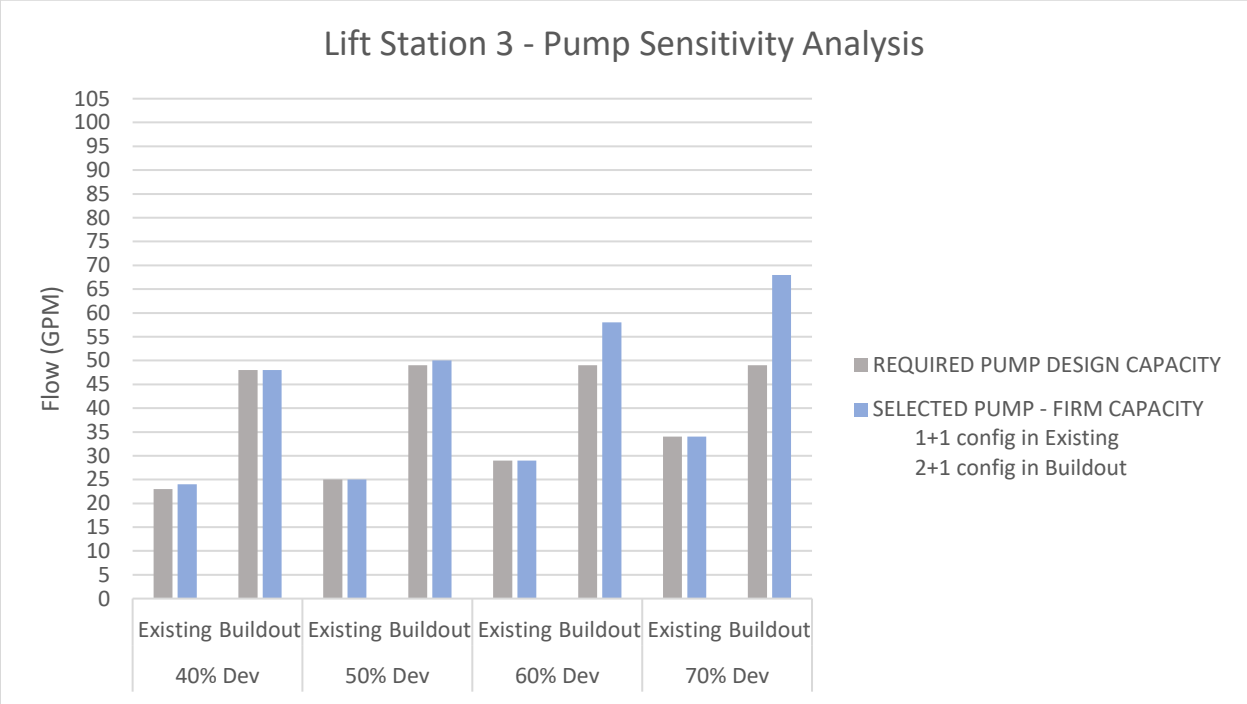

Figure 3.7: Lift Station LS-3 – Pump Sensitivity Analysis for Interim Scenarios

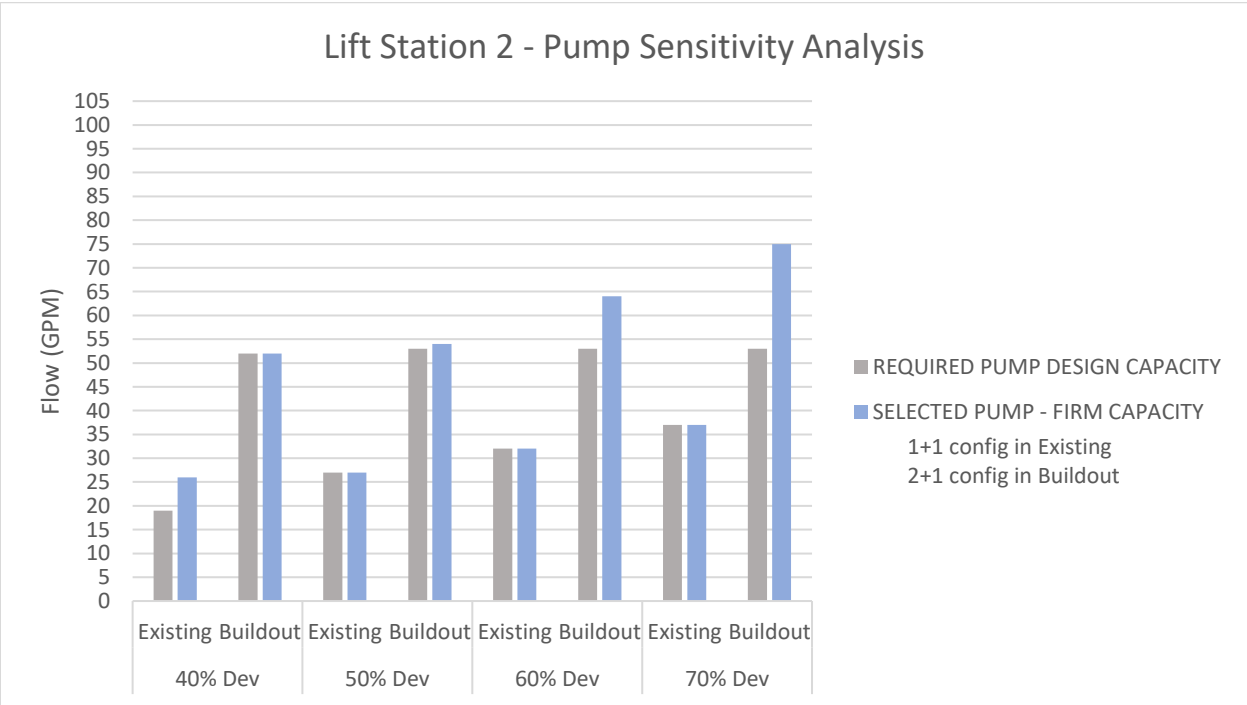

Figure 3.8: Lift Station LS-2 – Pump Sensitivity Analysis for Interim Scenarios

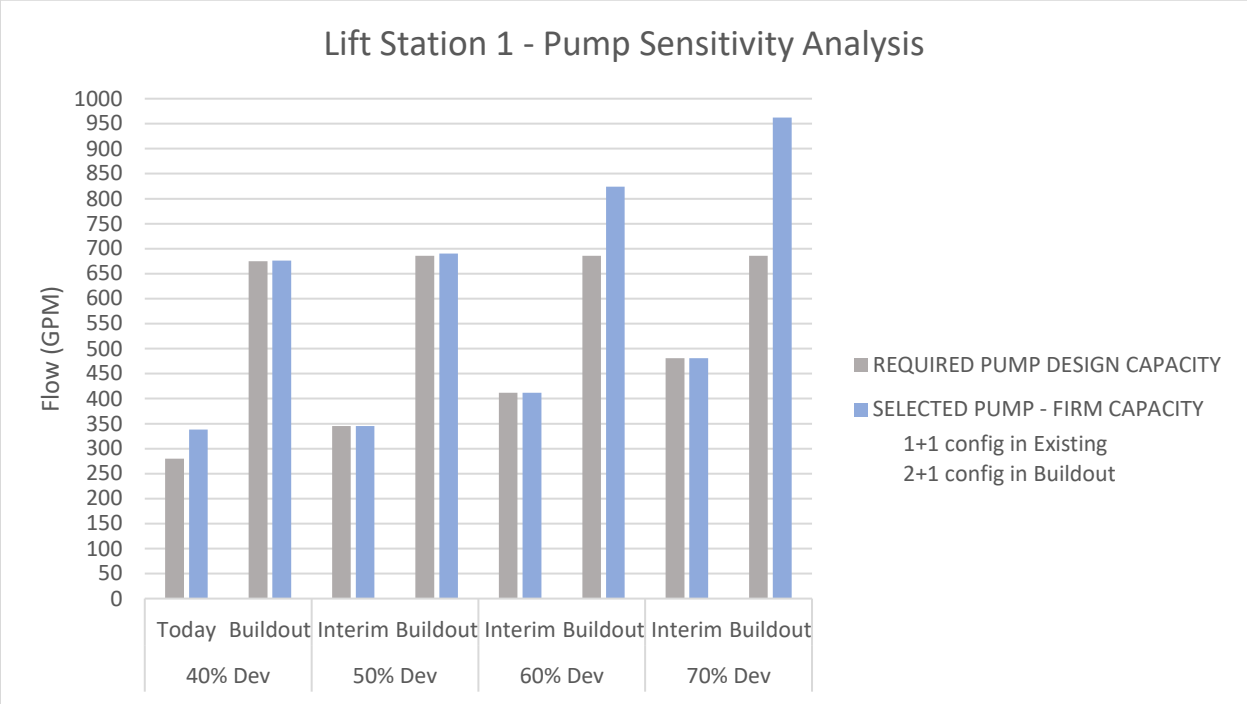

Figure 3.9: Lift Station LS-1 – Pump Sensitivity Analysis for Interim Scenarios

If the four smaller lift stations are designed to accommodate the 60% developed conditions, the required lift station capacities range from 20 to 45 gpm, as outlined in Table 3.9. Given these low flows, it is crucial to re-check the velocities and residence time of the force mains.

Table 3.10 specifies the resulting force main velocities associated with these flows. Generally, the force main velocities are below the 2 fps scouring velocity. The only instance when the velocity exceeds the 2 fps minimum is when all smaller lift stations are simultaneously pumping sewage through the shared force main Goetz-CMH2 Segment.

Table 3.11 shows the residence time in the force main when the prepackaged lift stations are initially sized with at 60% development flows. The low pumping rate will increase the residence time, increasing the time it takes to flush out the force main. However, as shown in Table 3.11, the residence time in the force main at 60% development conditions is within a flush time of under 4 hours.

The outcome of this sensitivity analysis indicates that the overall approach of designing to a partially developed condition may not be the ideal solution. This approach can result in force main velocities that are low, and when upgraded to meet buildout conditions in the future, this option may lead to oversized lift stations. Although the 60% development case evaluated herein was found to be the best alternative of the partially-developed options, it is not as beneficial as a design based on build-out conditions. The design based on build-out conditions is discussed in the following section.

Table 3.9: Lift Station Design Capacities in Interim Conditions – 60% developed

Interim Conditions							
Lift Station	**Number of Parcels**	**Cascading Lift Station Flows (gpm)**	**Average Day from Tributary Area (gpd)**	**Average Day including Cascading Tributary Area (gpd)**	**Peak Hour Flow for Tributary Area (gpm)**	**Peak Hour Flow for Tributary Area w/ 20% Safety Factor (gpm)**	**Total Design Capacity[1] (gpm)**
LS-5	41	0	8,672	8,672	17.3	21	21
LS-4	43	21	9,095	17,766	18.1	22	43
LS-3	57	0	12,056	12,056	24.0	29	29
LS-2	63	0	13,325	13,325	26.6	32	32
LS-1[2]	607	104	128,381	171,527	255.9	308	412

[1]Total Design Capacity includes the Peak Hour Flow from the Lift Station Tributary Area with a 20% safety factor as well as the Peak Pump Flow from Cascading Lift Stations.
[2]Lift Station 1 is a regional lift station that is not covered in Sections 3 and 4 for the prepackaged pump station analysis. See Section 6 of this lift station evaluation report for a separate analysis of Lift Station 1.

Table 3.10: Force Main Velocities in Interim Conditions – 60% developed

Force Main Segment	Force Main Diameter (inches)	Interim Conditions – 60% dev		
		Design Flow (gpm)	Velocity (ft/s)	Minimum Velocity (ft/s)
LS5 Segment	3.0	21	0.95	
LS4 Segment	3.0	43	1.95	
LS3 Segment	3.0	29	1.32	
LS2 Segment	3.0	32	1.45	
Lake-Goetz Segment (Shared FM – LS 4 & 3)	4.0	72	1.84	0.74
Goetz-CMH2 Segment (Shared FM – LS 4, 3 & 2)	4.0	104	2.66	0.74

Table 3.11: Force Main Residence Times in Interim Conditions – 60% developed

Lift Station	Pumping Rate (gpm)	Pipe Length (ft)	Volume in the Force Mains (gal)	Design Wet Well Cycle Volume (gal)	Average Day Inflow (gpm)	Force Main Residence Time (hrs)
LS-5	21	340 – 3" FM	125	150	6.0	0.4
LS-4	43	550 – 3" FM 1285 – 4" FM	1040	280	12.3	1.8
LS-3	29	740 – 3" FM 1285 – 4" FM	1115	190	8.4	2.9
LS-2	32	190 – 3" FM 835 – 4" FM	615	210	9.3	1.4

Note: Force Main Residence Time is calculated based on the average day inflows from the tributary areas being served (at 60% developed condition). A cycle period, representing the wet well filling time and the pumping run time, is established. This cycle period is then multiplied by the number of cycles required to flush the force main system.

3.2.3.3 Buildout Condition Design – Basis of Design

Because of the low flow conditions of the smaller lift stations, the difference in flow requirements between the 60% interim design condition and the buildout condition are not significant. The pump sizes available to meet the 60% interim conditions were oversized and nearly met the buildout condition flow requirements. The increase in size wasn't enough to strongly warrant the considerations for the 2+1 pump configuration at buildout conditions discussed in Subsection 3.2.3.2.

Table 3.12: Lift Station Design Capacities – 60% Developed Conditions vs. Buildout Conditions

Lift Station	60% Developed Design Capacity (gpm)	Buildout Design Capacity (gpm)
LS-5	21	35
LS-4	43	72
LS-3	29	49
LS-2	32	53

These selected pumps were small grinder pumps featuring 1 to 3 HP motors. The interim conditions would require 1 or 2 HP pumps for interim conditions and the build out conditions could be pumped using 3 HP pumps. These pump sizes are typical for duplex pump stations and are not typically supplied with triplex pump stations.

Discussions with lift station system vendors were initially conducted for the 60% developed conditions. These discussions were focused on duplex systems that would initially accommodate the 60% developed condition and then later transition to triplex systems when SA4 reaches buildout conditions and another pump is required. However, upon reviewing the vendors' available lift station systems, it became evident that a triplex system for buildout conditions would not be cost-effective. Given the low flow rates even at buildout, designing a triplex system would unnecessarily increase costs. A triplex system would require additional pumps, a larger wet well and more control panel hardware. All vendors recommended a duplex system design.

The design of the lift station systems for buildout conditions is further supported by the observation that force main velocities fall below the desired threshold of 2 feet per second (fps) when pumps are sized for partially developed conditions as described in Subsection 3.2.3.2. When sized for buildout conditions, the velocities are more favorable for operation of the system.

3.2.3.4 Conclusion

Considering flow projections, pump sizes, scouring velocities, and manufacturer's recommendations, a recommendation is made to size lift stations LS-2 through LS-5 for buildout conditions for the initial construction of the facility.

Table 3.13 below summarizes the flow design capacities used as the basis of design for lift stations LS-2 through LS-5. The wet well for each location will be sized to accommodate future buildout conditions. However, it is crucial to avoid oversizing during partially developed conditions. Oversized wet wells can lead to long residence times. This can cause odors, increase sedimentation and allow scum layers to develop. To reduce wet well residence time while accommodating buildout conditions, the wet well float settings can be adjusted to lower the wet well cycle volume.

Table 3.13: Lift Station Design Capacities – Basis of Design

Buildout Conditions – Prepackaged Lift Stations Basis of Design							
Lift Station	**Number of Developed Parcels**	**Cascading Lift Station Flows (gpm)**	**Average Day from Tributary Area (gpd)**	**Average Day including Cascading Tributary Area (gpd)**	**Peak Hour Flow for Tributary Area (gpm)**	**Peak Hour Flow for Tributary Area w/ 20% Safety Factor (gpm)**	**Total Design Capacity[1] (gpm)**
LS-5	68	0	14,382	14,382	28.7	35	35
LS-4	72	35	15,228	29,610	30.4	37	72
LS-3	95	0	20,093	20,093	40.0	49	49
LS-2	104	0	21,996	21,996	43.8	53	53

[1]Total Design Capacity includes the Peak Hour Flow from the Lift Station Tributary Area with a 20% safety factor as well as the Peak Pump Flow from Cascading Lift Stations.

3.3 Pumping Head

To evaluate the pumping head at each location, Bentley's SewerCAD Hydraulic Modeling Software was used to model the force main system tied to lift stations LS-2 through LS-5 and generate system curves. The regional lift station, LS-1, was excluded from this analysis as it has a separate force main system from the four smaller lift stations. A separate analysis for Lift Station 1 is included in Section 6.

Pumping head involves several factors, including static head and the combined effects of major and minor friction losses within the piping system. Static head accounts for the elevation difference between water levels in the wet well and the highest point in the force main. The force main elevations inputted in the model were based on the current 30% design plans. Similarly, the wet well water levels inputted in the model were estimated and based on the following assumption. The pump-off level was set at 2.5 feet above the presumed wet well bottom and the pump-on level established at a depth above the pump-off level to meet the designed cycle volume of the wet well in buildout conditions. This is based on an assumed 4-foot diameter wet well recommended by the lift station system vendors. The elevations utilized in the model can be found in Table 3.14. In this initial stage, minor losses–which include those due to fittings, bends, valves, etc.–were considered negligible and thus excluded from the head loss calculations in the model. Conversely, major losses resulting from friction within the pipes were calculated in the SewerCAD model, which applied the Hazen-Williams equation with a design C-factor of 140.

3.3.1 Static Head

While some variation between the current 30% and final design may occur, the elevations provided in this report offer a general understanding of the required static head. Table 3.14 outlines the minimum and maximum static head for each lift station. The minimum static head indicates the vertical lift needed for the pump to move sewage from the pump ON elevation to the highest point on the force main. The maximum static head indicates the vertical lift needed for the pump to move sewage from the pump OFF elevation to the highest point on the force main.

Table 3.14: Static Head

Lift Station	High Point on Force Main (ft)	Wet Well Bottom Elevation (ft)	Pump ON Elevation (ft)	Pump OFF Elevation (ft)	Minimum Static Head (ft)	Maximum Static Head (ft)
LS-5	1536.25	1516.0	1521.05	1518.50	15.2	17.8
LS-4	1534.4	1507.5	1515.00	1510.00	19.4	24.4
LS-3	1547.2	1518.0	1525.07	1520.50	22.1	26.7
LS-2	1534.4	1497.5	1504.26	1500.00	30.1	34.4

Note: Use Figure 3.10 for an example illustration of the wet well. The pump on and off levels were established as described in Section 3.3.

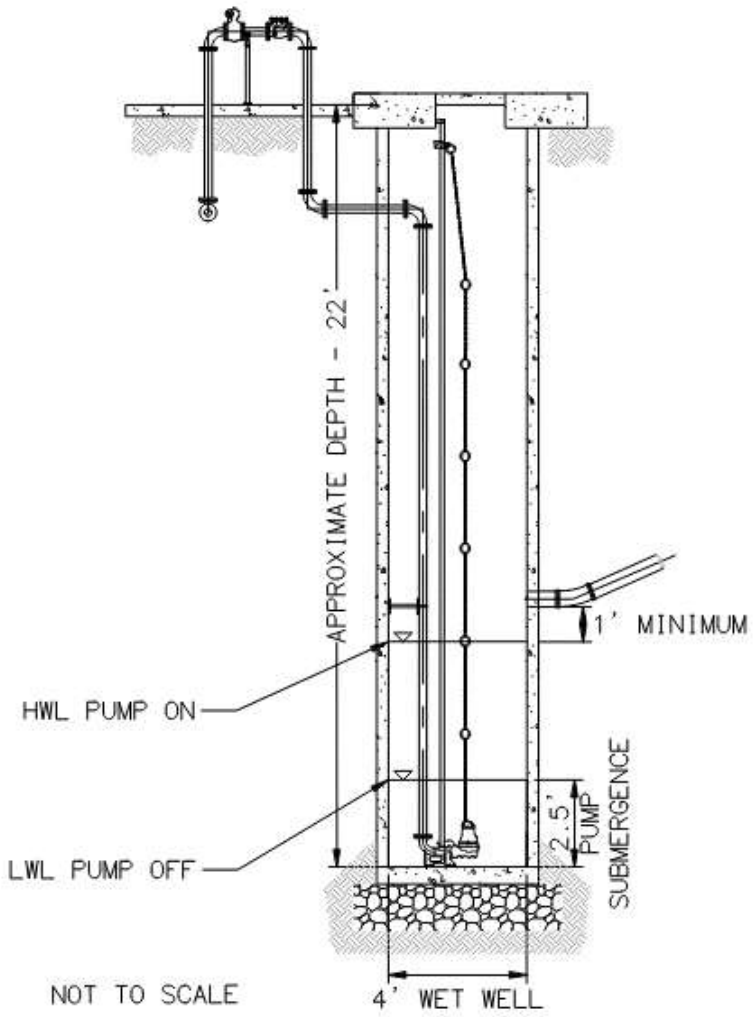

Figure 3.10: Example Illustration of Wet Well

3.3.2 System Curves

The proposed sewer system for Quail Valley SA4 has a unique design, involving cascading lift stations and a shared force main for LS-2, LS3 and LS-4.

For example, consider LS-5. It has its own separate force main that discharges into the sewer gravity system connected to LS-4. The flows from LS-5 cascades into LS-4, meaning that LS-5's pumping duty point directly impacts the capacity of LS-4. Oversizing of LS-5 must be avoided to minimize the flow capacity of LS-4. Since LS-5 force main is separate, its system curve is not dependent on the operation of the other lift stations. Only two system curves are generated for lift station 5: one when the wet well level is at pump-on (low head conditions) and another when the wet well level is at pump-off (high head conditions). Note that LS-5 will be sized to meet peak hour buildout flow generation at high head conditions.

In contrast, Lift stations LS-2, LS-3, and LS-4 share a common force main, causing their system curves to vary based on the other station operating conditions. When the lift stations in the shared force main operate under different conditions, two key factors can occur:

1. **Increased Starting Head (Head at Zero Flow):** When neighboring lift stations within the force main are operational, the pump head increases due to the inclusion of both the static head and additional frictional head loss. The force main already contains flows from the other active lift stations, requiring the lift station to overcome not only its own static and friction head but also the increased friction head resulting from combined flow rates within the shared force main.
2. **Steeper System Curve:** When lift stations within the shared force main operate simultaneously, the combined flow rate in the force main increase. This leads to higher velocities and increased friction in the force main, resulting in a steeper system curve. The steepest system curve occurs when all lift stations are active. The system curve is more gradual when only one lift station is active. Lift station duty points also affect the system curves. Higher operating points contribute more flow to the force main, leading to steeper system curves.

Considering the factors discussed, a set of system curves specific to each prepackaged lift station alternatives were generated. These curves account for the different operating points of each system alternative and the varying operating conditions of neighboring lift stations (i.e. all lift stations active or only a few lift stations active). This is detailed in Section 5.

Meanwhile, Table 3.15 below illustrates the pumping head requirements of each lift station under existing and buildout conditions, assuming that the operating conditions of the lift stations will match their design capacities detailed in Table 3.13. Note that each development condition has a low head and high head row. The low head represents the minimum pumping head when the associated lift station is the sole active station and the sewage in the wet well is at high water level. The high head represents the maximum pumping head when all lift stations in the shared force main are active and the sewage in the wet well is at low water level.

Table 3.15: Pumping Head Requirements for Existing and Buildout Conditions

Lift Station	Development Condition		Flow Rate (gpm)	Static Head (ft)	Required Pumping Head (ft)
LS-5	Existing Conditions	Low Head	15	15.2	15.5
		High Head		17.8	18.1
	Buildout Conditions	Low Head	35	15.2	16.5
		High Head		17.8	19.1
LS-4	Existing Conditions	Low Head	30	19.4	21.8
		High Head		24.4	29.6
	Buildout Conditions	Low Head	72	19.4	31.4
		High Head		24.4	48.7
LS-3	Existing Conditions	Low Head	25	22.1	23.0
		High Head		26.7	27.6
	Buildout Conditions	Low Head	49	22.1	25.1
		High Head		26.7	35.4
LS-2	Existing Conditions	Low Head	22	30.1	30.7
		High Head		34.4	37.4
	Buildout Conditions	Low Head	53	30.1	33.0
		High Head		34.4	48.0

3.4 Wet Well Capacity

Once the pumping rate of each lift station is established, the required cycling volume for the wet well can be determined. The required cycling volume depends on the specific lift station system chosen. Therefore, wet well volumes will be finalized after evaluating and selecting the lift station system. It is worth noting that due to the deep sewer conditions of SA4, the prepackaged lift station system will require a customized wet well. Most of the pre-manufactured wet wells are not rated for the depths required for this project. Nevertheless, the wet well will still be included as part of the overall packaged lift station system.

The numbered items listed below are the criteria that were used to determine the cycling volume for the wet wells. Note that this volume specifically represents the amount of water pumped during a single pump cycle, rather than the total storage capacity of the wet well. It encompasses the volume between the "pump on" and "pump off" elevations.

1. **Calculate the minimum pump cycle volume.** The minimum pump cycle volume can be calculated using the equation: V=tQ/4, where V = minimum volume in gallons, t = minimum pump cycle time in minutes and Q = pump capacity in gallons per minute. The minimum pump cycle time was set at 10 minutes, which was based on the EMWD guideline of six pump starts per hour. This minimum pump cycle volume serves as the baseline requirement and is then increased to meet the criteria detailed in numbers 2 through 5.
2. **The wet well is larger than the minimum volume calculated.** This establishes a minimum threshold to prevent more than 6 pump starts per hour.
3. **Provides a reasonable "time to fill" based on average day flows from the tributary areas being served.** This time represents the residence time of the accumulated incoming flows. Excessive time-to-fill would indicate the wet well is too large, and could lead to issues like odors, sediment deposition, or scum layer development. The target time to fill is less than 60 minutes.
4. **Allows the pump to run for a minimum of 5 minutes.** This is tabulated as "time to drain" and represents the time it would take to drain the wet well volume based on the pump design capacity. The pump run times should provide enough time for the pump to run at speed and exercise the pump.
5. **Has a pump cycle time of no less than 20 minutes.** The EMWD Small Sewage Lift Station Guidelines, Section IV,E,3,b indicate the pump should cycle no more than 6 start per hour at 1/2 of the cycle volume. This requirement limits the cycle time to a minimum of 20 minutes.

Table 3.16 outlines the wet well cycle volume requirements for each lift station, based on the assumption that their operating conditions will align with the design flows detailed in Table 3.13. However, since the actual operating conditions will vary for each lift station system alternative, the required wet well capacity will also differ and be larger. Thus, Table 3.16 provides an initial wet well capacity requirement, serving as the basis for evaluating the prepackaged lift station system alternatives.

Table 3.16: Wet Well Cycle Volume Requirements - Basis of Design

Lift Station	Design Flow (gpm)	Minimum Wet Well Cycle Volume (gal)	Design Wet Well Cycle Volume[1] (gal)	Time to Fill (Non-Peak Existing Conditions) (min)	Time to Fill (Non-Peak Buildout Conditions) (min)	Time to Drain (min)	Pump Cycle Time (min)[2]
LS-5	35	88	240	58	24	7	27
LS-4	72	180	470	56	23	7	26
LS-3	49	123	320	44	23	7	26
LS-2	53	200	360	57	24	7	27

[1]These preliminary wet well cycle volume requirements serve as the basis for evaluating the prepackaged lift station systems. Each prepackaged lift station alternative will have different wet well capacity requirements due to varying operating conditions.
[2]Pump Cycle time = 4*Design Wet Well Cycle Volume/Pump Duty Point. The pump cycle time is calculated using the industry standard equation that predicts the maximum starts per hour.

Table 3.17 presents the available wet well cycle volume and estimated wet well depth for each lift station. This was calculated based on preliminary pump-off, pump-on and wet well bottom elevations for a 4-foot diameter wet well. The process to determine the available wet well cycle volume began by assuming an initial wet well depth of 22 feet. Then, the pump-on level was set 2.5 feet above the wet well bottom and the pump off level was set 1 at least foot below the sewer invert. This provided an initial wet well cycle volume, and if this volume did not meet the requirements in Table 3.16, the wet well depth was increased. As a result, the wet well depths for the lift stations ranged from 22 to 23.5 feet deep. Table 3.17 serves as a basis for the wet well depths, which will vary to meet the specific wet well capacity requirement for each lift station system alternative.

For preliminary analysis, a 22-feet deep wet was assumed to aid in initial lift station system selection and obtain system quotes from vendors. This depth will be refined during final design of the lift stations.

Table 3.17: Available Wet Well Cycle Volume based on Estimated Wet Well Depth

Lift Station	Estimated Ground Elevation (ft)	Estimated Wet Well Depth (ft)	Wet Well Bottom Elevation (ft)	Pump ON Elevation (ft)	Pump OFF Elevation (ft)	Available Wet Well Cycle Volume (gal)
LS-5	1538	22.0	1516.0	1521.05	1518.50	240
LS-4	1531	23.5	1507.5	1515.00	1510.00	470
LS-3	1541	23.0	1518.0	1525.07	1520.50	430
LS-2	1521	23.5	1497.5	1504.26	1500.00	400

Note: Use Figure 3.10 for an example illustration of the wet well. The pump on and off levels were established as described in Section 3.3 and in the paragraph above.

3.5 Conclusion

Lift stations LS-2, LS-3, LS-4 and LS-5 must be designed to meet buildout conditions from the inception of the facilities. This approach ensures that the lift stations are equipped to handle all sewage inflows from existing to buildout conditions of SA4. Due to the low flow conditions of these lift stations, the difference in flow requirements between the existing and buildout conditions does not justify designing an interim lift station condition with future expansion. Table 3.18 summarizes the flow capacity, pumping head, and wet well capacity requirements of the smaller lift stations, which serve as the basis for selecting the prepackaged lift station systems. Each prepackaged lift station system is then evaluated, analyzing its pump duty points, wet well conditions, force main velocities, and residence times to ensure all criteria are met.

Table 3.18: Lift Station System Sizing – Basis of Design

Lift Station	Flow Design Capacity (gpm)		Pumping Head Requirement (feet)	Wet Well Cycle Volume Requirement (gal)
LS-5	35	Low Head	16.5	240
		High Head	19.1	
LS-4	72	Low Head	31.4	470
		High Head	48.7	
LS-3	49	Low Head	25.1	320
		High Head	35.4	
LS-2	53	Low Head	33.0	360
		High Head	48.0	

Note: These sizing requirements serve as the basis for evaluating the prepackaged lift station systems. Each prepackaged lift station alternative will have different pumping head and wet well capacity requirements due to varying operating conditions.

4. SEWER AIR VALVES

Any high point along the vertical force main alignment must include an air release valve to release trapped air at these points. However, air valves in sewer mains can present challenges, such as odor, gas, and small amounts of fluid release into the environment. This issue can be mitigated by equipping these air valves with a fiberglass enclosure to contain the odor, gas, and fluid, and by directing the air, gas and accompanying fluids back into the nearest gravity sewer manhole. In addition, a regular maintenance schedule must be implemented to inspect and clean these air valves and their enclosures.

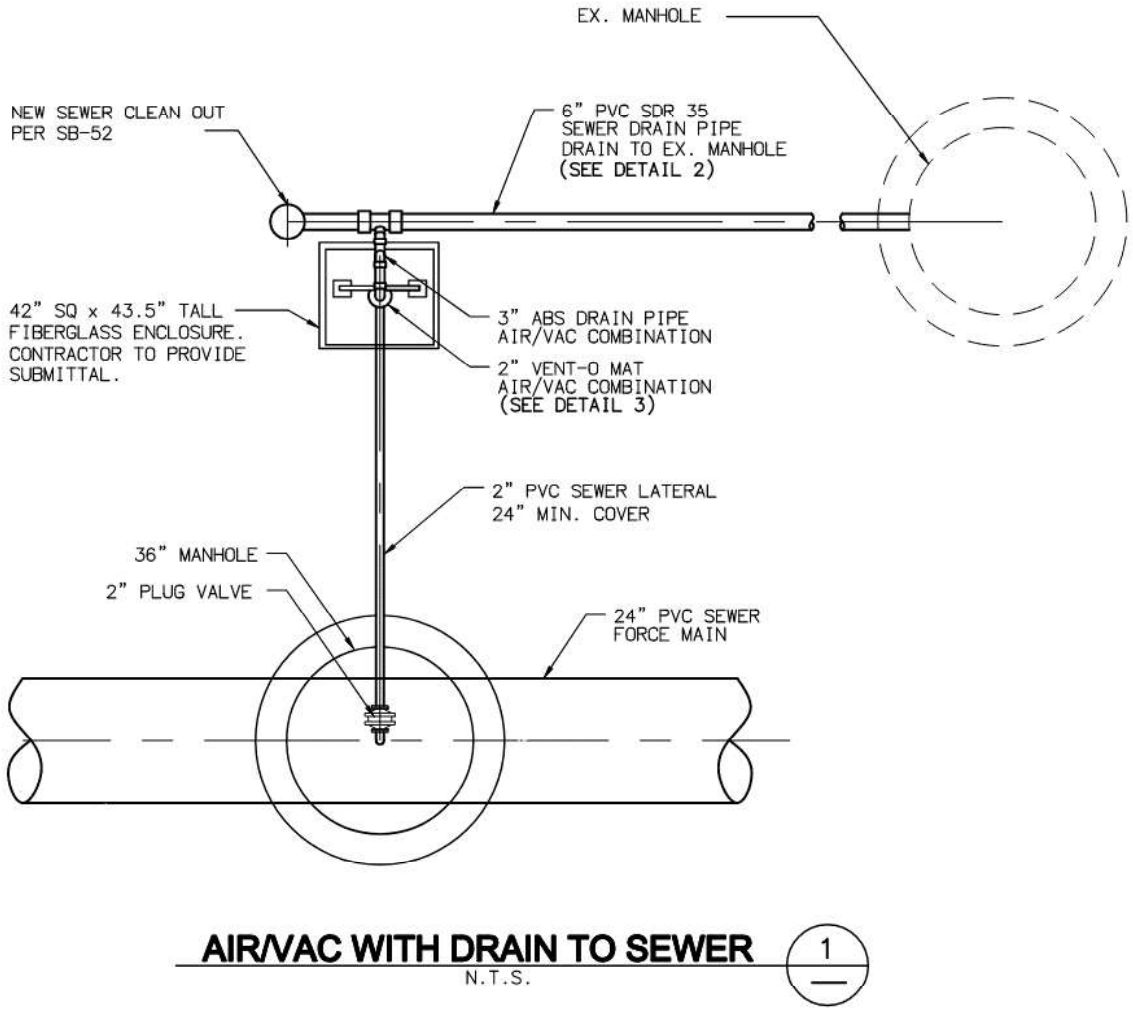

Figure 4.1: Sewer Air Valve Detail

5. PREPACKAGED LIFT STATION SYSTEM EVALUATION

This section evaluates the prepackaged lift station systems for the smaller lift stations – LS-2, LS-3, LS-4, and LS-5 —against the basis for design detailed in Section 3 and summarized in Table 3.16. It analyzes the operating points, wet well conditions, force main velocities and residence times for each lift station system alternative to ensure all criteria are met.

Additionally, this section identifies the preferred prepackaged lift station system using a scoring matrix. The scoring matrix evaluation was performed based on MBI's communication with vendors for four alternative prepackaged lift station systems. Due to the design deviations made in this PDR, the E-One Grinder System proposed in the 2022 Feasibility Study was deemed to be insufficient to meet both the existing and buildout conditions of Quail Valley SA4. Instead, three other systems were considered and include systems manufactured by Sierra Peak, Jensen and Xylem. These systems will be analyzed based on their operation and maintenance (O&M), capacity range, system integration, lifecycle cost, expected service life, power and backup power requirements, and ease of replacement of the system and parts. Additionally, maintaining uniformity across the lift station systems by using the same wet well size and/or identical pump models for all or most of the smaller lift station systems is a key objective and will be an important factor in the evaluation.

The prepackaged lift stations presented in this section are all based on a 4-foot diameter wet well. A 6-foot diameter wet well may be more beneficial for the lift stations systems to provide extra space for maintenance. The sewage depth in the larger diameter wet well would need to be adjusted to match the cycle volume and time of the 4-foot diameter wet well.

5.1 Alternative 1: E-One

The E-One Grinder System, initially proposed in the 2022 Feasibility Study, is a progressive cavity grinder pump system that can be configured from duplex to quadplex. According to the feasibility study, the plan was to use a duplex E-One system to meet existing conditions and then upgrade to a quadplex E-One system as necessary. However, due to sewer design adjustments and the higher sewage generation rate implemented in this PDR, each smaller lift station now handles a higher volume of tributary flows. Consequently, the smaller lift station systems require greater flow capacity than the E-One system was originally designed for.

E-One offers a 1 HP pump that has a maximum capacity of 15 gpm but rated for flows of 7,000 gpd or approximately 5 gpm. This is too low given the lift station capacities determined in Section 3.2. Unfortunately, E-One manufactures only one model pump, and higher-capacity grinder pumps are not available from them. However, E-one does offer an alternative: the quadplex grinder pump system. This system comprises three duty pumps and one standby pump, with a combined maximum capacity of approximately 45 gpm. The challenge lies in meeting the buildout design capacities shown in Table 3.3. While increasing the system size beyond four pumps could potentially meet the buildout design capacities, it could significantly burden the District's operation and maintenance staff. Maintenance needs would increase, as each pump requires regular checks and servicing, which can be time-consuming and costly. Additionally, more pumps increase the risk of failure, leading to potential operational disruptions and immediate repairs. As a result, the E-one system is not recommended for this project, as its quadplex grinder pump system cannot meet the lift station design requirements shown in Table 3.13.

The system curves for each lift station along with the E-one pump curves are provided in Figures 5.1 through 5.7. Because lift stations LS-2, LS-3 and LS-4 share a force main, their system curves will vary

based on each other's design flow. Therefore, two distinct figures are provided–one for existing conditions and another for buildout conditions. Within each figure, multiple system curves can be found to represent the various operating scenarios (e.g., all lift stations active, only one active, or a combination of lift stations active).

Because of its progressive cavity design, the E-One pump curve lacks a shut-off head, making it suitable for high-pressure applications. Additionally, the E-One pump curve is steep and nearly vertical, indicating that the E-One pumps maintains a consistent flow rate even with varying system head loss. While this characteristic could be beneficial for the project, the E-One pump delivers low flows and its quadplex system cannot meet the buildout flow requirements of lift stations LS-2 through LS-4, as shown in Figure 5.3, Figure 5.5, and Figure 5.7.

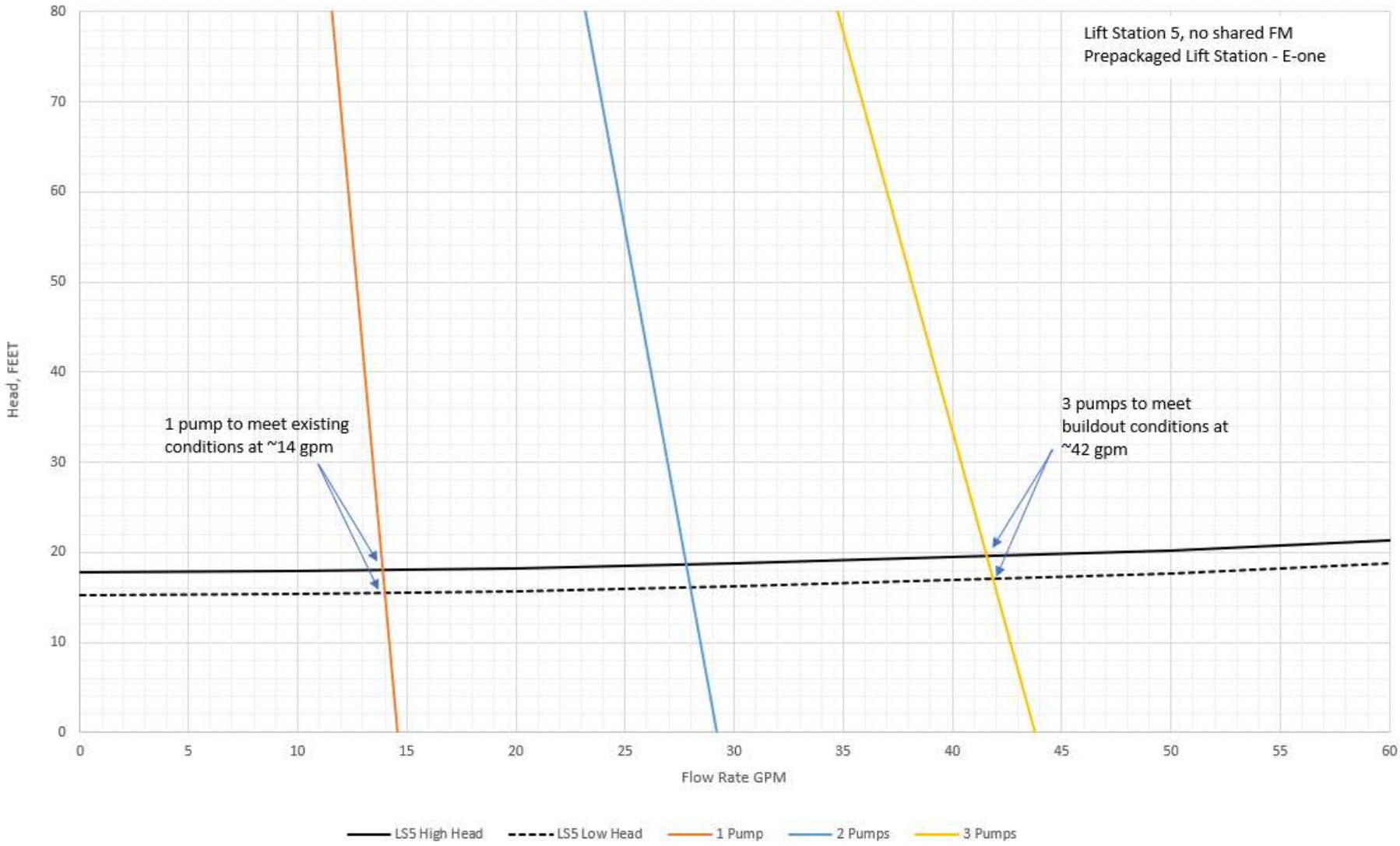

Figure 5.1: Lift Station LS-5 – System Curve with E-One Pump Curve

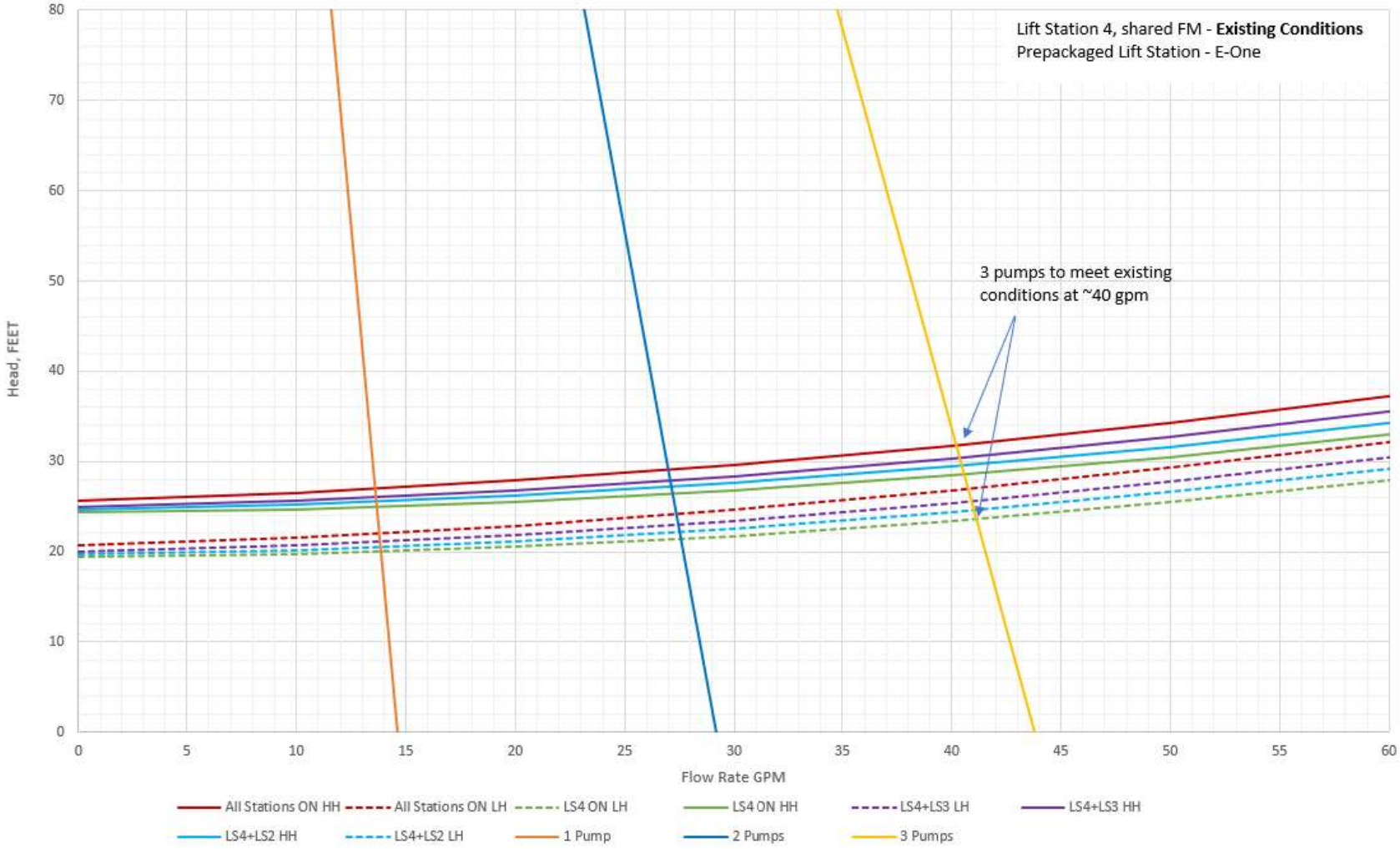

Figure 5.2 : Lift Station LS-4 – Existing Conditions System Curve with E-One Pump Curve

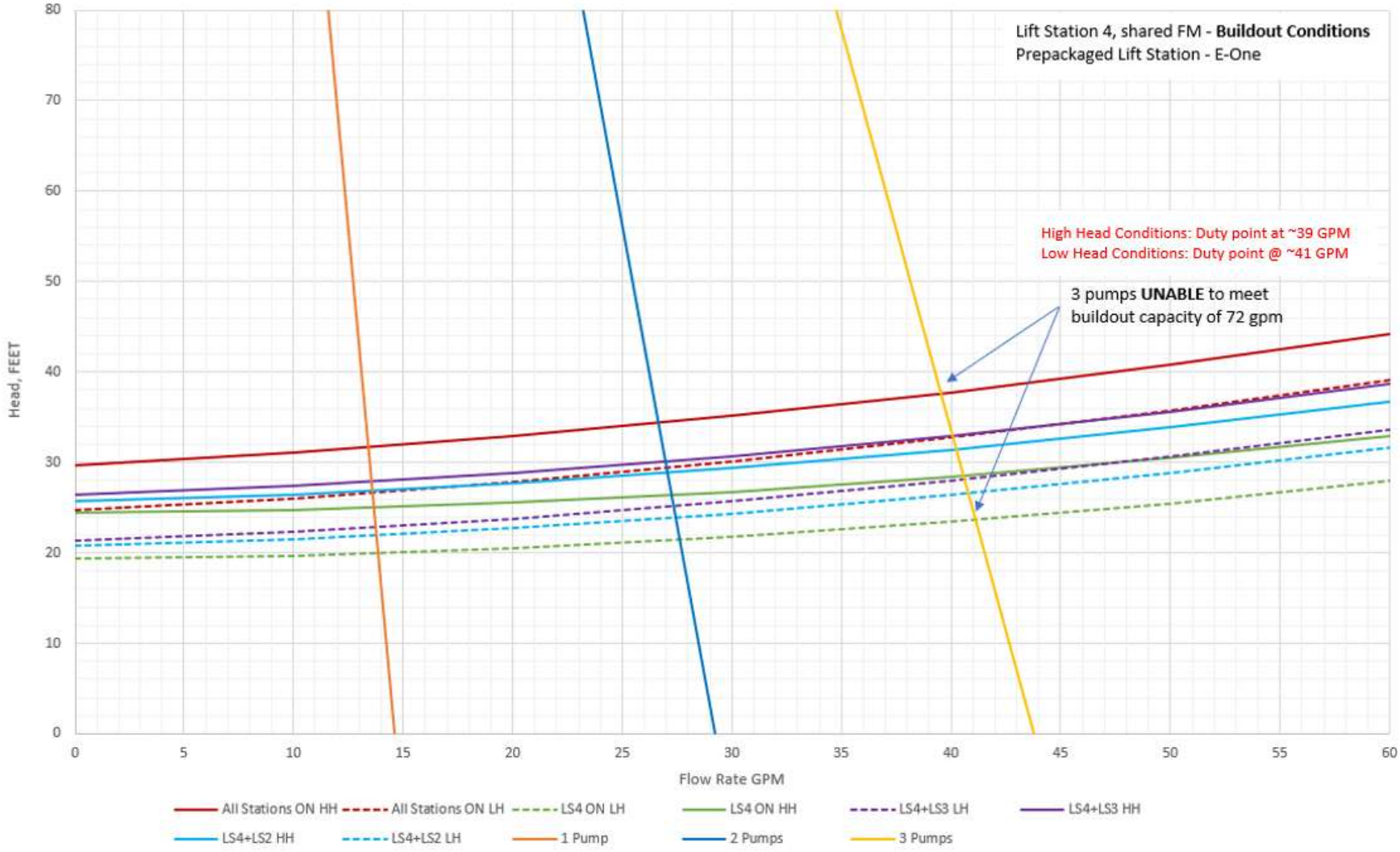

Figure 5.3: Lift Station LS-4 – Buildout Conditions System Curve with E-One Pump Curve

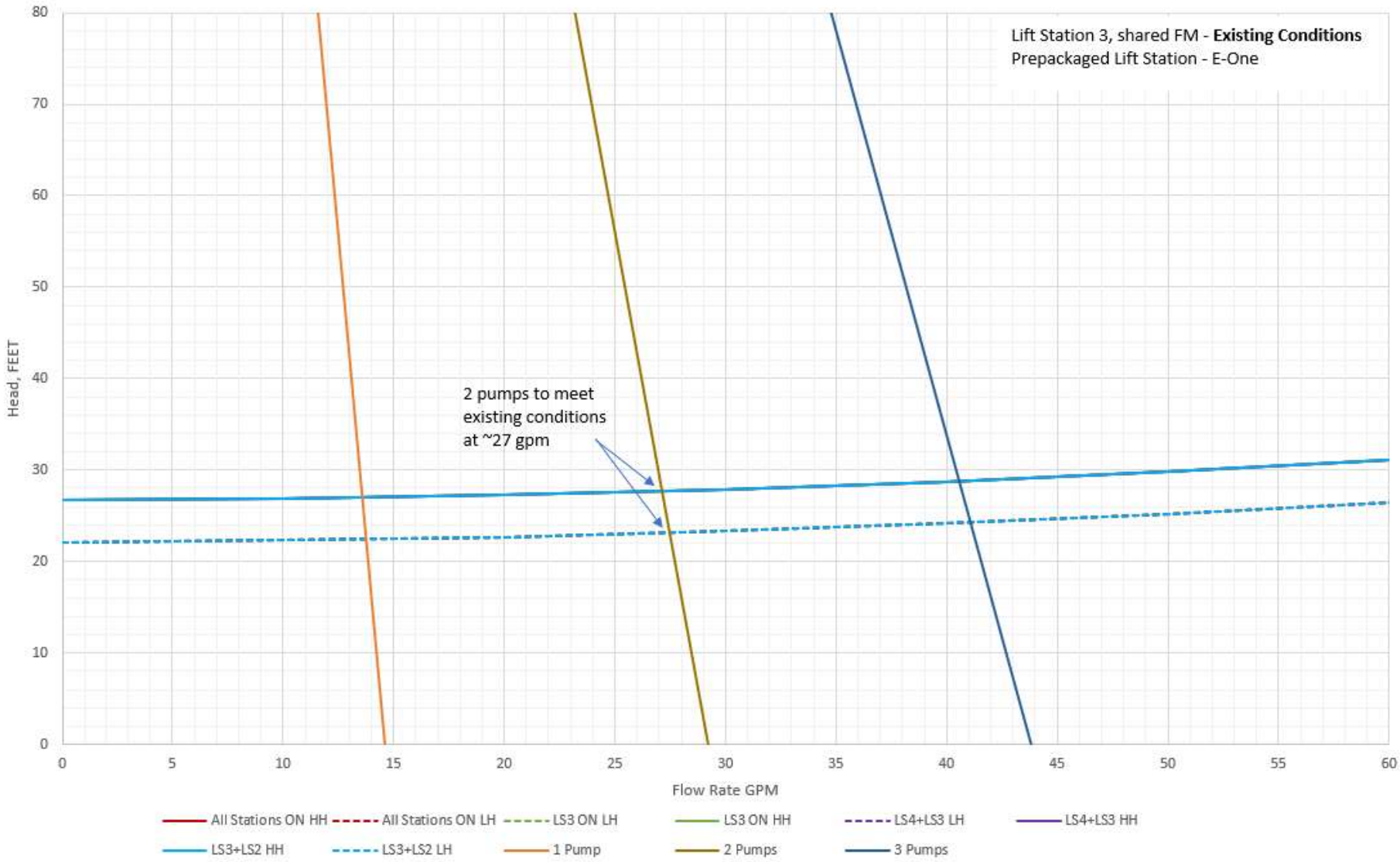

Figure 5.4 : Lift Station LS-3 – Existing Conditions System Curve with E-One Pump Curve

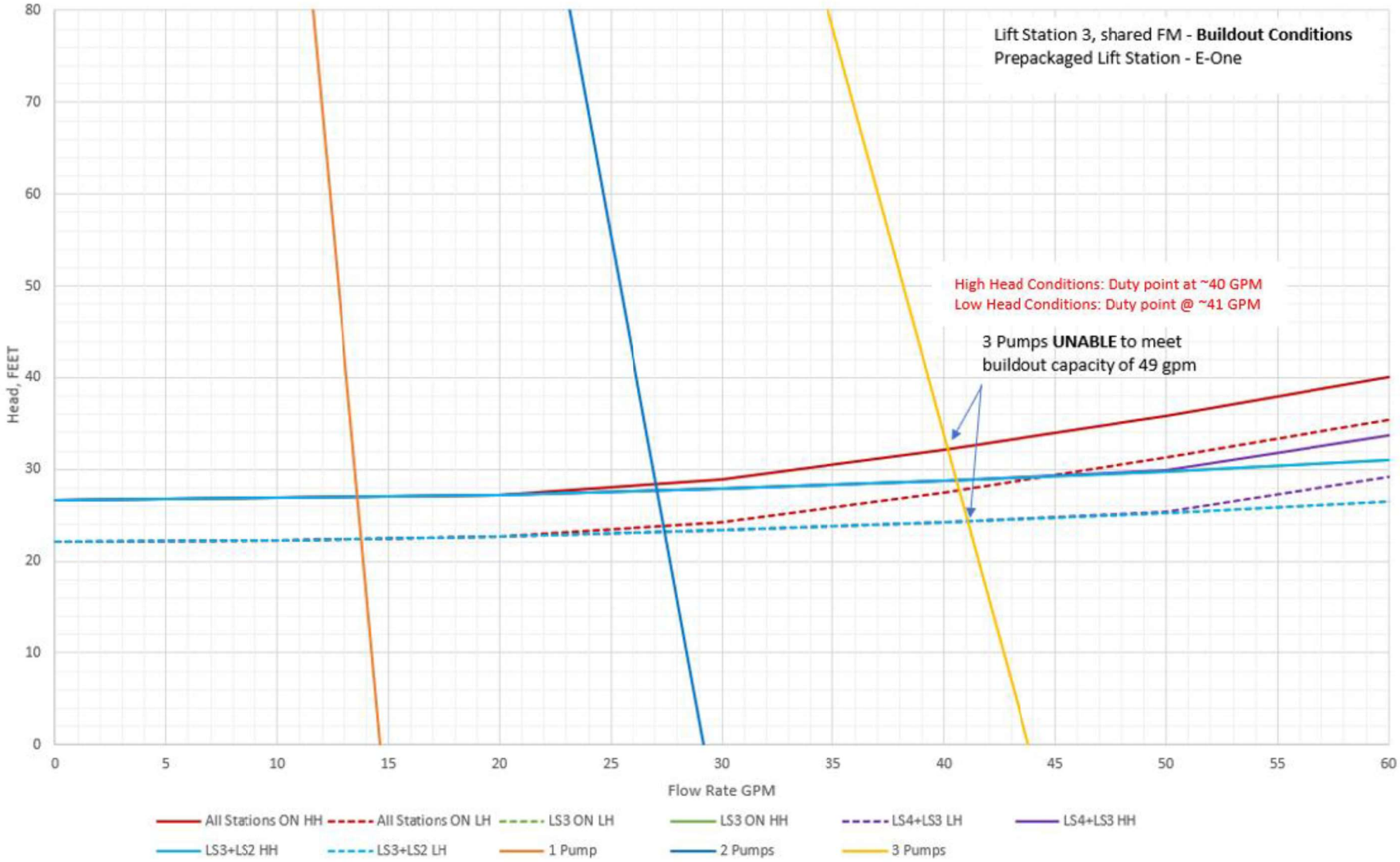

Figure 5.5: Lift station LS-3 – Buildout Conditions System Curve with E-One Pump Curve

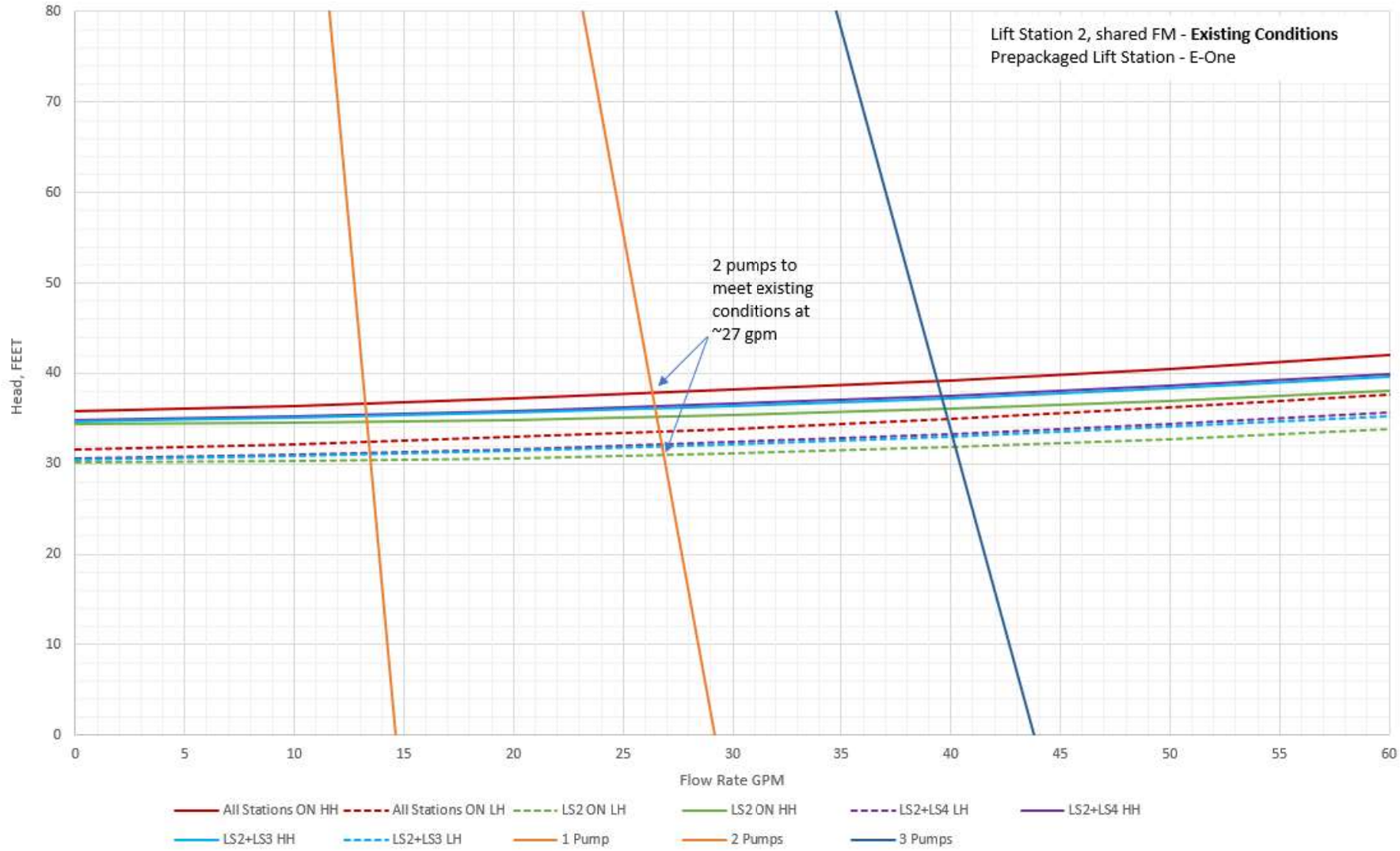

Figure 5.6: Lift Station LS-2 – Existing Conditions System Curve with E-One Pump Curve

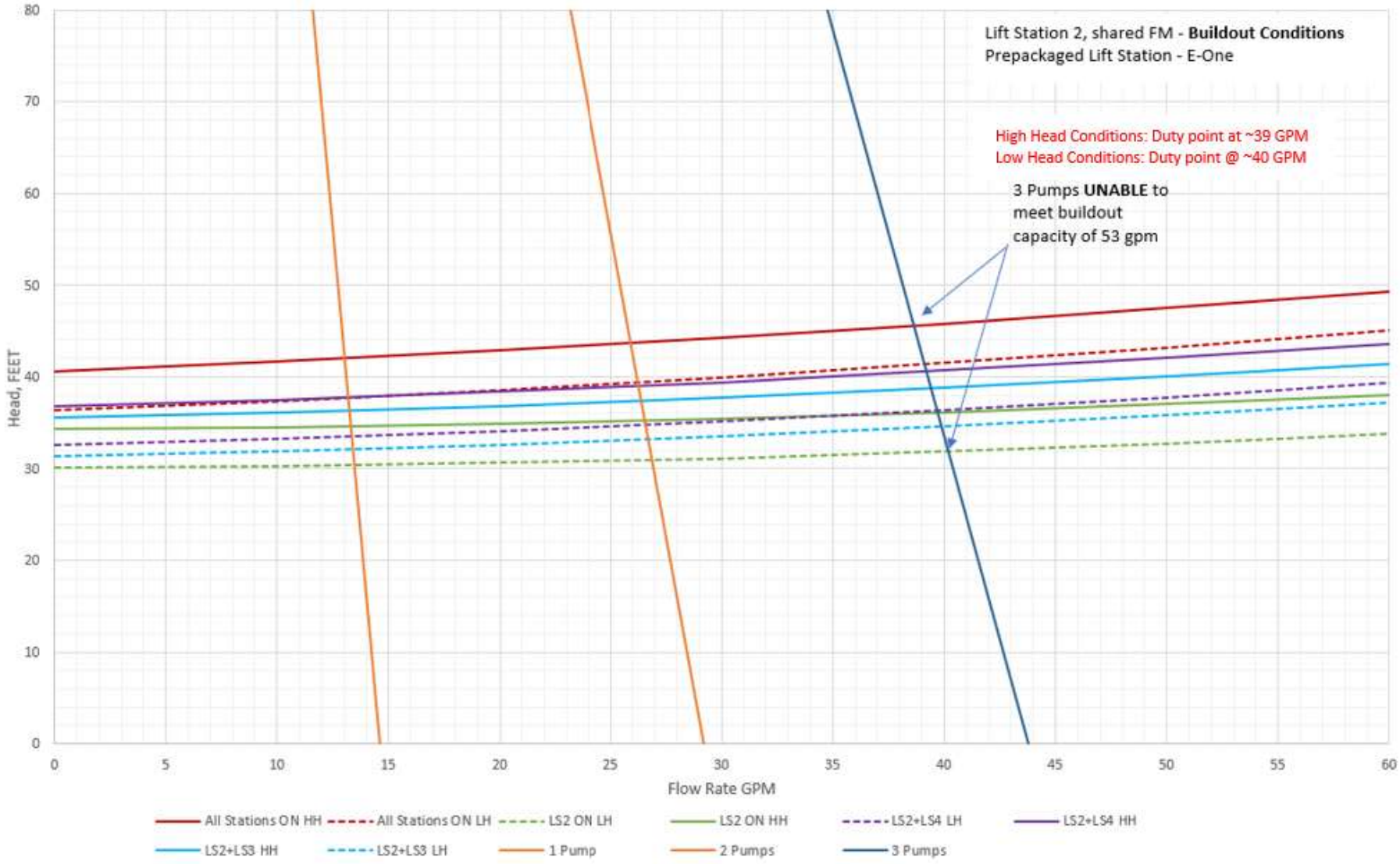

Figure 5.7: Lift Station LS-2 – Buildout Conditions System Curve with E-One Pump Curve

5.2 Alternative 2: Sierra Peak

The proposed Sierra Peak lift station package for this project is a Duplex grinder pump system. This system includes two pumps (1 duty and 1 standby), a factory-assembled fiberglass wet well, lift-out rails and base elbow, internal discharge piping, valves, control panel and float level controls. While the valves will be located inside the wet well, a separate fiberglass vault can be provided if valves need to be housed outside the wet well. According to the EMWD Small Sewage Lift Station Guidelines, wet wells should have a minimum diameter of 6 feet. However, considering that LS-2 through LS-5 are smaller lift stations with smaller pumps, a wet well diameter of 4 feet is used. This narrower diameter helps minimize odor and sediment issues that could arise in excessively wide wet wells. The narrow diameter prevents dead zones at the bottom of the wet well and promotes effective fluid flow during pumping, thereby reducing solids deposition. It also allows solids to collect directly below the pump suction area, where velocities are highest, further reducing sediment deposition. Additionally, a narrow diameter reduces the surface area from which odorous gas can be emitted.

For the initial analysis, the fiberglass wet well is assumed to be 4 feet in diameter and 22 feet high.

The choice of pumps depends on the specific capacity requirements of each lift station.

- For LS-5, a 2 HP grinder pump, model SP2A, is selected. This pump is available with a 1-phase 208V or 240V power requirement. Since LS-5 cascades into LS-4, it significantly influences the capacity of LS-4. To prevent LS-4 from having a large pump, LS-5 cannot be oversized. Thus, a smaller capacity pump is chosen for LS-5.
- For LS-2 through LS-4, a 3 HP grinder pump, model HKGP, is selected. This pump is available with a 1-phase 230V power requirement. LS-4 will have the standard 5” diameter impeller. LS-2 and LS-3 will have a modified 4.56” diameter impeller. The impellers are modified to meet the specific requirements of each lift station without placing the pumps in a run-out condition. The modified impellers do not affect the lead time or cost of the pumps.

The Sierra Peak system comes with a standard panel, but modifications can be made to integrate controls into EMWD’s SCADA system. The estimated lead time for components of the new system are as follows: 1) pumps and panel: 4 weeks; 2) wet well: 7-10 weeks. The pumps in the Sierra Peak system have an expected life of 12-15 years with proper O&M. The wet well and panel are designed for outdoor installation and are not usually replaced in a normal course of system operation. Servicing of the pumps is estimated to be every 4 to 7 years to replace worn parts and maintain pump performance and efficiency. For the 2 HP pump, replacement and service parts are stocked in a warehouse near the project site, ensuring delivery to EMWD within 1-2 days. However, for the 3 HP pump, replacement and service parts must be ordered from the factory, resulting in an estimated lead time of 1-2 weeks.

A quote provided by the vendor, Signa Mechanical, estimates the 2 HP duplex system for LS-5 at $31,900 and the 3 HP duplex system for LS-2, LS-3 and LS-4 at $41,100. The packaged systems include the wet well, pumps, standard control panel, valves (inside the basins), lift-out rails and base elbow, floats, and internal discharge piping. In this quote, each basin is 4 feet in diameter and 22 feet in height, with 2-inch discharge piping. A separate expander will be required to increase the discharge line from a 2-inch to a 3-inch. According to the vendor, the basin (or wet well) components are pre-installed at the factory, eliminating the need for field assembly. The basin is shipped as a single, complete unit.

5.2.1 System Curves with Sierra Peak Pump Selections

The system curves for each lift station, along with the selected Sierra pump curves, are provided in Figures 5.8 through 5.11. Each figure corresponds to a lift station and its system curves, which remain the same for both existing and buildout conditions of Quail Valley SA4. The Sierra Peak systems are designed to handle the buildout capacity requirements even in the existing developed condition of SA4, as detailed in Section 3.2.3.3.

Although wet well float settings can be adjusted to lower the wet well cycle volume in the partially developed conditions, this system curve analysis assumes that the wet well cycle volume remain consistent regardless of the development status of SA4. While the pump-on float level could be lowered to reduce the wet well cycle volume, this adjustment was not considered when generating the system curves. This assumption simplifies the analysis by avoiding the complexity of managing multiple system curves for different development stages. If the pump-on float level is lower, the low head system curves will shift upward, but the high head system curves will remain unaffected. The lift station systems are designed to handle peak buildout conditions at high head, ensuring that they have adequate capacity even as development progresses. As a result, the system curves are identical for partially developed and fully developed conditions.

In this analysis, the system curves will only vary when the operating conditions of other lift stations change, particularly because lift stations LS-2, LS-3 and LS-4 share a common force main. Each figure includes multiple system curves to represent various operating scenarios, such as all lift stations being active, only one being active, or a combination of lift stations being active.

Table 5.1 provides an overview of the duty points and design capacities for each Sierra Peak lift station system. Lift station LS-5 maintains a consistent duty point of approximately 35 gpm at both high and low heads, while the other stations exhibit varying duty points. Lift station LS-3 has pumps that are larger than necessary due to the limited pump options. Opting for a triplex system could reduce pump oversizing, but doing so would compromise the uniformity of the lift station systems in terms of the number of pumps and wet well size. Thus, Lift station LS-3 has a pumping range of 68-86 gpm, with its buildout design capacity (basis of design) set at 49 gpm. Lift stations LS-2 and LS-4 have pumping ranges of 57-80 gpm and 73-89 gpm, respectively; the low end of their operating range meets the buildout design capacity (basis of design) of 53 gpm and 72 gpm, respectively.

Lift stations LS-2, LS-3 and LS-4 exhibit a wide range of duty points due to their shared force main. Despite this variability, these stations effectively manage pump cycle time, pump run time, wet well residence time and force main velocities and residence time within the acceptable limits. This is shown in Table 5.2, Table 5.3, and Table 5.4.

In Table 5.2, the “time to fill” or wet well residence time is approximately at the 60-minute maximum target for existing conditions and well below the 60-minute maximum target for buildout conditions. The wet well residence time can be changed by adjusting the float settings to reduce the wet well cycle volume. However, this adjustment may reduce the pump cycle time to below the 20-minute minimum target and the pump run time to below the 5-minute minimum target, presenting a trade-off. With the wet well cycle volumes documented in Table 5.2, the “time to fill” or wet well residence time, “time to drain” or pump run time, and pump cycle time are near or below 60 minutes, at or above 5 minutes, and at or above 20 minutes, respectively. These values meet the targeted parameters.

Table 5.3 shows that, with respect to force main velocities, the higher duty points at low head conditions help increase the velocities in the force main. This ensures that most of the force main achieves scouring

velocities above 2 fps. The only instance where the force main velocity falls below 2 fps is in the segment servicing lift station LS-5, due to its low flows.

Table 5.4 illustrates the force main residence time (or flushing time) under existing and buildout conditions. In existing conditions, the residence times ranges from 0.6 to 2.8 hours, while in buildout conditions, it ranges from 0.3 to 1.9 hours. These estimates assume that the lift stations are operating independently to flush the share force main. The force main residence time remains below the maximum criteria of 4 hours.

Table 5.1: Sierra Peak System Duty Points

Lift Station	Pump Model	Duty Point at high head (gpm)	High Head (ft)	Duty Point at low head (gpm)	Low Head (ft)	Design Capacity in Existing Conditions (gpm)	Design Capacity in Buildout Conditions – basis of design (gpm)
LS-5	SP2A23-SL 4.5” Dia. Impeller	35	19	35	16	15	35
LS-4	HKGP3-2301 5” Dia. Impeller	73	54	89	37	30	72
LS-3	HKGP3-2301 4.56” Dia. Impeller	68	45	86	30	25	49
LS-2	HKGP3-2301 4.56” Dia. Impeller	57	52	80	36	22	53

Table 5.2: Sierra Peak System Wet Well Cycle Volume Calculations

Lift Station	Duty Point (gpm)		Minimum Wet Well Cycle Volume (gal)	Design Wet Well Cycle Volume[1] (gal)	Time to Fill (Non-Peak Existing Conditions) (min)	Time to Fill (Non-Peak Buildout Conditions) (min)	Time to Drain (min)	Pump Cycle Time (min)[2]
LS-5	At HH	35	88	240	58	24	7	27
	At LH	35	88				7	27
LS-4	At HH	73	183	470	56	23	6	26
	At LH	89	223				5	21
LS-3	At HH	68	170	430	60	31	6	25
	At LH	86	215				5	20
LS-2	At HH	57	143	400	63	26	7	28
	At LH	80	200				5	20

Note: Wet Well is evaluated for the high head (HH) and low head (LH) duty points of the system to evaluate wet well residence time, pump run time and pump cycle time in both scenarios. High head conditions occur when all lift stations are in operation and sewage in the wet well is at low water level. Low head conditions occur when only the associated lift station is in operation and sewage is at high water level.

[1]Wet well is sized to accommodate future buildout conditions. Float settings can be adjusted to lower design wet well cycle volume and time to fill when SA4 is not yet fully developed.

[2]Pump Cycle time = 4*Design Wet Well Cycle Volume/Pump Duty Point. The pump cycle time is calculated using the industry standard equation that predicts the maximum starts per hour.

Table 5.3: Force Main Velocities using Sierra Peak System

Force Main Segment	Force Main Diameter (inches)	High Head Scenario		Low Head Scenario			
		Duty Point (gpm)	Velocity (ft/s)	Duty Point (gpm)	Velocity (LS5 & LS4 operating) (ft/s)	Velocity (LS3 only) (ft/s)	Velocity (LS2 only) (ft/s)
LS5 Segment	3.0	35	1.59	35	1.59		
LS4 Segment	3.0	73	3.31	89	4.04		
LS3 Segment	3.0	68	3.09	86		3.90	
LS2 Segment	3.0	57	2.59	80			3.63
Lake-Goetz Segment (Shared FM – LS 4 & 3)	4.0	141	3.60	Varies on which Lift Station is active	2.27	2.20	2.04
Goetz-CMH2 Segment (Shared FM – LS 4, 3 & 2)	4.0	198	5.06	Varies on which Lift Station is active	2.27	2.20	2.04

Note: Force Main Velocity is evaluated for the high head (HH) and low head (LH) duty points. The high head conditions occur when all pumps are in operation and sewage in the wet well is at low water level. The low head conditions occur when only the associated lift station is in operation and sewage is at high water level; thus, velocities through the shared force main will vary in the low head scenario.

Table 5.4: Force Main Residence Times using Sierra Peak System (Existing & Buildout Inflow)

Lift Station	Pumping Rate (gpm)	Pipe Length (ft)	Volume in the Force Mains (gal)	Design Wet Well Cycle Volume (gal)	Force Main Residence Time with Existing Inflow (hrs)	Force Main Residence Time with Buildout Inflow (hrs)
LS-5	35	340 – 3" FM	125	240	0.6	0.3
LS-4	73-89	550 – 3" FM 1285 – 4" FM	1,040	470	2.3	1.9
LS-3	68-86	740 – 3" FM 1285 – 4" FM	1,115	430	2.8	1.6
LS-2	57-80	190 – 3" FM 835 – 4" FM	615	400	1.8	0.8

Note: Force Main Residence Time is calculated based on the average day inflows from the tributary areas being served (each at existing conditions and buildout conditions). A cycle period, representing the wet well filling time and the pumping run time, is established. This cycle period is then multiplied by the number of cycles required to flush the force main system.

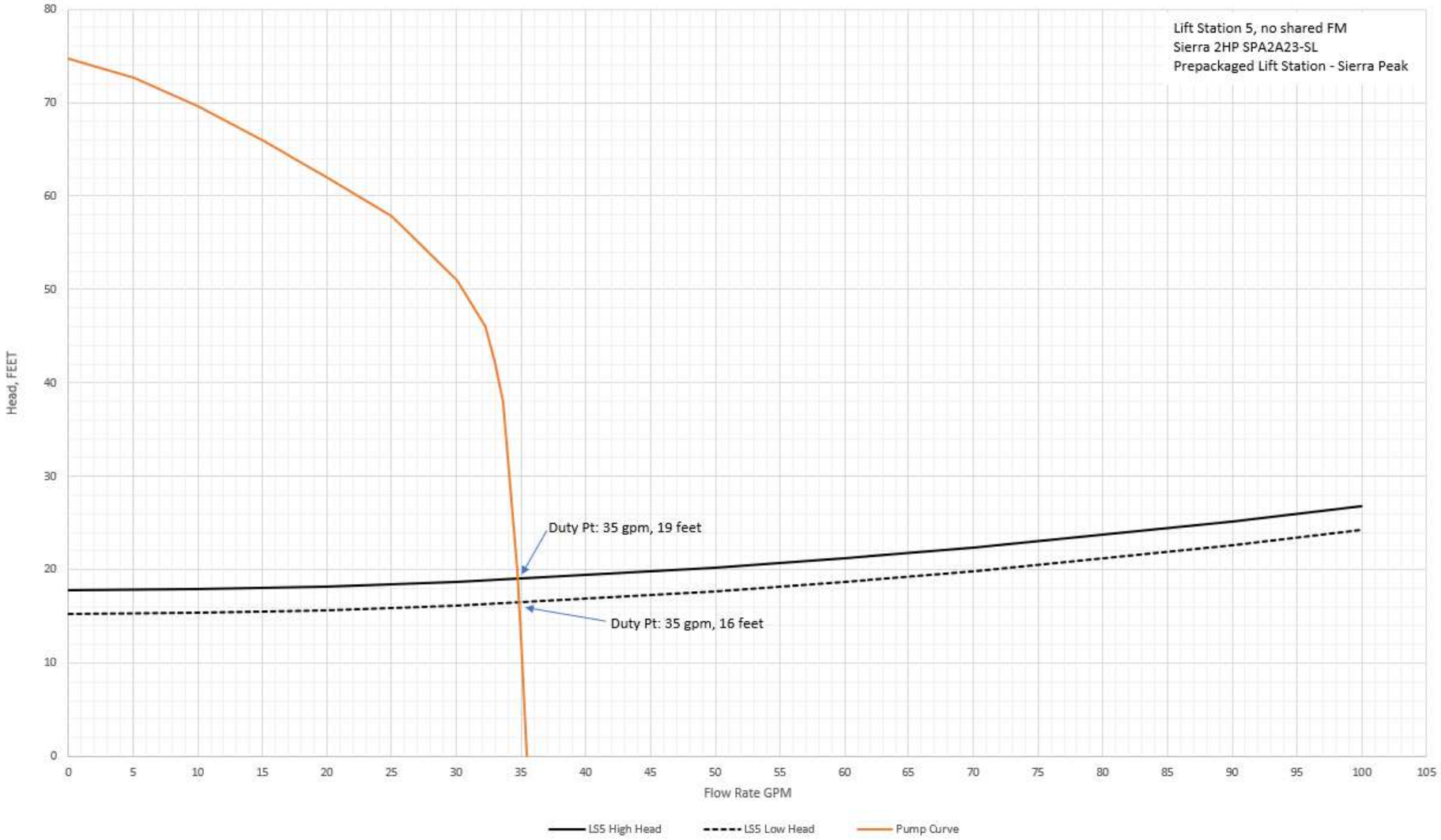

Figure 5.8: Lift Station LS-5 System Curve with Sierra Peak 2 HP Pump Curve

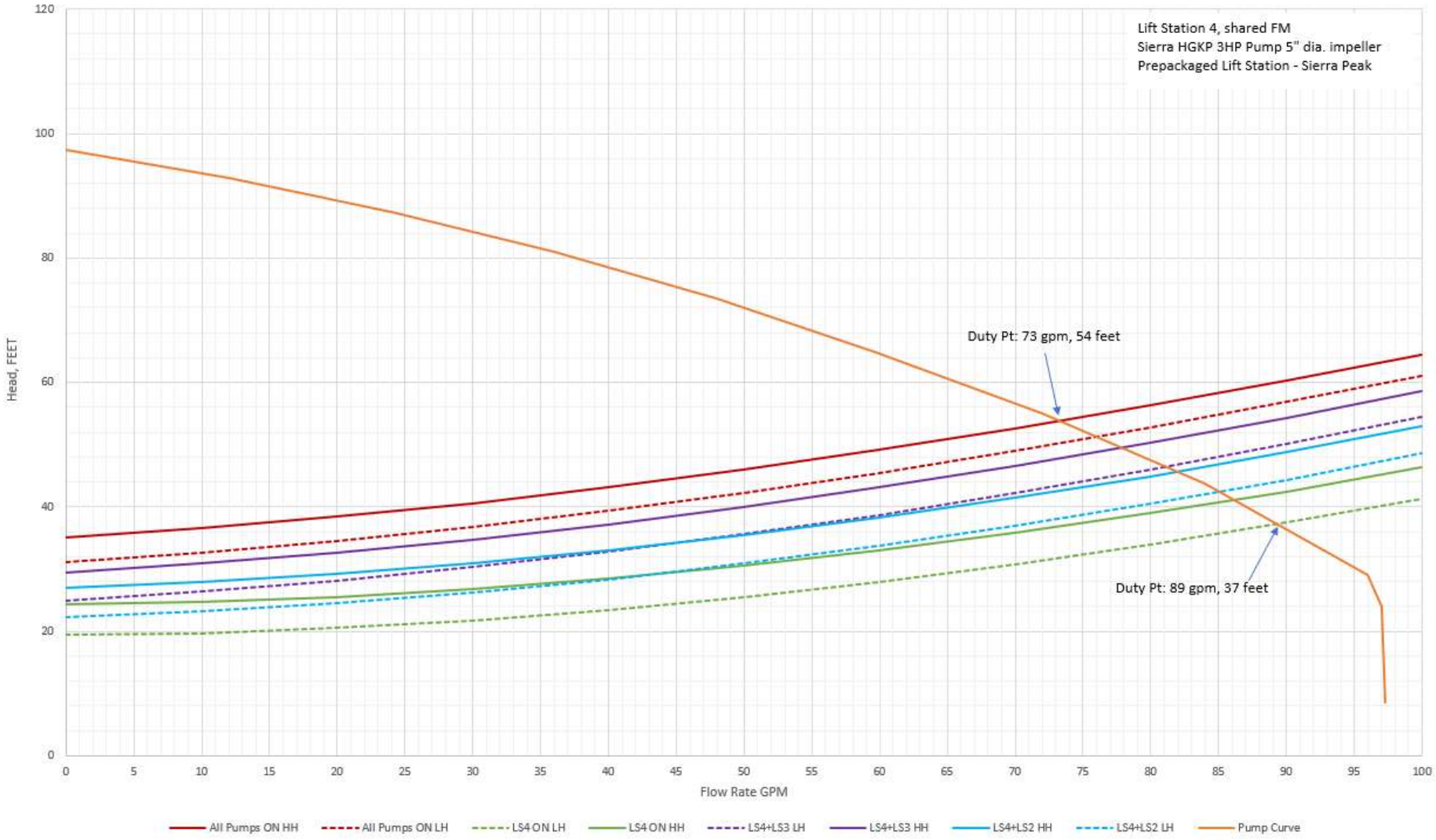

Figure 5.9: Lift Station LS-4 System Curve with Sierra Peak 3 HP 5" Impeller Pump Curve

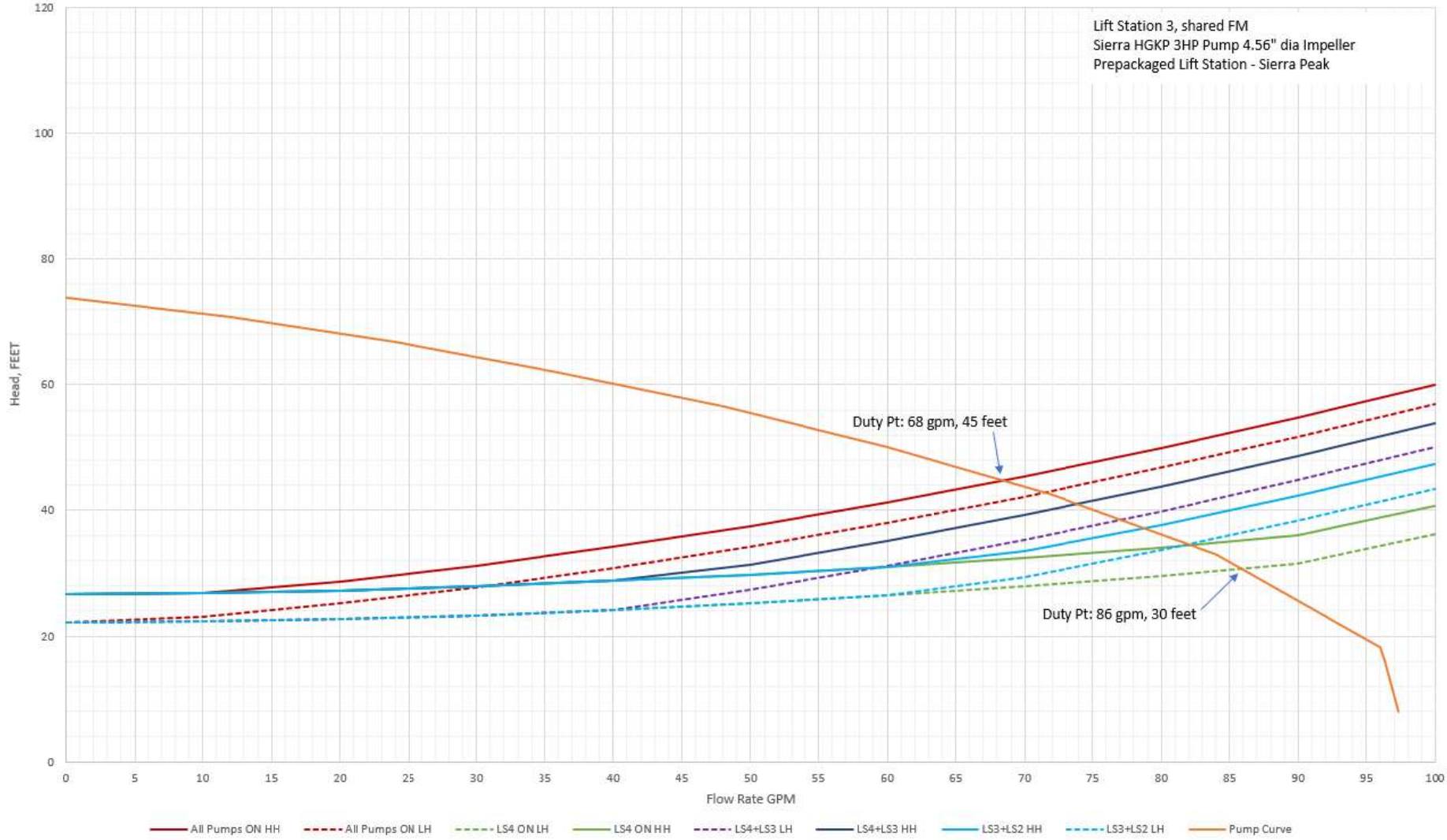

Figure 5.10: Lift Station LS-3 – System Curve with Sierra Peak 3 HP 4.56" Impeller Pump Curve

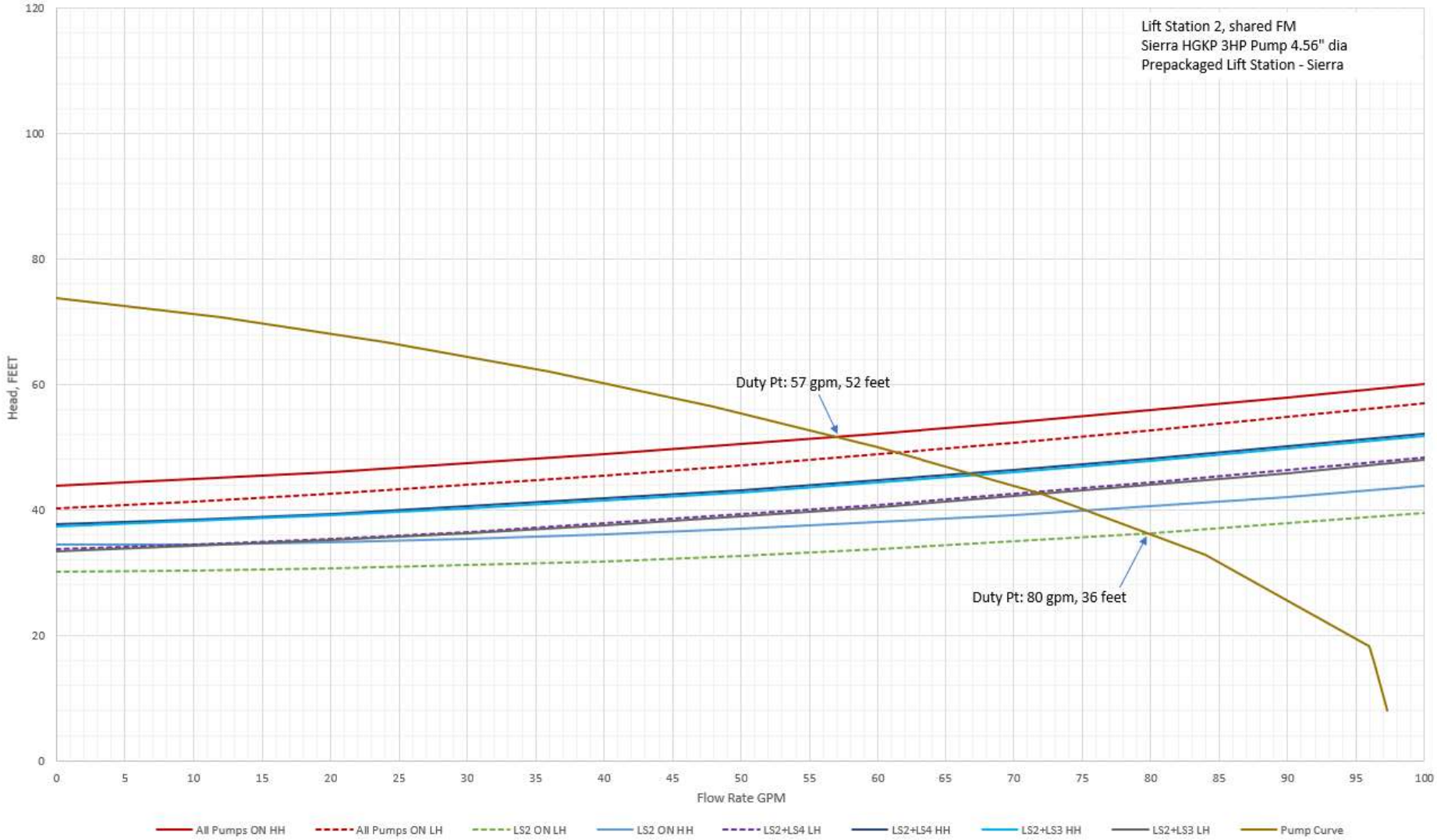

Figure 5.11: Lift Station LS-2 – System Curve with Sierra Peak 3 HP 4.56" Impeller Pump Curve

The Sierra Peak systems meet the buildout design capacities (basis of design) for all lift stations. The operational ranges for these lift stations are within permissible limits, ensuring that pump cycle time, pump run time, wet well residence time, and force main residence time and velocities, remain within the acceptable criteria. Additionally, the pumps in the systems operate well within their curve. While they may run to the right of the curve, especially at low head scenarios. The pumps stay within their operational range on the pump curve. The operating conditions of the Sierra system align with the design needs of the smaller lift stations, LS-2 through LS-5.

5.3 Alternative 3: Jensen

The proposed Jensen lift station package for this project is a Duplex grinder pump system. This system includes two pumps (1 duty and 1 standby), a precast concrete wet well and a separate precast concrete valve vault, guiderails and base elbow, internal discharge piping, valves, control panel and float level controls. It is important to note that, unlike other systems, the pumps in Jensen lift station systems are manufactured by HOMA, not by the package vendor. According to the EMWD Small Sewage Lift Station Guidelines, wet wells should have a minimum diameter of 6 feet. However, considering that LS-2 through LS-5 are smaller lift stations with smaller pumps, a wet well diameter of 4 feet is used. This narrower diameter helps minimize odor and sediment issues that could arise in excessively wide wet wells. This narrower diameter helps minimize odor and sediment issues that could arise in excessively wide wet wells. The narrow diameter prevents dead zones at the bottom of the wet well and promotes effective fluid flow during pumping, thereby reducing solids deposition. It also allows solids to collect directly below the pump suction area, where velocities are highest, further reducing sediment deposition. Additionally, a narrow diameter reduces the surface area from which odorous gas can be emitted.

For the initial analysis, the concrete wet well was assumed to be 4 feet in diameter and 22 feet high.

The choice of pumps depends on the specific capacity requirements of each lift station.

- For LS-5, a 2 HP grinder pump, model GRP12, is selected. This pump is available with a 1-phase 230V power requirement. Since LS-5 cascades into LS-4, it significantly influences the capacity of LS-4. To prevent LS-4 from having a large pump, LS-5 cannot be oversized. Thus, a smaller capacity pump is chosen for LS-5.
- For LS-4, a 4 HP grinder pump, model GRP34, is selected. This pump is available with a 1-phase 230V power requirement. Based on the hydraulic system curve, this pump will operate between 86-115 gpm. This results in a larger wet well size in comparison to the Sierra Peak selection.
- For LS-2 and LS-3, a 3 HP grinder pump, model GRP26, is selected. This pump is available with a 1-phase 230V power requirement.

The Jensen system can have a SCADA ready panel to allow integration of controls into EMWD's SCADA system. The estimated lead time for the Jensen system is 10 weeks. The wet well and other infrastructure have an expected life of 20-25 years. The pumps in the Sierra Peak system have an expected life of 10 years with proper O&M. The pumps should be serviced and inspected annually, with replacement parts having a delivery time of 4-6 weeks.

A quote provided by Jensen estimates the 2 HP duplex system for LS-5 at approximately $49,615, the 3 HP duplex system for LS-2 and LS-3 at $53,408 and the 4 HP duplex system for LS-4 at $53,485. Note that that the cost difference between the 3 HP system and 4 HP system is very minimal. The packaged systems include the concrete wet well and concrete valve vault, pumps with base elbows and guide rails,

standard control panel, and 2-inch internal discharge piping and valves. Note that these quotes account for only the cost of equipment and delivery; installation is not included.

A separate expander will be required to increase the discharge line from a 2-inch to a 3-inch.

5.3.1 System Curves with Jensen HOMA Pump Selections

The system curves for each lift station, along with the selected Jensen pump curves, are provided in Figures 5.12-5.15. Each figure corresponds to a lift station and its system curves, which depict both the existing and buildout conditions of Quail Valley SA4. The Jensen systems are designed to handle the buildout capacity requirements even in the existing developed condition of SA4, as detailed in Section 3.2.3.3.

Although wet well float settings can be adjusted to lower the wet well cycle volume in the partially developed conditions, this system curve analysis assumes that the wet well cycle volume remain consistent regardless of the development status of SA4. While the pump-on float level could be lowered to reduce the wet well cycle volume, this adjustment was not considered when generating the system curves. This assumption simplifies the analysis by avoiding the complexity of managing multiple system curves for different development stages. If the pump-on float level is lower, the low head system curves will shift upward, but the high head system curves will remain unaffected. The lift station systems are designed to handle peak buildout conditions at high head, ensuring that they have adequate capacity even as development progresses. As a result, the system curves are identical for partially developed and fully developed conditions.

In this analysis, the system curves will only vary when the operating conditions of other lift stations change, particularly because lift stations LS-2 through LS-4 share a common force main. Each figure includes multiple system curves to represent various operating scenarios, such as all lift stations being active, only one being active, or a combination of lift stations being active.

Table 5.5 provides an overview of the duty points for each lift station system, along with the design capacities under both existing and buildout conditions. It is important to note that, as a basis of design, the lift station systems are to be designed to meet buildout conditions.

- Lift Station LS-5: The system's duty point is approximately 40 gpm, meeting the buildout design capacity of 35 gpm. This increased pumping rate must be accounted for in Lift Station LS-4 due to their cascading relationship. This increases the design capacity of Lift Station LS-4 to 79 gpm from 72 gpm.
- Lift Station LS-4: The system operates at a pumping range of 86 to 115 gpm, accommodating a wide range of flow. Because it can operate at such a high flow of up to 115 gpm, the wet well cycle volume must be increased to maintain the pump cycle time at or above 20 minutes. This wet well cycle volume is approximately 100 gallons larger in comparison to the Sierra Peak and Flygt alternatives. Additionally, because of the volume increase, the wet well residence time extends to approximately 70 minutes. Although this exceeds the maximum residence time of 60 minutes, the overage is acceptable, and the system remains sufficient to meet the design requirements for Lift Station LS-4.
- Lift Station LS-3: The system operates at a pumping range of 73 to 85 gpm, with buildout design capacity (basis of design) of 49 gpm.
- Lift Station LS-2: The system operates at a pumping range of 68-82 gpm, with buildout design capacity (basis of design) of 53 gpm.

Lift Stations LS-2, LS-3 and LS-4 exhibit a wide range of duty points due to their shared force main. Despite this variability, these stations effectively manage pump cycle time, pump run time, wet well residence time and force main velocities and residence time within the acceptable limits.

Table 5.6 indicates that the "time to fill" (or wet well residence time) ranges from 60 to 70 minutes under existing conditions and remains well below the 60-minute maximum target for buildout conditions. The longer wet well residence time in can be mitigated by adjusting the float settings to reduce the wet well cycle volume in existing conditions. However, this adjustment may reduce the pump cycle time to below the 20-minute minimum target and the pump run time to below the 5-minute minimum target, presenting a trade-off. To ensure that pump run time and pump cycle time criteria are met, a higher fill time condition has been maintained. This increase in fill time is minimal. Specifically, the LS-4 Jensen system is oversized, resulting in a significantly larger wet well size than the alternative Sierra Peak system.

Table 5.7 shows that, with respect to force main velocities, the higher duty points at low head conditions help increase the velocities in the force main to above the scouring velocity of 2 fps. The only instance when the force main velocities fall below 2 fps is in the segment servicing lift station LS-5, due to its low flows. These Jensen systems exhibit higher flows at low head in comparison to other system alternatives, yet the force main velocities do not exceed 6 fps.

Table 5.8 illustrates the force main residence time (or flushing time) under existing and buildout conditions. In existing conditions, the residence times ranges from 0.6 to 2.8 hours, while in buildout conditions, it ranges from 0.3 to 1.8 hours. These estimates assume that the lift stations are operating independently to flush the share force main. The force main residence time remains below the maximum criteria of 4 hours.

Table 5.5: Jensen System Duty Points

Lift Station	Pump Model	Duty Point at high head (gpm)	High Head (ft)	Duty Point at low head (gpm)	Low Head (ft)	Design Capacity in Existing Conditions (gpm)	Design Capacity in Buildout Conditions – basis of design (gpm)
LS-5	GRP12/1FM	41	19	43	17	15	35
LS-4	GRP34/1/C	86	64	115	46	30	79[1]
LS-3	GRP26/1/C FM	73	52	85	30	25	49
LS-2	GRP26/1/C FM	68	57	82	36	22	53

[1]The design capacity in this case increases to 79 gpm becasue lift station 5 duty point is 43 gpm (greater than the target of 35 gpm)

Table 5.6: Jensen System Wet Well Cycle Volume Calculations

Lift Station	Duty Point (gpm)		Minimum Wet Well Cycle Volume (gal)	Design Wet Well Cycle Volume[1] (gal)	Time to Fill (Non-Peak Existing Conditions) (min)	Time to Fill (Non-Peak Buildout Conditions) (min)	Time to Drain (min)	Pump Cycle Time (min)[2]
LS-5	High Head	41	103	240	58	24	6	23
	Low Head	43	108				6	22
LS-4	High Head	86	215	580	69	28	7	27
	Low Head	115	288				5	20
LS-3	High Head	73	170	430	60	31	6	24
	Low Head	85	215				5	20
LS-2	High Head	68	143	400	63	26	6	24
	Low Head	82	200				5	20

Note: Wet Well is evaluated for the high head (HH) and low head (LH) duty points of the system to evaluate wet well residence time, pump run time and pump cycle time in both scenarios. High head conditions occur when all lift stations are in operation and sewage in the wet well is at low water level. Low head conditions occur when only the associated lift station is in operation and sewage is at high water level.

[1]Wet well sized to accommodate future buildout conditions. Float settings can be adjusted to lower design wet well cycle volume and time to fill when SA4 is not yet fully developed.

[2]Pump Cycle time = 4*Design Wet Well Cycle Volume/Pump Duty Point. The pump cycle time is calculated using the industry standard equation that predicts the maximum starts per hour (where wet well inflow is half of pump flow).

Table 5.7: Force Main Velocities using Jensen System

Force Main Segment	Force Main Diameter (inches)	High Head Scenario		Low Head Scenario			
		Duty Point (gpm)	Velocity (ft/s)	Duty Point (gpm)	Velocity **(LS5 & LS4 only)** (ft/s)	Velocity **(LS3 only)** (ft/s)	Velocity **(LS2 only)** (ft/s)
LS5 Segment	3.0	41	1.86	43	1.95		
LS4 Segment	3.0	86	3.90	115	5.22		
LS3 Segment	3.0	73	3.31	85		3.86	
LS2 Segment	3.0	68	3.09	82			3.72
Lake-Goetz Segment (Shared FM – LS 4 & 3)	4.0	159	4.06	Varies on which Lift Station is active	2.94	2.17	2.09
Goetz-CMH2 Segment (Shared FM – LS 4, 3 & 2)	4.0	227	5.80	Varies on which Lift Station is active	2.94	2.17	2.09

Note: Force Main Velocity is evaluated for the high head (HH) and low head (LH) duty points. The high head conditions occur when all pumps are in operation and sewage in the wet well is at low water level. The low head conditions occur when only the associated lift station is in operation and sewage is at high water level; thus, velocities through the shared force main will vary in the low head scenario.

Table 5.8: Force Main Residence Times using Jensen System (Existing and Buildout Inflow)

Lift Station	Pumping Rate (gpm)	Pipe Length (ft)	Volume in the Force Mains (gal)	Design Wet Well Cycle Volume (gal)	Force Main Residence Time with Existing Inflow (hrs)	Force Main Residence Time with Buildout Inflow (hrs)
LS-5	35	340 – 3" FM	125	240	0.6	0.3
LS-4	73-89	550 – 3" FM 1285 – 4" FM	1040	580	2.3	1.8
LS-3	68-86	740 – 3" FM 1285 – 4" FM	1115	430	2.8	1.6
LS-2	57-80	190 – 3" FM 835 – 4" FM	615	400	1.8	0.8

Note: Force Main Residence Time is calculated based on the average day inflows from the tributary areas being served (each at existing conditions and buildout conditions). A cycle period, representing the wet well filling time and the pumping run time, is established. This cycle period is then multiplied by the number of cycles required to flush the force main system.

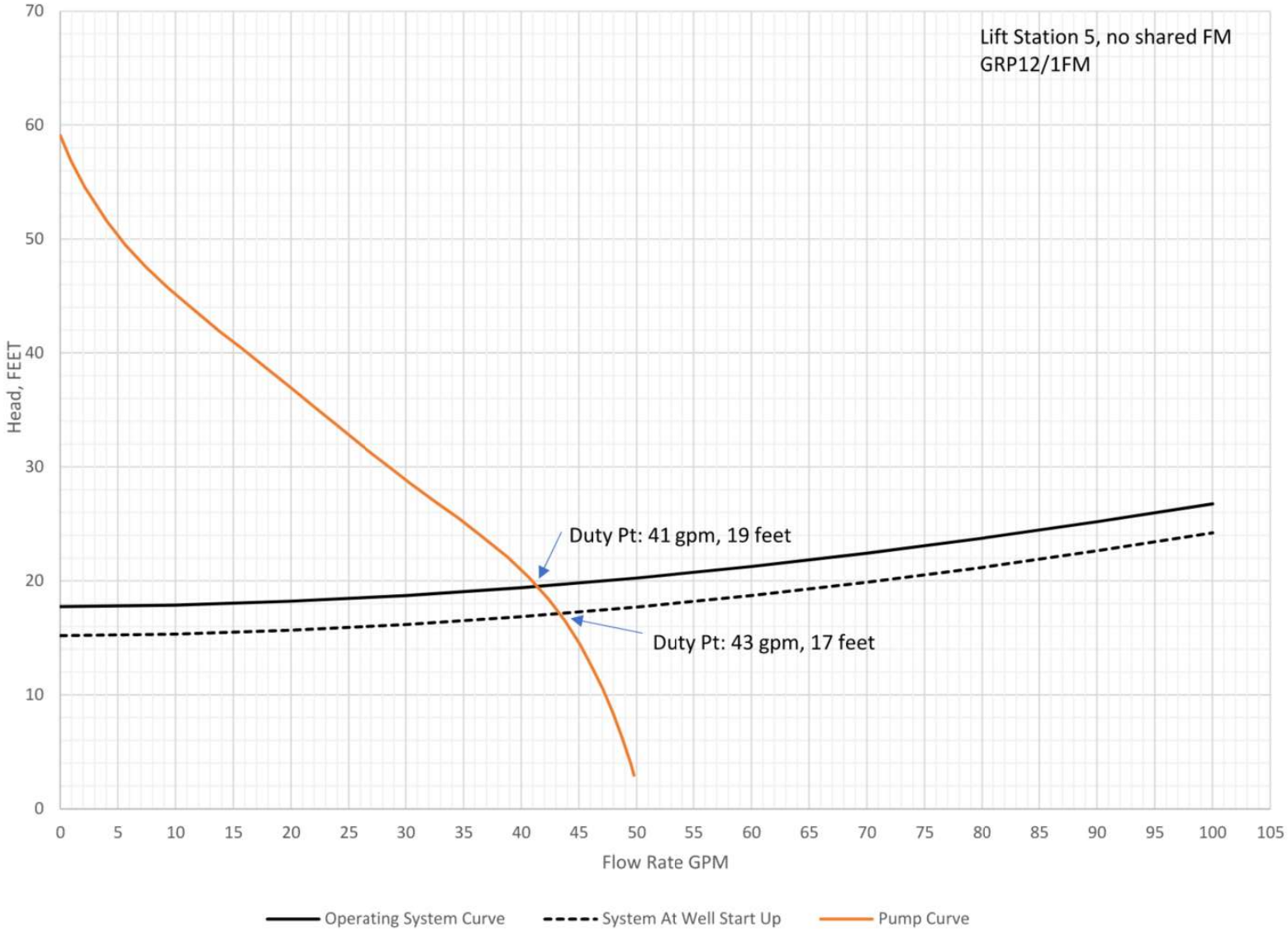

Figure 5.12: Lift Station LS-5 – System Curve with Jensen GRP12 Pump Curve

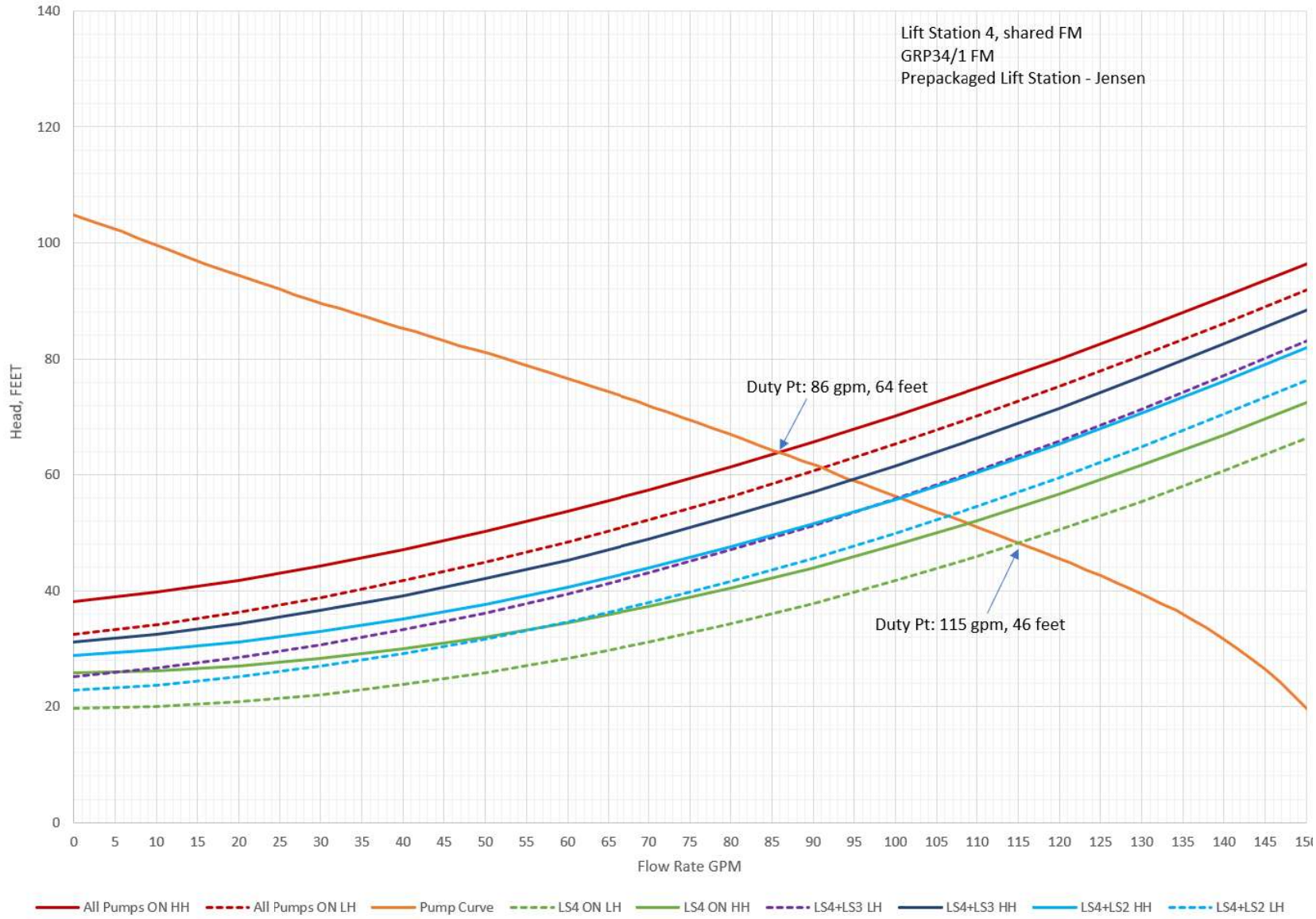

Figure 5.13: Lift Station LS-4 – System Curve with Jensen GRP34 Pump Curve

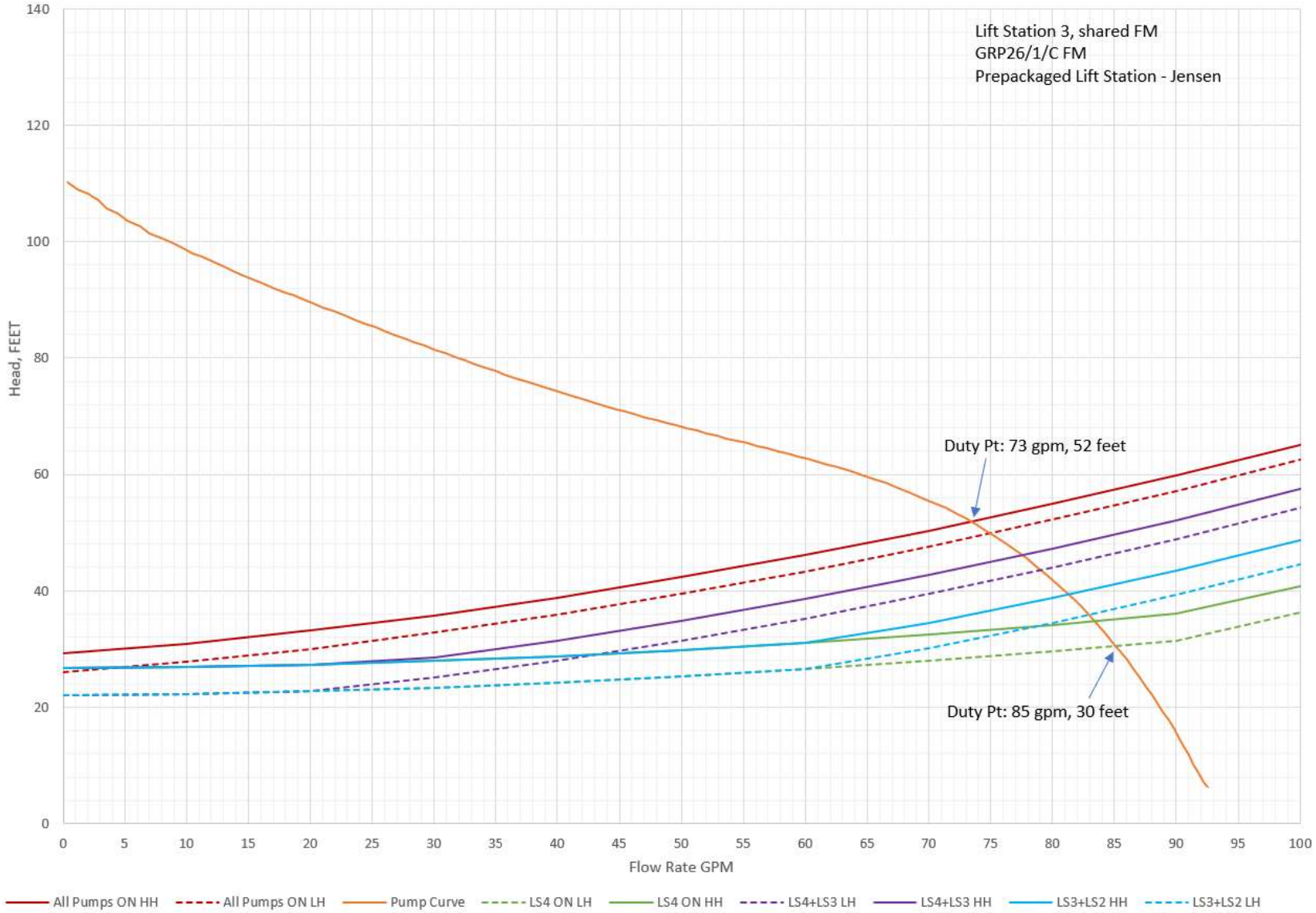

Figure 5.14: Lift Station LS-3 – System Curve with Jensen GRP26 Pump Curve

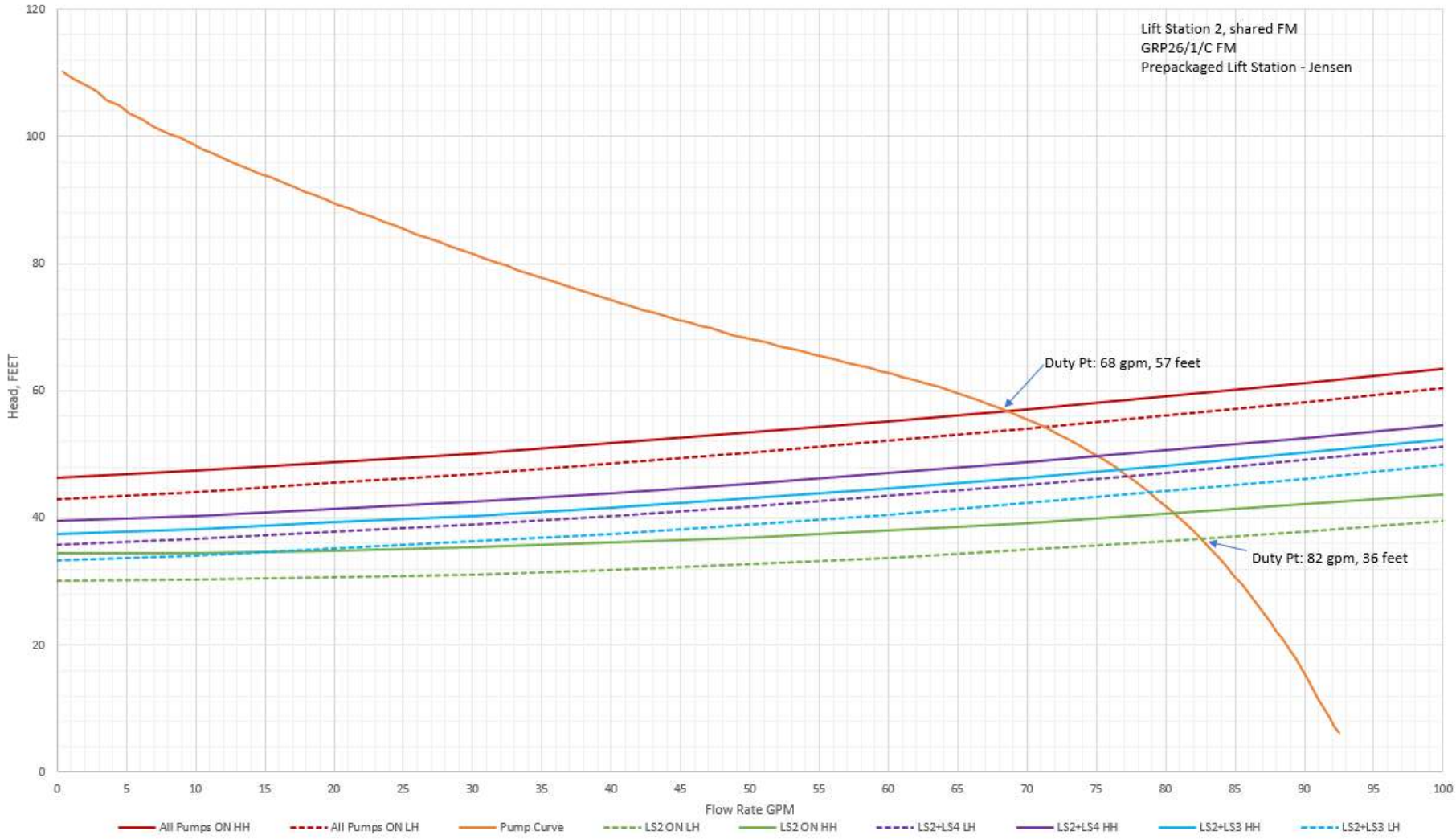

Figure 5.15: Lift Station LS-2 – System Curve with Jensen GRP26 Pump Curve

The Jensen systems meet the buildout design capacities (basis of design) for lift stations LS-2 through LS-5. Although the operational ranges for these lit station systems are wide, their pump cycle time, pump run time, force main residence time and velocities remain within the acceptable criteria. A higher fill time exceeding 60 minutes can be observed under existing conditions, but this increase is acceptable. In addition, the pumps in the Jensen systems operate within their curve and are not within a run out condition. The operating conditions of the Jensen systems align with the design needs of the smaller lift stations, LS-2 through LS-5.

5.4 Alternative 4: Flygt

The proposed Flygt lift station package for this project is a duplex non-clog pump system. This system is Flygt's TOP Pre-Engineered Fiberglass Pump Station. It includes two VFD integrated pumps (1 duty and 1 standby), a 4-feet diameter x 22-feet deep pre-engineered fiberglass reinforced plastic wet well, guiderails and base elbow, internal discharge piping, valves, control panel and level sensors. The Flygt lift station systems offer clog-clearing and low-maintenance features, along with VFD-integrated pumps, that can easily adapt to the phased construction and development of SA4:

1. Wet Well Features
    a. The patented sump bottom geometry is smaller than conventional sumps, allowing sediment to collect directly beneath the pump where suction is strongest, reducing the potential for solids buildup.
    b. The Safe-Hatch access cover equipped with safety grates provides fall-through protection. It also facilitates easy pump inspection, as pumps can be placed on these grates for cleaning and maintenance.
2. Adaptive N Technology in Pumps
    a. Flygt's Adaptive N technology claim clog-free operation, using hard iron impellers for durability and improved lifespan.
    b. The Adaptive N impeller in the pumps moves axially upward when necessary, allowing bulky fibrous material and debris to pass through smoothly. Once the debris clears, hydraulic pressure returns the impeller to its original position.
3. Concertor DP Pump
    The chosen pump for the Flygt TOP Station is the Concertor DP pump. This is a 3 HP pump that will be used for lift stations LS-2 through LS-5 and requires a 3-phase, 460 V power requirement. This pump provides a comprehensive solution for fluctuating duty points due to the shared force main and growing inflow conditions in Quail Valley SA4. The Concertor DP addresses these challenges through:
    a. Provides a fully integrated, intelligent wastewater pumping system.
        - The Concertor pump integrates variable frequency drives (VFDs), control electronics, and temperature control equipment into the pump to give a single, pre-engineered system. It continuously monitors operating conditions and dynamically adjusts the pump motor speed in real time, providing feedback to operators for performance monitoring.
        - The integrated VFD in the pump will start the pump at full speed to avoid clogging and the ramp it down to the desired speed to hit the target duty point.
        - This can include output for SCADA monitoring by EMWD.
    b. Provides a wide operating range and adaptive performance.
        - Unlike the fixed performance curves of conventional pumps, the Concertor pump can operate almost anywhere under the full speed 3HP curve using IE4 synchronous motors.

This allows the Concertor to adjust its speed for optimal operation when faced with varying duty points due to the shared force main and growing inflow conditions.
- Additionally, this flexibility enables using the same Concertor pump for both existing and buildout scenarios. By dynamically adjusting the pump speed and wet well levels to accommodate sewage inflow, an excessive pumping rate beyond the intended target is avoided. This ensures optimal wet well residence time, pump run time, and pump cycle time.

c. Provides a single pump model for all stations
   - The 3-inch, 3HP model covers all duty points, allowing for uniform use across all four stations. This approach simplifies inventory management, as the District can maintain standard spare parts that cover multiple stations.

d. Provides a clog clearing function
   - The Concertor pump features clog detection through continuous monitoring of amperage draw. It can distinguish between hard and soft clogs. When a clog is detected, the pump stops and reverses the impeller to dislodge the obstruction.
   - The Concertor pump also has a cleaning function that disregards low-level. It effectively clears the well until the pump starts drawing air, triggering a return to normal function.
   - The Concertor pump has a high-speed flush function. Pump can be set to periodically operate at full speed to attain desired scour velocities in the force main.
   - This functionality benefits operators by reducing maintenance needs and minimizing the frequent need of vactor trucks. Particularly in Quail Valley, where narrow streets pose challenges, optimizing maintenance frequency is crucial.
   - Furthermore, this cleaning function provides additional benefits compared to a standard pump. Given that lift stations LS-2 through LS-5 require very low HP pumps, there's a risk of insufficient power to clear clogs.

The Concertor DP pump is expected to have a service life of 15-20 years with proper O&M. Each pump is estimated to be serviced a least every two (2) years to maintain the pump's performance and equipment. The manufacturer estimates replacement parts can be obtained within one (1) week, and a replacement pump can be supplied within two (2) weeks.

As indicated by the Flygt vendor, the Flygt lift station system is estimated to cost $102,400. This packaged system includes a 4-foot diameter and 22 feet high fiberglass reinforced plastic wet well with lift-out rails, base elbow and 3-inch internal discharge piping, dual Concertor pumps, control panel and level sensors. Note that this estimate only includes the cost of the equipment listed above and does not include the cost of valves and installation.

5.4.1 System Curves with Flygt Concertor DP Pump Selections

The system curves for each lift station, along with the Concertor DP pump curves, are provided in Figures 5.16 through 5.23. Note that the pump curves reflect adjusted speeds to align with the lift station design capacities specified in Table 3.2 and Table 3.3. Two figures are provided for each lift station giving a total of 8 figures: each figure representing an existing condition and a buildout condition scenario. All figures will have multiple system curves that represent various operating scenarios within the shared force main such as all lift stations active, only one active, or a combination of lift stations active. Given that the Concertor DP pumps feature integrated variable frequency drives (VFDs), the pump curves at varying speeds are provided to align with the lift station capacity requirements in existing condition and buildout condition. For simplicity in generating the system curves, it is assumed that the wet well cycle volumes

remain consistent regardless of development status. However, it's essential to recognize that wet well cycle volumes can be dynamically adjusted based on the inflow conditions the pump encounters.

Table 5.9 provides an overview of duty points for each lift station system, including wet well cycle volume, wet well residence time, pump run time, and pump cycle time. The pumps can adjust to match inflow conditions (whether existing or buildout), resulting in an optimal pumping rate without oversizing. As a result, this Flygt system achieves better wet well residence times, pump run times, and pump cycle times in comparison to the Sierra Peak and Jensen systems. Additionally, it allows for a smaller wet well cycle volumes in comparison to the Sierra Peak and Jensen systems. On the other hand, the force main velocities are lower, sometimes falling below 2 fps, particularly in existing conditions (as indicated in Table 5.10). This is not a significant issue because the Concertor pumps can use their high-speed flush function to periodically operate at full speed and attain the desired scouring velocities. Furthermore, the force main residence times remain below the 4-hour maximum allowable limit during both existing and buildout conditions, as shown in Table 5.11 and Table 5.12.

Table 5.9: Flygt System Duty Points and Wet Well Cycle Volume Calculations

Lift Station		Duty Point (gpm)	Minimum Wet Well Cycle Volume (gal)	Design Wet Well Cycle Volume[1] (gal)	Time to Fill (Non-Peak Existing Conditions) (min)	Time to Fill (Non-Peak Buildout Conditions) (min)	Time to Drain (min)	Pump Cycle Time (min)[2]
LS-5	Existing	15	38	100	24		7	27
	Buildout	35	88	240		24	7	27
LS-4	Existing	30	75	200	24		7	27
	Buildout	72	180	470		23	7	26
LS-3	Existing	25	63	180	25		7	29
	Buildout	49	123	320		23	7	26
LS-2	Existing	22	143	160	25		7	29
	Buildout	53	200	360		24	7	27

Note: Wet Well is evaluated under existing and buildout conditions to evaluate wet well residence time, pump run time and pump cycle time in both scenarios.

[1]Wet well sized to accommodate future buildout conditions. However, the Flygt system will dynamically adjust wet well levels to accommodate the changing sewage inflow. Thus, wet well cycle volume will be reduced during partially developed condition of SA4.

[2]Pump Cycle time = 4*Design Wet Well Cycle Volume/Pump Duty Point. The pump cycle time is calculated using the industry standard equation that predicts the maximum starts per hour.

Table 5.10: Force Main Velocities using Xylem System

Force Main Segment	Force Main Diameter (inches)	Existing Conditions			Buildout Conditions		
		Design Flow (gpm)	Velocity (ft/s)	Minimum Velocity (ft/s)	Design Flow (gpm)	Velocity (ft/s)	Minimum Velocity (ft/s)
LS5 Segment	3.0	15	0.68		35	1.59	
LS4 Segment	3.0	30	1.36		72	3.27	
LS3 Segment	3.0	25	1.14		49	2.23	
LS2 Segment	3.0	22	1.00		53	2.41	
Lake-Goetz Segment (Shared FM – LS 4 & 3)	4.0	55	1.41	0.64	121	3.09	1.25
Goetz-CMH2 Segment (Shared FM – LS 4, 3 & 2)	4.0	77	1.97	0.56	174	4.45	1.35

Note: Force Main Velocity is evaluated under existing and buildout conditions. Under existing conditions, the pumps will operate at a lower rate, resulting in force main velocities under 2 fps. However, this can be mitigated by utilizing the Concertor pump's high-speed flush cycle, which sets the pump to periodically run at full speed to achieve scouring velocities in the force main.

Table 5.11: Force Main Residence Times in Existing Inflow Conditions using Flygt System

Lift Station	Pumping Rate (gpm)	Pipe Length (ft)	Volume in the Force Mains (gal)	Design Wet Well Cycle Volume (gal)	Average Day Inflow (gpm)	Force Main Residence Time (hrs)
LS-5	15	340 – 3" FM	125	100	4.1	0.6
LS-4	30	550 – 3" FM 1285 – 4" FM	1040	200	8.4	2.6
LS-3	25	740 – 3" FM 1285 – 4" FM	1115	180	7.2	3.3
LS-2	22	190 – 3" FM 835 – 4" FM	615	160	6.3	2.1

Note: Force Main Residence Time is calculated based on the average day inflows from the tributary areas being served (at existing conditions). A cycle period, representing the wet well filling time and the pumping run time, is established. This cycle period is then multiplied by the number of cycles required to flush the force main system.

Table 5.12: Force Main Residence Times in Buildout Inflow Conditions using Flygt System

Lift Station	Pumping Rate (gpm)	Pipe Length (ft)	Volume in the Force Mains (gal)	Design Wet Well Cycle Volume (gal)	Average Day Inflow (gpm)	Force Main Residence Time (hrs)
LS-5	35	340 – 3" FM	125	240	10.0	0.3
LS-4	72	550 – 3" FM 1285 – 4" FM	1040	470	10.6	1.9
LS-3	49	740 – 3" FM 1285 – 4" FM	1115	320	14.0	1.7
LS-2	53	190 – 3" FM 835 – 4" FM	615	360	15.3	0.9

Note: Force Main Residence Time is calculated based on the average day inflows from the tributary areas being served (at buildout conditions). A cycle period, representing the wet well filling time and the pumping run time, is established. This cycle period is then multiplied by the number of cycles required to flush the force main system.

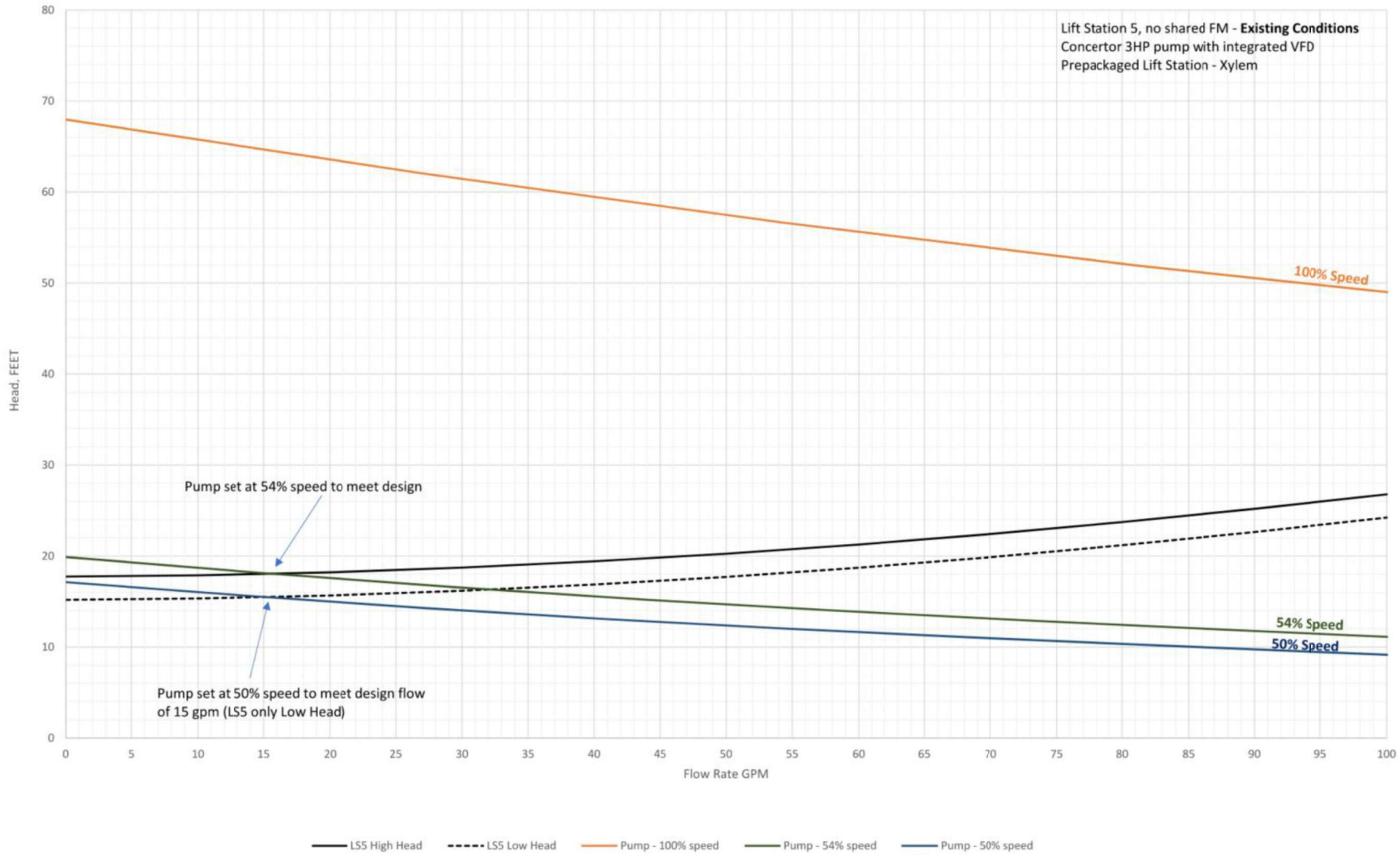

Figure 5.16: Lift Station LS-5 – System Curve with Flygt Concertor DP Pump Curve (Existing Conditions)

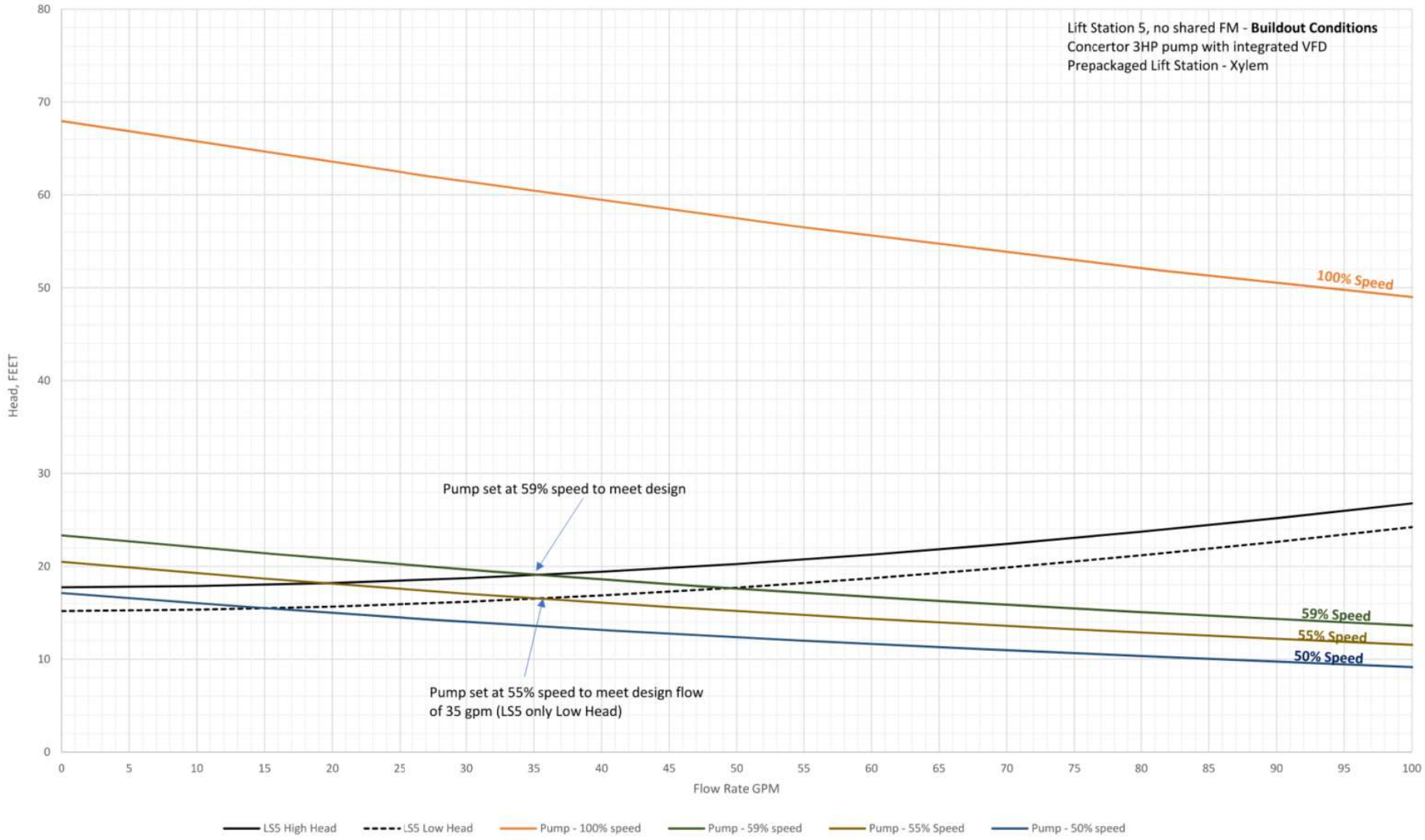

Figure 5.17: Lift Station LS-5 – System Curve with Flygt Concertor DP Pump Curve (Buildout Conditions)

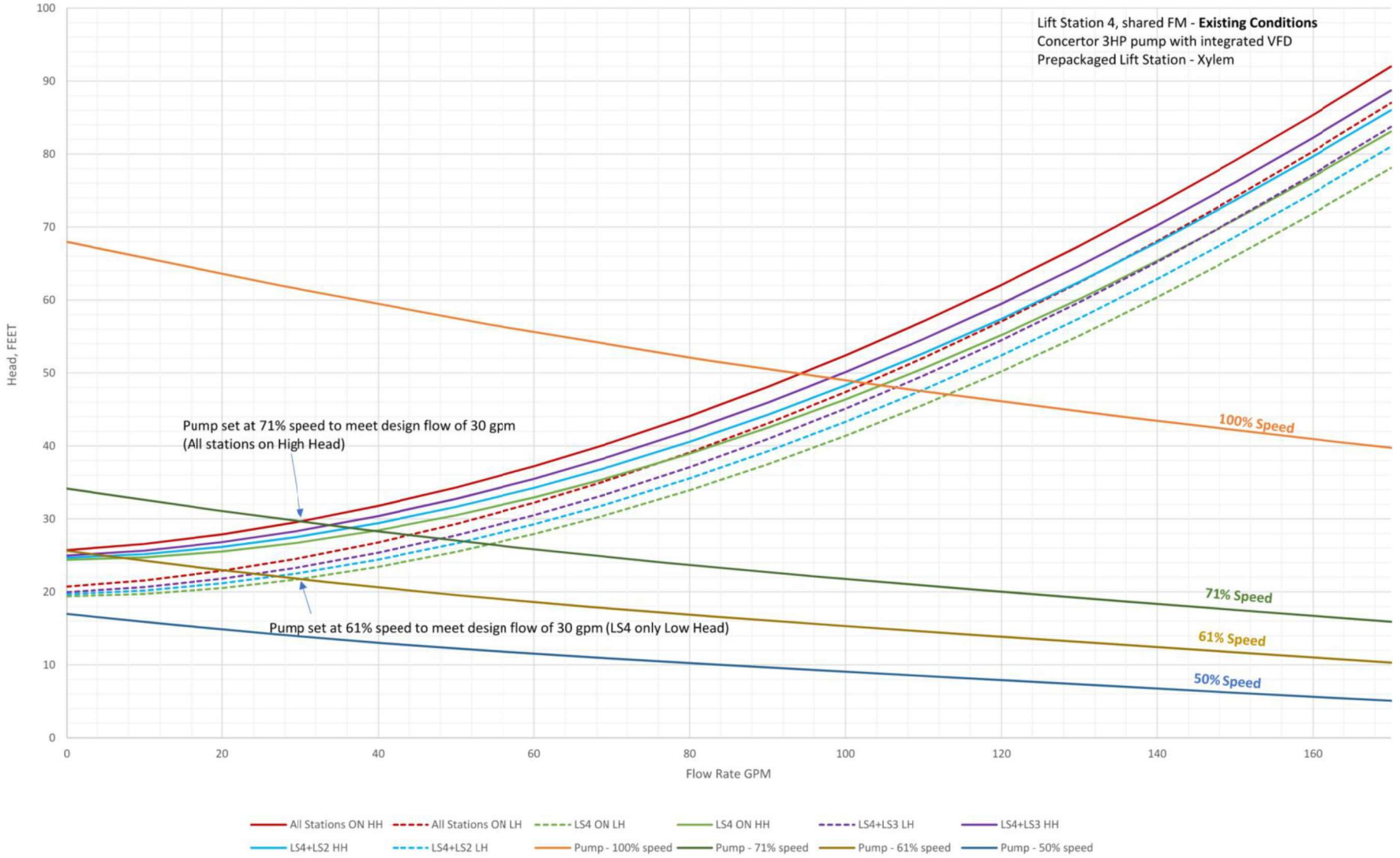

Figure 5.18: Lift Station LS-4 – System Curve with Flygt Concertor DP Pump Curve (Existing Conditions)

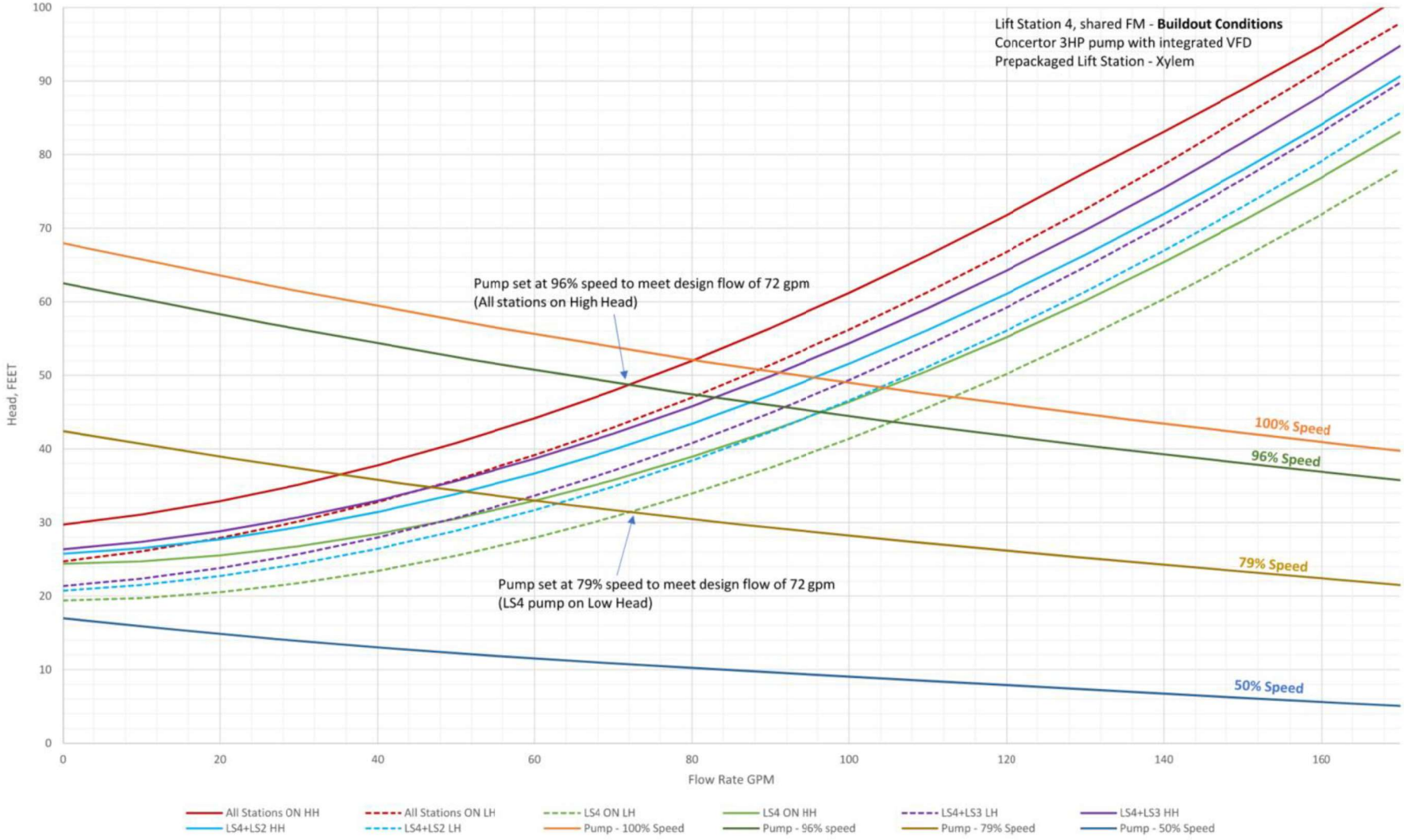

Figure 5.19: Lift Station LS-4 – System Curve with Flygt Concertor DP Pump Curve (Buildout Conditions)

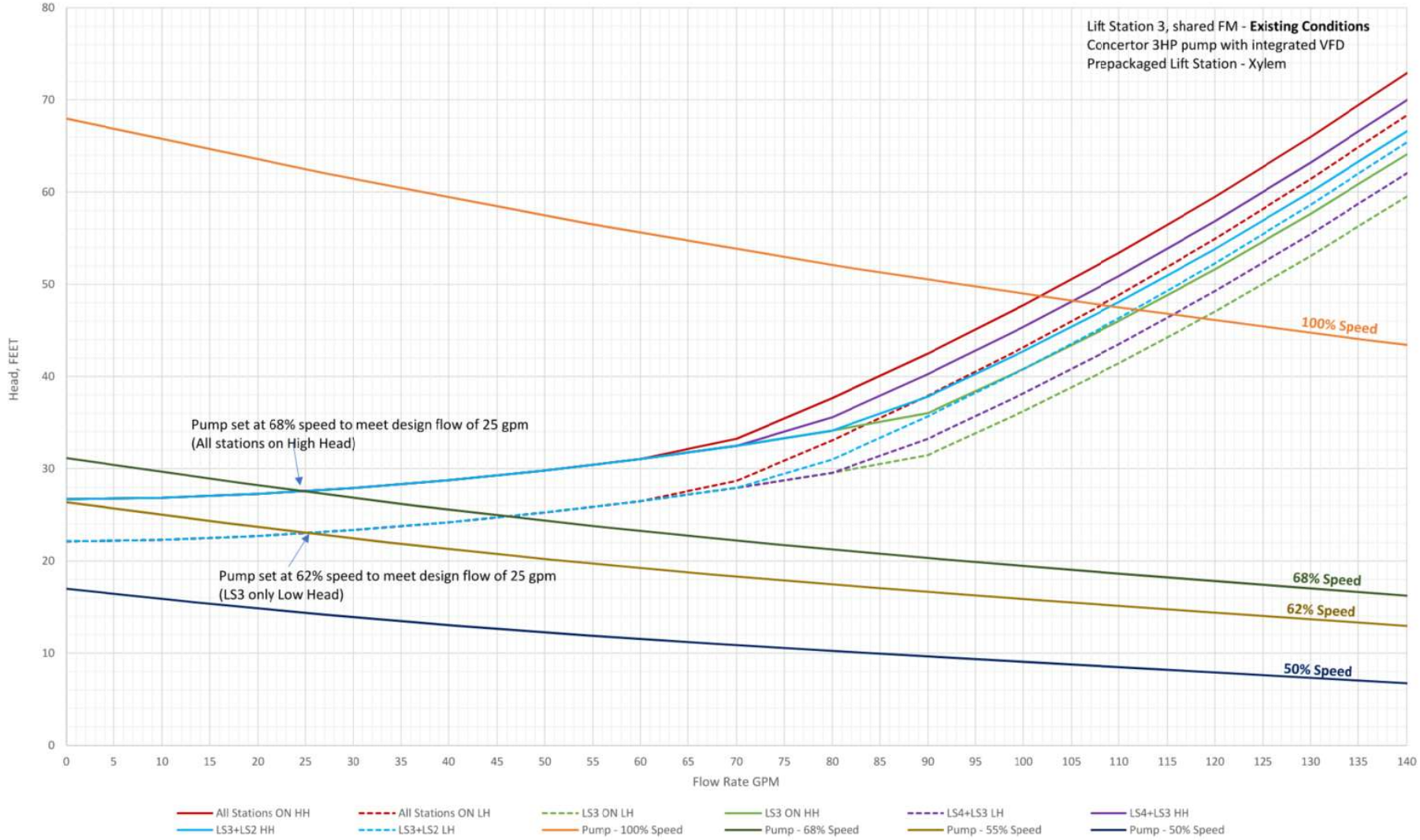

Figure 5.20: Lift Station LS-3 – System Curve with Flygt Concertor DP Pump Curve (Existing Conditions)

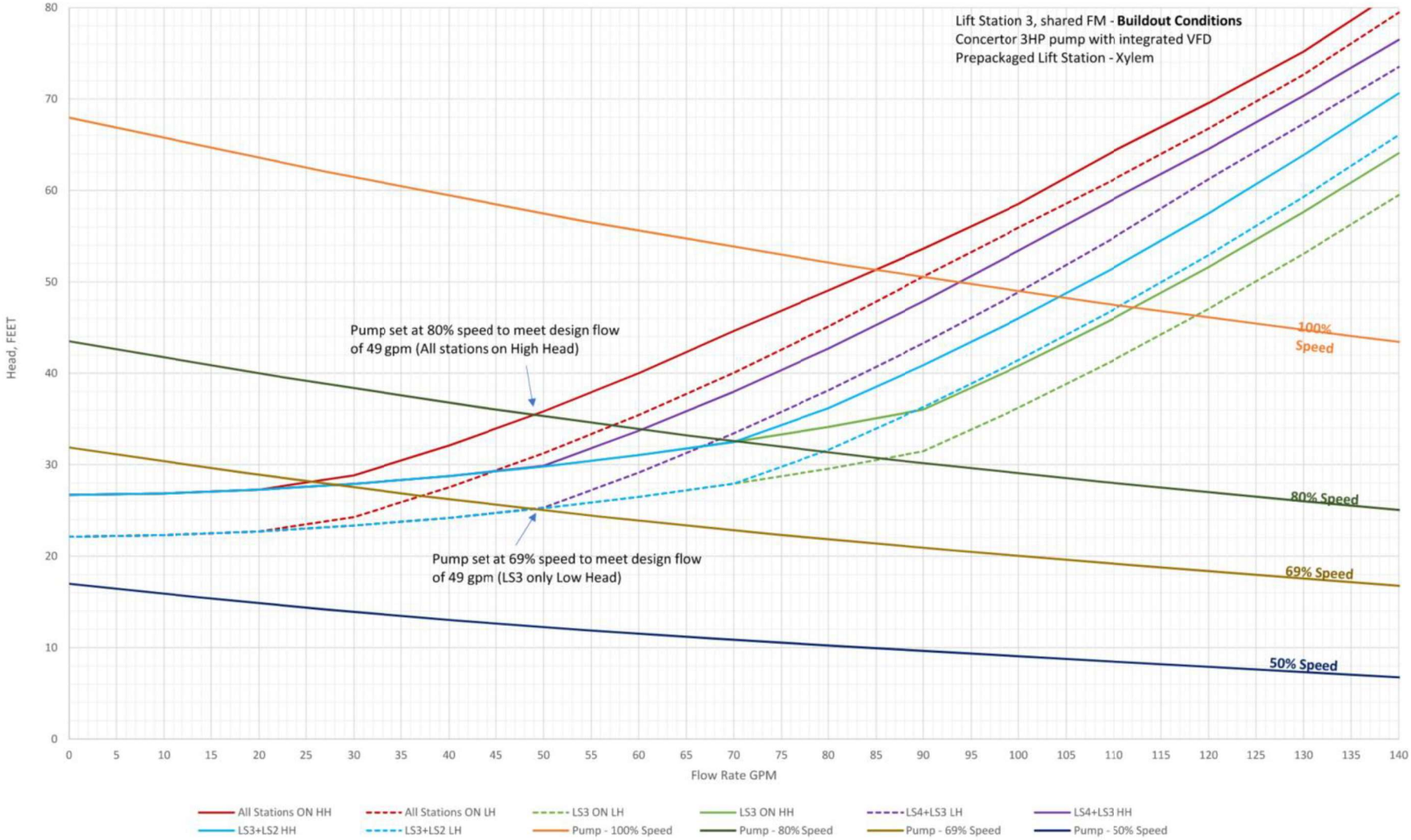

Figure 5.21: Lift Station LS-3 – System Curve with Flygt Concertor DP Pump Curve (Buildout Conditions)

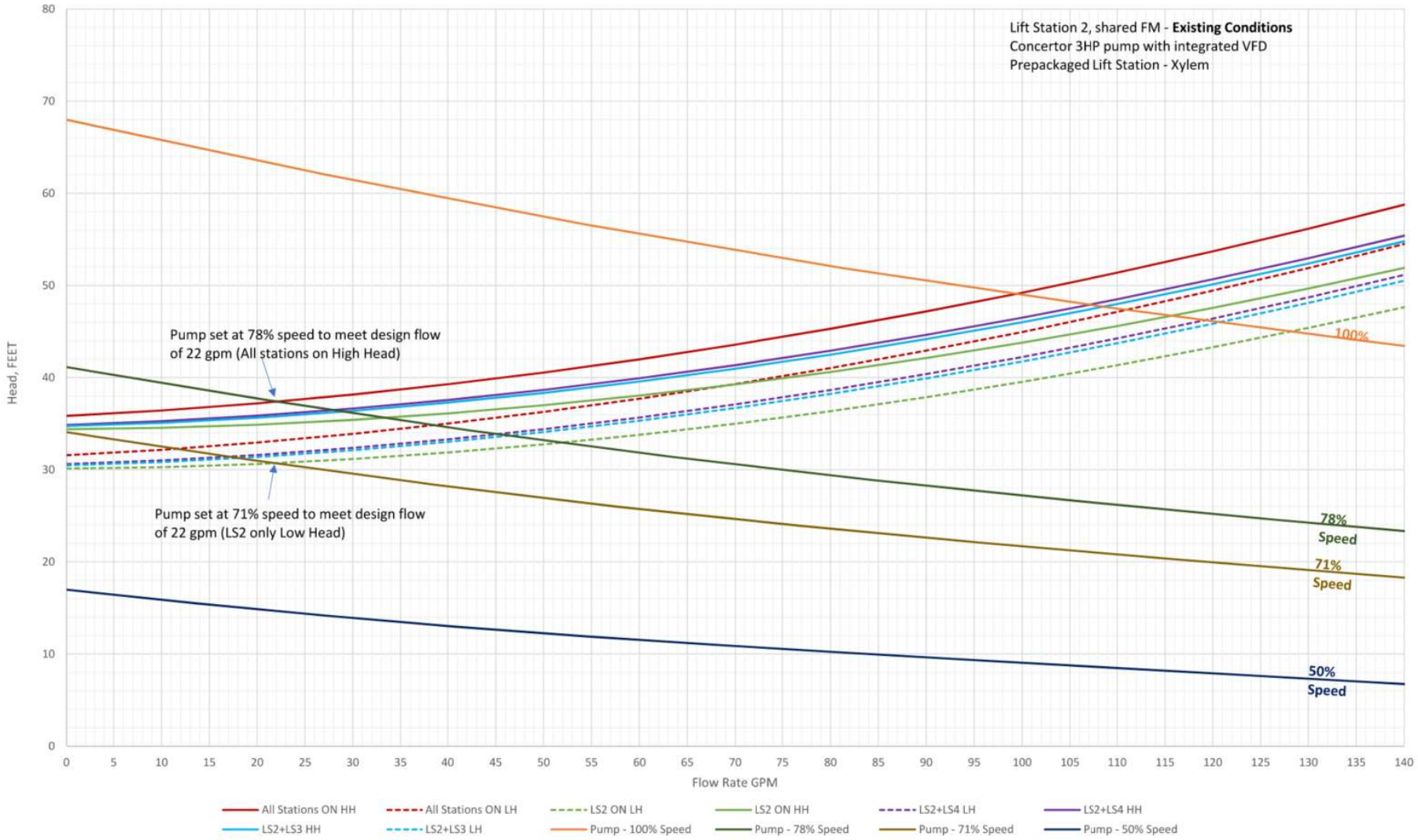

Figure 5.22: Lift Station LS-2 – System Curve with Flygt Concertor DP Pump Curve (Existing Conditions)

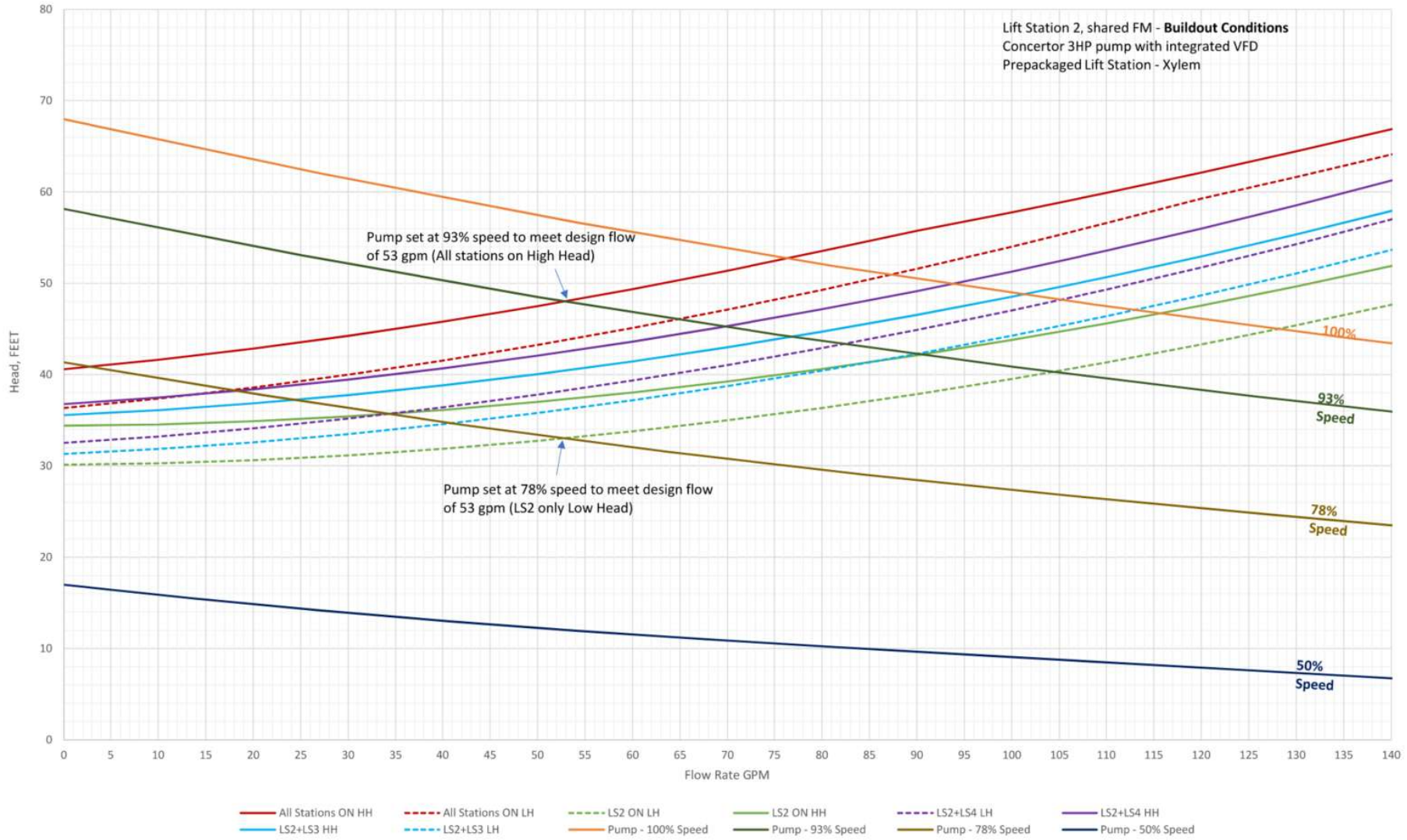

Figure 5.23: Lift Station LS-2 – System Curve with Flygt Concertor DP Pump Curve (Buildout Conditions)

The Flygt system features pumps that meet the buildout design capacities (basis of design) for lift stations LS-2 through LS-5. During the partially developed conditions of the SA4, the pumps will adjust to the lower sewage inflows by reducing their speed to achieve the optimal pumping rate. The Concertor pumps operate to match the sewage inflow, regardless of the development stage of SA4. As a result, the system reduces the wet well cycle volume, optimizing pump run time and cycle times to consistently meet the required criteria. The operating conditions of the Flygt system are aligned with the design needs of the smaller lift stations, LS-2 through LS-5.

5.5 Lift Station System Scoring

Each of the lift station alternatives was scored based on seven (7) categories. Each category was given a score of one (1) through five (5), where a score of five represents the most favorable conditions and one represents the alternative with the least favorable conditions for each category. The evaluation assumed that each category received equal weight.

The results of the scoring are provided in Table 5.13. The approach methodology used to determine the score is further explained in the following subsections.

Table 5.13: Scoring Matrix

Criteria	Sierra Peak	Jensen	Flygt
System Size	4	2	5
Force Main Velocities	3	3	5
Wet Well Residence Time	4	3	5
Force Main Residence Time	5	5	5
Constructability	5	4	5
Operation and Maintenance	5	2	3
System Integration	5	5	5
Lifecycle Cost	5	2	3
Service Life	3	2	5
Power Requirements	3	4	1
Ease of Replacement	4	2	4
Total	46	34	46

5.6 Scoring Constraints Scoring

The following subsection explains the evaluation criteria used in the scoring matrix table.

5.6.1 System Size Scoring

The three alternative lift station systems function at distinct duty points due to their unique pump curves. Additionally, these systems operate across a wide range of pumping rates because of the shared force main in the sewer network. This can cause the pumps to be oversized, potentially pumping more than 1.5 times the inflow rate. This then necessitates an increase the wet well size to ensure sufficient sewage flow buildup and prevent rapid pump operation. However, larger wet wells can lead to sediment and odor issues, resulting in increased maintenance. Hence, the system size scoring is based on the size of the pump and wet well of each lift station system. The following scoring system was used for the scoring matrix.

1-The lift station system is significantly oversized with pumps operating at more than double the buildout inflow sewage rate for all four smaller lift stations.

2- The lift station system has moderately oversized pumps in all four smaller lift station and requires a larger wet well volume in at least one of the four smaller lift stations.
3- The lift station system has moderately oversized pumps in all four smaller lift station.
4- The lift station system has moderately oversized pumps in only three of the four smaller lift stations.
5- The lift station system has appropriately sized pumps in all four smaller lift stations

The Flygt duplex station is equipped with an integrated VFD pump. This pump allows it to match the sewage inflow rate effectively. For the Sierra Peak duplex station, the pumps operate at a moderately higher rate than the buildout inflow rate, except for the pumps at lift station 5. In lift station 5, the pump is sized precisely to meet the buildout capacity. On the other hand, the Jensen duplex station has pumps that operate at a moderately higher rate than the buildout inflow rate for all four smaller lift stations. Additionally, one of these pumps runs at too high of a rate requiring larger wet well cycle volume and increasing the wet well residence time.

5.6.2 Force Main Velocities Scoring

A minimum self-scouring velocity of 2 feet per second is desired within the force main system. When velocities fall below this threshold, sediment may accumulate, leading to clogs. Consequently, operational and maintenance burdens increase, requiring regular flushing provisions. The scoring system below was used for evaluation.

1-The lift station system produces velocities below 2 fps within the force main system for both existing and buildout conditions.
2- The lift station system produces velocities below 2 fps within the force main system for existing conditions only.
3-The lift station system produces velocities above 2 fps within most of the force main system, except for the LS5 segment.
4-The lift station system produces velocities above 2 fps within the force main system for buildout conditions.
5-The lift station system produces velocities above 2 fps within the force main system for existing and buildout conditions. Or the lift station system features a high-speed flush function.

Given that the Flygt system can function within the existing condition lift station capacities, which represent nearly half the flow rate of the buildout conditions, the velocities in the force main system for the Flygt system fall below the minimum threshold of 2 fps under existing conditions. However, the Flygt system has a high-speed flush function, allowing the pump to periodically operate at full speed to achieve scouring velocities. The Sierra Peak and Jensen systems maintain velocities above this 2 fps minimum, except for the force main segment connected to lift station 5. Due to its small capacity of 35 gallons per minute (gpm), the force main for LS-5 will still yield low velocities even when utilizing a 3-inch diameter pipe.

5.6.3 Wet Well Residence Time Scoring

The wet well residence time is a critical consideration in selecting lift station systems. It is represented as the ‘time to fill’ parameter in wet well cycle volume calculations. If sewage remains the in the wet well for too long, it can produce foul-smelling gases, including hydrogen sulfide (H_2S), which leads to odor problems. In addition, extended exposure to sewage due to long residence times can lead to corrosion of the wet well structure. These issues ultimately contribute to increase system maintenance, which is undesirable. During existing conditions non-peak inflow, the “time to fill” value is highest.

Adjusting float levels was initially considered to reduce the wet well cycle volume and in turn, reduce the wet well residence time, especially in Quail Valley's early development stages. However, due to oversized pumps in these lift station system alternatives, reducing the cycle volume to mitigate long residence times would result in pump cycle times falling below acceptable limits. Consequently, accepting longer residence times while carefully evaluating their severity is necessary. The scoring system below was implemented for the scoring matrix.

1-The lift station system has wet well residence times exceeding 60 minutes in existing non-peak inflows for all four smaller lift stations.
2- The lift station system has wet well residence times exceeding 60 minutes in existing non-peak inflow for three of the four smaller lift stations.
3- The lift station system has wet well residence times exceeding 60 minutes in existing non-peak inflow for two of the four smaller lift stations.
4- The lift station system has wet well residence times exceeding 60 minutes in existing non-peak inflow for one of the four smaller lift stations.
5- The lift station system has wet well residence times below the 60-minute maximum in all four smaller lift stations.

The Sierra Peak system demonstrates a wet well residence time exceeding 60 minutes during non-peak existing conditions for Lift Station 2. The Jensen system exhibits a wet well residence time exceeding 60 minutes during non-peak existing conditions for both Lift Stations 2 and 4. In contrast, the Xylem system achieves the most optimal wet well residence time across all inflow conditions. This efficiency results from the Xylem pumps adjusting their pumping rate to match the station's inflow. Since the Xylem pumps are not oversized, the wet well volume can be adjusted to minimize wet well residence time without causing rapid pump run times.

5.6.4 Force Main Residence Time Scoring

The force main residence time is another critical consideration in selection lift station systems. It refers to the duration sewage spends within the force mains before it is flushed out. The desired force main residence time is under 4 hours. The following scoring system was used for the scoring matrix.

1-The lift station system has force main residence times exceeding 2 days.
2- The lift station system has force main residence times exceeding 24 hours.
3- The lift station system has force main residence times exceeding 6 hours.
4- The lift station system has force main residence times exceeding 4 hours.
5- The lift station system has force main residence times under the desired 4 hours.

For all three alternative systems, the force main residence times fall under 4 hours.

5.6.5 Constructability

While each lift station system requires similar infrastructure improvements and construction, certain proposed systems necessitate additional labor during construction due to the chosen wet well material. The two materials to consider are precast concrete and fiberglass.

Precast concrete structures are generally more affordable than fiberglass structures. However, during installation, precast concrete requires additional labor because it needs a protective coating to mitigate corrosion from chemicals and gases in the sewage. Furthermore, concrete wells are delivered as individual rings, and joint sealants are used to connect these rings during installation. This process may introduce

uncertainty in the stability of the structure, especially in variable soil conditions of Quail Valley SA4. For instance, improper sealant installation can compromise the seal, leading to potential leakage from the well.

In contrast, fiberglass is inherently resistant to sewage chemicals and gases, eliminating the need for additional coatings. Furthermore, fiberglass installation is less labor-intensive and may be better suited to the field conditions of the project area.

Keep these items in mind, the scoring system for constructability is detailed below.

1- N/A
2- N/A
3- N/A
4- The lift station system uses wet wells made of precast concrete.
5- The lift station system uses wet wells made of fiberglass or fiberglass reinforced plastic.

5.6.6 Operation and Maintenance Scoring

The operation and maintenance costs play a crucial role in the collection system. Lift stations with greater repair needs, operational needs, service requirements, labor demands and energy needs significantly impact the ongoing cost of the lift stations. Each lift station system has varying requirements for O&M. Consequently, the primary scoring criteria will be the manufacturer or vendor's expected frequency of servicing. While this doesn't encompass all O&M aspects, it does provide insight into repair frequency, staff time, and ongoing costs for maintaining the lift station. The scoring system adopts a conservative approach, assuming maximum service requirements.

1-The lift station will require maintenance staff to inspect the system, including the wet well, pump impellers, oil levels, floats or level sensors, o-rings, electrical cable, connections and cabinets more than twice a year.
2-The lift station will require maintenance staff inspect the system, including the wet well, pump impellers, oil levels, floats or level sensors, o-rings, electrical cable, connections and cabinets once a year.
3- The lift station will require maintenance staff inspect the system, including the wet well, pump impellers, oil levels, floats or level sensors, o-rings, electrical cable, connections and cabinets every 2 years.
4- The lift station will require maintenance staff inspect the system, including the wet well, pump impellers, oil levels, floats or level sensors, o-rings, electrical cable, connections and cabinets every 3 years.
5- The lift station will require maintenance staff inspect the system, including the wet well, pump impellers, oil levels, floats or level sensors, o-rings, electrical cable, connections and cabinets every 4 years.

5.6.7 System Integration Scoring

The ease of the control system integration is critical for the proposed system to be easily monitored and accessed if experiencing issues. As a result, it is expected the lift station will be easily integrated into the EMWD SCADA system. The following scoring system was used for the scoring matrix.

1-The systems are not easily integrated into EMWD's system.
2-N.A.

3-The systems are integrated into EMWD's system.
4-N.A.
5-The systems are easily integrated into EMWD's system.

5.6.8 Comparative Lifecycle Cost Scoring

Evaluating lifecycle costs will establish a baseline for comparing the relative cost of lift station system alternatives. This analysis provides a comparative framework to assess the efficiency of these systems and its impact on overall costs. By considering factors such as capital cost, maintenance cost, and energy cost, this evaluation offers a comprehensive view of the financial implications throughout the lift station's lifecycle. Please note that the costs provided are intended for comparison purposes only and do not represent the actual lifecycle costs of the lift station systems.

The capital cost will be determined based on the manufacturer's price for each system. Maintenance costs will cover inspections, cleaning, and repairs required over time, including replacement parts and labor. Given the varying service requirements of each system, it is assumed that each service visit will cost 5% of the initial system price, covering the additional costs of replacement parts, labor, and miscellaneous needs.

Energy requirements will also contribute to the overall cost of each lift station. The energy cost will depend on the activity level of each pump and the electricity rate EMWD incurs per KWH. As Quail Valley develops, power costs are also expected to increase. For this evaluation, it is assumed that each system will, on average, operate one pump 24 hours a day for the service life of the system, with each KWH costing $0.246. This serves as a baseline to compare relative energy use and does not represent the actual costs expected to be incurred. Note, that the Flygt system, featuring the Concertor pump with an integrated VFD, could potentially save up to 70% in energy costs according to the manufacturer's brochure. This potential saving has been included in the Flygt system's estimated energy cost.

By using comparative cost scoring, this evaluation will help identify the most cost-effective lift station system, ensuring that EMWD makes the best investment for long-term sustainability and performance.

1-All small lift stations will cost over $900,001.
2-All small lift stations will cost between $800,001-$900,000.
3-All small lift stations will cost between $700,001-$800,000.
4-All small lift stations will cost between $600,001-$700,000.
5-All small lift stations will cost less than $600,000.

The Sierra Peak system is projected to have a capital cost of $155,000 for all four smaller lift station systems, as quoted by the manufacturer. Based on maintenance requirements, service needs and the cost of parts, the lift station may incur an additional $40,000 in maintenance cost over its 20-year service life. The energy cost for all four Sierra Peak systems, based on operational assumptions noted above, is estimated to be $355,000 over the next 20 years. In total, the comparative cost of the Sierra Peak station is estimated to be $550,000.

The Jensen system is estimated to have a capital cost of $220,000 for all four smaller lift station systems, as quoted by the manufacturer. Considering the maintenance requirements, service needs, and parts costs, the lift station may incur an additional $220,000 in maintenance expenses over its 20-year service life. The energy cost for all four Jensen systems, based on the operational assumptions provided, is estimated to be $385,000 over the next 20 years. Altogether, the comparative cost of the Jensen station is estimated to be $825,000.

The Flygt pump system option is estimated to have a capital cost $410,000 for the four smaller lift station systems, as quoted by the manufacturer. Taking into account the maintenance requirements, service needs, and parts costs, the lift station is expected to incur an additional $205,000 in maintenance expenses over its 20-year service life. Assuming the energy cost for this system is 70% lower compared to standard pumps, the energy cost for all four systems is estimated to be $115,000 over the next 20 years. In total, the comparative cost of the Flygt station is estimated to be $730,000.

5.6.9 Service Life Scoring

The service life of the lift station systems will affect the net cost of the facility. The longer the service life of a system, the greater value that system has for the district. The service life will be based on the manufacturer's expected service life of the pump. The service life is directly connected to operation and maintenance, and the estimated service life assumes proper operation and maintenance are performed for all lift station. The following scoring system was used for the scoring matrix.

1-The service life of the lift station system pumps is less than 7 years.
2- The service life of the lift station system pumps is 7-12 years.
3- The service life of the lift station system pumps is between 12-15 years.
4-The service life of the lift station system pumps is 15-19 years.
5-The service life of the lift station system pumps is 20+ years.

According to these lift station system vendors, the pumps in these systems have the following expected service life: 1) Sierra Peak: 12-15 years; 2) Jensen: 10 years; 3) Flygt: 15-20 years

5.6.10 Power Requirement Scoring

The continuous operation of the lift station system is critical for the collection system's reliability and efficiency. If a sudden power shutdown occurs, the backup power will be critical to temporarily maintain the operation of the lift stations. However, pumps with high power requirements will add additional cost to the pump's operation and require larger backup power generators for the lift station. The following scoring system was used for the scoring matrix.

1- The lift station system pump requires 3 HP with 3-phase power.
2- The lift station system pump requires 4 HP with 1-phase power.
3- The lift station system pump requires 3 HP with 1-phase power.
4- The lift station system pump requires 2 HP with 1-phase power.
5- The lift station system pump requires 1 HP with 1-phase power.

The Sierra Peak system utilizes 2 HP grinder pumps for LS-5 and 3 HP grinder pumps for LS-2 through LS-4. In contrast, the Jensen system employs 2 HP grinder pumps for LS-5, 3 HP grinder pumps for LS-2 and LS-3, and 4 HP grinder pumps for LS-4. Lastly, the Flygt system relies on 3 HP non-clog pumps for all four smaller lift stations, but these pumps require 3-phase power supply.

5.6.11 Ease of Replacement Scoring

Regardless of the alternative selected, the lift station will require replacement parts and eventually require the replacement of the pumps and lift station. The length of time it takes to acquire replacement parts will directly affect the reliability and efficiency of the collection system. The following scoring system was used for the scoring matrix.

1- Replacement parts and the pump will take longer than 2 months to acquire.

2- Replacement parts and pump can be acquired between 1-2 months.
3- Replacement parts and pump can be acquired within 1 month.
4- Replacement parts and pump can be acquired between 1-2 weeks.
5-Replacement parts and pump can be acquired within 1 week.

5.7 Conclusion

The scoring between the Sierra Peak and Flygt systems is very close. The main difference between these two alternatives is the power requirement. The final decision will be contingent up on power availability. The Flygt system requires a three-phase power supply, requiring electrical upgrades within Quail Valley SA4. The Sierra Peak system only requires single-phase power.

Given the close scoring, the decision will ultimately depend on the availability of three-phase power. If the necessary upgrades to the three-phase power supply are feasible, the Flygt system is the recommended solution. Otherwise, the Sierra Peak system is the recommended solution if three-phase power is not available or feasible.

6. LIFT STATION LS-1 PHASING

Lift Station 1 serves as the designated regional lift station for Quail Valley SA4. Given the phased construction of the proposed sewer system, phasing of Lift Station 1 (LS-1) is essential to ensure optimal operation as the sewage inflows grow in each subsequent phase. Designing for the maximum inflow conditions at buildout could lead to operational concerns during the initial phases. If initially designed and constructed to handle buildout flow, this would result in an oversized facility that would have long residence times between pump cycles and would be more likely to develop odors, sedimentation, and scum layers. Furthermore, attempting to mitigate these challenges by reducing the cycle volume of the wet well can strain the pump with run times that are too short and inefficient. This section will explore various strategies to accommodate the phased approach to construction of Lift Station 1 to serve the gravity system of SA4.

6.1 Lift Station LS-1 Capacity – by Phase

The Phasing Sewer Improvements Exhibit outlines the proposed phases for constructing the septic-to-sewer collection system. The delineation of each phase serves as the basis for establishing the phased tributary areas. This will assist in quantifying sewage flows in each subsequent phase. Table 6.1 and Table 6.2 calculate the cumulative capacity required of LS-1 for each phase under existing conditions and buildout conditions, respectively. Table 6.3 provides a summary of both tables. During phases 6 through 8, the design capacity of LS-1 accounts for inflow from the cascading smaller lift station systems (LS-2 through LS-5). The inflow from these cascading lift station systems can be obtained from the duty points specified for the Sierra Peak smaller lift station systems in Table 5.1. For phase 6, only lift station 2 will be operational, so its duty point in low head conditions of 80 gpm is used for inflow. For phases 7 and 8, the three lift stations within the shared force main (LS-2 through LS-4) will be operational, so the inflow used is their combined duty points under high head conditions of approximately 200 gpm.

Table 6.1: Lift Station 1 Design Capacity by Construction Phase (Existing Conditions)

LS-1 Phase	Number of Parcels from Tributary Area	Number of Parcels from cascading lift stations	Average Day Flow from Tributary Area (gpd)	Average Day Flow with smaller lift station inflow* (gpd)	Peak Hour Flow for Tributary Area (gpm)	Peak Hour Flow for Tributary Area w/ 20% Safety Factor (gpm)	Smaller Lift Station Inflow (gpm)	Total Design Capacity* (gpm)
1	99	0	20,939	20,939	41.7	51	0	51
2	210	0	44,415	44,415	88.5	107	0	107
3	321	0	67,892	67,892	135.3	163	0	163
4	422	0	89,253	89,253	177.9	214	0	214
5	516	0	109,134	109,134	217.5	262	0	262
6*	516	43	109,134	224,334	217.5	262	80	342
7*	516	121	109,134	397,134	217.5	262	200	462
8*	516	149	109,134	397,134	217.5	262	200	462

*The design capacity for phases 6 through 8 includes inflows from the peak pump flow of cascading smaller lift station systems, LS-2 through LS-5. In addition, the computed average day flow includes the inflows from the peak pump flow of cascading smaller lift station systems.

Table 6.2: Lift Station 1 Design Capacity by Construction Phase (Buildout Conditions)

LS-1 Phase	Number of Parcels from Tributary Area	Number of Parcels from cascading lift stations	Average Day Flow from Tributary Area (gpd)	Average Day Flow with smaller lift station inflow* (gpd)	Peak Hour Flow for Tributary Area (gpm)	Peak Hour Flow for Tributary Area w/ 20% Safety Factor (gpm)	Smaller Lift Station Inflow (gpm)	Total Design Capacity* (gpm)
1	155	0	32,783	32,783	65.3	79	0	79
2	359	0	75,929	75,929	151.3	182	0	182
3	565	0	119,498	119,498	238.2	286	0	286
4	802	0	169,623	169,623	338.1	406	0	406
5	1025	0	216,788	216,788	432.1	519	0	519
6*	1025	104	216,788	331,988	432.1	519	80	599
7*	1025	271	216,788	504,788	432.1	519	200	719
8*	1025	339	216,788	504,788	432.1	519	200	719

*The design capacity for phases 6 through 8 includes inflows from the peak pump flow of cascading smaller lift station systems, LS-2 through LS-5. In addition, the computed average day flow includes the inflows from the peak pump flow of cascading smaller lift station systems.

Table 6.3: Lift Station 1 Design Capacity Existing vs Buildout Conditions

Lift Station 1 Phase	Existing Design Capacity (gpm) (based on PH+20%)	Buildout Design Capacity (gpm) (based on PH+20%)
1	51	79
2	107	182
3	163	286
4	214	406
5	262	519
6*	342	599
7*	462	719
8*	462	719

Because the gravity system will be constructed in phases, the sizing of Lift Station 1 is designed to align with these phases. However, parcels may potentially develop once the gravity mains in preceding phases are completed and new developments can connect. It is difficult to predict whether buildout within the phase will happen before advancing to the next construction phase of the gravity system. Thus, the phasing of the gravity mains and buildout of the development could overlap, making it challenging to precisely forecast wastewater demands throughout the phased construction of the gravity system. To ensure the lift station can handle the varying wastewater flow generation amounts, it is necessary to design for a flow range of 51 to 719 gpm. It is important to note that the minimum value of this design flow range may be increased to ensure scouring velocities in the force mains.

6.1.1 Force Main Velocities

Given that the gravity sewer line will be constructed in phases, it is crucial to size the force main appropriately. The force main should accommodate the increasing demands within each phase while staying within the acceptable velocity limits of 2 fps to 6 fps. A minimum velocity of 2 fps prevents solids from settling in the force main, while a maximum velocity of 6 fps minimizes significant head losses, thereby reducing pump power requirements, operational costs, and the magnitude of hydraulic pressure transients.

An analysis of the required design capacity by phase versus velocity in force main diameters ranging from 3 inches to 8 inches was conducted, as shown in Table 6.4. This analysis assists in determining preliminary force main sizes. The selection of these sizes is initial and may be adjusted as pump options are examined in more detail. Table 6.4 indicates that a single force main diameter cannot handle all phased capacities. Therefore, a combination of two force main lines will be necessary for the design.

Table 6.4: Lift Station 1 Design Capacity Existing vs Buildout Conditions

LS-1 Phase	Existing Design Capacity (gpm)	Velocity (fps)[1]				Buildout Design Capacity (gpm)	Velocity (fps)[1]			
		3 inch Force Main	4 inch Force Main	6 inch Force Main	8 inch Force Main		3 inch Force Main	4 inch Force Main	6 inch Force Main	8 inch Force Main
1	51	2.31	1.30	0.58	0.33	79	3.59	2.02	0.90	0.50
2	107	4.86	2.73	1.21	0.68	182	8.26	4.65	2.07	1.16
3	163	7.40	4.16	1.83	1.04	286	12.98	7.30	3.25	1.83
4	214	9.71	5.46	2.43	1.37	406	18.43	10.37	4.61	2.59
5	262	11.89	6.69	2.97	1.67	519	23.56	13.25	5.89	3.31
6	342	15.52	8.73	3.88	2.18	599	27.19	15.29	6.80	3.82
7	462	20.97	11.80	5.24	2.95	719	32.63	18.36	8.16	4.59
8	462	20.97	11.80	5.24	2.95	719	32.63	18.36	8.16	4.59

[1]Flow velocities outside the acceptable range of 2 fps and 6 fps are highlighted red.

Various combinations of force main diameters were explored to ensure that the force main velocities remained within the acceptable range for each phased scenario. The combinations of force main diameters are detailed below:

1. **2 – parallel 4" force main lines**

A single 4-inch force main will handle flow rates of up to approximately 200 gpm and accommodate the existing condition up to phase 4 and buildout condition up to phase 2. Once the maximum velocity is exceeded, a second 4-inch force main will be activated to run in parallel, supporting flows up to ultimate buildout. Note that ultimate buildout refers to the complete construction of the gravity system when all homes have connected and SA4 is fully developed. However, at ultimate buildout (phase 8) with a flow rate of 719 gpm, the velocity through the parallel force main lines will reach 9.04 fps, making this option impractical. Additionally, this approach lacks redundancy for the lift station system, particularly when one line requires maintenance, as a single 4-inch force main will be unable to handle the larger flows in the later phases.

2. **1 – 3" force main and 1 – 6" force main**

A single 3-inch force main will handle flow rates up to 130 gpm and accommodate the existing condition up to phase 2 and the buildout condition phase 1. Once the maximum velocity is exceeded, the second 6-inch line will be used instead. The 6-inch line will handle the flow rates between 130 gpm and 530 gpm, covering the existing condition from phase 2 to 8 and the buildout condition up to phase 5. It is important to note, however, that velocities below 2 fps will occur during existing condition phases 2 and 3 (1.21 fps and 1.83 fps, respectively). For flows greater than 530 gpm, both force mains will need to operate in parallel to accommodate the higher flows. While this option appears favorable due to the 3-inch force main's ability to provide effective scouring velocities during the project's initial phases, it becomes impractical in terms of cost and construction in the long run. Additionally, this approach lacks redundancy – when one line requires maintenance a single 3-inch line will be unable to handle any of the larger flows.

3. **1 – 4" force main and 1 – 6" force main**

A single 4-inch force main will handle flow rates of up to approximately 200 gpm and accommodate the existing condition up to phase 3 and buildout condition up to phase 2. Once the maximum velocity is exceeded, the second 6-inch line will take over. The 6-inch line will

handle the flow rates between 200 gpm and 520 gpm, covering the existing condition from phase 4 to 8 and the buildout condition up to phase 5. For flows exceeding 530 gpm, both force mains must operate in parallel. Note that when the 4-inch force main is used, the lift station pumps must be initially sized to handle the buildout capacity of phase 1, ensuring velocities remain above 2 fps. However, this approach may not accommodate the use of the smaller prepackaged systems proposed for lift stations LS-2 through LS-5, making it challenging to assess the smaller prepackaged systems suitability. Nonetheless, this 4" and 6" force main combination offers a good option for the force main system. Since the diameters of each line are relatively close in size, this option may provide redundancy in the event that the larger 6" line requires maintenance. Confirmation of redundancy will occur after pump selection. If it doesn't provide redundancy, the force main combination will need reassessment, likely involving upsizing the first force main line.

This step was used to establish that the preliminary sizing of the lift station force mains will need to be a minimum of one 4-inch and one 6-inch diameter line. This preliminary sizing was essential to develop the initial system curves and determine the pump operating points needed for pump selection. These sizes will need to be verified and further refined in each of the alternatives discussed in Section 6.5.

6.2 Lift Station LS-1 Pumping Head

Pumping head involves several factors, including static head and the combined effects of major and minor losses within the piping system. Static head accounts for the elevation difference between water levels in the wet well and the highest point in the force main. The elevation in the force main is approximate based on the current 30% design plans. Similarly, the water levels in the wet well are estimated: the pump-off level is set at 2.5 feet above the presumed wet well bottom, and the pump-on level is established at maximum of 4 feet above the pump-off level to meet the designed cycle volume of the wet well. Note that this wet well cycle volume will vary by phase of the project. The geometry of the wet well is rectangular and will vary depending on the pumps chosen. In this initial stage, minor losses due to fittings, bends, valves, etc. are exclude from the head loss calculations. On the other hand, major losses resulting from friction within the pipe are calculated using the Hazen-Williams equation:

$$H_f = [10.44\ (Q/C)^{1.85}\ D^{-4.87}]\ L$$

Where:

H_f	=	Head Loss (feet)	
Q	=	Flow (gpm)	
C	=	Hazen Williams Coefficient (140 for design)	
D	=	Pipe Diameter (inches)	
L	=	Length of Pipe (feet)	

6.2.1 Static Head

The minimum static head of lift station LS-1 will vary depending on the project phase. As the project progresses, the minimum static head will decrease since the wet well high-water level need to be raised to accommodate the need for larger wet well cycle volumes. As a result, this will broaden the range of operating duty points for the lift station. On the other hand, the maximum static head is expected to remain constant, as the system's low water level remains unchanged despite the adjustment in the float levels. To understand the highest and lowest pumping flows the lift station can accommodate, the final pump on and pump off elevations in ultimate buildout conditions will be used to calculate the static head for lift station LS-1.

Table 6.5: Static Head Lift Station 1

LS-1 Phase	High Point on Force Main (ft)	Wet Well Bottom Elevation (ft)	Pump ON Elevation (ft)	Pump OFF Elevation (ft)	Minimum Static Head (ft)	Maximum Static Head (ft)
8 – Ultimate Buildout Conditions	1549	1472	1480	1476	69	73

Note: Use Figure 6.1 for an example illustration of the wet well.

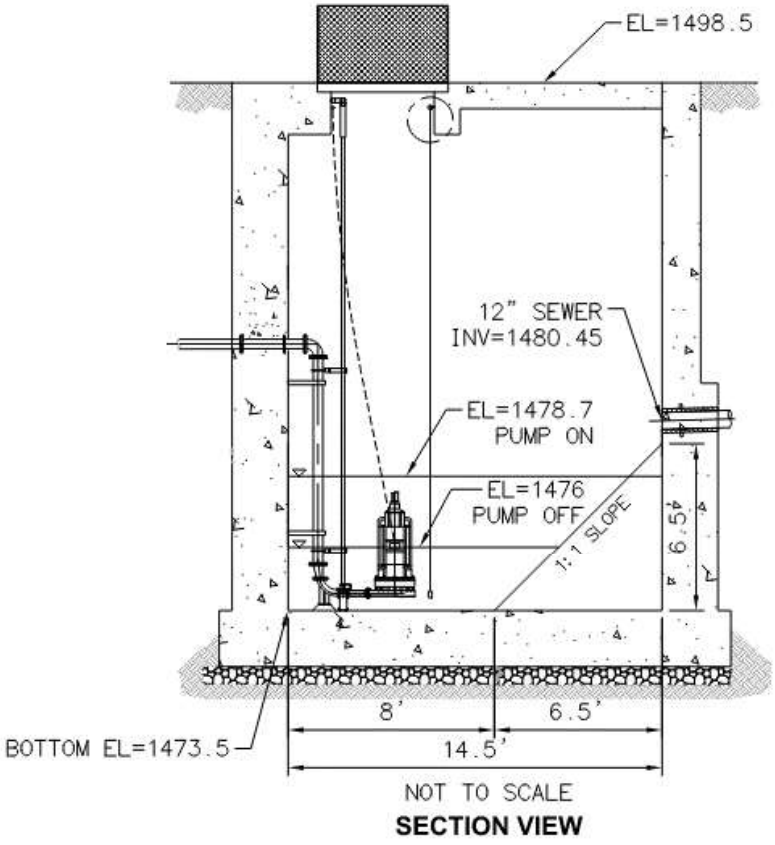

Figure 6.1: Example Illustration of Wet Well

6.2.2 System Curves

For preliminary analysis, it is assumed that initial flows would be directed through a 4-inch force main with a length of approximately 3,300 linear feet. As the construction phase progresses and flows increase to about 200 gpm, discharge from the lift station would be switched over to the larger 6-inch force main. Once the flows exceed 520 gpm, discharge from the lift station would be directed through both the 4-inch and 6-inch force main to minimize velocities and limit head loss in the force main.

The pumping head is calculated for flows through a single 4-inch force main, a single 6-inch force main, and both the 4-inch and 6-inch force mains combined, as shown in Table 6.6. The pumping head requirements for each phase in both existing and buildout conditions are summarized in the table.

Table 6.6: Pumping Head Requirements using 4" and 6" FM lines for Lift Station 1 - Phased

LS-1 Phase	Existing Design Capacity (gpm)	TDH (ft)	Buildout Design Capacity (gpm)	TDH (ft)
1	51	79	79	88
2	107	98	182	140
3	163	128	286	95
4	214	86	406	115
5	262	92	519	140
6*	342	103	599	158
7*	472	128	729	124
8*	472	128	729	124

LEGEND
4 inch FM
6 inch FM
both 4" and 6"

The pumping head requirements shown in Table 6.6. are preliminary and serve as the initial pump operating points for pump selection. These pumping head requirements will be further refined as pump and force main size alternatives are explored in Section 6.5 These refinements will be reflected in the system curves provided with each alternative.

6.3 Wet Well Sizing

Once the pumping rate of each lift station is established, the required cycling volume for the wet well can be determined. Note that this volume specifically represents the amount pumped during a single pump cycle, rather than the total storage capacity of the wet well. It encompasses the volume between the "pump on" and "pump off" elevations.

The numbered items listed below are the criteria that were used to determine the cycling volume for the wet wells.

1. **Calculate the minimum pump cycle volume.** The minimum pump cycle volume can be calculated using the equation: V=tQ/4, where V = minimum volume in gallons, t = minimum pump cycle time in minutes and Q = pump capacity in gallons per minute. The minimum pump cycle time was set at 10 minutes, which was based on the EMWD guideline of six pump starts per hour. This minimum pump cycle volume serves as the baseline requirement and is then increased to meet the criteria detailed in numbers 2 through 5.
2. **The wet well is larger than the minimum volume calculated.** This establishes a minimum threshold to prevent more than 6 pump starts per hour.
3. **Provides a reasonable "time to fill" based on average day flows from the tributary areas being served.** This time represents the residence time of the accumulated incoming flows. Excessive time-to-fill would indicate the wet well is too large, and could lead to issues like odors, sediment deposition, or scum layer development. The target time to fill is less than 60 minutes at average day flows.
4. **Allows the pump to run for a minimum of 5 minutes.** This is tabulated as "time to drain" and represents the time it would take to drain the wet well volume based on the pump design capacity. The pump run times should provide enough time for the pump to run at speed and exercise the pump.

5. **Has a pump cycle time of no less than 20 minutes.** The EMWD Small Sewage Lift Station Guidelines, Section IV,E,3,b indicate the pump should cycle no more than 6 start per hour at 1/3 of the cycle volume. This requirement limits the cycle time to a minimum of 20 minutes.

Table 6.7 outlines the wet well cycle volume requirements for each phase of lift station LS-1, assuming its operating conditions will align exactly with the design capacities detailed in Table 6.3. However, since the actual operating conditions will vary for each lift station alternative, the required wet well capacity will also differ and be larger. Thus, Table 6.7 provides an initial wet well capacity requirement, serving as the basis for evaluating the prepackaged lift station system alternatives.

Table 6.7: Wet Well Cycle Volume Requirements of LS-1 by Phase – Basis of Design

Phase	Design Capacity (gpm)	Minimum Wet Well Cycle Volume (gal)	Design Wet Well Cycle Volume[1] (gal)	Time to Fill (Non-peak) (min)	Time to Drain (min)	Pump Cycle Time (min)
1 Existing	51	128	340	23	7	27
1 Buildout	79	198	540	24	7	27
2 Existing	107	268	620	20	6	23
2 Buildout	182	455	1200	23	7	26
3 Existing	163	408	1200	25	7	29
3 Buildout	286	715	1900	23	7	27
4 Existing	214	535	1400	23	7	26
4 Buildout	406	1015	2700	23	7	27
5 Existing	262	655	1800	24	7	27
5 Buildout	519	1298	3800	25	7	29
6 Existing	342	855	2300	15	7	27
6 Buildout	599	1498	3800	16	6	25
7 Existing	462	1155	3400	12	7	29
7 Buildout	719	1798	3800	11	5	21
8 Existing	462	1155	3400	12	7	29
8 Buildout	719	1798	3800	11	5	21

[1]These preliminary wet well cycle volume requirements serve as the basis for evaluating the LS-1 lift station alternatives described in Section 6.5. Each lift station alternative will have different wet well capacity requirements due to varying operating conditions.

6.4 Conclusion of Sizing Requirements

Lift Station 1 must be designed as a phased system to meet the multiple phases of operation associated with the phased construction of the proposed sewer system and future development of SA4. A range of design flow conditions along with wet well capacity requirements were established and summarized in Table 6.8. LS-1 must be designed for a flow range of 51 to 719 gpm with a wet well sized to handle a wet cycle volume of up to a minimum of 3800 gallons. Pumping head requirements based on a preliminary force main size were also determined and summarized in Table 6.8. These parameters serve as the basis for evaluating the design alternatives for LS-1. Each lift station design alternative is evaluated in Section 6.5, analyzing its pump duty points and wet well conditions to ensure all parameters are met.

Table 6.8: LS-1 System Sizing – Basis of Design

Phase	Design Capacity (gpm)	Pumping Head Requirement (feet)	Design Wet Well Cycle Volume[1] (gal)
1 Existing	51	128	340
1 Buildout	79	198	540
2 Existing	107	268	620
2 Buildout	182	455	1200
3 Existing	163	408	1200
3 Buildout	286	715	1900
4 Existing	214	535	1400
4 Buildout	406	1015	2700
5 Existing	262	655	1800
5 Buildout	519	1298	3800
6 Existing	342	855	2300
6 Buildout	599	1498	3800
7 Existing	462	1155	3400
7 Buildout	719	1798	3800
8 Existing	462	1155	3400
8 Buildout	719	1798	3800

Note: These sizing requirements serve as the basis for evaluating the design alternatives for Lift Station 1. Each lift station alternative will have different pumping head and wet well capacity requirements due to varying operating conditions.

6.5 Lift Station LS-1 Pump Selection and Phasing

6.5.1 Option 1 – Flygt NP3202 with VFD and dual 4” & 6” force mains

Option 1 proposes a duplex station equipped with 45 HP pumps featuring variable frequency drives to accommodate the increase in flow rates during subsequent phases. Initially, flows would be directed through a 4-inch force main. As construction progresses and flows increase, discharge from the lift station would transition to the larger 6-inch force main. Ultimately, once flows exceed 500 gpm, discharge from the lift station would be split between the 4-inch and 6-inch force mains.

Figure 6.2 provides a visual representation of the lift station system functionality for Option 1, showing how it operates across varying flow rates and indicating which pumps and force mains to use as project phases advance and design flows increase.

The wet well geometry is rectangular, featuring an 8’ x 8’ flat bottom and 1:1 side slopes. However, one side deviates from the slope pattern and is vertical. Figure 6.3 shows an illustration of the proposed wet well geometry for Option 1.

FLYGT NP3202/468 45HP PUMPS WITH VFD (DUPLEX) - 4-INCH & 6-INCH FORCE MAINS

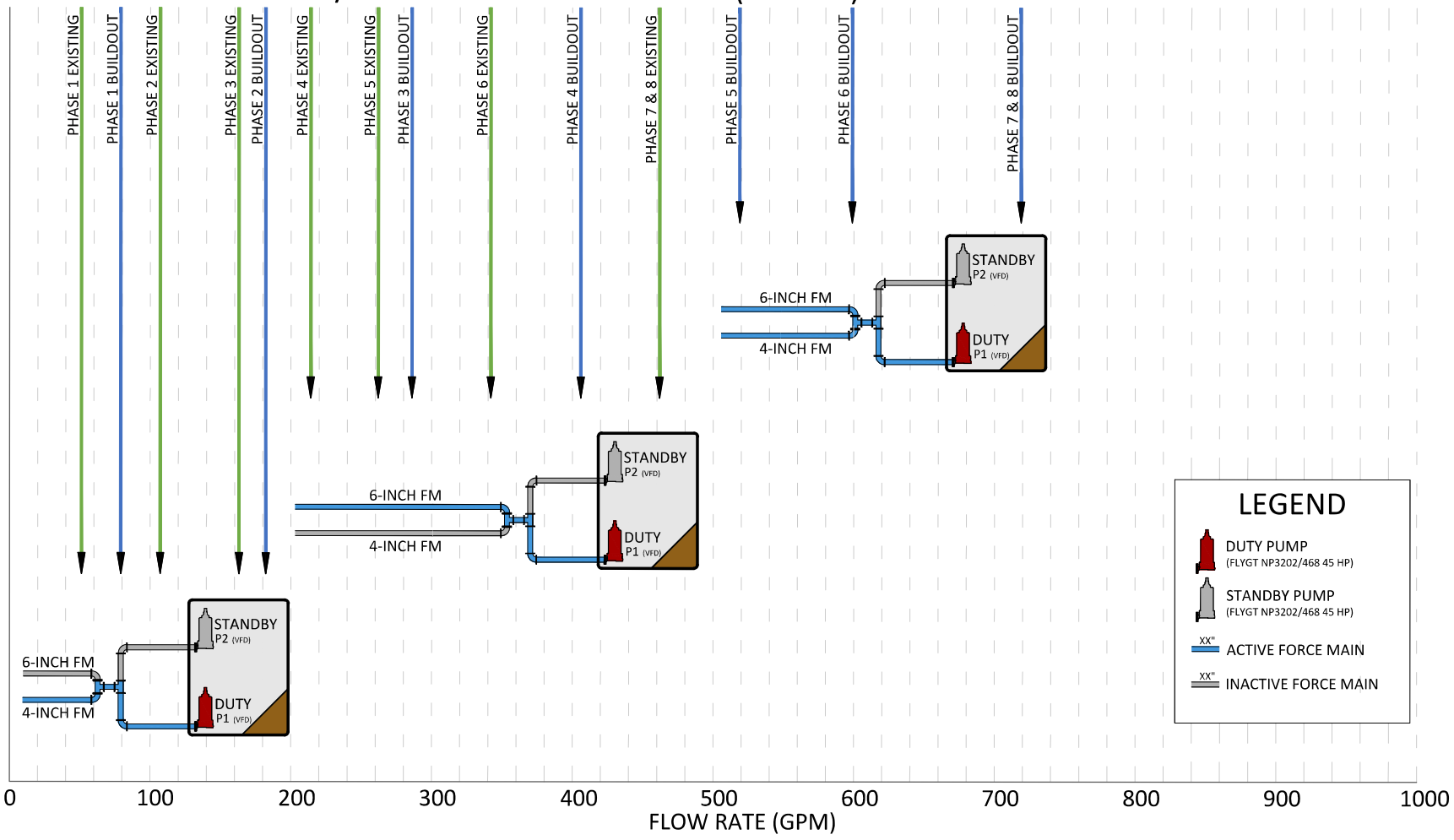

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FIGURE 6.2

OPT. 1-LS CONFIGURATION

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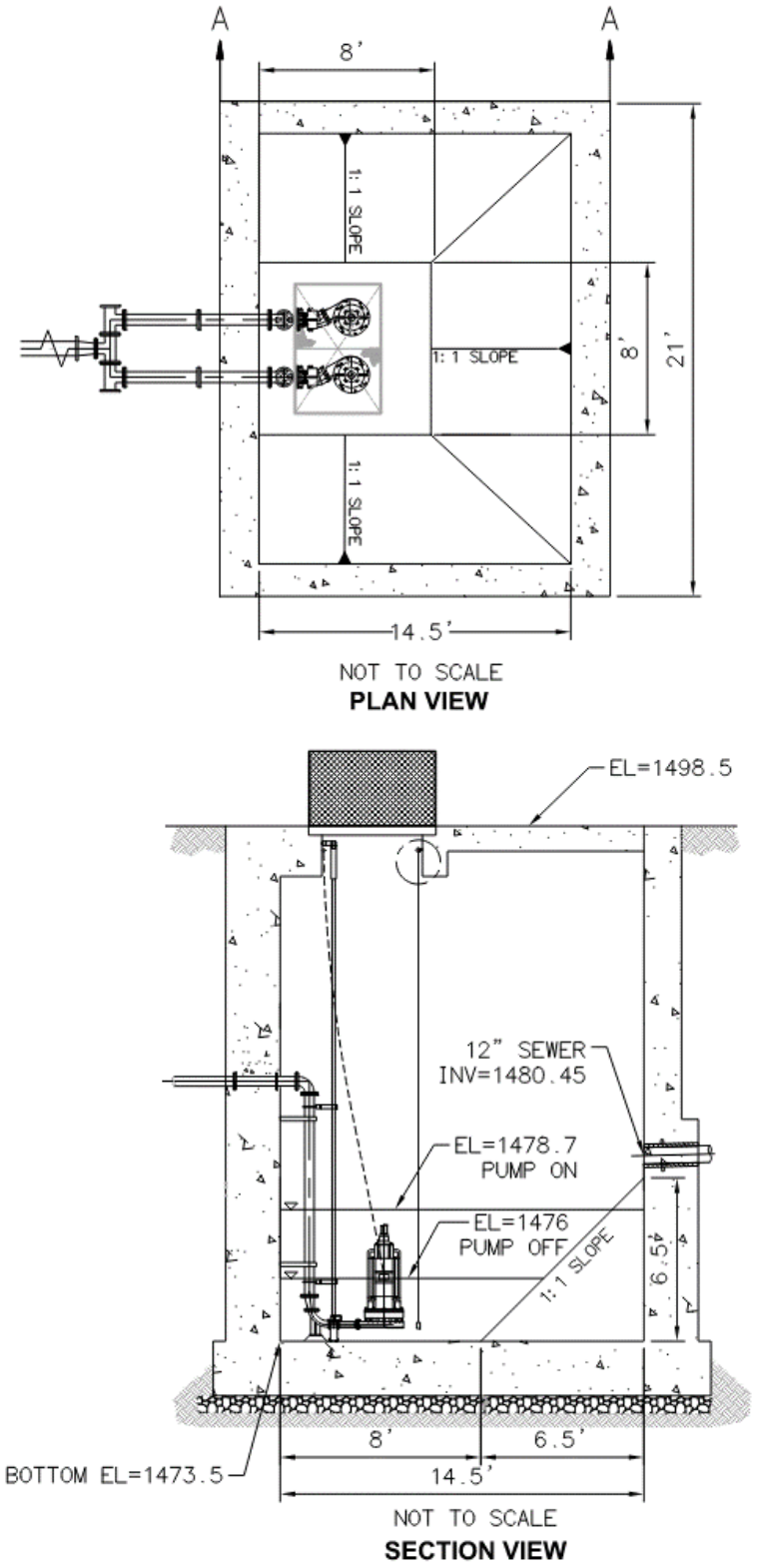

Figure 6.3: Example Illustration of Wet Well – Options 1, 2, 3, 4,7 & 8

An initial pump recommendation was provided by Flygt and is summarized below.

- Model: NP 3202/468
- Impeller diameter: 316 mm
- Impeller type: semi-open N-impeller
- Motor: 45 HP
- Power Requirements: 460V 3 phase
- Control: VFD

Advantages:

- **Single Pump Model**: Uses the same pump model for all phases, avoiding upgrades to motors, control panels, and system components.
- **No Downtime**: Keeps the lift station operational during subsequent phases.
- **Cost-Effective in the long run:** Save costs by avoiding new pump purchases and installations for each phase.
- **Energy efficient**: Efficiently handles phased flows by adjusting pump speed based on energy efficiency. Additionally, the pump starts at full speed and gradually reduces to desired speed to prevent potential for clogging.
- **Cleaning Features**:
    i. **Clog Detection** - Monitors amps to identify clogs; VFDs stop the pump and reverse the impeller to clear blockages.
    ii. **Pump Cleaning** - Allows periodic drawdown of wet well regardless of water level (e.g., every 12 hours).
    iii. **High-Speed Flush** – Pump can be set to periodically operate at full speed to attain the desired scour velocities in the force main.

Disadvantages:

a. **Higher upfront costs** due to VFD installation and setup
b. **Greater operational complexity**, potentially arising from the intricate VFD user interface
c. **Anticipated larger control panel size** compared to constant speed systems.

Figures 6.4 through 6.6 illustrate the system curves in conjunction with the pump curves for the 45 HP Flygt pump. These graphs reveal that the pumps operate predominantly on the left side of the pump curve in the earlier phases of the project, which is suboptimal for efficiency. However, considering its intermittent usage, operating within this range is deemed acceptable by the vendor. The curves also show that the pumps will only be turned down as low as approximately 70% of their full speed to meet the varying flow conditions, which is acceptable for pump operation. Table 6.9 provides a summary of the lift station system's operating conditions by phase. During phase 1, the pump must operate at approximately 110 gpm even though its design capacity falls below that. This adjustment ensures that velocities in the force main remain above 2 fps.

Furthermore, redundancy measures have been assessed in case one of the two lines requires maintenance. When only one of the two lines is available, the pump operating condition at full speed is detailed in Table 6.10. As indicated in the table, the pump cannot handle the average daily inflow at buildout when only the 4-inch line is available during maintenance.

Another approach to assess redundancy involves examining the lift station system during one hour of peak flow. Results of this analysis are shown in Table 6.11 . When only the 6-inch force main is online,

the pump rate falls below the peak flow rate, resulting in sewage backing up into the gravity sewer and at a depth of approximately 5.3 feet above the low-water level. For reference, the gravity sewer invert is about 4.4 feet above low-water level. It will take approximately 80 minutes to drain out the peak flow volume after its onset. The same occurs when only the 4-inch force main is online. Sewage will fill past the gravity sewer invert to a depth of approximately 12.6 feet above the low-water level. It will take approximately 180 minutes to drain out the peak flow volume after its onset.

Due to the depth of gravity system, minor surcharges into the gravity main can occur without causing overflow into the sewer laterals. Based on the 30% plans, the deepest existing lateral has an invert of 1486 feet, roughly 10 feet above the low water level. Thus, the sewer system is not expected to experience lateral overflow if the sewage in the wet well does not fill 10 feet above the low-water level. If the 4-inch force main is offline, sewage will overflow into the lateral. Increasing the size of the force main lines may be necessary to avoid surcharges and provide redundancy.

Table 6.9: Flygt NP3202 with VFD and Dual 4" & 6" Force Mains - Operating Conditions by Phase

Phase	Design Capacity (gpm)	Number of pumps	Force Main Diameter	Desired pump flow rate[1] (gpm)	Velocity in Force Main (fps)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (Non-peak) (min)	Time to Drain (min)	Pump Cycle Time (min)
1 Existing	51	1+1	4-inch	107[2]	2.7	620	0.57	43	6	23
1 Buildout	79	1+1	4-inch	107[2]	2.7	620	0.57	27	6	23
2 Existing	107	1+1	4-inch	107	2.7	620	0.57	20	6	23
2 Buildout	182	1+1	4-inch	182	4.7	1200	1.03	23	7	26
3 Existing	163	1+1	4-inch	163	4.2	1200	1.03	25	7	29
3 Buildout	286	1+1	6-inch	286	3.3	1900	1.54	23	7	27
4 Existing	214	1+1	6-inch	214	2.4	1400	1.18	23	7	26
4 Buildout	406	1+1	6-inch	406	4.6	2700	2.05	23	7	27
5 Existing	262	1+1	6-inch	262	3.0	1800	1.47	24	7	27
5 Buildout	519	1+1	4-inch and 6-inch	519	4.1	3800	2.68	25	7	29
6 Existing	342	1+1	6-inch	342	3.9	2300	1.80	15	7	27
6 Buildout	599	1+1	4-inch and 6-inch	599	4.7	3800	2.68	16	6	25
7 Existing	462	1+1	6-inch	462	5.2	3400	2.46	12	7	29
7 Buildout	719	1+1	4-inch and 6-inch	719	5.7	3800	2.68	11	5	21
8 Existing	462	1+1	6-inch	462	5.2	3400	2.46	12	7	29
8 Buildout	719	1+1	4-inch and 6-inch	719	5.7	3800	2.68	11	5	21

[1]Since Option 1 proposed VFD controls, a desired pump flow rate is reported to ensure ideal wet well conditions are met (i.e. wet well residence time, pump run time and cycle time). The pump flow rate should not exceed this value.
[2]Pump shall run at a minimum of 107 gpm during phase 1 of the project to meet the 2 fps minimum velocities and to avoid running the pump too far left of the pump curve.

Table 6.10: Redundancy Check with Flygt NP3202 with VFD and Dual 4" & 6" Force Mains (run pump at full speed)

Maintenance Condition	Force Main Diameter Available	Pump Flow Rate at full speed (gpm)	Average Day Inflow at Ultimate buildout (gpm)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (min)	Time to Drain (min)	Pump Cycle Time (min)
4-inch FM down	6-inch	525	351	3800	2.68	11	7	29
6-inch FM down	4-inch	220	351	3800	2.68	11	17[1]	69

[1]The pump cannot handle the average daily inflow, so it will be unable to drain the wet well if the average day inflow continuously enters the wet well. However, the given value indicates the time required to drain the wet well cycle volume when there is no inflow.

Table 6.11: Redundancy Check with Flygt NP3202 with VFD and Dual 4" & 6" Force Mains (peak flow for one hour)

Maintenance Condition	Force Main Diameter Available	Pump Flow Rate at full speed (gpm)	Peak Flow at Ultimate buildout[3] (gpm)	Volume of sewage left in wet well post 1-hr peak (gallons)	Depth of sewage left in wet well post 1-hr peak [2] (ft)	Time to Drain[1] (min)
4-inch FM down for maintenance	6-inch	525	632.1	9600	5.3	80
6-inch FM down for maintenance	4-inch	220	632.1	26100	12.6	180

[1]Time to drain includes 60 minutes of pumping time during peak flow along with additional time to pump out excess volume after the 1-hour peak period.
[2]This is the calculated depth above the LWL of the wet well.
[3]This is peak flow without the 20% factor of safety.

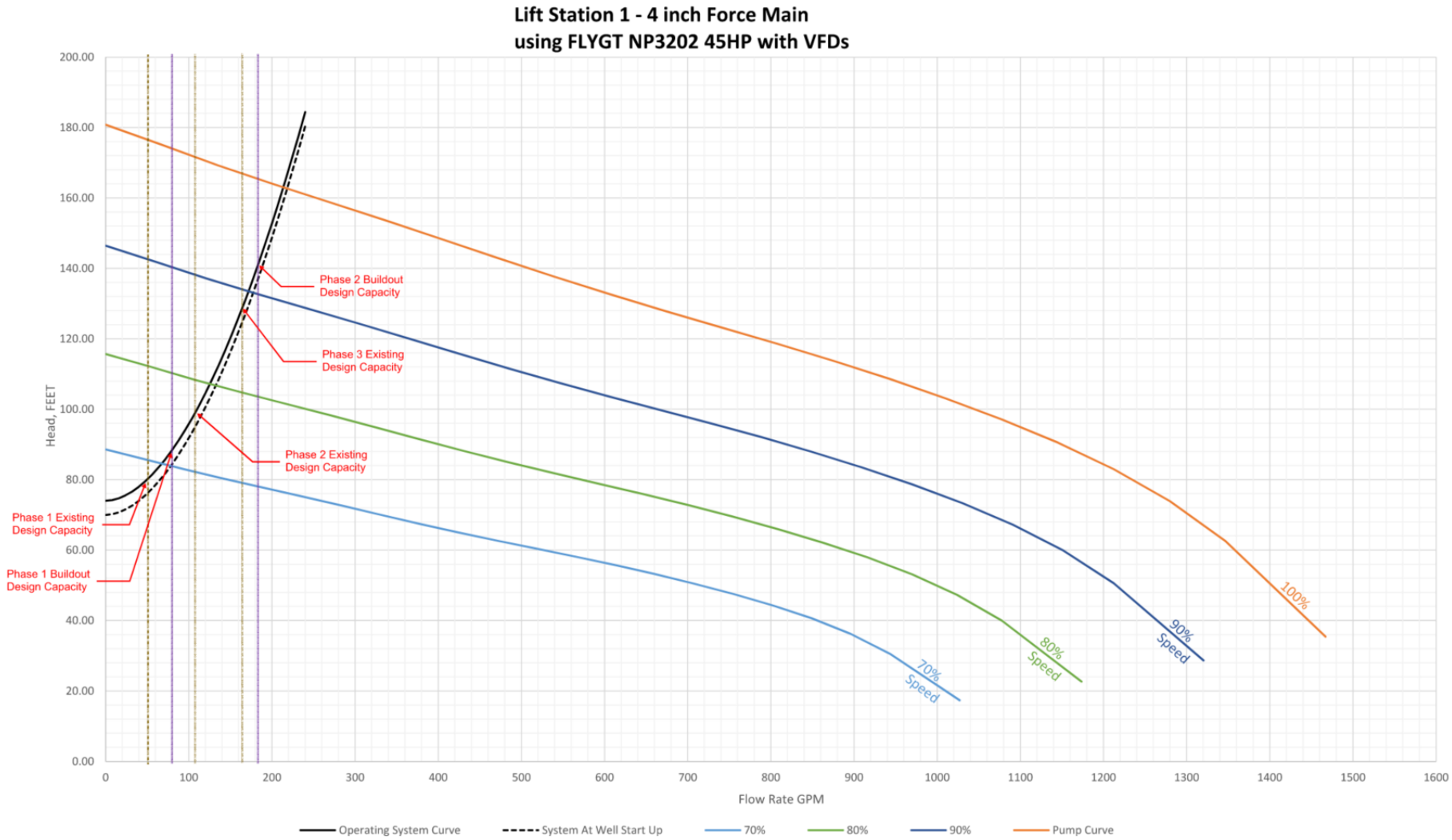

Figure 6.4: Lift Station LS-1 – 4-inch System Curve with Flygt NP3202/468 Pump Curves

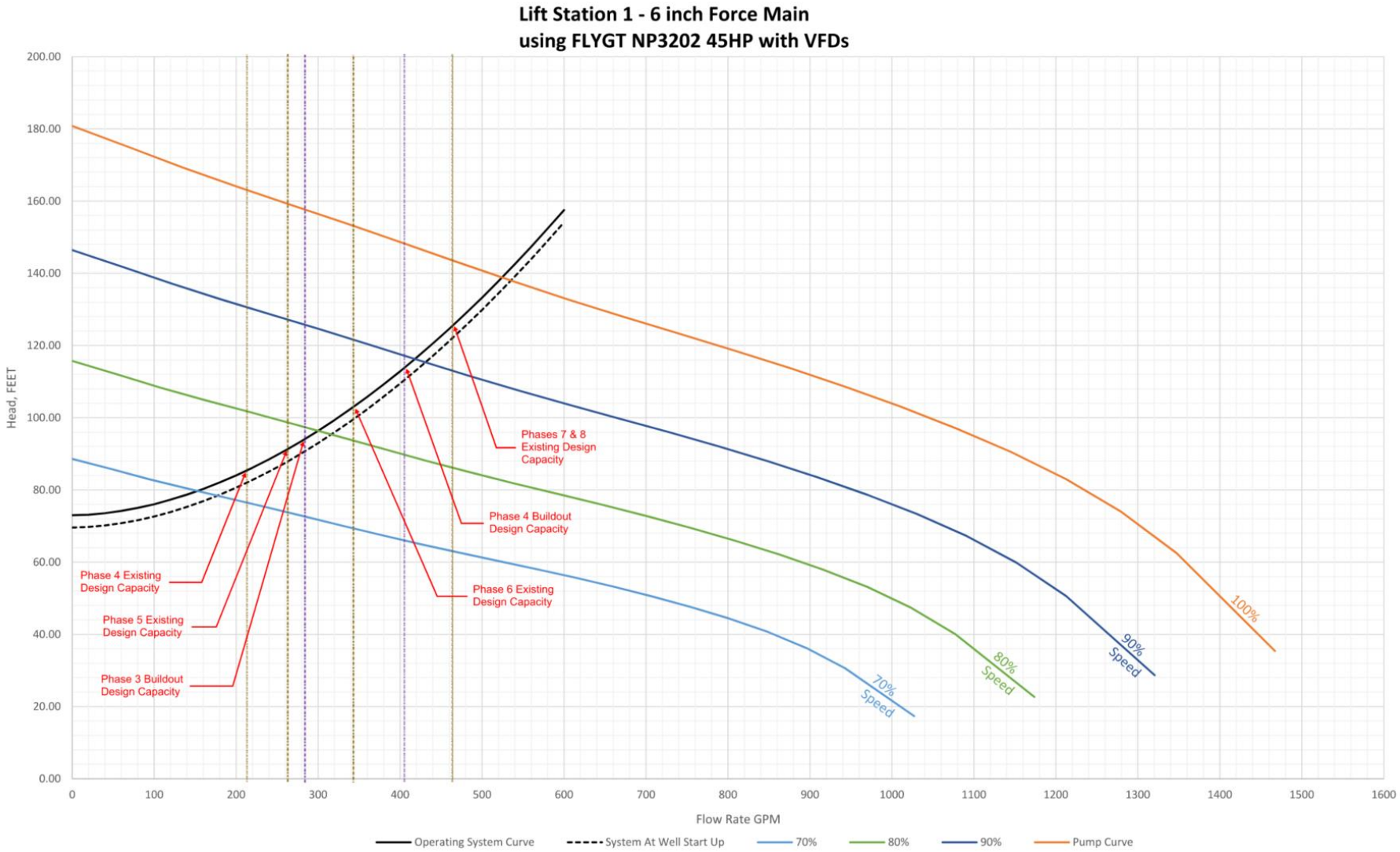

Figure 6.5: Lift Station LS-1 – 6-inch System Curve with Flygt NP3202/468 Pump Curves

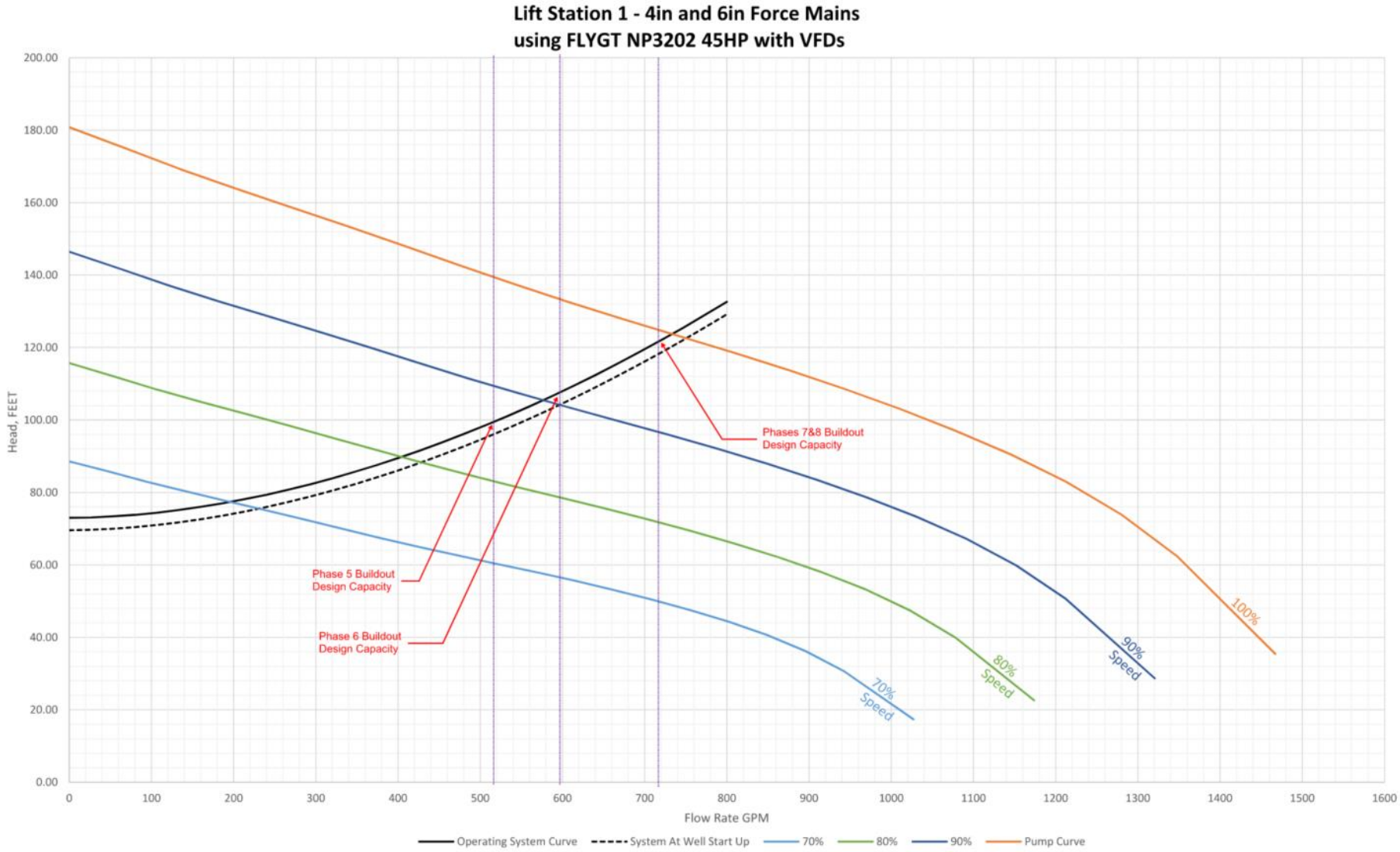

Figure 6.6: Lift Station LS-1 – Dual 4-inch & 6-inch System Curve with Flygt NP3202/468 Pump Curves

6.5.2 Option 2 – Flygt NP3202 with VFD and dual 6" force mains

Option 2 proposes a duplex station equipped with 45 HP pumps featuring variable frequency drives. It closely resembles option 1, except it utilizes dual 6-inch force mains and the pumps use a smaller diameter impeller. Initially, flows would be directed through one 6-inch force main. As construction progresses and flows increase, discharge from the lift station would transition to both 6-inch force mains.

Figure 6.7 illustrates the functionality of the lift station system for Option 2, showing how it handles varying flow rates and indicating which pumps and force mains to use as the phases progress and design flows increase.

The wet well geometry is rectangular, featuring an 8' x 8' flat bottom and 1:1 side slopes. However, one side deviates from the slope pattern and is vertical. Figure 6.4, located in Section 6.5.1, shows an illustration of the proposed wet well geometry for Option 2.

LIFT STATION 1 - OPTION 2
FLYGT NP3202/469 45HP PUMPS WITH VFD (DUPLEX) - DUAL 6-INCH FORCE MAINS

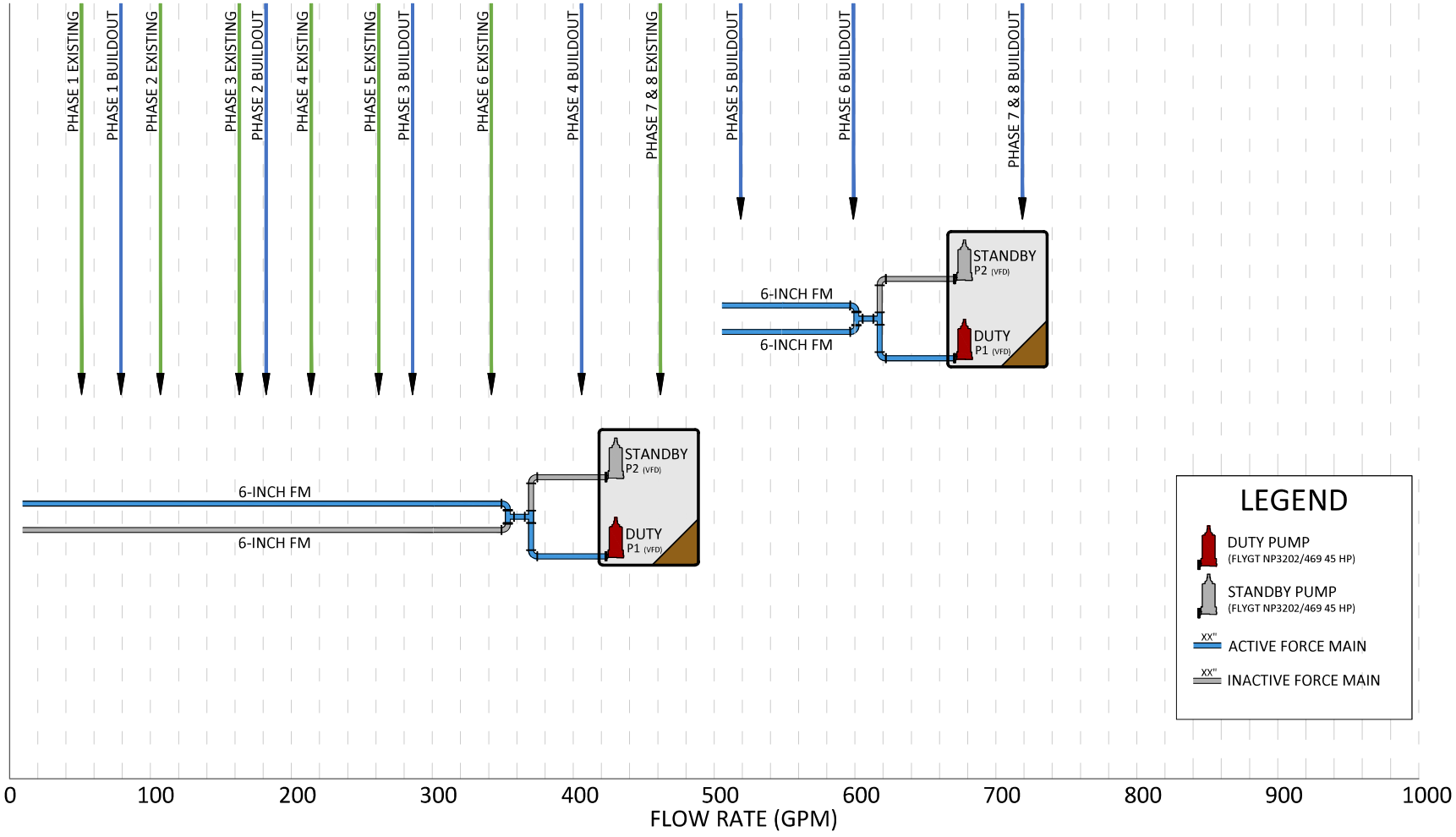

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FIGURE 6.7

OPT. 2-LS CONFIGURATION

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An initial pump recommendation was provided by Flygt and is summarized below.

- Model: NP 3202/469
- Impeller diameter: 290 mm
- Impeller type: semi-open N-impeller
- Motor: 45 HP
- Power Requirements: 460V 3 phase
- Control: VFD

The advantages and disadvantages of this VFD driven pump can be found in Section 6.5.1, mirroring those of Option 1.

Figures 6.8 and 6.9 illustrate the system curves in conjunction with the pump curves for the 45 HP Flygt pump. These graphs reveal that the pumps operate predominantly on the left side of the pump curve in the early phases of the project, which is suboptimal for efficiency. However, considering their intermittent usage, operating within this range is deemed acceptable by the vendor. The curves also show that the pumps will only be turned down as low as approximately 75% of their full speed to meet the varying flow conditions, which is acceptable for pump operation. Table 6.12 provides a summary of the lift station system's operating conditions by phase.

In the early project phases, the pump can operate in either of two alternatives.

- Alternative 1: The pumps must operate at a minimum of 107 gpm to avoid operating too far left on the curve. At this flow rate, velocities in the force main remain below the 2 fps minimum. Despite this, wet well conditions are slightly better than those in alternative 2, optimizing residence time, pump run time, and cycle time. Refer to Table 3.16 for a summary of the wet well conditions in each alternative.
- Alternative 2: To maintain adequate force main velocities, the pumps should operate at a minimum flow rate of 182 gpm. However, this pump flow increase affects wet well conditions, leading to increased residence time in the wet well and reduced pump run time and cycle time. While all criteria are still met, it is important to highlight the differences. Either alternative can be implemented, and the choice depends on maintenance preference.

Redundancy measures have been assessed in case one of the two lines requires maintenance. When only one 6" line is available, the pump's operating condition at full speed is detailed in Table 6.13. As indicated in the table, the pump can handle the average daily inflow at buildout when only one 6-inch line is available during maintenance.

Another redundancy assessment examines the lift station system during one hour of peak flow. Results of this analysis are shown in Table 6.14 . When only one 6-inch force main is online, the pump rate falls below the ultimate buildout peak flow rate. This results in sewage to fill at a depth of approximately 7.8 feet above the low-water level, causing back up into the gravity sewer. For reference, the gravity sewer invert is about 4.4 feet above low-water level. It will take approximately 100 minutes to drain out the peak flow volume after its onset.

Due to the depth of gravity system, minor surcharges into the gravity main can occur without causing overflow into the sewer laterals. Based on the 30% plans, the deepest existing lateral has an invert of 1486 feet, roughly 10 feet above the low water level. Thus, the sewer system is not expected to experience lateral overflow because the sewage in the wet well does not fill 10 feet past the low-water level during peak hour flow when only one 6-inch force main is available.

Table 6.12: Flygt NP3202 with VFD and Dual 6" Force Mains - Operating Conditions by Phase

	Phase	Design Capacity (gpm)	Number of pumps	Force Main Diameter	Desired pump flow rate[1] (gpm)	Velocity in Force Main (fps)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (Non-peak) (min)	Time to Drain (min)	Pump Cycle Time (min)
Alternative 1: Pump Operations	1 Existing	51	1+1	6-inch	107[2]	1.2	620	0.57	43	6	23
	1 Buildout	79	1+1	6-inch	107[2]	1.2	620	0.57	27	6	23
	2 Existing	107	1+1	6-inch	107	1.2	620	0.57	20	6	23
	3 Existing	163	1+1	6-inch	163	1.9	1200	1.03	25	7	29
Alternative 2: Pump Operations	1 Existing	51	1+1	6-inch	182	2.1	920	0.81	63	5	20
	1 Buildout	79	1+1	6-inch	182	2.1	920	0.81	40	5	20
	2 Existing	107	1+1	6-inch	182	2.1	920	0.81	30	5	20
	3 Existing	163	1+1	6-inch	182	2.1	1200	1.03	25	7	26
	2 Buildout	182	1+1	6-inch	182	2.1	1200	1.03	23	7	26
	3 Buildout	286	1+1	6-inch	286	3.3	1900	1.54	23	7	27
	4 Existing	214	1+1	6-inch	214	2.4	1400	1.18	23	7	26
	4 Buildout	406	1+1	dual 6-inch	406	2.3	2700	2.05	23	7	27
	5 Existing	262	1+1	6-inch	262	3.0	1800	1.47	24	7	27
	5 Buildout	519	1+1	dual 6-inch	519	2.9	3800	2.68	25	7	29
	6 Existing	342	1+1	6-inch	342	3.9	2300	1.80	15	7	27
	6 Buildout	599	1+1	dual 6-inch	599	3.4	3800	2.68	16	6	25
	7 Existing	462	1+1	6-inch	462	5.2	3400	2.46	12	7	29
	7 Buildout	719	1+1	dual 6-inch	719	4.1	3800	2.68	11	5	21
	8 Existing	462	1+1	6-inch	462	5.2	3400	2.46	12	7	29
	8 Buildout	719	1+1	dual 6-inch	719	4.1	3800	2.68	11	5	21

[1]Since Option 1 proposed VFD controls, a desired pump flow rate is reported to ensure ideal wet well conditions are met (i.e. wet well residence time, pump run time and cycle time). The pump flow rate should not exceed this value.
[2]Pump shall run at a minimum of 107 gpm during phase 1 of the project to avoid running the pump too far left of the pump curve.

Table 6.13: Redundancy Check with Flygt NP3202 and Dual 6" FMs (run pump at full speed)

Maintenance Condition	Force Main Diameter Available	Pump Flow Rate at full speed (gpm)	Average Day Inflow at Ultimate buildout (gpm)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (min)	Time to Drain (min)	Pump Cycle Time (min)
One 6-inch FM down	6-inch	420	351	3,800	2.68	11	9	36

Table 6.14: Redundancy Check with Flygt NP3202 and Dual 6" FMs (peak flow for an hour)

Maintenance Condition	Force Main Diameter Available	Pump Flow Rate at full speed (gpm)	Peak Flow at Ultimate buildout[3] (gpm)	Volume of sewage post 1-hr peak (gallons)	Depth of sewage post 1-hr peak[2] (ft)	Time to Drain[1] (min)
One 6-inch FM down	6-inch	420	632.1	15,300	7.8	100

[1]Time to drain includes 60 minutes of pumping time during peak flow along with additional time to pump out excess volume after the 1-hour peak period.
[2]This is the calculated depth above the LWL of the wet well.
[3]This is peak flow without the 20% factor of safety.

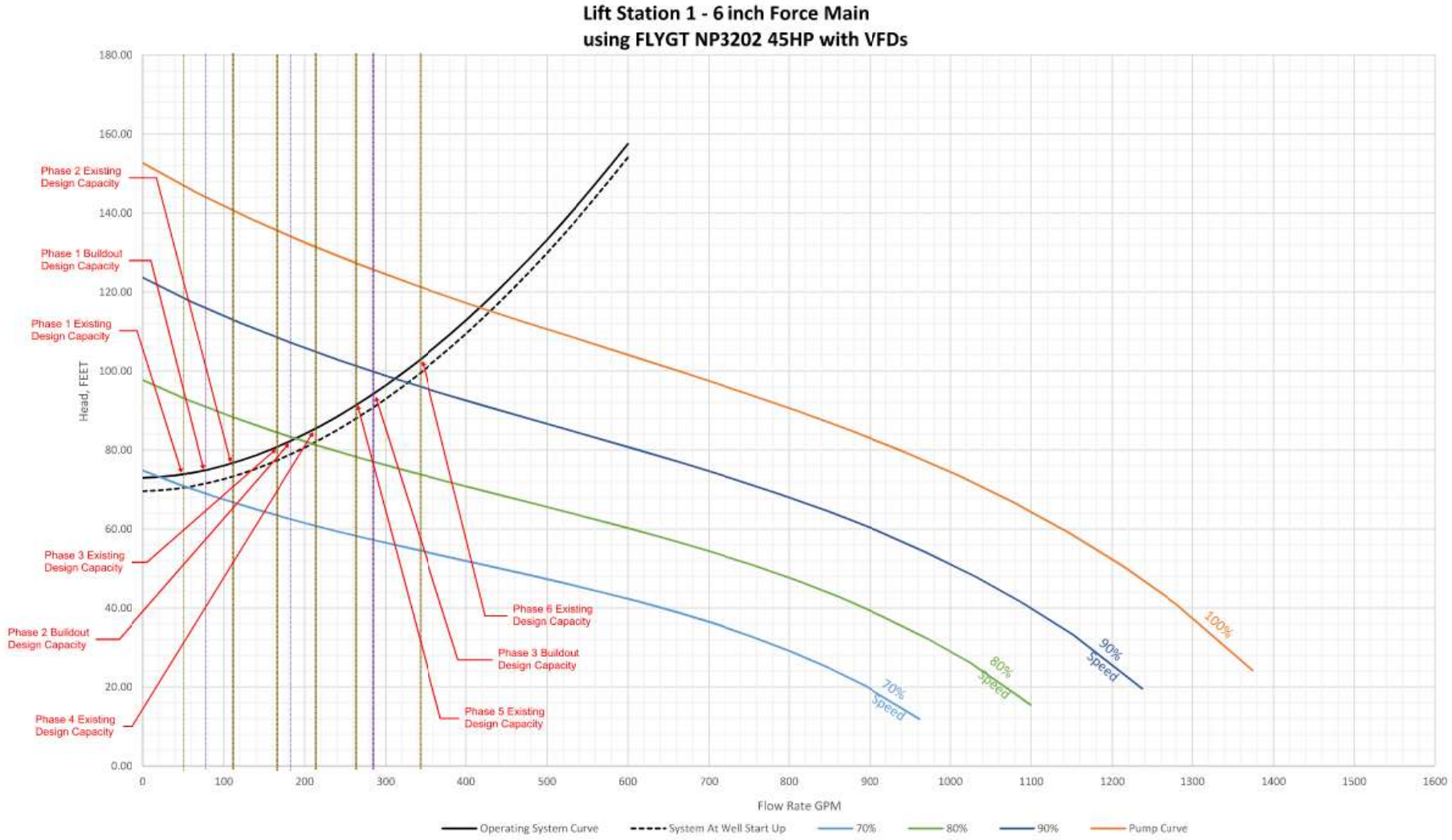

Figure 6.8: Lift Station LS-1 – 6-inch System Curve with Flygt NP3202/469 Pump Curves

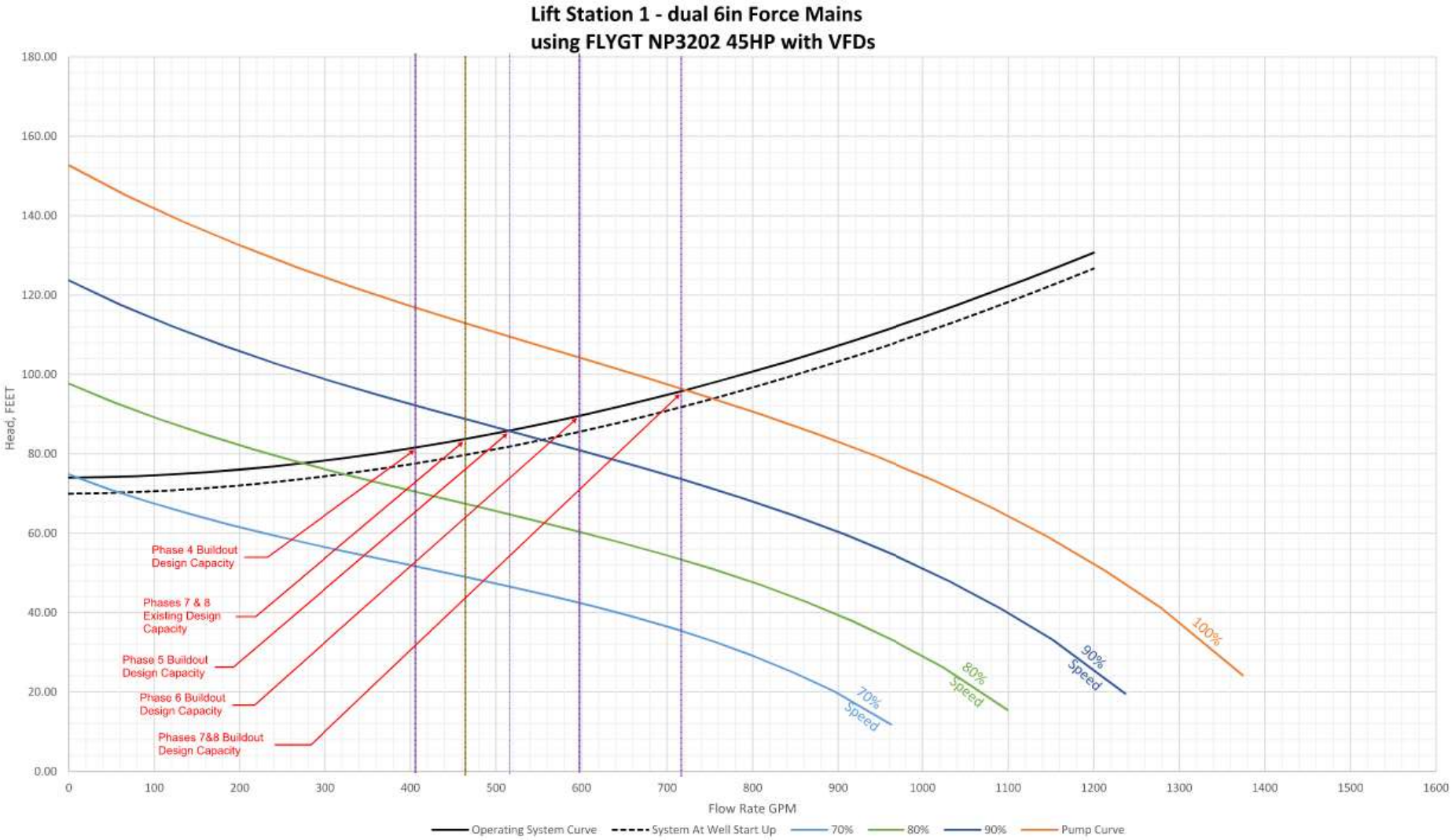

Figure 6.9: Lift Station LS-1 – Dual 6-inch System Curve with Flygt NP3202/469 Pump Curves

6.5.3 Option 3 – Keen Grinder/Chopper Pumps and dual 4" & 6" force mains

Option 3 proposes two lift station systems.

Interim Lift Station System: A duplex station equipped with 5 HP grinder pumps and a 4-foot diameter wet well is proposed. This interim system will accommodate the low flows in phase 1 (both existing and buildout conditions). These low flows will be directed through a 4-inch force main. Using this interim lift station allows testing of the grinder systems proposed for lift stations LS-2 through LS-5. Despite variations in pump motor, this identical model pump serves as a valuable evaluation test.

An initial lift station system recommendation was provided by Signa, a Keen Pump Vendor, and is summarized below.

- Model: HKGP
- Impeller type: Grinder
- Motor: 5 HP
- Power Requirements: 230V 1 phase or 230V/460V 3 phase
- Constant Speed Pump

Permanent Lift Station System: As the project advances beyond phase 2, the interim lift station will be replaced by a larger permanent system. This new system features duplex 50 HP chopper pumps to handle higher flows. The 50 HP motor is necessary for ultimate buildout conditions, but it is not essential for phases 3-6. However, to avoid frequent pump or motor changes, the 50 HP motor with a trimmed down impeller will be utilized at inception. New impeller sizes will be installed in subsequent phases. This approach ensures that pump operation roughly aligns with the lift station's design capacity during each phase, thereby preventing significantly oversized pumps and promoting favorable wet well conditions. Table 6.15 summarizes the lift station system's operating conditions for each phase, specifying the appropriate impeller size to be utilized. Note that the impeller sizes are intentionally chosen to operate above the design capacity for some phases. This approach minimizes frequent impeller replacements. Instead, the impellers are designed to accommodate multiple phases – slightly oversized pumps are permissible in some phases as long as wet well conditions remain within the acceptable criteria.

These higher flows will initially be directed through the 6-inch force main. Once flows exceed 500 gpm, discharge from the lift station would be divided between the 4-inch and 6-inch force mains.

Figure 6.10 provides a visual representation of the lift station system functionality for Option 3, showing how it operates across varying flow rates and indicating which pumps and force mains to use as project phases advance and design flows increase.

The wet well geometry is rectangular with an 8' x 8' flat bottom and 1:1 side slopes, except for one vertical side. Figure 6.4, located in Section 6.5.1, shows an illustration of the proposed wet well geometry for Option 3.

An initial pump recommendation was provided by Signa, a Keen Pump Vendor, and is summarized below.

- Model: K4VBCH
- Impeller diameter: varies and increases in each advancing phase
- Impeller type: Chopper
- Motor: 50 HP

- Power Requirements: 230V, 460V or 575V 3 phase
- Constant Speed Pump

LIFT STATION 1 - OPTION 3
KEEN HKGP 5HP & K4VBCH 50HP (DUPLEX) - 4-INCH & 6-INCH FORCE MAINS

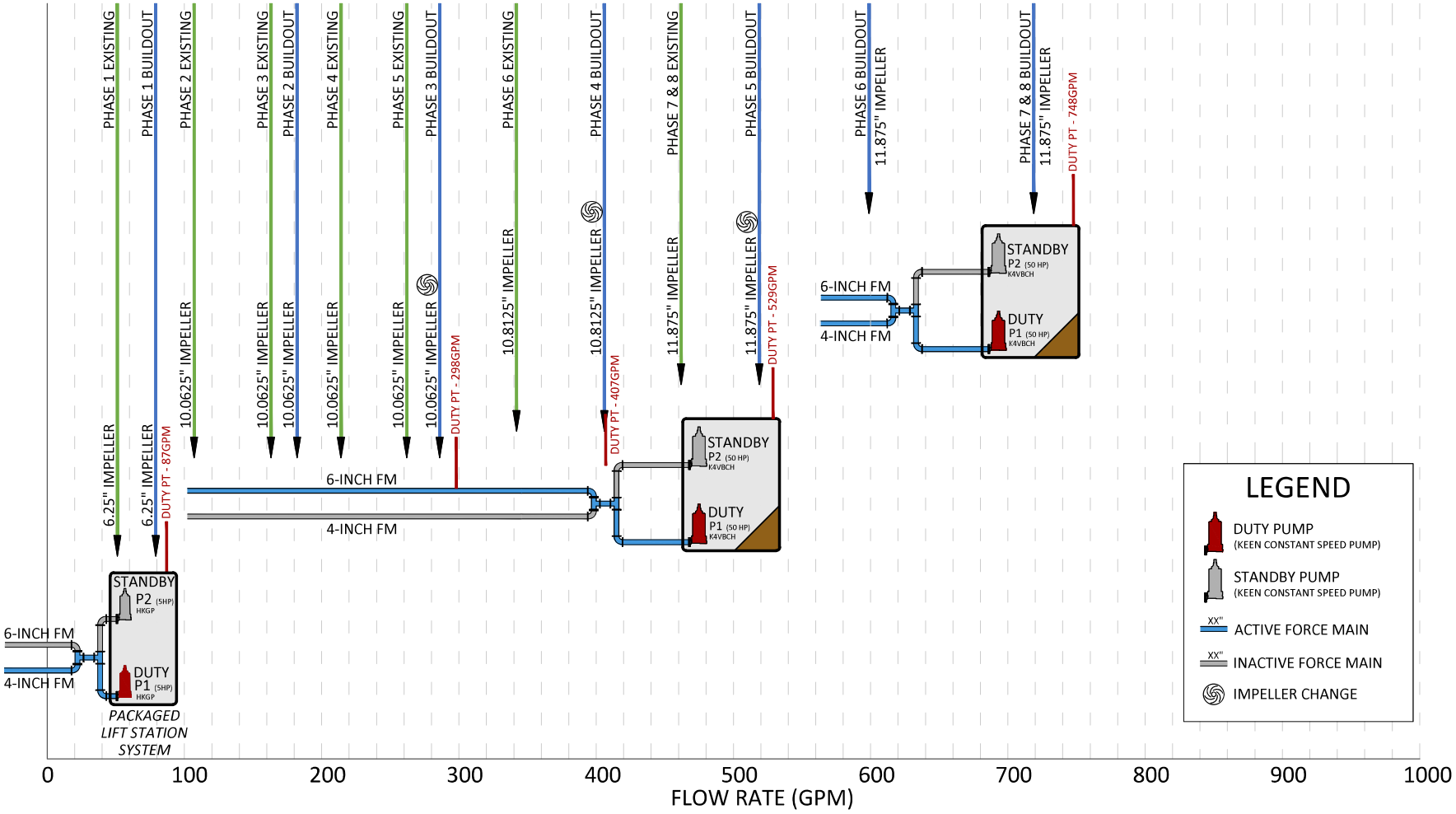

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FIGURE 6.10

OPT. 3-LS CONFIGURATION

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Advantages:

a. **Single Pump Model beyond Phase 1**: Uses the same pump model to handle flows beyond Phase 1, avoiding upgrades to motors and control panels. Only new impellers are needed as phases progress.
b. **Minimal Downtime**: Allows the lift station to stay operational during subsequent phases. One pump at a time is temporarily taken out of service for about a week each time the impeller needs replacement to handle the higher flows. Both the interim and permanent systems may be simultaneously constructed to prevent any downtime during the transition from one to the other
c. **Cost-Effective:** Save costs by avoiding new pump purchases and installations for each phase. Constant speed option is also cheaper than the VFD option.
d. **Test Drive on Prepackaged Lift Stations:** This option enables EMWD to test the smaller prepackaged lift stations proposed for lift stations LS-2 through LS-5.
e. **Good solids handling**: Grinder and chopper pumps break down solids before they enter the impeller, ensuring smooth operation and preventing blockages.

Disadvantages:

a. **Two Systems:** Requires the construction of two separate systems.
b. **Added costs from impeller changes:** While the factory doesn't add markup for trimming impellers, there is still an expense associated with buying a standard impeller for resize. This cost is expected to be a couple thousand dollars for the service.
c. **Requires management of impeller sizes:** Customized impeller sizes require diligent tracking of current and future sizes.

Figures 6.11 through 6.13 illustrate the system curves in conjunction with the pump curves for the 5 HP Keen HKGP Grinder Pump and 50 HP Keen K4VBCH Chopper Pump. For Phase 1, the 5 HP pumps will operate at approximately 87 gpm on the right side of the pump curve as shown in

Figure 6.11. Since this is a grinder pump, operation in this range is acceptable. For Phases 2 through 7, the 50 HP pumps will operate slightly to the left of the pump curve but still within the recommended operational range. In ultimate buildout conditions, the 50 HP pumps will operate close to the middle of the curve.

Redundancy measures have been assessed to ensure continuous operation during maintenance of the force mains. When only one of the two lines is available, the pump operating condition is detailed in Table 6.16. As indicated in the table, the pump cannot handle the average daily inflow at buildout when only the 4-inch line is available during maintenance.

Another approach to assess for redundancy in the system involves examining the lift station system when peak flow is sustained for one hour. Results of this analysis are shown in Table 6.17. When only the 6-inch force main is online, the pump rate falls below the peak flow rate, resulting in sewage accumulating at a depth of about 5.2 feet above the low-water level. For reference, the gravity sewer is 4.4. feet above the low-water level. Sewage will back flow into the gravity mains, and it will take approximately 80 minutes of pumping to get the reduce the level to low-water level – this pumping duration includes 60 minutes of peak flow occurrence and additional pumping time after the peak flow has subsided. When only the 4-inch force main is online, the pump rate falls below the peak flow rate, resulting in sewage filling past the gravity sewer invert to a depth of approximately 12.8 feet above the low-water level. It will take approximately 100 minutes to drain out the peak flow volume after its onset.

Due to the depth of gravity system, minor surcharges into the gravity main can occur without causing overflow into the sewer laterals. Based on the 30% plans, the deepest existing lateral has an invert of 1486', roughly 10 feet above the low water level. Thus, the sewer system is not expected to experience lateral overflow if the sewage in the wet well does not fill 10 feet above the low-water level. If the 4-inch force main is down, sewage will overflow into the lateral. Increasing the size of the force main lines may be necessary to avoid surcharges and provide redundancy.

Table 6.15: Grinder/Chopper Pumps and Dual 4" & 6" Force Mains - Operating Conditions by Phase

Phase	Design Capacity (gpm)	Number of pumps	Force Main Diameter	Pump flow rate (gpm)	Velocity in Force Main (fps)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (Non-peak) (min)	Time to Drain (min)	Pump Cycle Time (min)	Pump Model	Impeller Size
1 Existing	51	1+1	4-inch	87	2.2	580	0.53	40	7	27	HKGP	6.25"
1 Buildout	79	1+1	4-inch	87	2.2	580	0.53	25	7	27	HKGP	6.25"
2 Existing	107	1+1	6-inch	298	3.4	1600	1.33	52	5	21	K4VBCH	10.0625"
2 Buildout	182	1+1	6-inch	298	3.4	1900	1.54	36	6	26	K4VBCH	10.0625"
3 Existing	163	1+1	6-inch	298	3.4	1900	1.54	40	6	26	K4VBCH	10.0625"
3 Buildout	286	1+1	6-inch	298	3.4	1900	1.54	23	6	26	K4VBCH	10.0625"
4 Existing	214	1+1	6-inch	298	3.4	1900	1.54	61	6	26	K4VBCH	10.0625"
4 Buildout	406	1+1	6-inch	407	4.6	2700	2.05	23	7	27	K4VBCH	10.8125"
5 Existing	262	1+1	6-inch	298	3.4	1900	1.54	25	6	26	K4VBCH	10.0625"
5 Buildout	519	1+1	6-inch	529	5.9	3800	2.68	25	7	29	K4VBCH	11.875"
6 Existing	342	1+1	6-inch	407	4.6	3000	2.23	19	7	29	K4VBCH	10.8125"
6 Buildout	599	1+1	4-inch and 6-inch	748	5.9	3800	2.68	16	5	20	K4VBCH	11.875"
7 Existing	462	1+1	6-inch	529	5.9	3500	2.52	13	7	26	K4VBCH	11.875"
7 Buildout	719	1+1	4-inch and 6-inch	748	5.9	3800	2.68	11	5	20	K4VBCH	11.875"
8 Existing	462	1+1	6-inch	529	5.9	3500	2.52	13	7	26	K4VBCH	11.875"
8 Buildout	719	1+1	4-inch and 6-inch	748	5.9	3800	2.68	11	5	20	K4VBCH	11.875"

Table 6.16: Redundancy Check with Grinder/Chopper Pumps and Dual 4" & 6" Force Mains (run pump at full speed)

Maintenance Condition	Force Main Diameter Available	Pump Flow Rate (gpm)	Average Day Inflow at Ultimate buildout (gpm)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (min)	Time to Drain (min)	Pump Cycle Time (min)
4-inch FM down	6-inch	529	351	3,800	2.68	25	7	29
6-inch FM down	4-inch	209	351	3,800	2.68	11	18[1]	73

[1]The pump cannot handle the average daily inflow, so it will be unable to drain the wet well if the average day inflow continuously enters the wet well. However, the given value indicates the time required to drain the wet well cycle volume when there is no inflow.

Table 6.17: Redundancy Check with Grinder/Chopper Pumps and Dual 4" & 6" Force Mains (peak flow for an hour)

Maintenance Condition	Force Main Diameter Available	Pump Flow Rate at full speed (gpm)	Peak Flow at Ultimate buildout[3] (gpm)	Volume of sewage post 1-hr peak (gallons)	Depth of sewage post 1-hr peak[2] (ft)	Time to Drain[1] (min)
4-inch FM down for maintenance	6-inch	529	632.1	9400	5.2	80
6-inch FM down for maintenance	4-inch	209	632.1	26700	12.8	190

[1]Time to drain includes 60 minutes of pumping time during peak flow along with additional time to pump out excess volume after the 1-hour peak period.
[2]This is the calculated depth above the LWL of the wet well.
[3]This is peak flow without the 20% factor of safety.

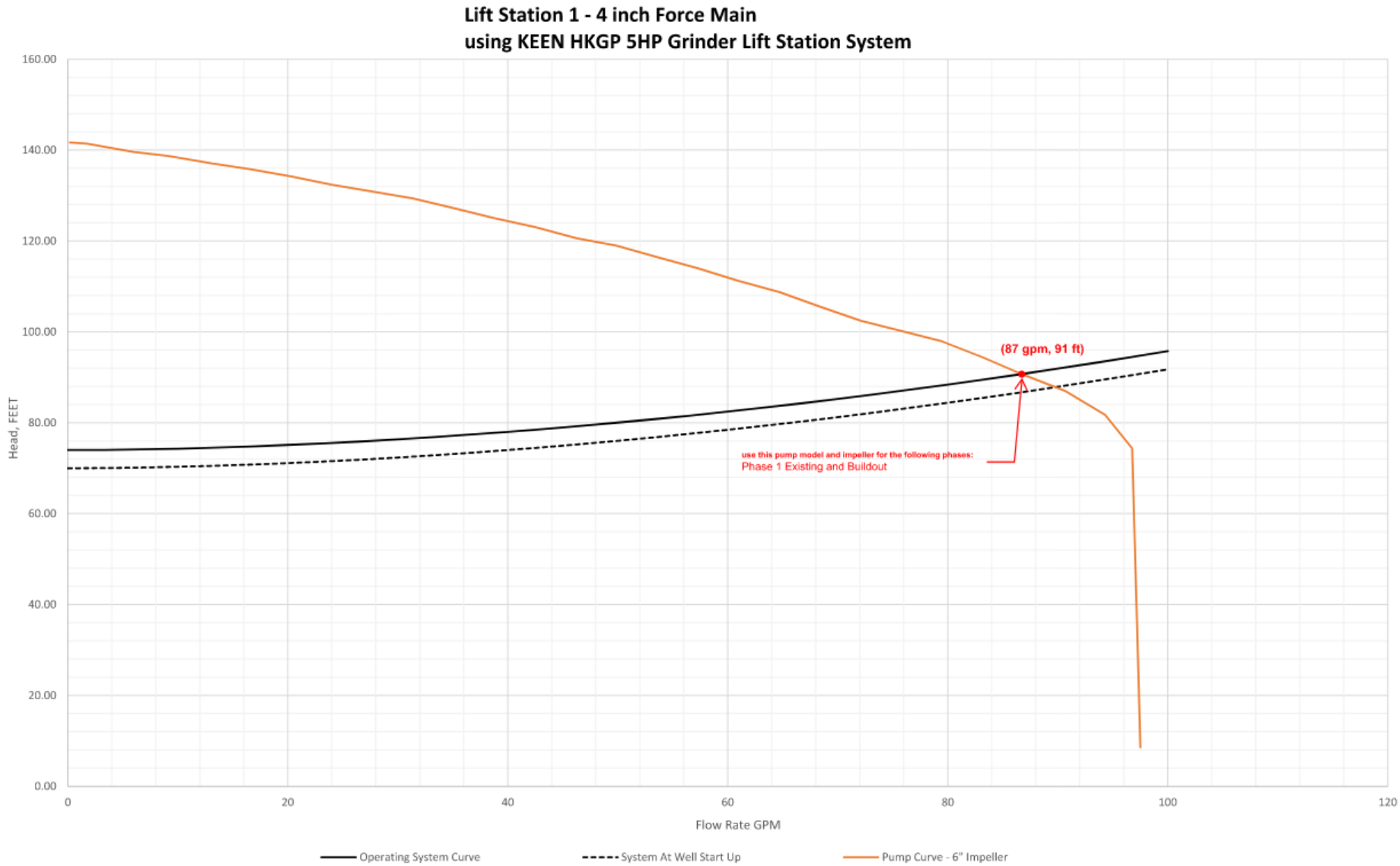

Figure 6.11: Lift Station LS-1 – 4-inch System Curve with Keen HKGP Pump Curve

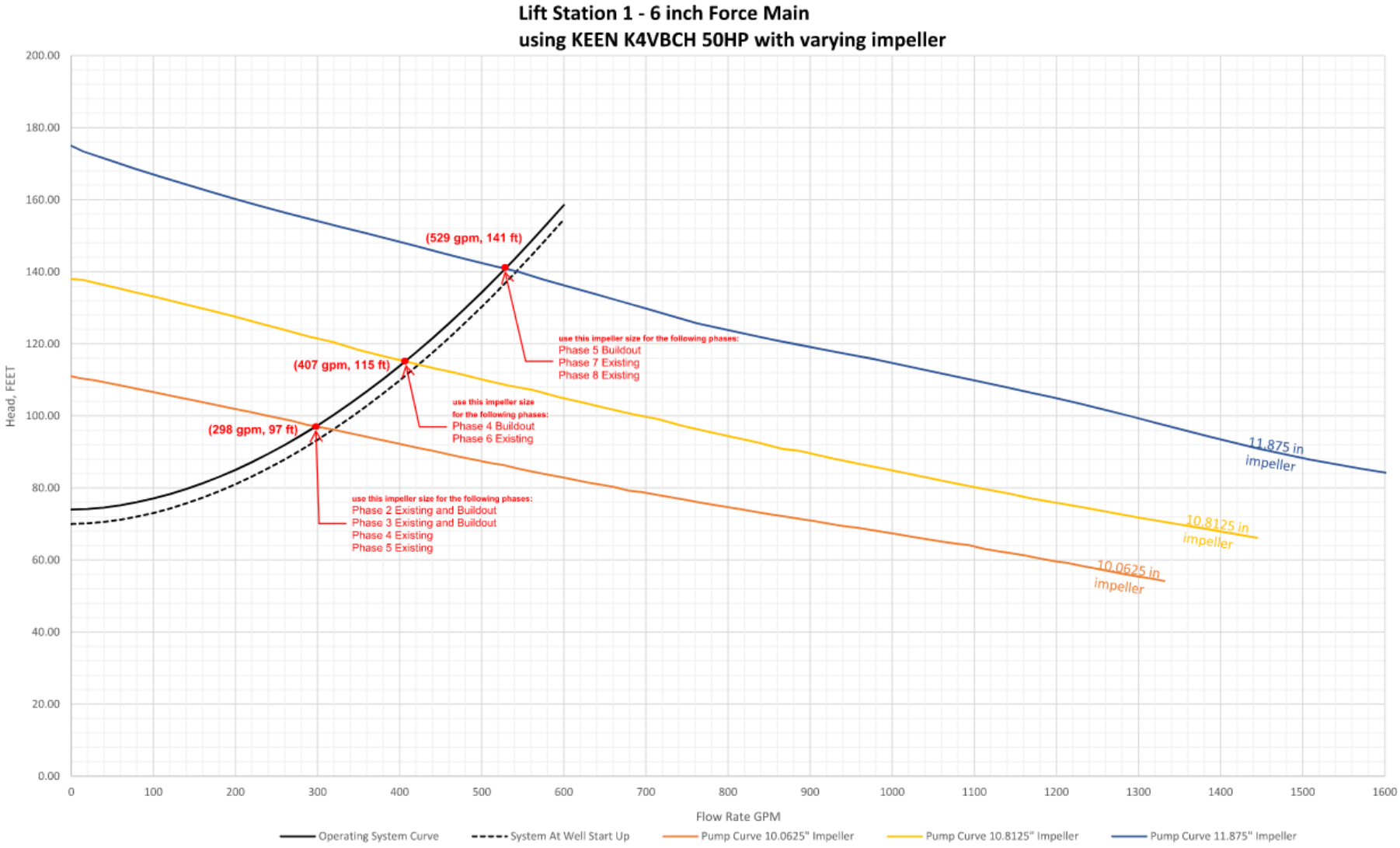

Figure 6.12: Lift Station LS-1 – 6-inch System Curve with Keen 4KVBCH Pump Curves

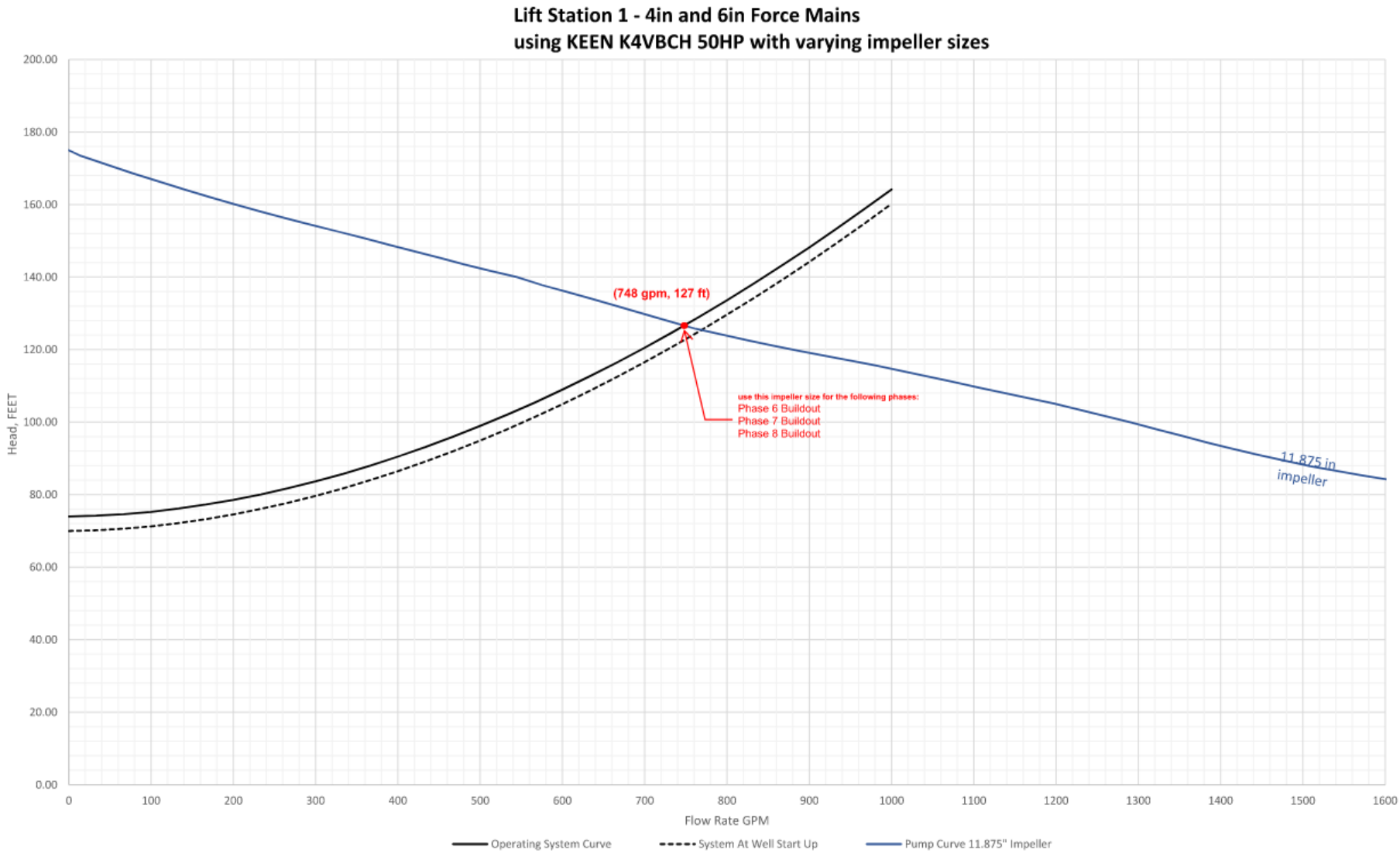

Figure 6.13: Lift Station LS-1 – Dual 4" & 6" System Curve with 4KVBCH Pump Curves

6.5.4 Option 4 – Keen Grinder/Chopper Pumps and dual 6" force mains

Option 4 proposes two lift station systems, similar to Option 3, but with larger force main sizes, which result in lower pump horsepower requirements.

Interim Lift Station System: A duplex station equipped with 5 HP grinder pumps and a 4-foot diameter wet well is proposed. This interim system will accommodate the low flows in phase 1 (both existing and buildout conditions). These low flows will be directed through a 6-inch force main. Using this interim lift station allows testing of the grinder systems proposed for lift stations 2 through 5. Despite variations in pump motor, this identical model pump serves as a valuable evaluation test. It is important to note that the 5 HP grinder system does not achieve the flow rate necessary to maintain velocities of at least 2 fps in the 6-inch force main.

An initial lift station system recommendation was provided by Signa, a Keen Pump Vendor, and is summarized below.

- Model: HKGP
- Impeller type: Grinder
- Motor: 5 HP
- Power Requirements: 230V 1 phase or 230V/460V 3 phase
- Constant Speed Pump

Permanent Lift Station System: As the project advances to phase 2, the interim lift station will be replaced by a larger permanent system. This new system features duplex 40 HP chopper pumps to handle higher flows. The 40 HP motor is necessary for ultimate buildout conditions, but it is not essential for phases 3-6. However, to avoid frequent pump or motor changes, the 40 HP motor with a trimmed down impeller will be utilized at inception. New impeller sizes will be installed in subsequent phases. This approach ensures that pump operation roughly aligns with the lift station's design capacity during each phase, thereby preventing significantly oversized pumps and promoting favorable wet well conditions. Table 6.18 summarizes the lift station system's operating conditions for each phase, specifying the appropriate impeller size to be utilized. Note that the impeller sizes are intentionally chosen to operate above the design capacity for some phases. This approach minimizes frequent impeller replacements. Instead, the impellers are designed to accommodate multiple phases – slightly oversized pumps are permissible in some phases as long as wet well conditions remain within the acceptable criteria.

These higher flows will be initially directed through one 6-inch force main. Once flows exceed 300 gpm, discharge from the lift station would be divided between the dual 6-inch force mains.

Figure 6.14 illustrates the functionality of the lift station system for Option 4, showing how it handles varying flow rates and indicating which pumps and force mains to use as the phases progress and design flows increase.

The wet well geometry is rectangular with an 8' x 8' flat bottom and 1:1 side slopes, except for one vertical side. Figure 6.4, located in Section 6.5.1, shows an illustration of the proposed wet well geometry for Option 4.

An initial pump recommendation was provided by Signa, a Keen Pump Vendor, and is summarized below.

- Model: K4VBCH
- Impeller diameter: varies and increases in each advancing phase
- Impeller type: Chopper
- Motor: 40 HP
- Power Requirements: 230V, 460V or 575V 3 phase
- Constant Speed Pump

LIFT STATION 1 - OPTION 4
KEEN HKGP 5HP & K4VBCH 40HP (DUPLEX) - DUAL 6-INCH FORCE MAINS

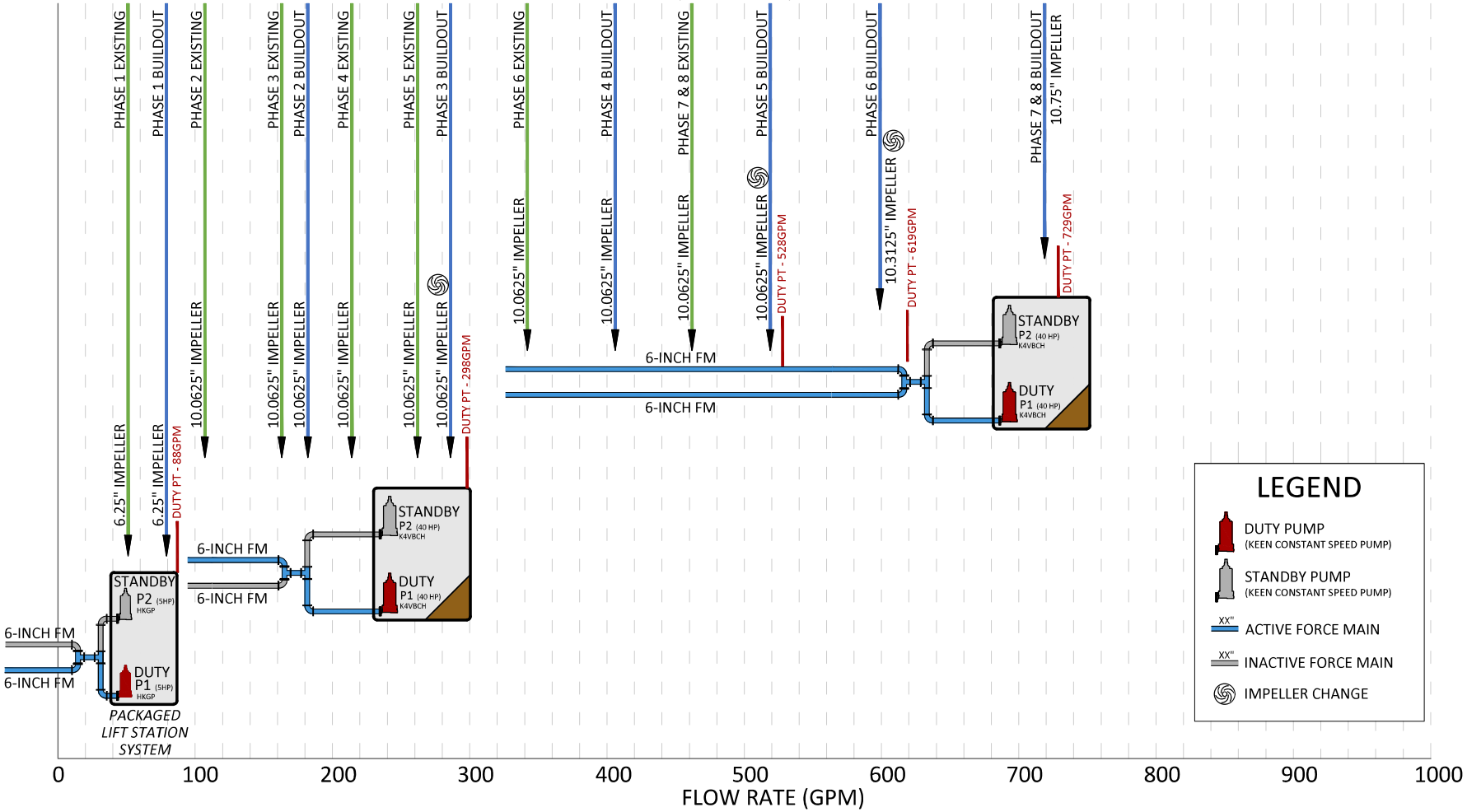

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FIGURE 6.14

OPT. 4-LS CONFIGURATION

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Advantages:

a. **Single Pump Model beyond Phase 1**: Uses the same pump model to handle flows beyond Phase 1, avoiding upgrades to motors and control panels. Only new impellers are needed as phases progress.
b. **Permanent System has smaller pump motor than Option 3**
c. **Minimal Downtime**: Allows the lift station to stay operational during subsequent phases. One pump at a time is temporarily taken out of service for about a week each time the impeller needs replacement to handle the higher flows. Both the interim and permanent systems may be simultaneously constructed to prevent any downtime during the transition from one to the other
d. **Cost-Effective:** Save costs by avoiding new pump purchases and installations for each phase. Constant speed option is also cheaper than the VFD option.
e. **Test Drive on Prepackaged Lift Stations:** This option enables EMWD to test the smaller prepackaged lift stations proposed for Lift Stations 2 through 5.
f. **Good solids handling**: Grinder and chopper pumps break down solids before they enter the impeller, ensuring smooth operation and preventing blockages.

Disadvantages:

a. **Two Systems:** Requires the construction of two separate systems.
b. **Added costs from impeller changes:** While the factory doesn't add markup for trimming impellers, there is still an expense associated with buying a standard impeller for resize. This cost is expected to be a couple thousand dollars for the service.
c. **Requires management of impeller sizes:** Customized impeller sizes require diligent tracking of current and future sizes.

Figures 6.15 through 6.17 illustrate the system curves in conjunction with the pump curves for the 5 HP Keen HKGP Grinder Pump and 40 HP Keen K4VBCH Chopper Pump. For Phase 1, the 5 HP pumps will operate at approximately 88 gpm on the right side of the pump curve as shown in Figure 6.17.

Figure 6.15. Since this is a grinder pump, operation in this range is acceptable. For Phases 2 through 5, the 40 HP pumps will operate slightly to the left of the pump curve but still within the recommended operational range. In later phases, the 50 HP pumps will operate close to the middle of the curve.

Redundancy measures have been assessed to ensure continuous operation during maintenance of the force mains. When only one of the two lines is available, the pump operating condition is detailed in

Table 6.19. As indicated in the table, the pump is able handle the average daily inflow at all phases when only one 6-inch line is available during maintenance.

Another approach to assess redundancy involves examining the lift station system when peak flow occurs for an hour as outlined in Table 6.20. When only one 6-inch force main is online, the pump rate falls below the peak flow rate, resulting in sewage accumulating at about 4.7 to 9.0 feet above the low water level. For reference, the gravity sewer invert is about 4.4 feet above low-water level. Sewage will back flow into the gravity mains, and it will take approximately 80 to 105 minutes to reduce the level to low-water level – this pumping duration includes 60 minutes of peak flow occurrence and additional pumping time after the peak flow has subsided.

Due to the depth of gravity system, minor surcharges into the gravity main can occur without causing overflow into the sewer laterals. Based on the 30% plans, the deepest existing lateral has an invert of 1486', roughly 10 feet above the low water level. Thus, the sewer system is not expected to experience lateral overflow because the sewage in the wet well does not fill 10 feet past the low-water level during peak hour flow when only one 6-inch force main is available.

Table 6.18: Grinder/Chopper Pumps and Dual 6" Force Mains - Operating Conditions by Phase

Phase	Design Capacity (gpm)	Number of pumps	Force Main Diameter	Pump flow rate (gpm)	Velocity in Force Main (fps)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (Non-peak) (min)	Time to Drain (min)	Pump Cycle Time (min)	Pump Model	Impeller Size
1 Existing	51	1+1	6-inch	88	1.0	580	0.53	40	7	26	HKGP	5.75"
1 Buildout	79	1+1	6-inch	88	1.0	580	0.53	25	7	26	HKGP	5.75"
2 Existing	107	1+1	6-inch	298	3.4	1600	1.33	52	5	21	K4VBCH	10.0625"
2 Buildout	182	1+1	6-inch	298	3.4	1900	1.54	36	6	26	K4VBCH	10.0625"
3 Existing	163	1+1	6-inch	298	3.4	1900	1.54	40	6	26	K4VBCH	10.0625"
3 Buildout	286	1+1	6-inch	298	3.4	1900	1.54	23	6	26	K4VBCH	10.0625"
4 Existing	214	1+1	6-inch	298	3.4	1900	1.54	31	6	26	K4VBCH	10.0625"
4 Buildout	406	1+1	dual 6-inch	528	3.0	3000	2.23	25	6	23	K4VBCH	10.0625"
5 Existing	262	1+1	6-inch	298	3.4	1900	1.54	25	6	26	K4VBCH	10.0625"
5 Buildout	519	1+1	dual 6-inch	528	3.0	3000	2.23	20	6	23	K4VBCH	10.0625"
6 Existing	342	1+1	dual 6-inch	528	3.0	3000	2.23	19	6	23	K4VBCH	10.0625"
6 Buildout	599	1+1	dual 6-inch	619	3.5	3800	2.68	16	6	25	K4VBCH	10.3125"
7 Existing	462	1+1	dual 6-inch	528	3.0	3500	2.52	13	7	27	K4VBCH	10.0625"
7 Buildout	719	1+1	dual 6-inch	729	4.1	3800	2.68	11	5	21	K4VBCH	10.75"
8 Existing	462	1+1	dual 6-inch	528	3.0	3500	2.52	13	7	27	K4VBCH	10.0625"
8 Buildout	719	1+1	dual 6-inch	729	4.1	3800	2.68	11	5	21	K4VBCH	10.75"

Table 6.19: Redundancy Check with Grinder/Chopper Pumps and Dual 6" Force Mains (run pump at full speed)

Maintenance Condition	Force Main Diameter Available	Pump Model and Impeller Size	Phase	Pump Flow Rate at full speed (gpm)	Average Day Inflow at Phase (gpm)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (min)	Time to Drain (min)	Pump Cycle Time (min)
One 6-inch line down	6-inch	K4VBCH 10.0625"	Phase 4 Buildout	298	118	3000	2.23	25	10	40
		K4VBCH 10.0625"	Phase 5 Buildout	298	151	3800	2.68	20	10	40
		K4VBCH 10.0625"	Phase 6 Existing	298	156	3000	2.23	19	10	40
		K4VBCH 10.0625"	Phase 7 Existing	298	276	3500	2.52	13	12	47
		K4VBCH 10.0625"	Phase 8 Existing	298	276	3500	2.52	13	12	47
		K4VBCH 10.3125"	Phase 6 Buildout	340	231	3800	2.68	16	11	45
		K4VBCH 10.75"	Phase 7 Buildout	395	351	3800	2.68	11	10	38
		K4VBCH 10.75"	Phase 8 Buildout	395	351	3800	2.68	11	10	38

Table 6.20: Redundancy Check with Grinder/Chopper Pumps and Dual 6" Force Mains (peak flow for an hour)

Maintenance Condition	Force Main Diameter Available	Pump Model and Impeller Size	Phase	Pump Flow Rate at full speed (gpm)	Peak Flow (gpm)	Volume of sewage post 1-hr peak (gallons)	Depth of sewage post 1-hr peak (ft)	Time to Drain[1] (min)
6-inch FM down for maintenance	6-inch	K4VBCH 10.0625"	Phase 4 Buildout	298	338.1	5,100	3.3	80
		K4VBCH 10.0625"	Phase 5 Buildout	298	432.1	10,700	5.8	95
		K4VBCH 10.0625"	Phase 6 Existing	298	297.5	3,000	2.2	70
		K4VBCH 10.0625"	Phase 7 Existing	298	417.5	9,700	5.4	95
		K4VBCH 10.0625"	Phase 8 Existing	298	417.5	9,700	5.4	95
		K4VBCH 10.3125"	Phase 6 Buildout	340	512.1	12,900	6.8	100
		K4VBCH 10.75"	Phase 7 Buildout	395	632.1	16,900	8.5	105
		K4VBCH 10.75"	Phase 8 Buildout	395	632.1	16,900	8.5	105

[1]Time to drain includes 60 minutes of pumping time during peak flow along with additional time to pump out excess volume after the 1-hour peak period.
[2]This is the calculated depth above the LWL of the wet well.
[3]This is peak flow without the 20% factor of safety.

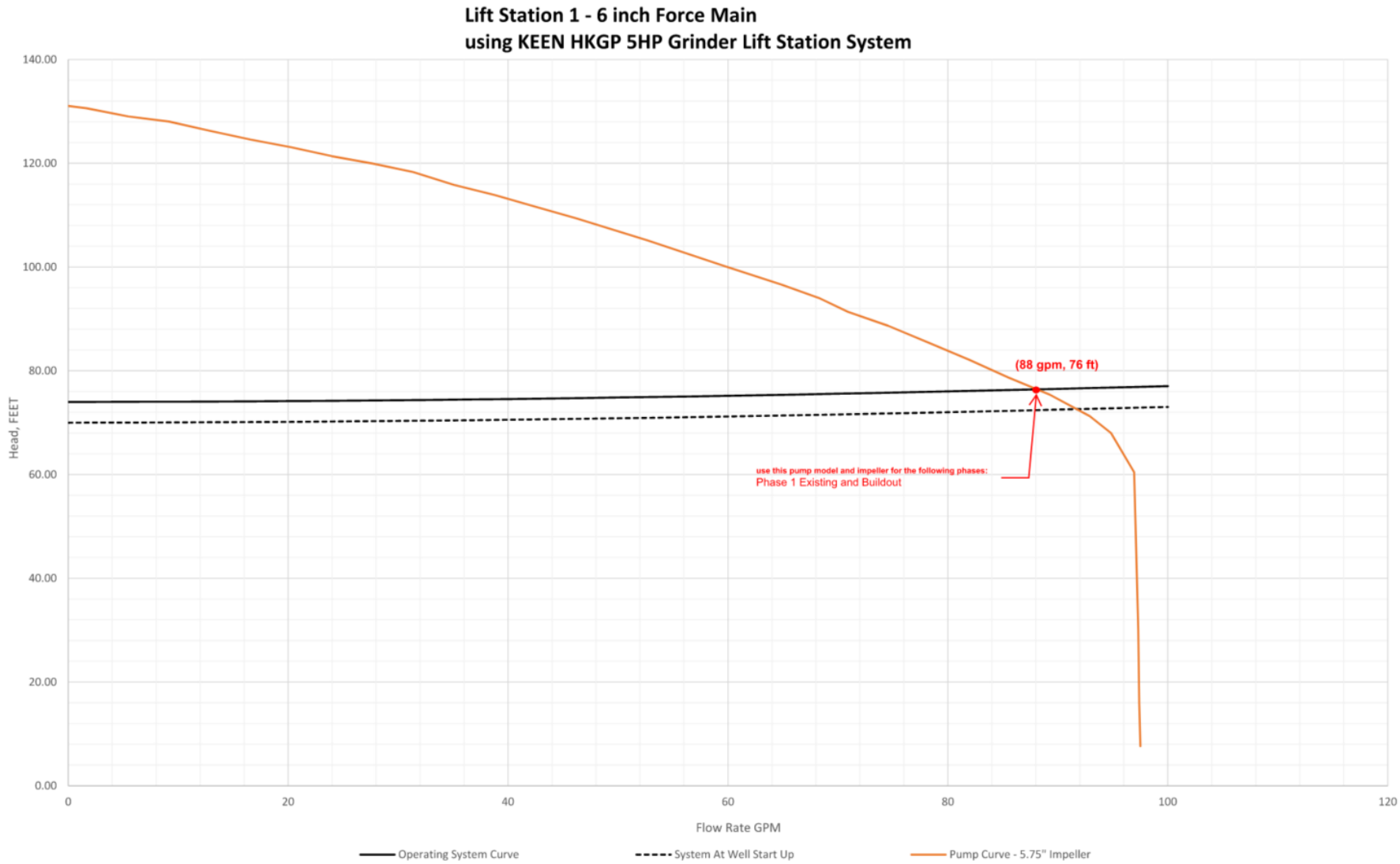

Figure 6.15: Lift Station LS-1 – 6-inch System Curve with Keen HKGP Pump Curve

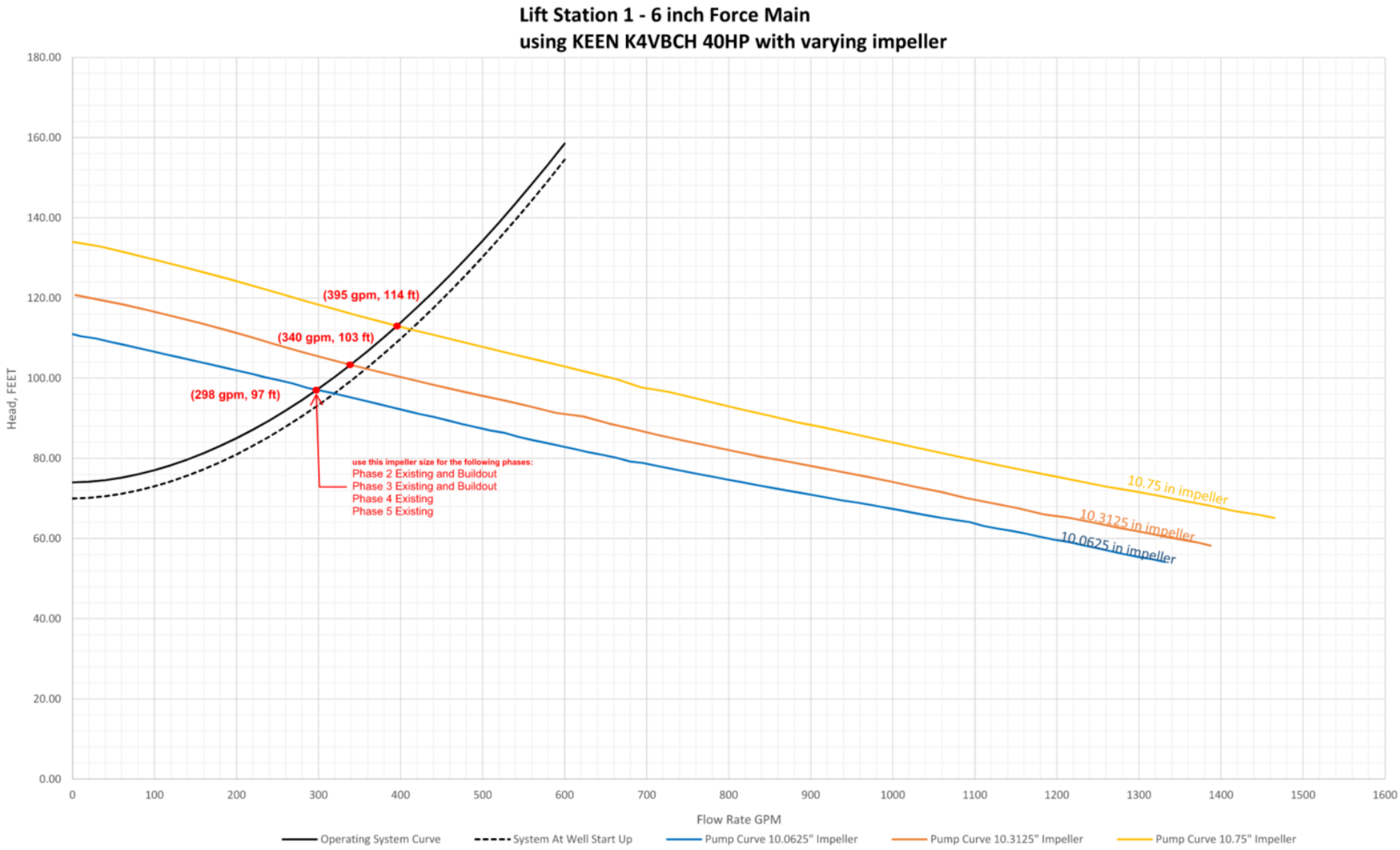

Figure 6.16: Lift Station LS-1 – 6-inch System Curve with Keen 4KVBCH Pump Curves

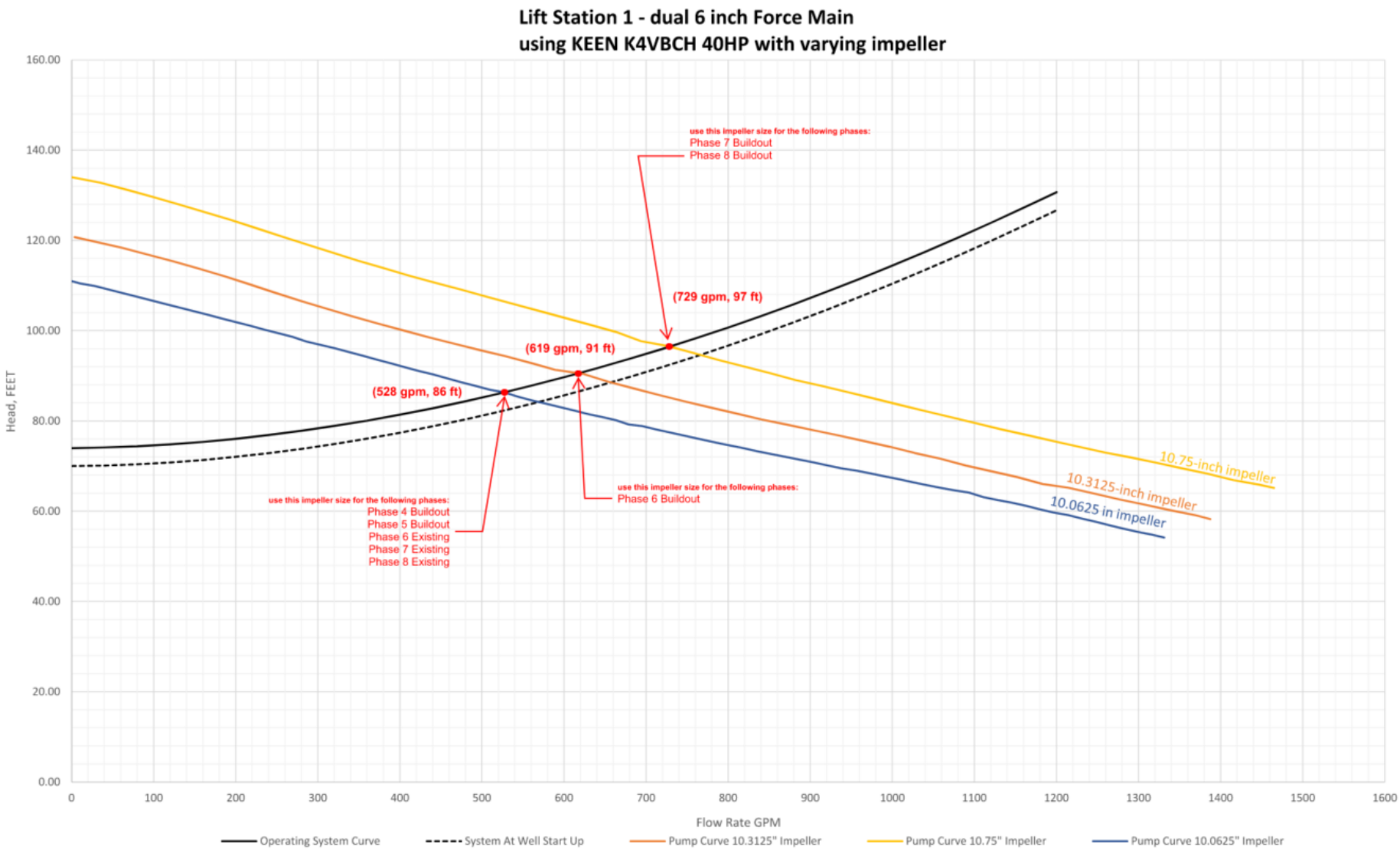

Figure 6.17: Lift Station LS-1 – Dual 6" System Curve with 4KVBCH Pump Curves

6.5.5 Option 5 – Flygt NP3127 (4+1 configuration) and dual 6" force mains

Option 5 proposes a 4+1 lift station equipped with 12 HP constant speed pumps. Initially, the lift station will have one duty pump and one standby pump to meet the low flow rates in the early phases of the project. As construction phases advance or the area builds out, additional pumps will be installed to handle the increased flow demands. The final configuration of the lift station will consist of four duty pumps and one standby pump, all utilizing the same pump model.

The low flows in early phases will be directed through a 6-inch force main. As the phases advance and higher flows occur, discharge from the lift station would be directed through dual 6-inch force mains. Figure 6.18 illustrates the functionality of the lift station system for Option 5, showing how it handles varying flow rates and indicating how many pumps and which force mains to use as the phases progress and design flows increase.

The proposed wet well will be a 15' x 18.5' rectangular structure, featuring an interior wall with knockouts to create a separate 8.5' x 18.5' area. This 8.5' x 18.5' section will serve as the wet well during the early phases of the project, housing the one duty pump, one standby pump and one future pump.

Figure 6.19 shows an illustration of the proposed wet well geometry for this option.

An initial pump recommendation was provided by Flygt and is summarized below.

- Model: NP 3127 SH 3~ Adaptive 249
- Impeller diameter: 146 mm
- Impeller type: Adaptive N-impeller
- Motor: 12 HP
- Power Requirements: 460V 3 phase
- Constant Speed Pump

LIFT STATION 1 - OPTION 5
FLYGT NP3127 12HP (5 PUMPS) - DUAL 6-INCH FORCE MAINS

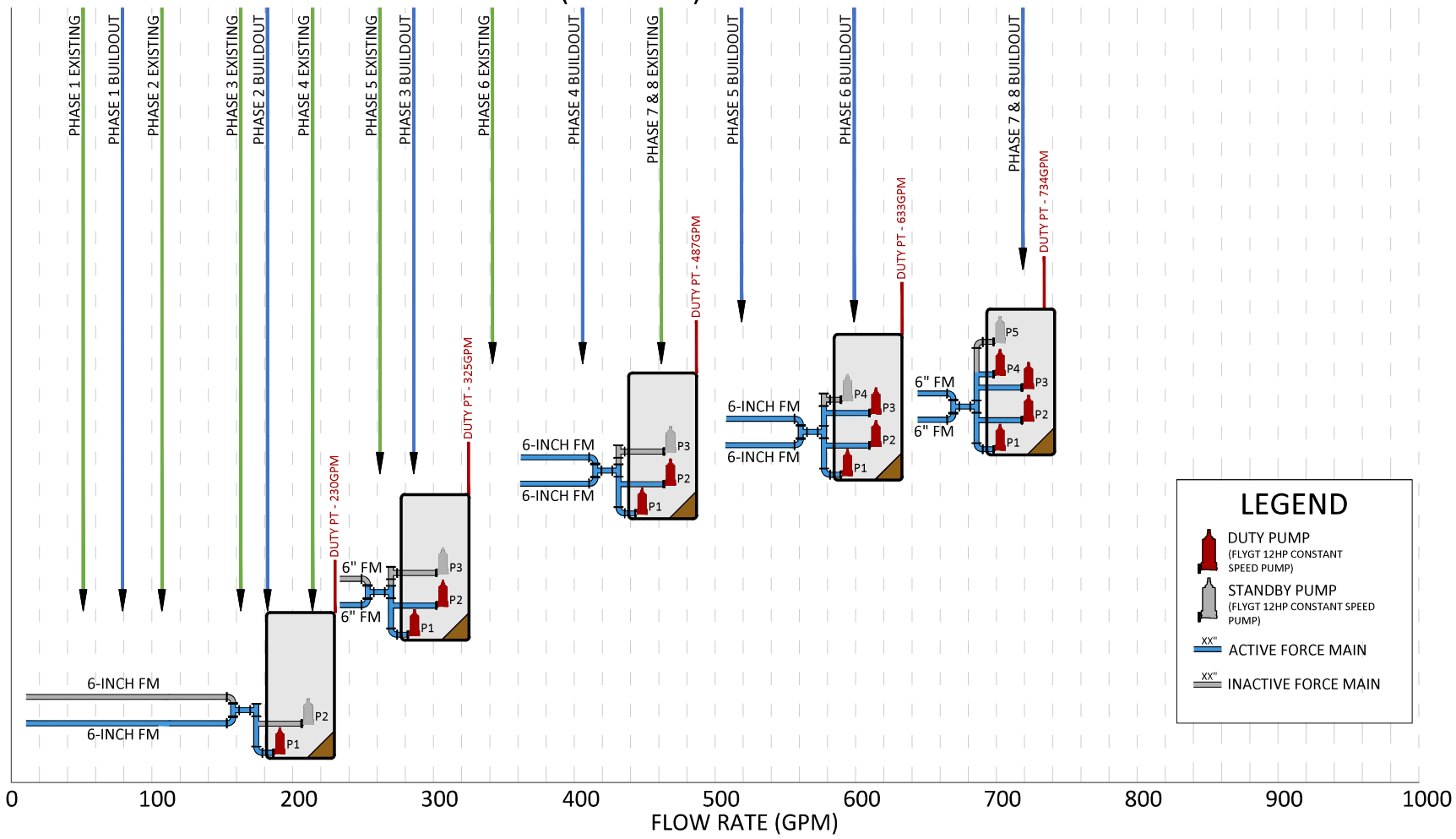

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FIGURE 6.18

OPT. 5-LS CONFIGURATION

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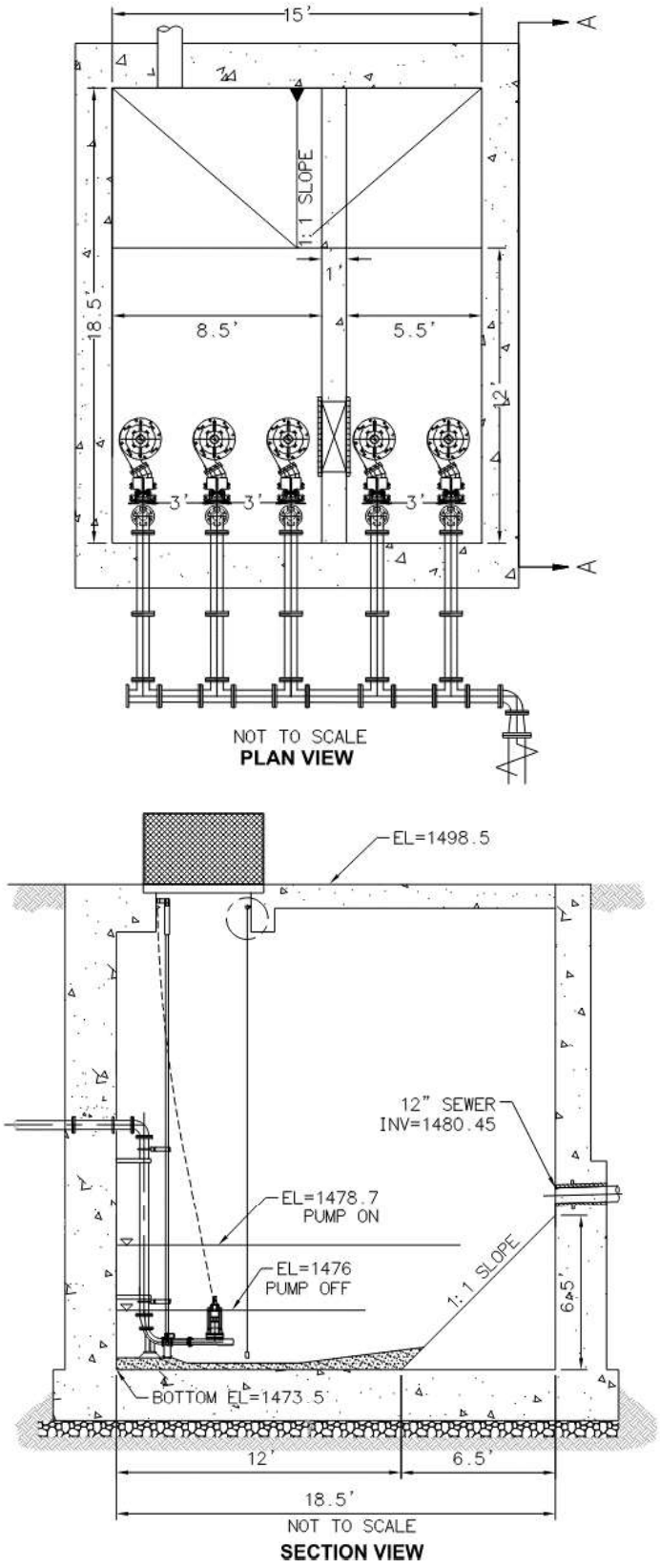

Figure 6.19: Example Illustration of Wet Well – Options 5, 6 & 9

Advantages:

a. **Single Pump Model**: All five pumps in the lift station will be identical pump models.
b. **Low Initial Costs:** By adding pumps as needed, the initial costs are low by starting with a small pump and increasing capacity over time.
c. **No Downtime**: The lift station can stay operational during subsequence phases. No pump will be taken out of service since new pumps will be installed to handle the higher flows.
d. **No Underutilized Pumps:** This option avoids the use of large 40-50 HP pumps during the initial low flow phases. Pumps typically have a service life of 10-20 years, and the timing of future construction phases and flow increases is uncertain. Installing a large pump prematurely may result in its replacement before reaching full capacity, leading to unnecessary expenditure.
e. **Less Clogging Concern**: Pumps will operate at full speed, so there is less clogging concern. Additionally, these pumps have Flygt's adaptive N-impeller to reduce risk of clogging due to low torque motors from smaller sized pumps. The adaptive N-impeller momentarily moves up axially to pass larger debris and avoid clogging.

Disadvantages:

a. **Potential for sedimentation and corrosion:** The wet well will have unoccupied space reserved for future pumps in the later phases. This empty space can lead to odor and grease buildup and sedimentation during the operation of the lift station before all pump slots are occupied. This may be mitigated by the 8'x12' section that will be used as the wet well cycle volume in the early phases of the project. The wet well residence time is greater than 60 minutes for phase 1 existing condition.
b. **Increased space requirements:** Additional space is needed to accommodate the five smaller pumps, along with the associated control panels, electrical connections, piping, and valves.
c. **Increased maintenance requirement:** There are more pumps to service and maintain.

Figures 6.20 and 6.21 illustrate the system curves alongside the pump curves for the four duty 12 HP Flygt pumps. These graphs reveal that the pumps operate near the middle of the pump curve, which is ideal for pump performance. The graphs also indicate that operating one to four pumps in this lift station will place its operating range between 230 gpm to 734 gpm. This operating range covers the design flow range well, except for the design flows in Phase 1 which are below 100 gpm. In existing Phase 1 condition, the lift station is oversized, resulting in a wet well residence time of 83 minutes. If a residence time marginally over the 60-minute maximum is acceptable, then this option is a viable design for Lift Station 1. Table 6.21 provides a summary of the lift station system's operating conditions by phase. It also specifies the number of pumps to be used and identifies which force mains will be utilized in each phase. Another option that utilizes a smaller pump for Phase 1 will be explored in Option 6.

Redundancy measures have been assessed to ensure continuous operation during maintenance of the force mains. When only one of the two lines is available, the pump operating condition is detailed in Table 6.22. As indicated in the table, the pump is able handle the average daily inflow at all phases when only one 6-inch line is available during maintenance.

Another approach to assess redundancy involves examining the lift station system when peak flow occurs for an hour as outlined in Table 6.23. When only one 6-inch force main is online, the pump rate falls below the peak flow rate, resulting to sewage accumulating at about 1.4 to 9.0 feet above the low water level. For reference, the gravity sewer invert is about 4.4 feet above low-water level. Sewage will back flow into the gravity mains, and it will take approximately 70 to 100 minutes to reduce the level to low-water level – this pumping duration includes 60 minutes of peak flow occurrence and additional pumping time after the peak flow has subsided.

Due to the depth of gravity system, minor surcharges into the gravity main can occur without causing overflow into the sewer laterals. Based on the 30% plans, the deepest existing lateral has an invert of 1486 feet, roughly 10 feet above the low water level. Thus, the sewer system is not expected to experience lateral overflow because the sewage in the wet well does not fill 10 feet past the low-water level as shown in Table 6.23.

Table 6.21: Flygt NP3127 4+1 Pumps and Dual 6" Force Mains - Operating Conditions by Phase

Phase	Design Capacity (gpm)	Number of pumps	Force Main Diameter	Pump flow rate (gpm)	Velocity in Force Main (fps)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (Non-peak) (min)	Time to Drain (min)	Pump Cycle Time (min)
1 Existing[1]	51	1+1	6-inch	230	2.6	1200	1.25	83	5	21
1 Buildout[1]	79	1+1	6-inch	230	2.6	1200	1.25	53	5	21
2 Existing[1]	107	1+1	6-inch	230	2.6	1300	1.35	42	6	23
2 Buildout[1]	182	1+1	6-inch	230	2.6	1300	1.35	25	6	23
3 Existing[1]	163	1+1	6-inch	230	2.6	1300	1.35	28	6	23
3 Buildout[1]	286	2+1	6-inch	325	3.7	1800	1.84	22	6	22
4 Existing[1]	214	1+1	6-inch	230	2.3	1300	1.35	21	6	23
4 Buildout[1]	406	2+1	dual 6-inch	487	2.8	2700	2.68	23	6	22
5 Existing[1]	262	2+1	6-inch	325	3.7	1800	1.84	24	6	22
5 Buildout	519	3+1	dual 6-inch	633	3.6	3500	2.15	23	6	22
6 Existing[1]	342	2+1	dual 6-inch	487	2.8	2700	2.68	17	6	22
6 Buildout	599	3+1	dual 6-inch	633	3.6	3500	2.15	15	6	22
7 Existing[1]	462	2+1	dual 6-inch	487	2.8	2700	2.68	10	6	22
7 Buildout	719	4+1	dual 6-inch	734	4.2	4200	2.54	12	6	23
8 Existing[1]	462	2+1	dual 6-inch	487	2.8	2700	2.68	10	6	22
8 Buildout	719	4+1	dual 6-inch	734	4.2	4200	2.54	12	6	23

[1]Design wet well cycle volume in these phases is only within the 8.5'x 12' section of the wet well. In the early phases, only this portion of the wet well will be available for storage of sewer flows.

Table 6.22: Redundancy Check with Flygt NP3127 4+1 Pumps and Dual 6" Force Mains (run pump at full speed)

Maintenance Condition	Force Main Diameter Available	Phase	Number of Pumps	Pump Flow Rate at full speed (gpm)	Average Day Inflow at Phase (gpm)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (min)	Time to Drain (min)	Pump Cycle Time (min)
One 6-inch line down	6-inch	Phase 4 Buildout[1]	2+1	325	118	2700	2.68	23	8	33
		Phase 5 Buildout	3+1	373	151	3500	2.15	23	9	38
		Phase 6 Existing[1]	2+1	325	156	2700	2.68	17	8	33
		Phase 7 Existing[1]	2+1	325	276	2700	2.68	10	8	33
		Phase 8 Existing[1]	2+1	325	276	2700	2.68	10	8	33
		Phase 6 Buildout	3+1	373	231	3500	2.15	15	9	38
		Phase 7 Buildout	4+1	402	351	4200	2.54	12	10	42
		Phase 8 Buildout	4+1	402	351	4200	2.54	12	10	42

[1]Design wet well cycle volume in these phases is only within the 8.5'x 12' section of the wet well. In the early phases, only this portion of the wet well will be available for storage of sewer flows.

Table 6.23: Redundancy Check with Flygt NP3127 4+1 Pumps and Dual 6" Force Mains (peak flow for an hour)

Maintenance Condition	Force Main Diameter Available	Phase	Number of Pumps	Pump Flow Rate at full speed (gpm)	Peak Flow (gpm)	Volume of sewage post 1-hr peak (gallons)	Depth of sewage post 1-hr peak[2] (ft)	Time to Drain[1] (min)
6-inch FM down for maintenance	6-inch	Phase 4 Buildout[4]	2+1	325	338.1	3400	3.3	70
		Phase 5 Buildout	3+1	373	432.1	6600	3.8	80
		Phase 6 Existing[4]	2+1	325	297.5	1300	1.4	65
		Phase 7 Existing[4]	2+1	325	417.5	7700	7.0	85
		Phase 8 Existing[4]	2+1	325	417.5	7700	7.0	85
		Phase 6 Buildout	3+1	373	512.1	10900	6.1	90
		Phase 7 Buildout	4+1	402	632.1	16500	9.0	100
		Phase 8 Buildout	4+1	402	632.1	16500	9.0	100

[1]Time to drain includes 60 minutes of pumping time during peak flow along with additional time to pump out excess volume after the 1-hour peak period.
[2]This is the calculated depth above the LWL of the wet well.
[3]This is peak flow without the 20% factor of safety.
[4]Available wet well volume in these phases is only within the 8.5'x 12' section of the wet well. In the early phases, only this portion of the wet well will be available for storage of sewer flows.

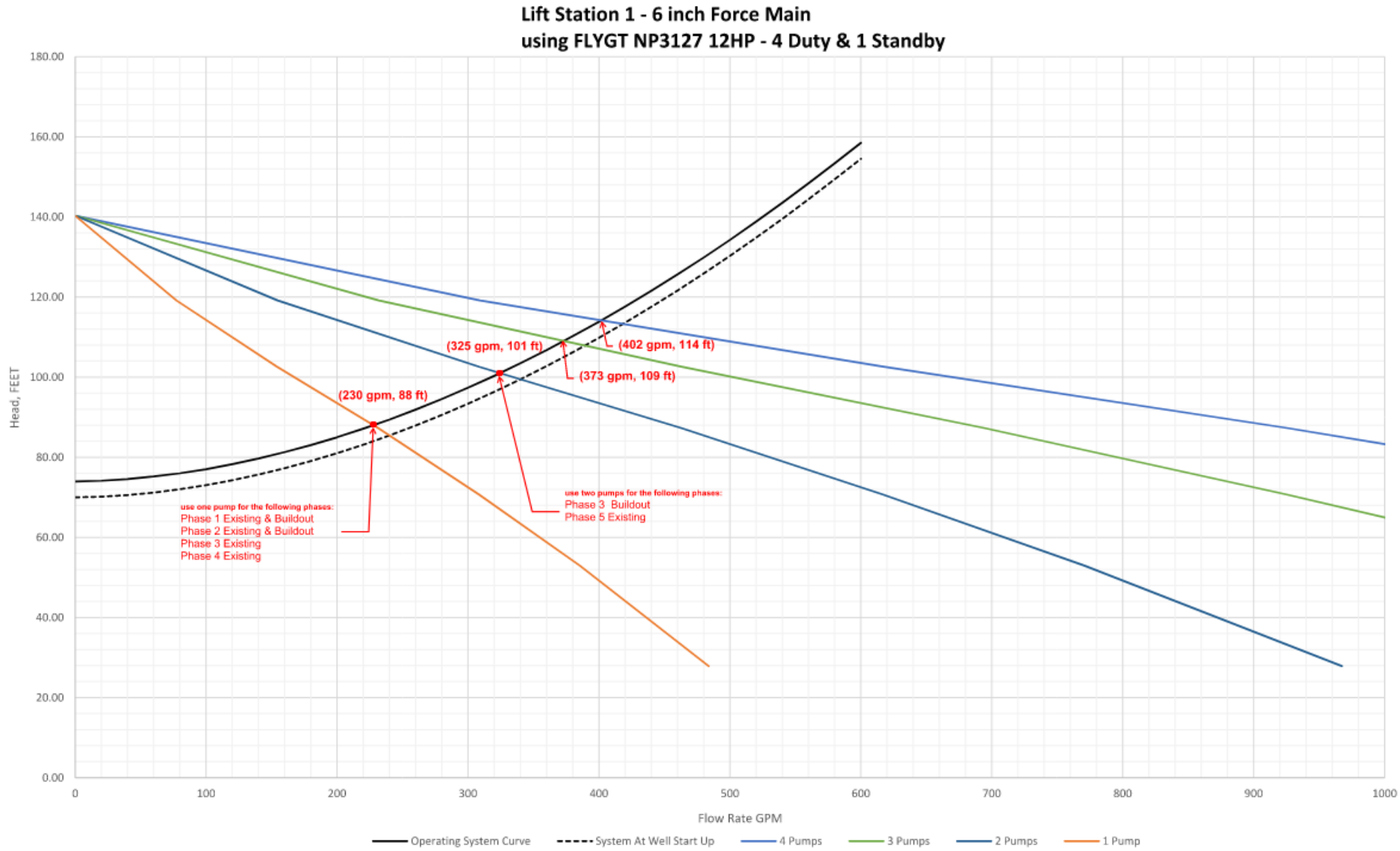

Figure 6.20: Lift Station LS-1 – 6-inch System Curve with Flygt NP3127 4+1 Pump Curves

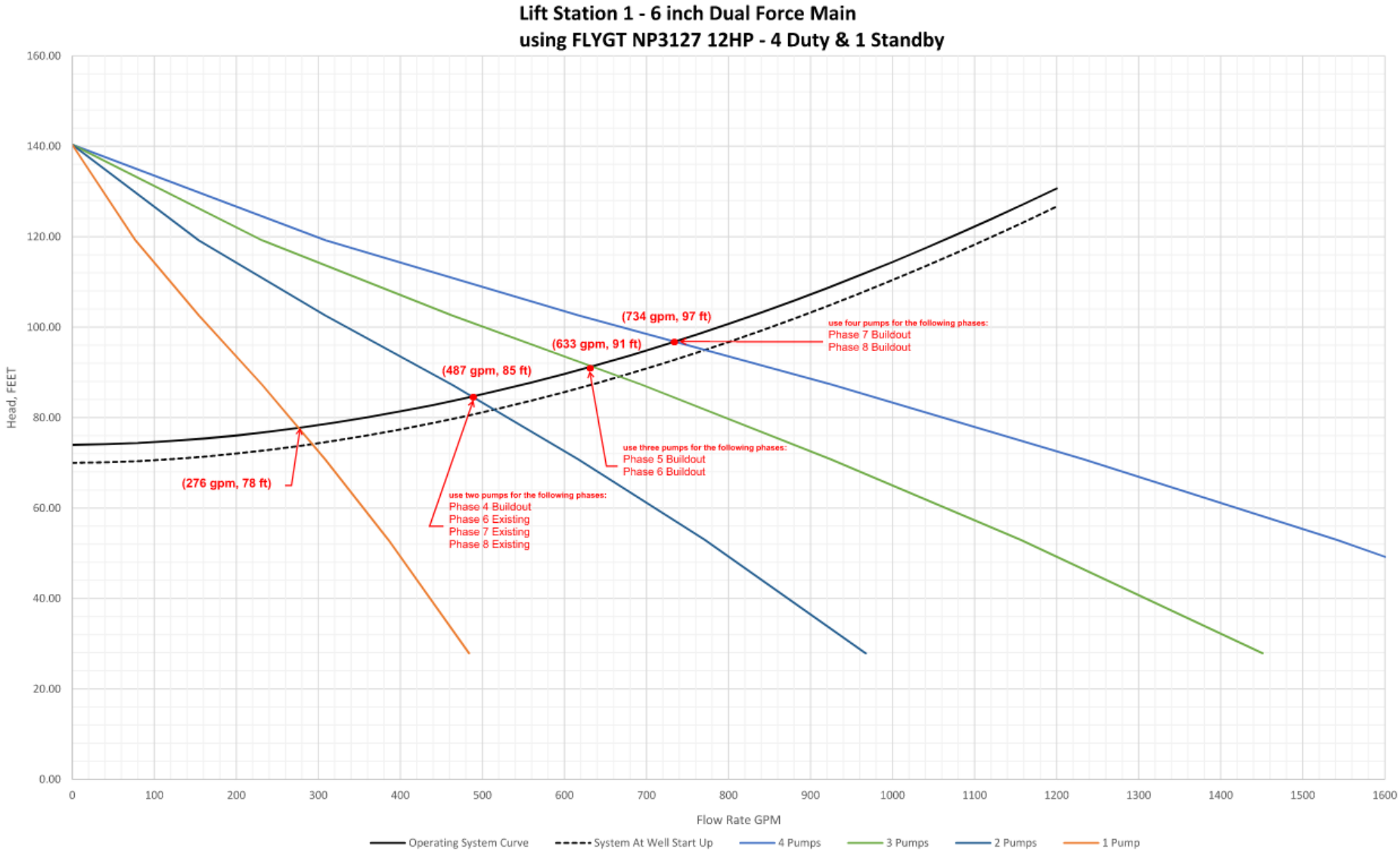

Figure 6.21: Lift Station LS-1 – Dual 6" System Curve with Flygt NP3127 4+1 Pump Curves

6.5.6 Option 6 – Flygt NP3102/NP3127 (4+1 configuration) and dual 6" force mains

Option 6, similar to Option 5, proposes a 4+1 lift station equipped with 12 HP constant speed pumps. However, it proposes installing a smaller 6.5 HP pump for the earlier low flow phases. Initially, the lift station will have one duty pump and one standby pump, each using 6.5 HP constant speed pumps, to meet the low flow rates in Phase 1 (existing and buildout) and Phase 2 (existing) of the project. As construction phases advance or the area builds out, the 6.5 HP pumps will be replaced with the 12 HP pumps and additional pumps will be installed to handle the increased flow demands. For example, once QVSA4 advances to Phase 2 buildout conditions, the one standby and one duty 6.5 HP pumps will be replaced by the 12 HP pumps – this results in a one standby and one duty 12 HP pumps during Phase 2 buildout and Phase 3 and 4 exiting conditions. The final configuration of the lift station will consist of four duty pumps and one standby pump, all utilizing the same 12 HP pump model.

The low flows in early phases will be directed through a 6-inch force main. As the phases advance and higher flows occur, discharge from the lift station would be directed through dual 6-inch force mains.

Figure 6.22 illustrates the functionality of the lift station system for Option 5, showing how it handles varying flow rates and indicating how many pumps and which force mains to use as the phases progress and design flows increase.

The proposed wet well will be a 15' x 18.5' rectangular structure, featuring an interior wall with knockouts to create a separate 8.5' x 18.5' area. This 8.5' x 18.5' section will serve as the wet well during the early phases of the project, housing the one duty pump, one standby pump and one future pump.

Figure 6.19, located in Section 6.5.6, shows an illustration of the proposed wet well geometry for this Option.

An initial pump recommendation was provided by Flygt and is summarized below.

Pumps for Phase 1 (existing and buildout) and Phase 2 (existing)

- Model: NP 3102 SH 3~ Adaptive 256
- Impeller diameter: 135 mm
- Impeller type: Adaptive N-impeller
- Motor: 6.5 HP
- Power Requirements: 460V 3 phase
- Constant Speed Pump

Pumps for Phases beyond Phase 2 (existing)

- Model: NP 3127 SH 3~ Adaptive 249
- Impeller diameter: 146 mm
- Impeller type: Adaptive N-impeller
- Motor: 12 HP
- Power Requirements: 460V 3 phase
- Constant Speed Pump

LIFT STATION 1 - OPTION 6
FLYGT NP3102 6.5HP & 3127 12HP (5 PUMPS) - DUAL 6-INCH FORCE MAINS

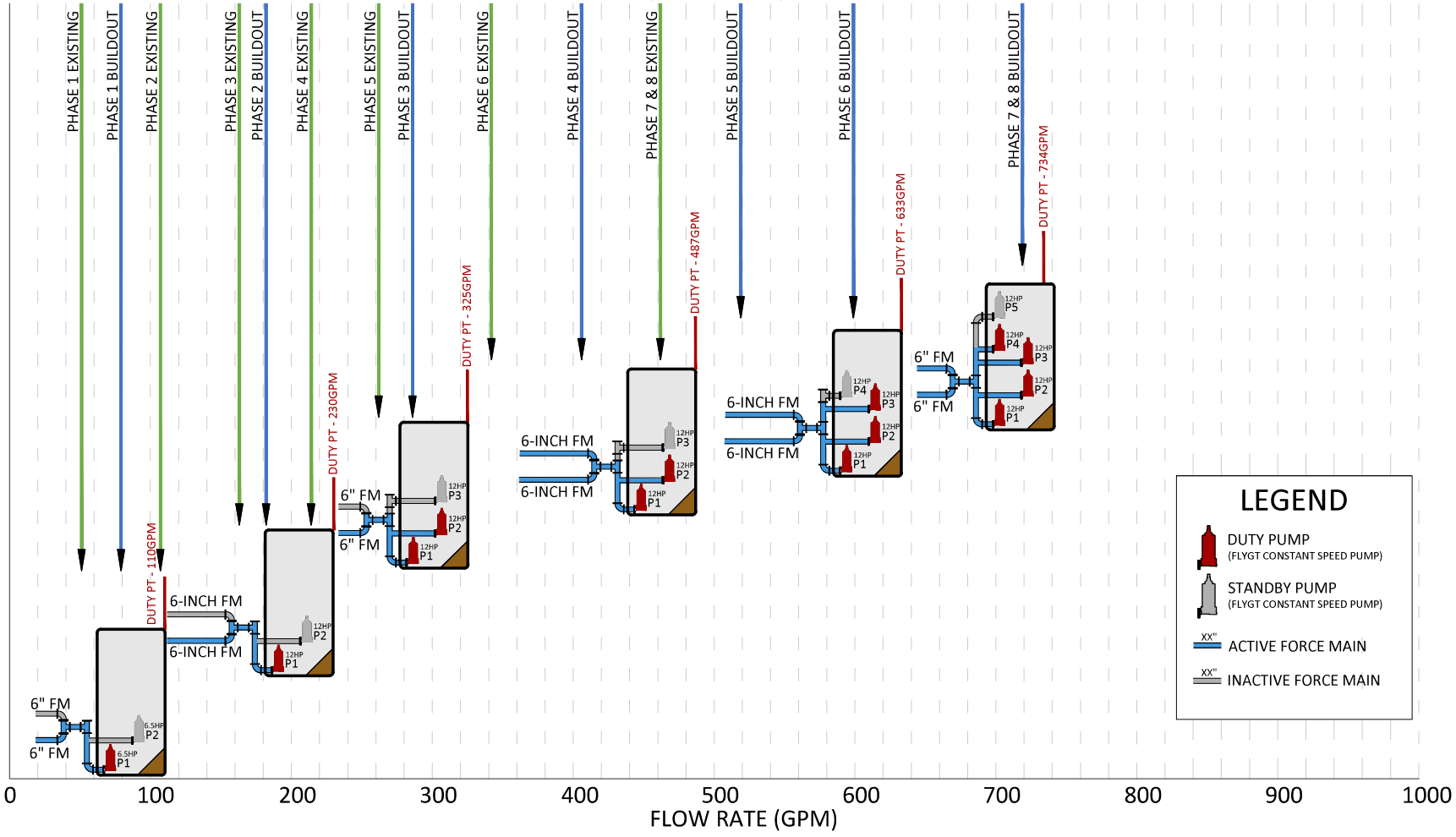

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FIGURE 6.22

OPT. 6-LS CONFIGURATION

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Advantages:

a. **Low Initial Costs:** By adding pumps as needed, the initial costs are low by starting with a small pump and increasing capacity over time.
b. **No Downtime**: The lift station can stay operational during subsequence phases. No pump will be taken out of service since new pumps will be installed to handle the higher flows.
c. **No Underutilized Pumps:** This option avoids the use of large 40-50 HP pumps during the initial low flow phases. Pumps typically have a service life of 10-20 years, and the timing of future construction phases and flow increases is uncertain. Installing a large pump prematurely may result in its replacement before reaching full capacity, leading to unnecessary expenditure.
d. **Better residence time in early phases:** Proposing a smaller 6.5 HP pump will avoid oversizing in Phases 1 and 2. This adjustment will improve wet well conditions for these phases compared to Option 5.
e. **Less Clogging Concern**: Pumps will operate at full speed, so there is less clogging concern. Additionally, these pumps have Flygt's adaptive N-impeller to reduce risk of clogging due to low torque motors from smaller sized pumps. The adaptive N-impeller momentarily moves up axially to pass larger debris and avoid clogging.

Disadvantages:

a. **Velocities below 2 fps in the force mains during Phases 1 and 2:** This may require frequent maintenance of the force mains.
b. **Additional cost for the replacement of 2 – 6 HP pumps:** When the project advances to Phase 2 buildout, the 6.5 HP pump will need to be replaced with 12 HP pumps, incurring additional pump costs. However, these pumps can be easily swapped without the need for confined space entry.
c. **Potential for sedimentation and corrosion:** The wet well will have unoccupied space reserved for future pumps in the later phases. This empty space can lead to odor and grease buildup and sedimentation during the operation of the lift station before all pump slots are occupied. This may be mitigated by the 8'x12' section that will be used as the wet well cycle volume in the early phases of the project.
d. **Increased space requirements:** Additional space is needed to accommodate the five smaller pumps, along with the associated control panels, electrical connections, piping, and valves.
e. **Increased maintenance requirement:** There are more pumps to service and maintain.

Figures 6.23 through 6.25 illustrate the system curves alongside the pump curves for the 6.5 HP Flygt pump and four duty 12 HP Flygt pumps.

Figure 6.23 shows that the 6.5 HP Flygt pump will operate at approximately 110 gpm, which can meet the wastewater demands for Phase 1 (both existing and buildout) and Phase 2 (existing). The 6.5 HP Flygt pump will operate more to the left of the curve but within the permissible limits. When the project advances to Phase 2 buildout, the 6.5 HP Flygt pumps will be replaced with 12 HP pumps. The 12 HP pumps operate near the middle of the pump curve. Figures 6.24 and 6.25 indicate that operating one to four 12 HP pumps in this lift station will place its operating range between 230 gpm to 734 gpm. This operating range covers the design flow range well between Phase 2 through 8. While the 6.5 HP pumps will cover the design flows in Phase 1. Table 6.24 provides a summary of the lift station system's operating conditions by phase. It also specifies the number of pumps to be used and identifies which force mains will be utilized in each phase.

Redundancy is already provided in the phases where only one 6-inch is utilized. However, redundancy measures need to be assessed in the phases where both 6-inch lines are utilized. When one of the two lines is down for maintenance, the capacity of the lift station will decrease. When only one of the two lines is available, the pump operating condition at full speed is detailed in Table 6.22. As indicated in the table, the pump is able handle the average daily inflow at all phases when only one 6-inch line is available during maintenance. On the other hand, the pump rate falls below the peak flow rate when only one 6-inch force main is online, resulting to sewage accumulating in the wet well ranging about 1.4 to 9.0 feet above the low water level. For reference, the gravity sewer invert is about 4.4 feet above low-water level. Sewage will back flow into the gravity mains, and it will take approximately 70 to 100 minutes to reduce the level to low-water level – this pumping duration includes 60 minutes of peak flow occurrence and additional pumping time after the peak flow has subsided. These results are outlined in Table 6.23.

Due to the depth of gravity system, minor surcharges into the gravity main can occur without causing overflow into the sewer laterals. Based on the 30% plans, the deepest existing lateral has an invert of 1486', roughly 10 feet above the low water level. Thus, the sewer system is not expected to experience lateral overflow because the sewage in the wet well does not fill 10 feet past the low-water level.

Table 6.24: Flygt NP3127 4+1 Pumps and Dual 6" Force Mains - Operating Conditions by Phase

Phase	Design Capacity (gpm)	Pump Model	Number of pumps	Force Main Diameter	Pump flow rate (gpm)	Velocity in Force Main (fps)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (Non-peak) (min)	Time to Drain (min)	Pump Cycle Time (min)
1 Existing[1]	51	NP3102	1+1	6-inch	110	1.3	700	0.74	48	6	25
1 Buildout[1]	79	NP3102	1+1	6-inch	110	1.3	700	0.74	31	6	25
2 Existing[1]	107	NP3102	1+1	6-inch	110	1.3	700	0.74	23	6	25
2 Buildout[1]	182	NP3127	1+1	6-inch	230	2.6	1300	1.35	25	6	23
3 Existing[1]	163	NP3127	1+1	6-inch	230	2.6	1300	1.35	28	6	23
3 Buildout[1]	286	NP3127	2+1	6-inch	325	3.7	1800	1.84	22	6	22
4 Existing[1]	214	NP3127	1+1	6-inch	230	2.3	1300	1.35	21	6	23
4 Buildout[1]	406	NP3127	2+1	dual 6-inch	487	2.8	2700	2.68	23	6	22
5 Existing[1]	262	NP3127	2+1	6-inch	325	3.7	1800	1.84	24	6	22
5 Buildout	519	NP3127	3+1	dual 6-inch	633	3.6	3500	2.15	23	6	22
6 Existing[1]	342	NP3127	2+1	dual 6-inch	487	2.8	2700	2.68	17	6	22
6 Buildout	599	NP3127	3+1	dual 6-inch	633	3.6	3500	2.15	15	6	22
7 Existing[1]	462	NP3127	2+1	dual 6-inch	487	2.8	2700	2.68	10	6	22
7 Buildout	719	NP3127	4+1	dual 6-inch	734	4.2	4200	2.54	12	6	23
8 Existing[1]	462	NP3127	2+1	dual 6-inch	487	2.8	2700	2.68	10	6	22
8 Buildout	719	NP3127	4+1	dual 6-inch	734	4.2	4200	2.54	12	6	23

[1]Design wet well cycle volume in these phases is only within the 8.5'x 12' section of the wet well. In the early phases, only this portion of the wet well will be available for storage of sewer flows.

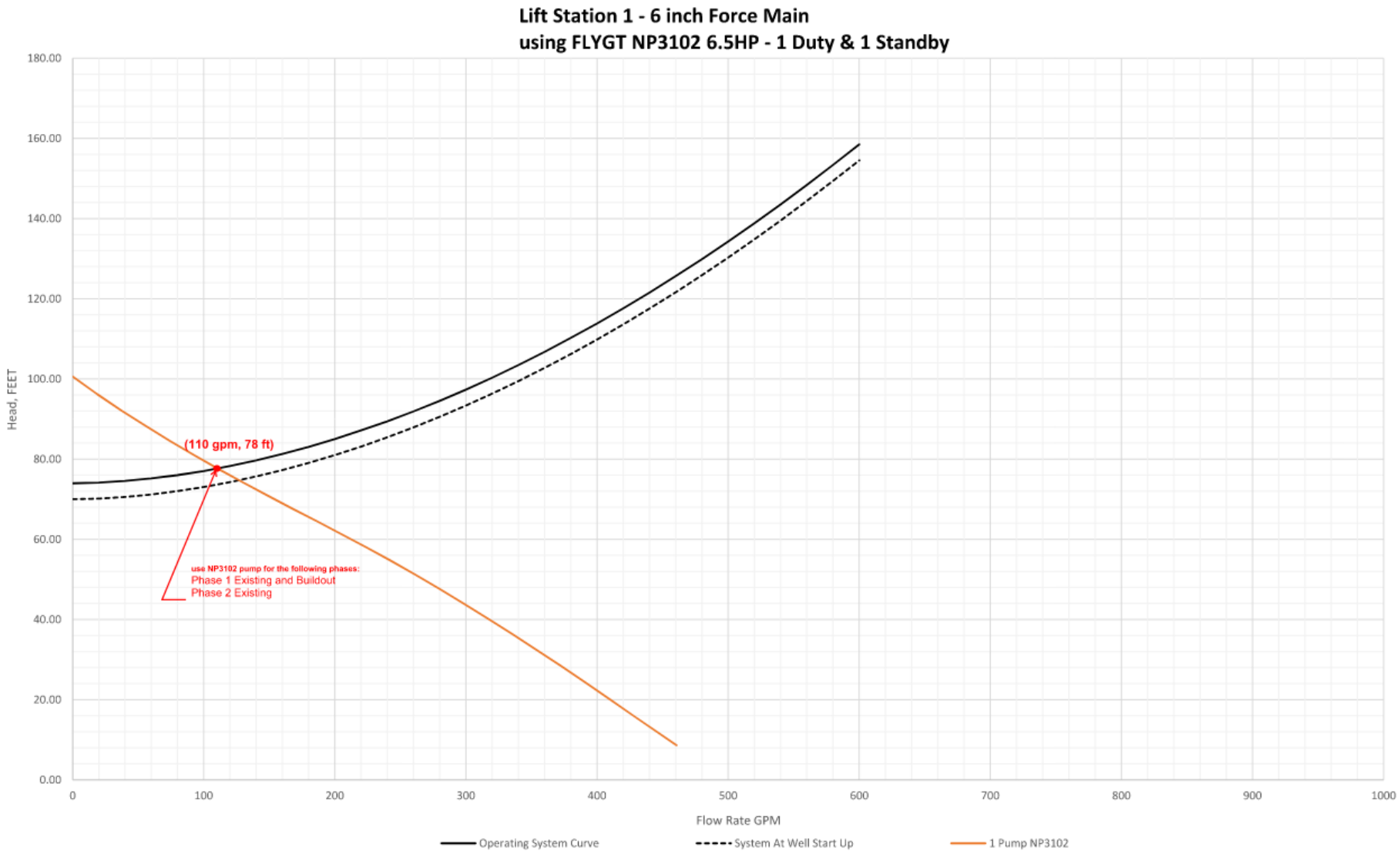


Figure 6.23: Lift Station LS-1 – 6-inch System Curve with Flygt NP3102 1+1 Pump Curves

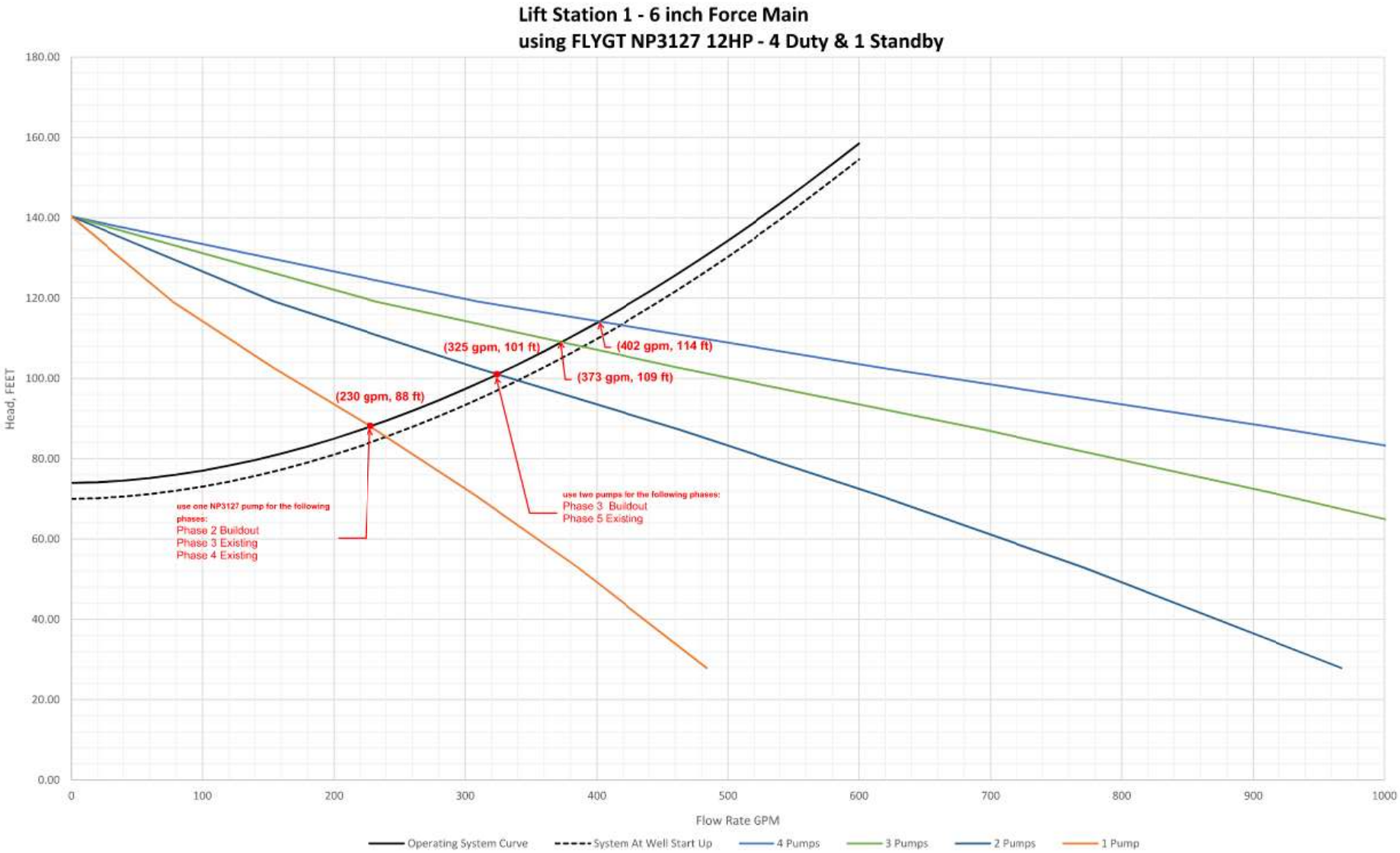


Figure 6.24: Lift Station LS-1 – 6-inch System Curve with Flygt NP3127 4+1 Pump Curves

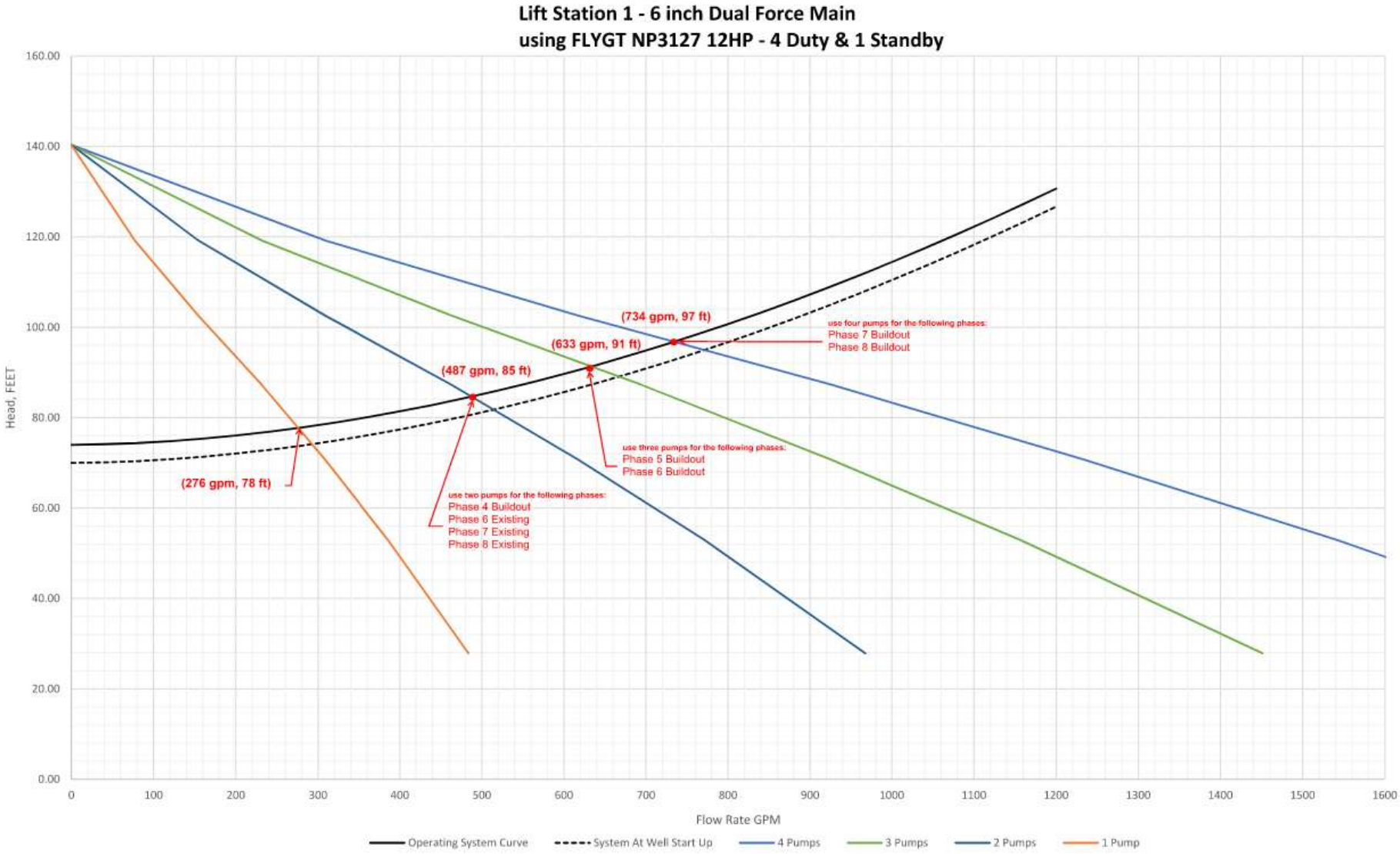
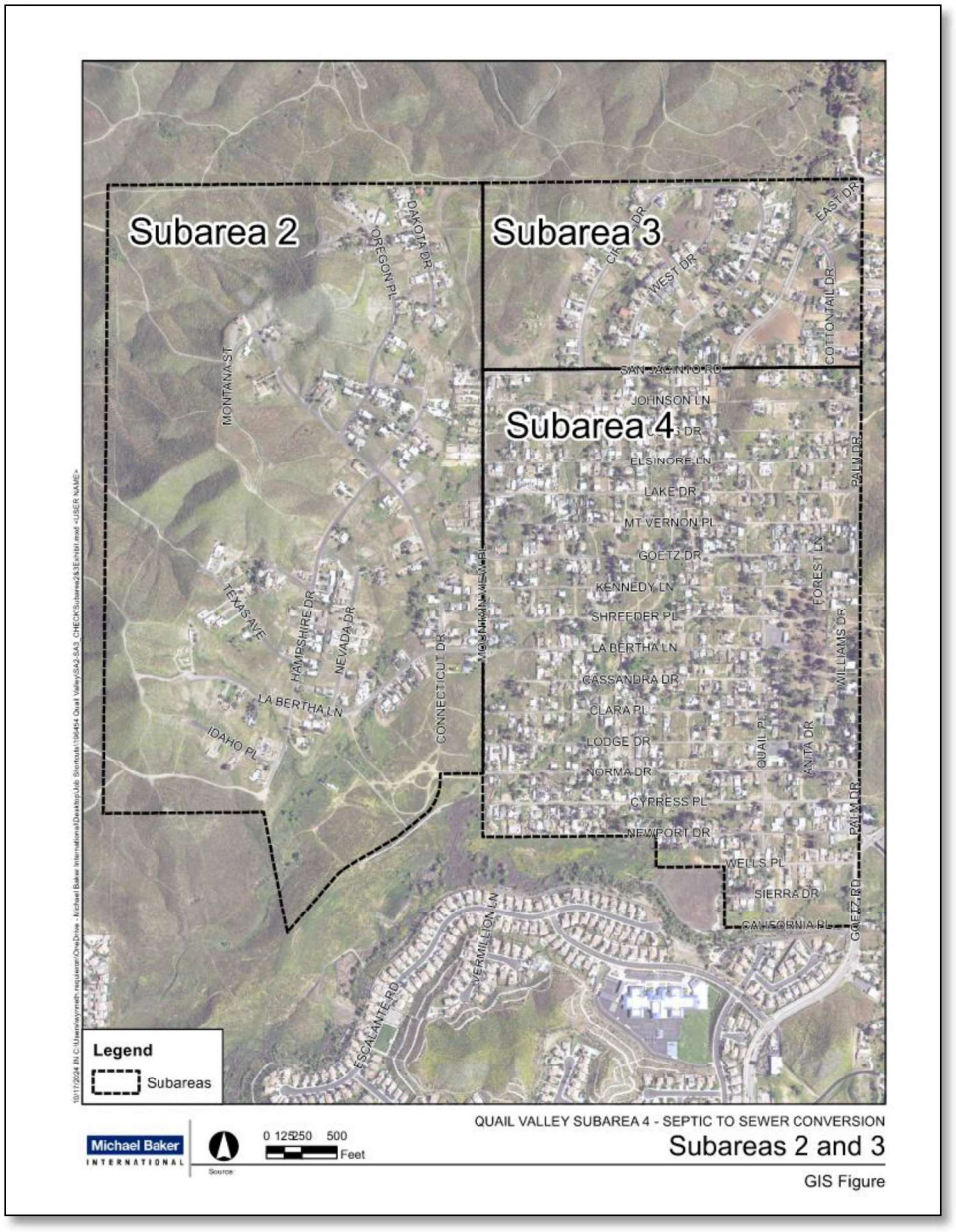


Figure 6.25: Lift Station LS-1 – Dual 6" System Curve with Flygt NP3127 4+1 Pump Curves

6.5.7 Future Connections from Subareas 2 and 3

Due to the geography of Quail Valley, Subareas 2 and 3 must flow through Subarea 4 to discharge to the backbone sewer line on Goetz Road. Therefore, if Subareas 2 and 3 are considered for public sewer systems in the future, Lift Station 1 will need additional capacity to handle the additional wastewater generation from Subareas 2 and 3.



The 2022 Feasibility Study performed flow calculations for Subareas 2 and 3 to understand their wastewater flows under the existing developed condition and ultimate buildout condition. Table 6.25 summarizes the existing and buildout dwelling units and anticipated flows of Subareas 2 and 3 as taken from the 2022 Feasibility Study. It is anticipated that Subareas 2 and 3 together can contribute approximately 107 gpm and 247 gpm of wastewater flows into Lift Station 1, respectively.

Table 6.25: Subareas 2 and 3 Wastewater Flows

Developed Condition	Subarea	Dwelling Unit Count	Flow per Dwelling Unit (gpd/du)	Average Flow (gpd)	Peak Factor	Peak Flow (gpd)	Peak Flow (gpm)
Existing	2	213	210	44,730	2.5	111,825	78
	3	79	210	16,590	2.5	41,475	29
Buildout	2	462	210	97,020	2.4	232,848	162
	3	232	210	48,720	2.5	121,800	85

The lift station options presented in the next subsections propose the use of dual 6-inch and 8-inch force mains. This configuration allows the pumps from the previous options to operate at a higher flow capacity, accommodating the additional flows from Subareas 2 and 3.

6.5.8 Option 7 – Flygt NP3202 with VFD and dual 6” & 8” force mains

Option 7 proposes the same duplex station with the same pumps as Option 1, but with dual 6” and 8” force mains. The duplex station is equipped with 45 HP pumps featuring variable frequency drives to accommodate the varied flow rates in the phased sewer construction of SA4. Discharge flows would initially be directed through the 6-inch force main. As construction progresses and flows increase, discharge from the lift station would transition to discharge through the larger 8-inch force main. The 8-inch force main alone can handle buildout conditions of Quail Valley SA4. If Subareas 2 and 3 connect to Lift Station 1 post construction of Subarea 4’s sewer system, the lift station would discharge flows through both the 6-inch and 8-inch force mains, thereby increasing its capacity to meet the additional sewage inflows from Subareas 2 and 3.

Figure 6.26 illustrates the functionality of the lift station system for Option 7, showing how it handles varying flow rates and indicating how many pumps and which force mains to use as the phases progress and design flows increase.

The wet well geometry of this lift station is rectangular, featuring an 8’ x 8’ flat bottom and 1:1 side slopes. However, one side deviates from the slope pattern and is vertical. This wet well geometry matches the one proposed for Option 1. Figure 6.4 shows an illustration of the proposed wet well geometry for Option 7.

The specifications for the pump to be used in this duplex station, as provided by Flygt, are summarized below.

- Model: NP 3202/468
- Impeller diameter: 316 mm
- Impeller type: semi-open N-impeller
- Motor: 45 HP
- Power Requirements: 460V 3 phase
- Control: VFD

LIFT STATION 1 - OPTION 7
FLYGT NP3202/468 45HP PUMPS WITH VFD (DUPLEX) - 6-INCH & 8-INCH FORCE MAINS

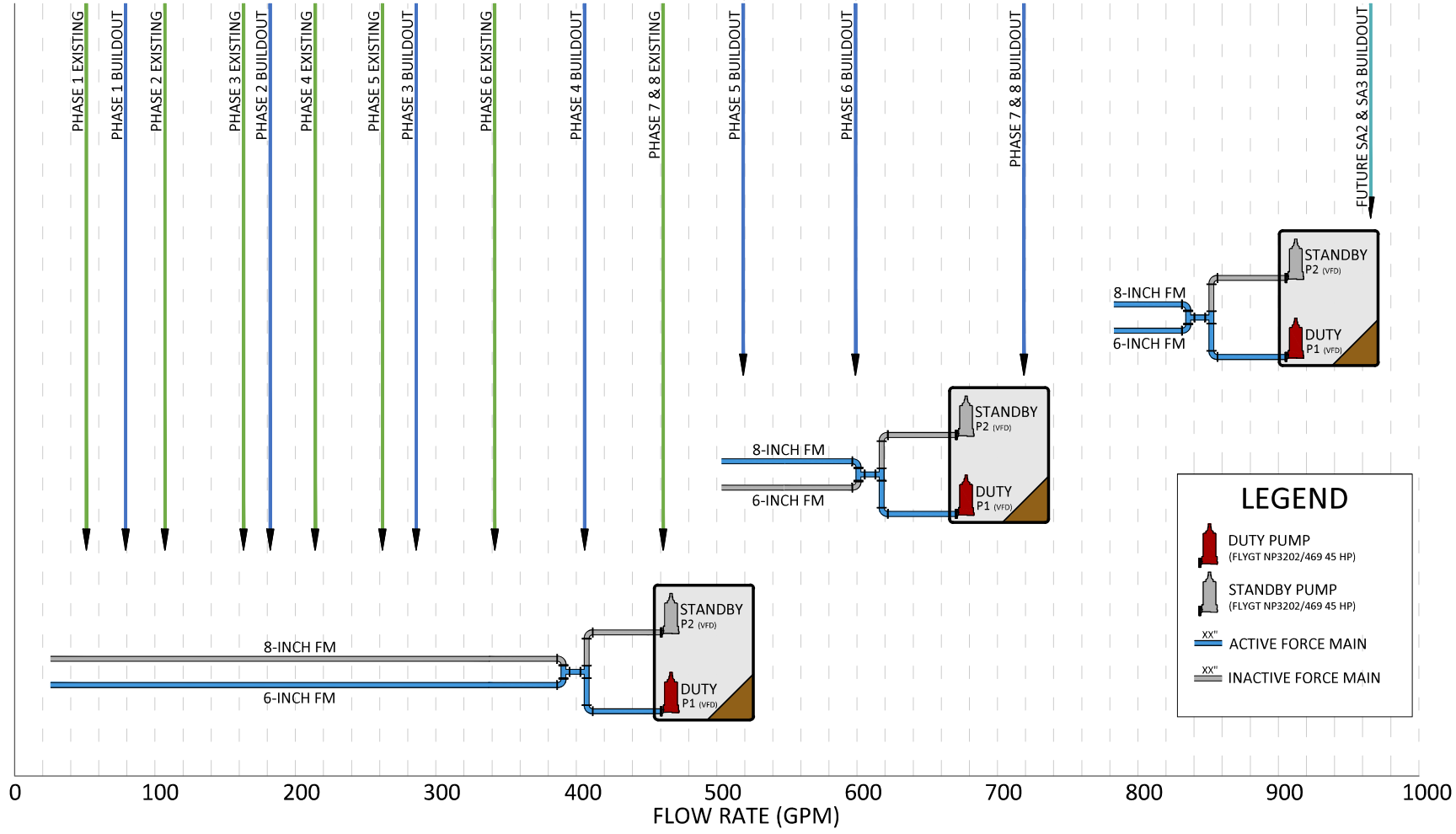


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FIGURE 6.26

OPT. 7-LS CONFIGURATION

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The advantages and disadvantages of this VFD driven pump can be found in Section 6.5.1, mirroring those of Option 1. The extra advantage Option 7 offers is that it can ultimately handle the additional inflows from Subareas 2 and 3.

Figures 6.27 through 6.29 illustrate the system curves in conjunction with the pump curves for the 45 HP Flygt pump. These graphs reveal that the pumps operate predominantly on the left side of the pump curve in the earlier phases of the project. Considering its intermittent usage, operating within this range is deemed acceptable by the vendor. The curves also show that the pumps will only be turned down as low as approximately 70% of their full speed to meet the varying flow conditions, which is acceptable for pump operation. Table 6.26 provides a summary of the lift station system's operating conditions by phase. During phase 1, the pump must operate at approximately 110 gpm, despite its design capacity being lower. This adjustment ensures that the pump doesn't run too far left of its curve. The 6-inch force main can handle up to approximately 520 gpm, corresponding to Phase 5 buildout conditions. Once these flow rates are exceeded, the 8-inch force main will be utilized, accommodating up to the fully phased buildout conditions of Subarea 4. It can also handle additional flows from existing developed conditions of Subareas 2 and 3, should they connect in the future. If Subarea 2 and 3 fully develops, this lift station can also handle the increased flow rates, provided that both the 6-inch and 8-inch force mains are utilized concurrently.

Redundancy measures have been evaluated to ensure continuous operation during maintenance of the force main lines. In the initial phases of the project, only the 6-inch force main will convey the flow. If the 6-inch force main requires maintenance, the 8-inch force main will handle any peak inflows from SA4 up to its fully developed condition. As the project progresses into Phase 6-7 buildout conditions, the 8-inch force main will be utilized. Thus, it is necessary to verify that the 6-inch line can handle the flows in these later phases. Redundancy measures are assessed for Phase 6, 7, and 8 buildout conditions and summarized in Table 6.27 and Table 6.28. The lift station can operate at a capacity of up to 525 gpm using only the 6-inch force main, which is higher than the average day inflow for Phase 6, 7, and 8 buildout conditions. Thus, the lift station can handle average day inflow up to the ultimate buildout conditions of SA4, even when the 8-inch force main is down.

Another approach to assess redundancy involves examining the lift station system during one hour of peak flow. Results of this analysis are shown in Table 6.28 . When only the 6-inch force main is online, the pump rate falls below the peak flow rates of Phases 6, 7, and 8 buildout conditions. This results in sewage filling past the high-water level to a depth of approximately 5.3 feet above the low-water level. For reference, high-water level depth is 4 feet above the low-water level. Sewage is expected to back up into the gravity mains, and it will take approximately 80 minutes to drain out the peak flow volume after its onset.

Table 6.26: Flygt NP3202 with VFD and Dual 6" & 8" Force Mains - Operating Conditions by Phase

Phase	Design Capacity (gpm)	Number of pumps	Force Main Diameter	Desired pump flow rate[1] (gpm)	Velocity in Force Main (fps)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (Non-peak) (min)	Time to Drain (min)	Pump Cycle Time (min)
1 Existing	51	1+1	6-inch	107[2]	1.2	620	0.57	43	6	23
1 Buildout	79	1+1	6-inch	107[2]	1.2	620	0.57	27	6	23
2 Existing	107	1+1	6-inch	107	1.2	620	0.57	20	6	23
2 Buildout	182	1+1	6-inch	182	2.1	1200	1.03	23	7	26
3 Existing	163	1+1	6-inch	163	1.9	1200	1.03	25	7	29
3 Buildout	286	1+1	6-inch	286	3.3	1900	1.54	23	7	27
4 Existing	214	1+1	6-inch	214	2.4	1400	1.18	23	7	26
4 Buildout	406	1+1	6-inch	406	4.6	2700	2.05	23	7	27
5 Existing	262	1+1	6-inch	262	3.0	1800	1.47	24	7	27
5 Buildout	519	1+1	6-inch	519	5.9	3800	2.68	25	7	29
6 Existing	342	1+1	6-inch	342	3.9	2300	1.80	15	7	27
6 Buildout	599	1+1	8-inch	599	3.8	3800	2.68	16	6	25
7 Existing	462	1+1	6-inch	462	5.2	3400	2.46	12	7	29
7 Buildout	719	1+1	8-inch	719	4.6	3800	2.68	11	5	21
8 Existing	462	1+1	6-inch	462	5.2	3400	2.46	12	7	29
8 Buildout	719	1+1	8-inch	719	4.6	3800	2.68	11	5	21
Future SA2 & SA3 connection (Buildout)	966	1+1	dual	966	4.0	5600	3.57	12	6	23

[1]Since Option 7 proposed VFD controls, a desired pump flow rate is reported to ensure ideal wet well conditions are met (i.e. wet well residence time, pump run time and cycle time). The pump flow rate should not exceed this value.
[2]Pump shall run at a minimum of 107 gpm during phase 1 of the project to avoid running the pump too far left of the pump curve.

Table 6.27: Redundancy Check with Flygt NP3202 with VFD and Dual 6" & 8" Force Mains (run pump at full speed)

Maintenance Condition	Force Main Diameter Available	Pump Flow Rate at full speed (gpm)	Average Day Inflow at Ultimate buildout (gpm)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (min)	Time to Drain (min)	Pump Cycle Time (min)
8-inch FM down	6-inch	525	351	3,800	2.68	11	7	29

Table 6.28: Redundancy Check with Flygt NP3202 with VFD and Dual 6" & 8" Force Mains (peak flow for an hour)

Maintenance Condition	Force Main Diameter Available	Pump Flow Rate at full speed (gpm)	Peak Flow at Ultimate buildout[3] (gpm)	Volume of sewage left in wet well post 1-hr peak (gallons)	Depth of sewage left in wet well post 1-hr peak [2] (ft)	Time to Drain[1] (min)
8-inch FM down for maintenance	6-inch	525	632.1	9,600	5.3	80

[1]Time to drain includes 60 minutes of pumping time during peak flow along with additional time to pump out excess volume after the 1-hour peak period.
[2]This is the calculated depth above the LWL of the wet well.
[3]This is peak flow without the 20% factor of safety.

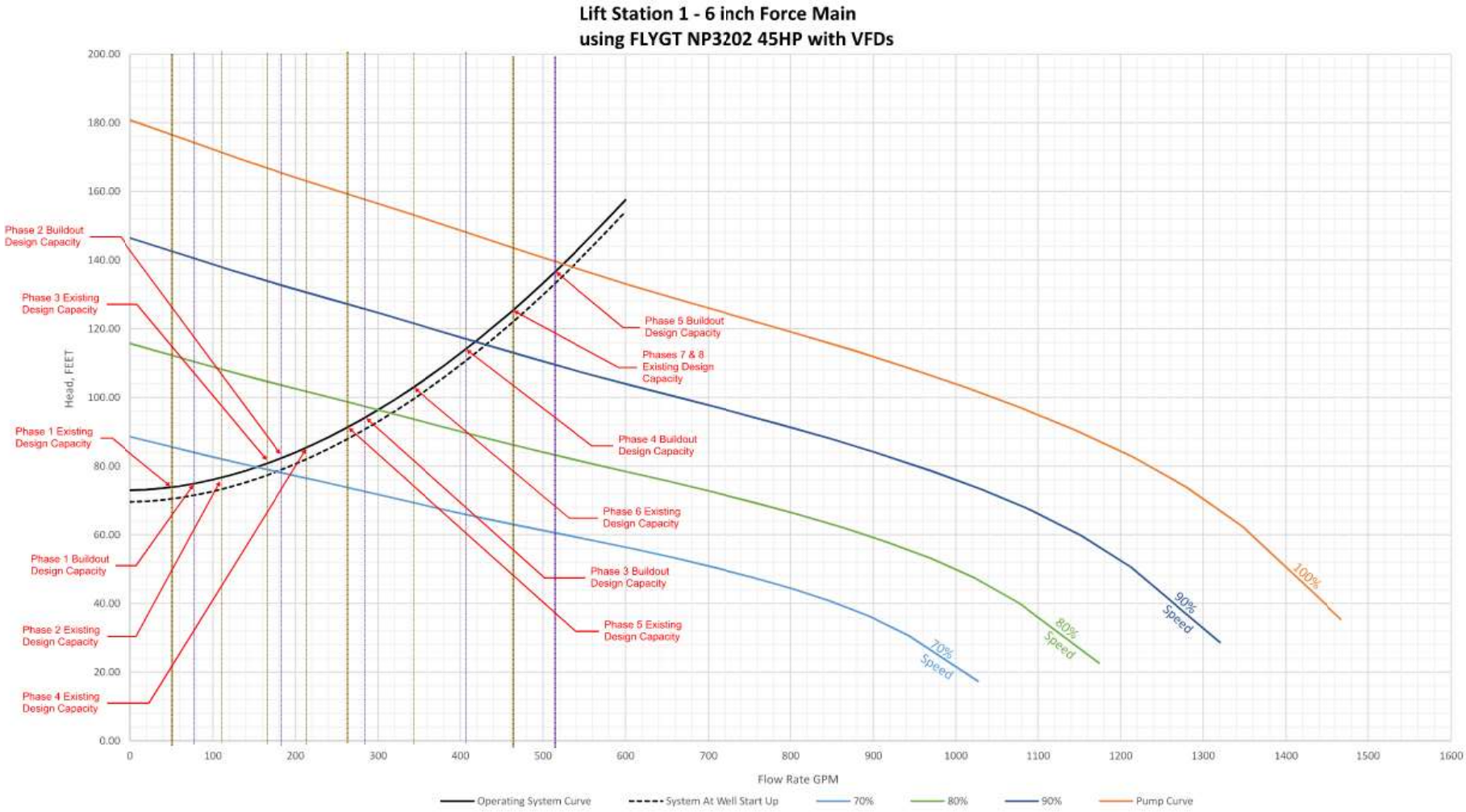

Figure 6.27: Lift Station LS-1 – 6-inch System Curve with Flygt NP3202/468 Pump Curves (Option 7)

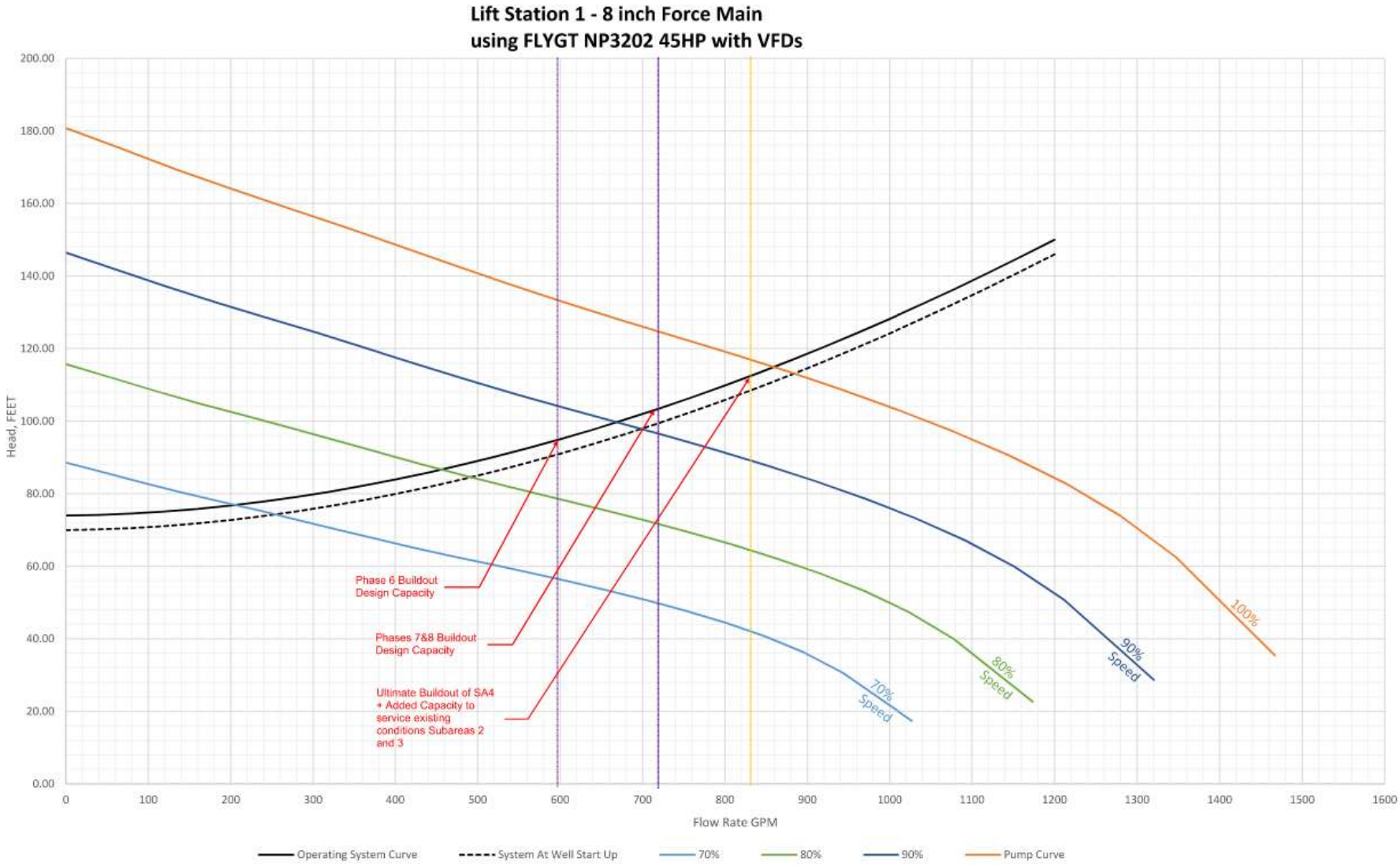

Figure 6.28: Lift Station LS-1 – 8-inch System Curve with Flygt NP3202/468 Pump Curves (Option 7)

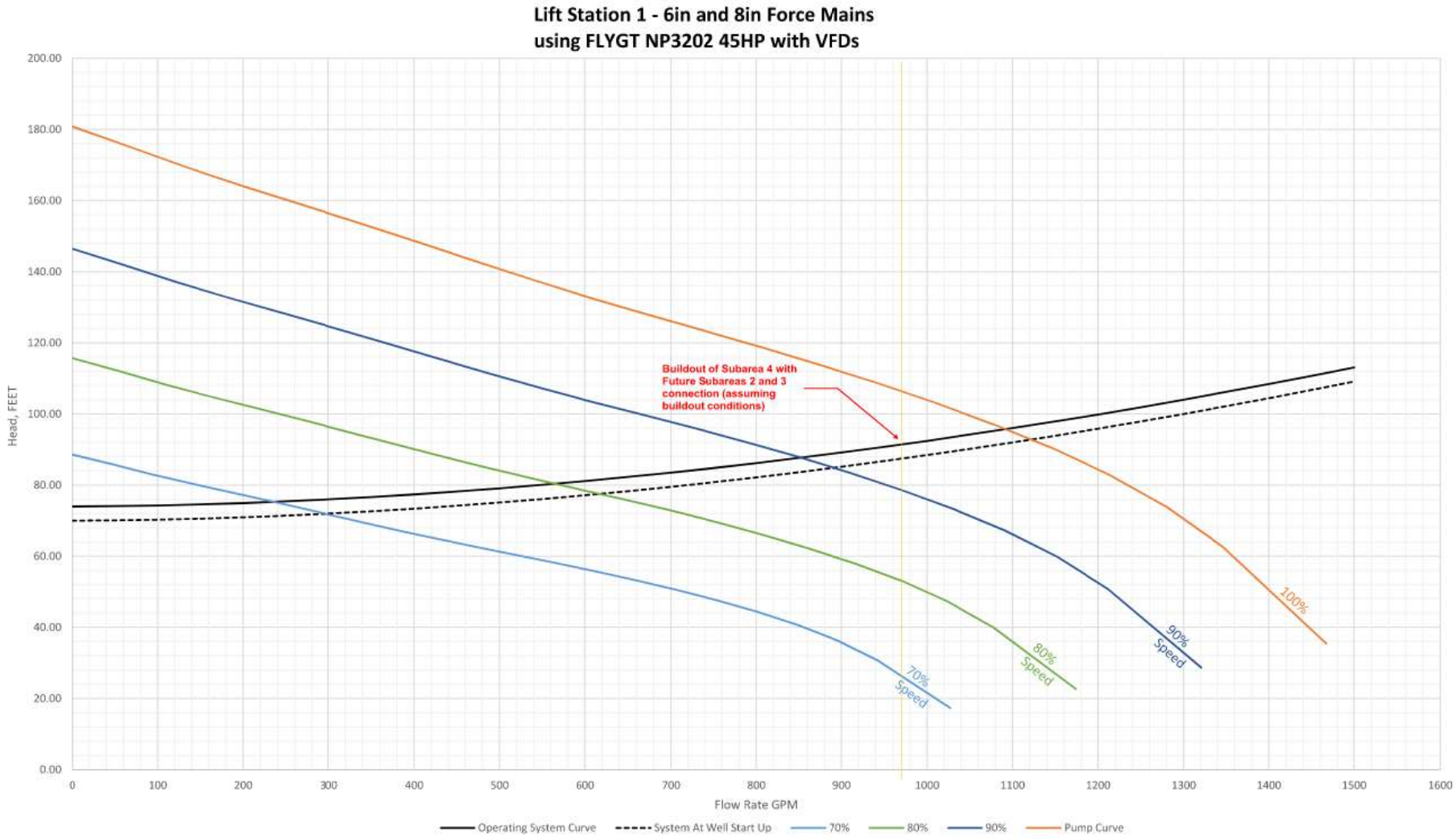

Figure 6.29: Lift Station LS-1 – 6" & 8" System Curve with Flygt NP3202/468 Pump Curves (Option 7)

6.5.9 Option 8 – Keen Grinder/Chopper Pumps and dual 6” & 8” force mains

Option 8 is a similar version of Option 4. It proposes the same two lift station systems but utilizes a 6-inch and 8-inch force main.

The interim lift station system, like in Option 4, includes the same duplex 5 HP grinder pumps and a 4-foot diameter wet well to handle low flows in Phase 1. The interim lift station system will pump flows through the 6-inch force main. It is important to note that the 5 HP grinder system does not achieve the flow rate necessary to maintain velocities of at least 2 fps in the 6-inch force main.

An initial lift station system recommendation for the interim lift station was provided by Signa, a Keen Pump Vendor, and is summarized below.

- Model: HKGP
- Impeller type: Grinder
- Motor: 5 HP
- Power Requirements: 230V 1 phase or 230V/460V 3 phase
- Constant Speed Pump

Past Phase 1, the interim lift station will be replaced by a larger permanent lift station. The permanent lift station system features the same duplex 40 HP chopper pumps and rectangular wet well with 8’ x 8’ flat bottom and 1:1 side slopes on three sides. Figure 6.4, located in Section 6.5.1, shows an illustration of the proposed wet well geometry for Option 8. The 40 HP chopper pumps will initially use a trimmed impeller and will transition to larger impeller sizes as flows increase in later phases. This system will utilize a 6-inch and an 8-inch force main to manage the flow rates. The 6-inch force main will be used until flows exceed 500 gpm. Then, the flows will transition to pumping through the 8-inch force main only. Both the 6-inch and 8-inch force main can be used concurrently, when SA4 is in full buildout conditions and additional flows from Subareas 2 and 3 are coming in. Figure 6.30 illustrates the functionality of the lift station system for Option 2, showing how it handles varying flow rates and indicating which pumps and force mains to use as the phases progress and design flows increase.

An initial pump recommendation for the permanent lift station was provided by Signa, a Keen Pump Vendor, and is summarized below.

- Model: K4VBCH
- Impeller diameter: varies and increases in each advancing phase
- Impeller type: Chopper
- Motor: 40 HP
- Power Requirements: 230V, 460V or 575V 3 phase
- Constant Speed Pump

KEEN HKGP 5HP & K4VBCH 40HP (DUPLEX) - 6-INCH & 8-INCH FORCE MAINS

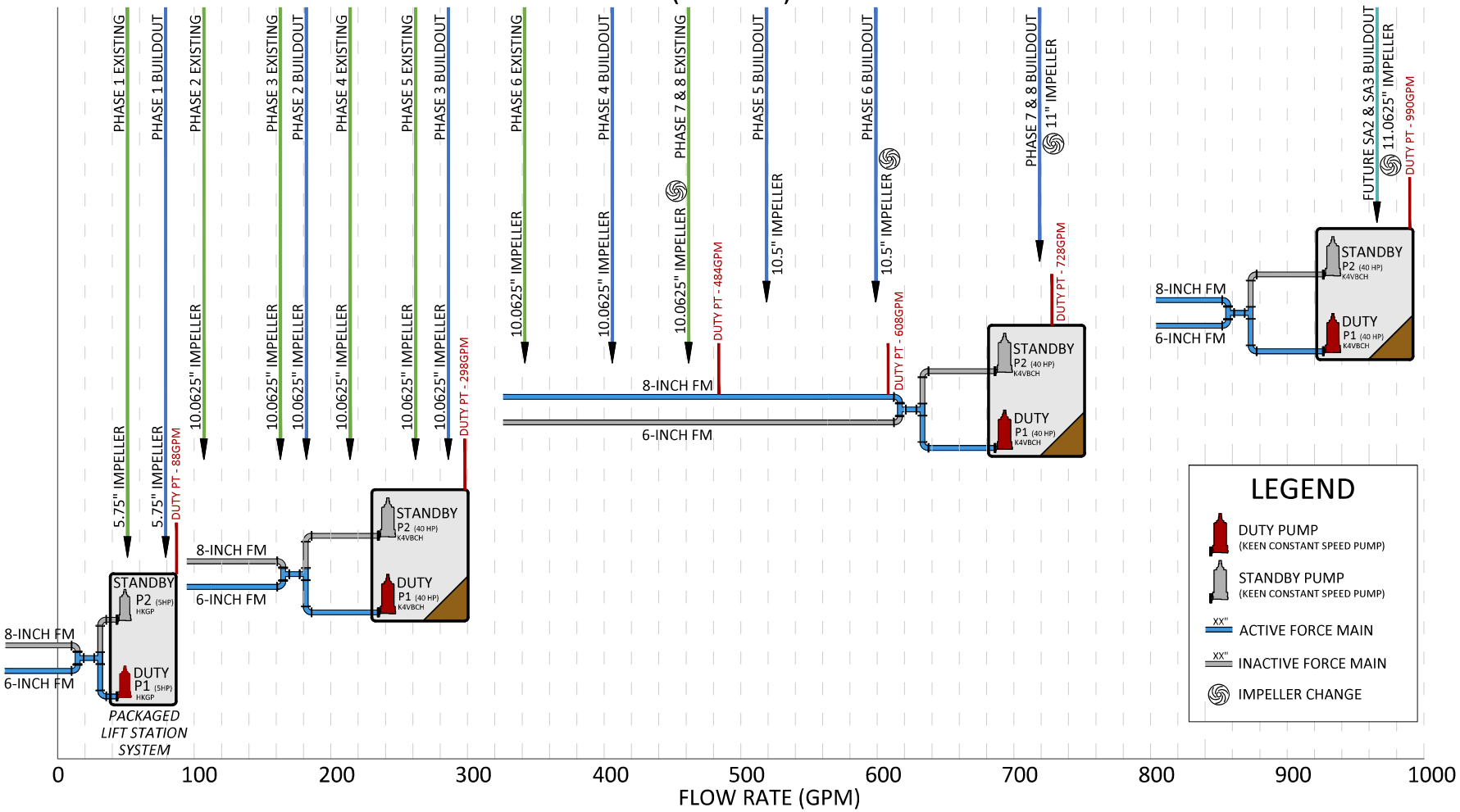

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FIGURE 6.30

OPT. 8-LS CONFIGURATION

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The advantages and disadvantages of this Keen pump can be found in Section 6.5.4, mirroring those of Option 4. The extra advantage Option 8 offers is that it can ultimately handle the additional inflows from Subareas 2 and 3.

Figures 6.31 through 6.34 illustrate the system curves (using 6-inch, 8-inch, or both force mains) in conjunction with the pump curves for the 15 HP Keen HKGP Grinder Pump and 40 HP Keen K4VBCH Chopper Pump. For Phase 1, the 5 HP pumps will operate at approximately 88 gpm on the right side of the pump curve. Refer to Figure 6.31. Since this is a grinder pump, operation in this range is acceptable. For Phases 2 through 5, the pumps will operate slightly to the left of the pump curve but still within the recommended operational range. In later phases, the pumps will operate close to the middle of the curve. Table 6.29 summarizes the lift station system's operating conditions for each phase, specifying the appropriate pump model and impeller size to be utilized. Note that the impeller sizes are intentionally chosen to operate above the design capacity for some phases. This approach minimizes frequent impeller replacements. Instead, the impellers are designed to accommodate multiple phases – slightly oversized pumps are permissible in some phases as long as wet well conditions remain within the acceptable criteria.

Redundancy measures have been evaluated to ensure continuous operation during maintenance of the force mains. In the early phases of the project, only the 6-inch force main will be in use, so the 8-inch force main will serve as a redundancy. However, as the project progresses, specifically into Phases 6-8 existing and Phases 4-8 buildout, the 8-inch line will be in use. Should the 8-inch line be down for maintenance, an analysis is required to determine if the 6-inch line can provide the necessary redundancy to maintain continuous operation. When only the 6-inch line is available, the pump operating condition is detailed in Table 6.30. As indicated in the table, the pump is able handle the average daily inflow at all phases when only the 6-inch line is available during maintenance.

Another approach to assess redundancy involves examining the lift station system when peak flow occurs for an hour as outlined in Table 6.31. When only the 6-inch force main is online, the pump rate falls below the peak flow rate, resulting in sewage accumulating at about 2.4 to 8.0 feet above the low water level. For reference, the gravity sewer invert is about 4.4 feet above low-water level. Sewage will back flow into the gravity mains, and it will take approximately 80 to 95 minutes to reduce the level to low-water level – this pumping duration includes 60 minutes of peak flow occurrence and additional pumping time after the peak flow has subsided.

Due to the depth of gravity system, minor surcharges into the gravity main can occur without causing overflow into the sewer laterals. Based on the 30% plans, the deepest existing lateral has an invert of 1486 feet, roughly 10 feet above the low water level. Thus, the sewer system is not expected to experience lateral overflow because the sewage in the wet well does not fill 10 feet past the low-water level during peak hour flow when only one 6-inch force main is available.

Table 6.29: Grinder/Chopper Pumps and Dual 6" & 8" Force Mains - Operating Conditions by Phase

Phase	Design Capacity (gpm)	Number of pumps	Force Main Diameter	Pump flow rate (gpm)	Velocity in Force Main (fps)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (Non-peak) (min)	Time to Drain (min)	Pump Cycle Time (min)	Pump Model	Impeller Size
1 Existing	51	1+1	6-inch	88	1.0	580	0.53	40	7	26	HKGP	5.75"
1 Buildout	79	1+1	6-inch	88	1.0	580	0.53	25	7	26	HKGP	5.75"
2 Existing	107	1+1	6-inch	298	3.4	1600	1.33	52	5	21	K4VBCH	10.0625"
2 Buildout	182	1+1	6-inch	298	3.4	1900	1.54	36	6	26	K4VBCH	10.0625"
3 Existing	163	1+1	6-inch	298	3.4	1900	1.54	40	6	26	K4VBCH	10.0625"
3 Buildout	286	1+1	6-inch	298	3.4	1900	1.54	23	6	26	K4VBCH	10.0625"
4 Existing	214	1+1	6-inch	298	3.4	1900	1.54	31	6	26	K4VBCH	10.0625"
4 Buildout	406	1+1	8-inch	484	3.1	3200	2.35	27	7	26	K4VBCH	10.0625"
5 Existing	262	1+1	6-inch	298	3.4	1900	1.54	25	6	26	K4VBCH	10.0625"
5 Buildout	519	1+1	8-inch	608	3.9	3800	2.68	25	6	25	K4VBCH	10.5"
6 Existing	342	1+1	8-inch	484	3.1	3200	2.35	21	7	26	K4VBCH	10.0625"
6 Buildout	599	1+1	8-inch	608	3.9	3800	2.68	16	6	25	K4VBCH	10.5"
7 Existing	462	1+1	8-inch	484	3.1	3400	2.46	12	7	28	K4VBCH	10.0625"
7 Buildout	719	1+1	8-inch	728	4.7	4800	3.19	14	7	26	K4VBCH	11.0"
8 Existing	462	1+1	8-inch	484	3.1	3400	2.46	12	7	28	K4VBCH	10.0625"
8 Buildout	719	1+1	8-inch	728	4.7	4800	3.19	14	7	26	K4VBCH	11.0"
Future SA2 & SA3 connection (Buildout)	966	1+1	6-inch and 8-inch	990	4.0	6500	3.96	14	7	26	K4VBCH	11.0625"

Table 6.30: Redundancy Check with Grinder/Chopper Pumps and Dual 6" & 8" Force Mains (run pump at full speed)

Maintenance Condition	Force Main Diameter Available	Pump Model and Impeller Size	Phase	Pump Flow Rate at full speed (gpm)	Average Day Inflow at Phase (gpm)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (min)	Time to Drain (min)	Pump Cycle Time (min)
8-inch line down	6-inch	K4VBCH 10.0625"	Phase 4 Buildout	298	118	3200	2.35	27	7	26
		K4VBCH 10.5"	Phase 5 Buildout	298	151	3800	2.68	25	6	25
		K4VBCH 10.0625"	Phase 6 Existing	298	156	3200	2.35	21	7	26
		K4VBCH 10.0625"	Phase 7 Existing	298	276	3400	2.46	12	7	28
		K4VBCH 10.0625"	Phase 8 Existing	298	276	3400	2.46	12	7	28
		K4VBCH 10.5"	Phase 6 Buildout	362	231	3800	2.68	16	10	42
		K4VBCH 11.0"	Phase 7 Buildout	432	351	4800	3.19	14	11	44
		K4VBCH 11.0"	Phase 8 Buildout	432	351	4800	3.19	14	11	44

Table 6.31: Redundancy Check with Grinder/Chopper Pumps and Dual 6" & 8" Force Mains (peak flow for an hour)

Maintenance Condition	Force Main Diameter Available	Pump Model and Impeller Size	Phase	Pump Flow Rate at full speed (gpm)	Peak Flow (gpm)	Volume of sewage post 1-hr peak (gallons)	Depth of sewage post 1-hr peak (ft)	Time to Drain[1] (min)
8-inch FM down for maintenance	6-inch	K4VBCH 10.0625"	Phase 4 Buildout	298	338.1	5200	3.4	80
		K4VBCH 10.5"	Phase 5 Buildout	298	432.1	10700	5.9	95
		K4VBCH 10.0625"	Phase 6 Existing	298	297.5	3200	2.4	70
		K4VBCH 10.0625"	Phase 7 Existing	298	417.5	9600	5.4	95
		K4VBCH 10.0625"	Phase 8 Existing	298	417.5	9600	5.4	95
		K4VBCH 10.5"	Phase 6 Buildout	362	512.1	12700	6.8	95
		K4VBCH 11.0"	Phase 7 Buildout	432	632.1	15300	8.0	95
		K4VBCH 11.0"	Phase 8 Buildout	432	632.1	15300	8.0	95

[1]Time to drain includes 60 minutes of pumping time during peak flow along with additional time to pump out excess volume after the 1-hour peak period.
[2]This is the calculated depth above the LWL of the wet well.
[3]This is peak flow without the 20% factor of safety.

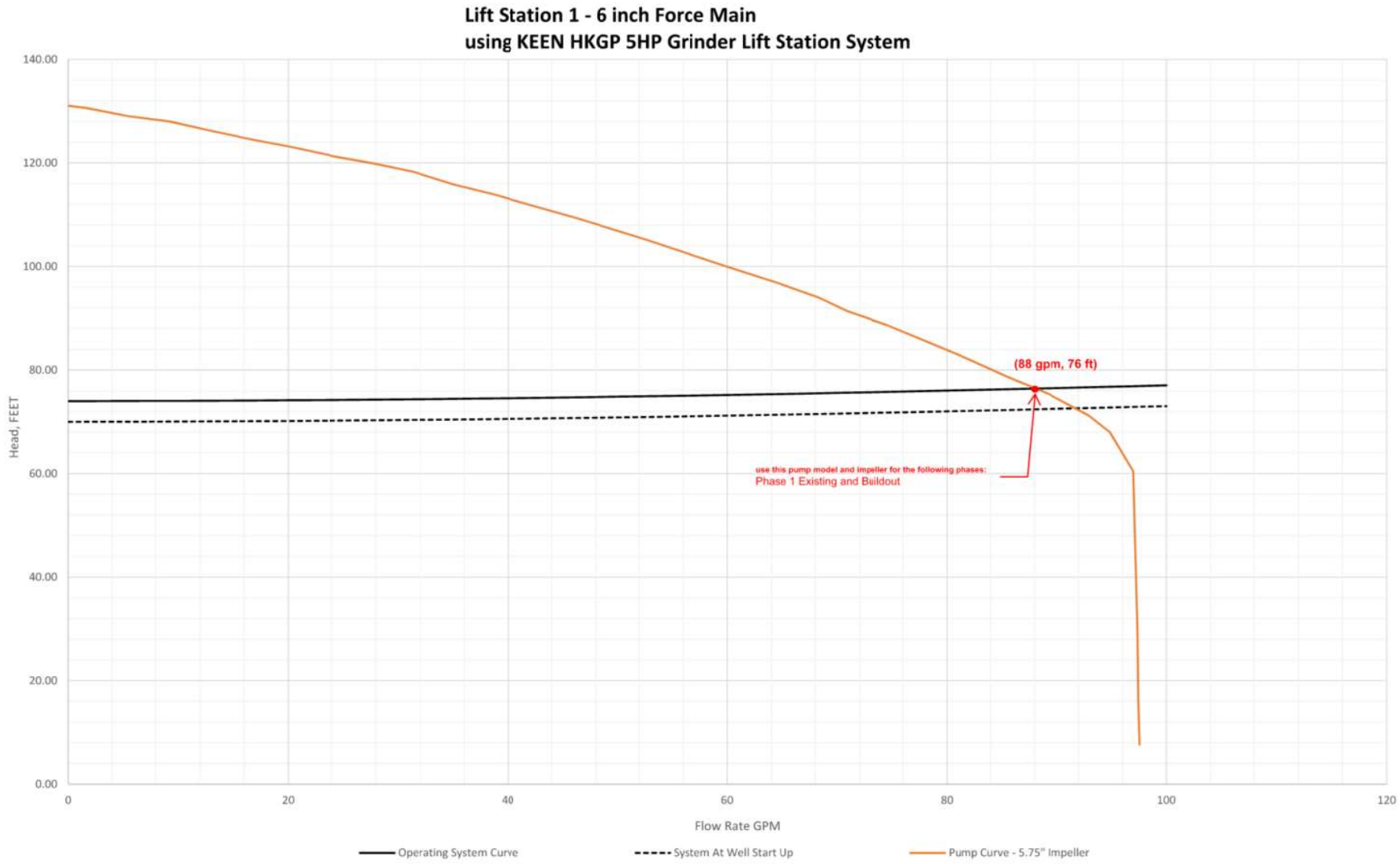

Figure 6.31: Lift station 1 – 6-inch System Curve with Keen HKGP Pump Curve

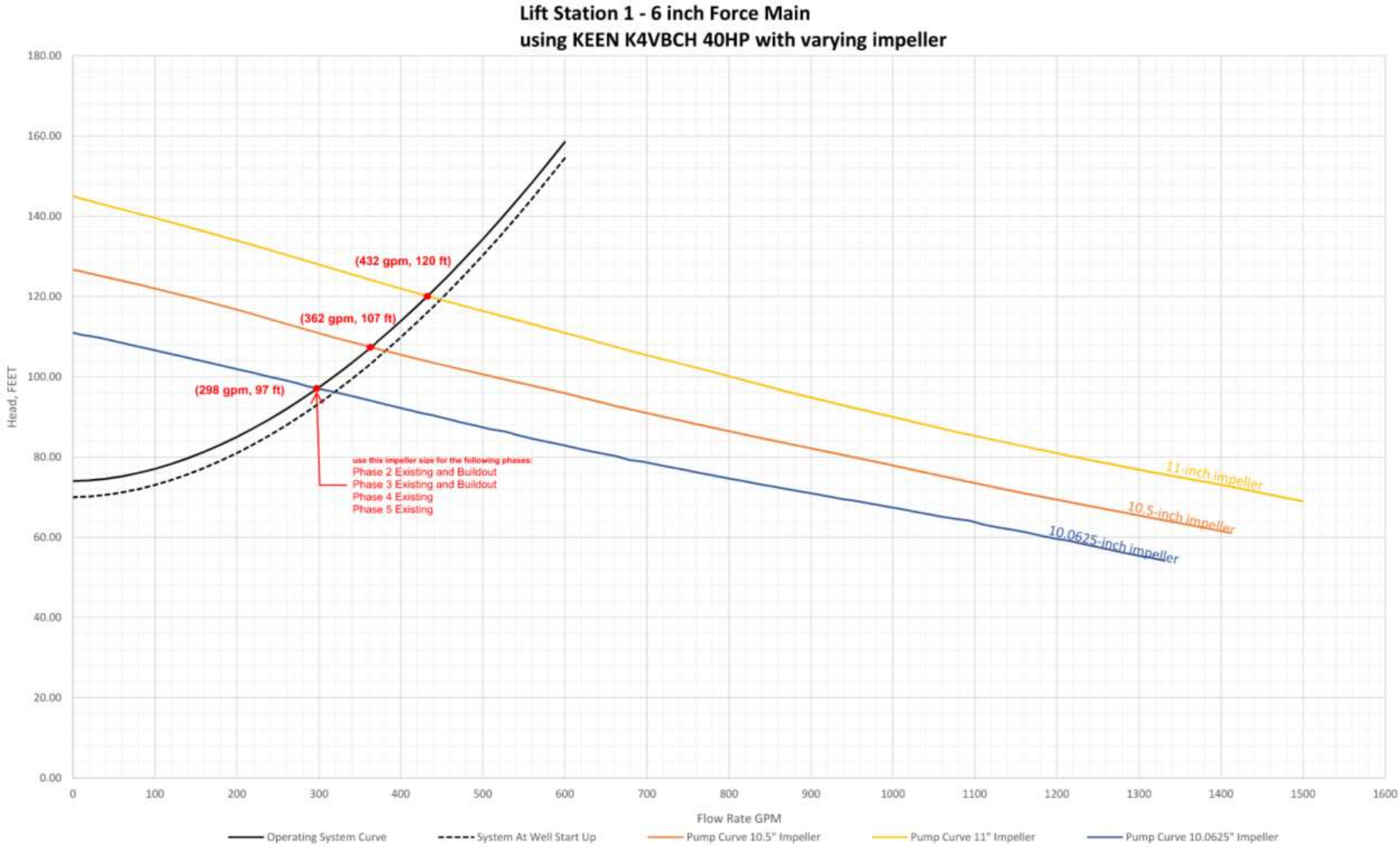

Figure 6.32: Lift station 1 – 6-inch System Curve with Keen 4KVBCH Pump Curves

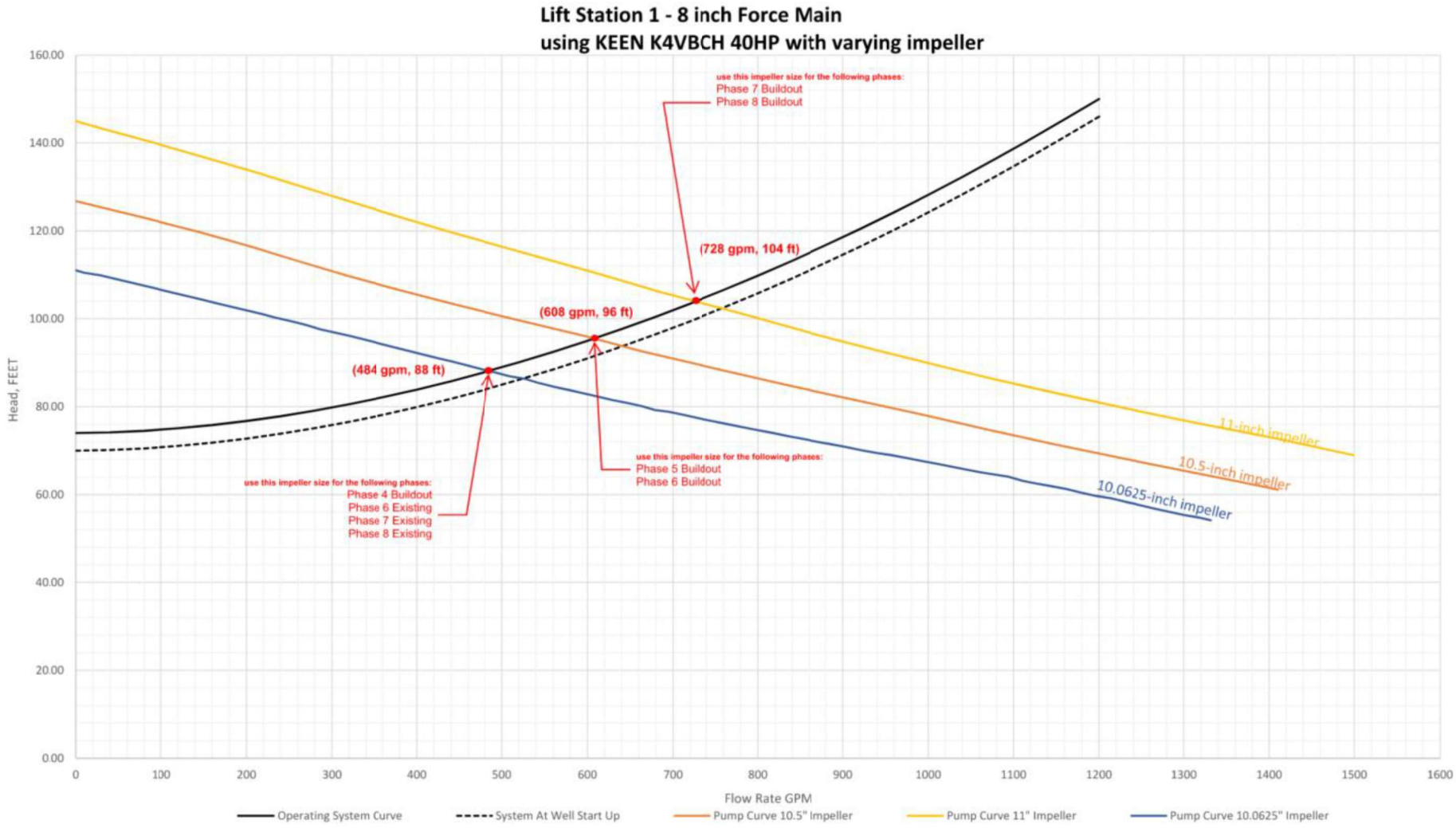

Figure 6.33: Lift station 1 – 8" System Curve with 4KVBCH Pump Curves

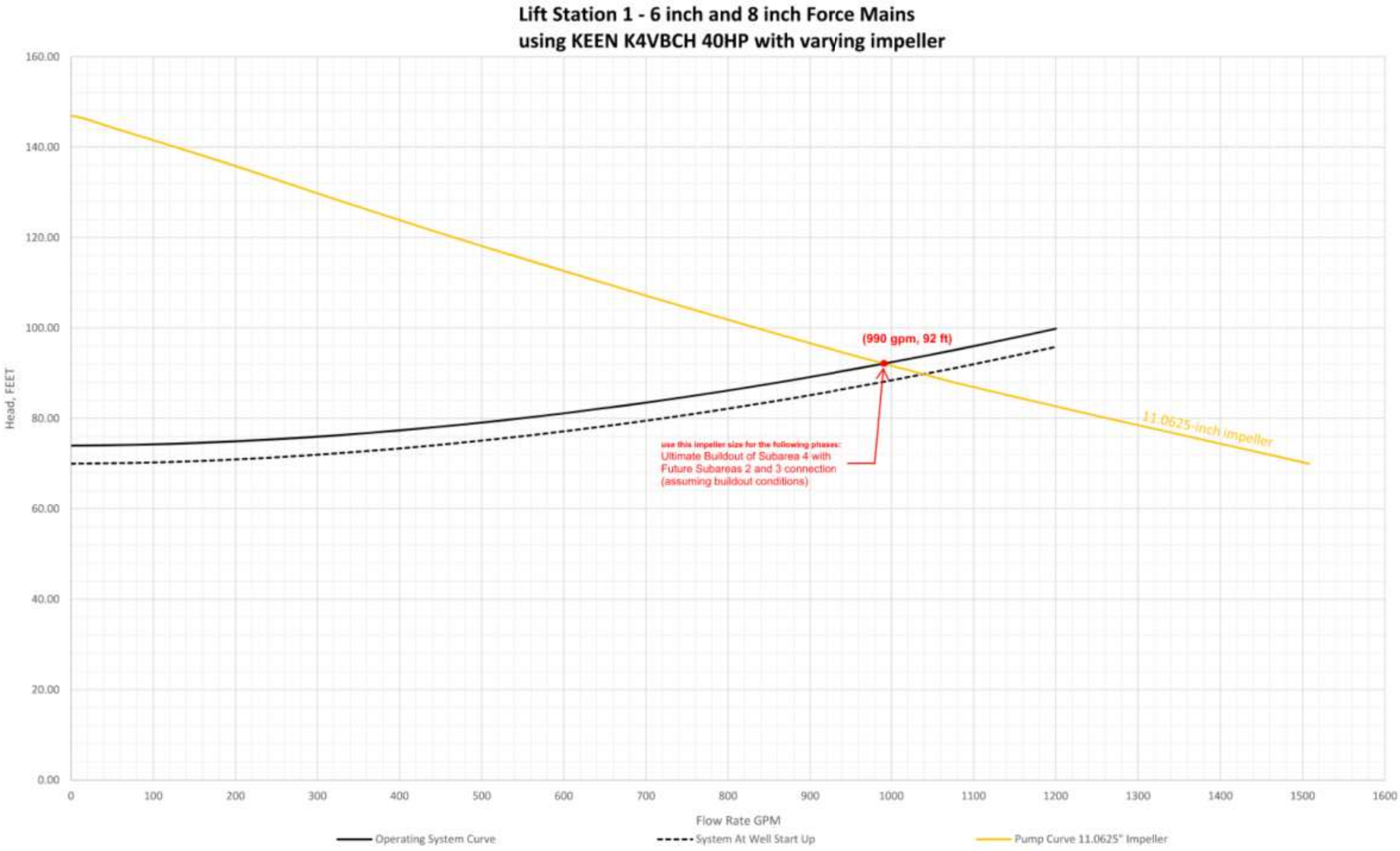

Figure 6.34: Lift station 1 – 6" & 8" System Curve with 4KVBCH Pump Curves

6.5.10 Option 9 – Flygt NP3102/NP3127 (4+1 configuration) and dual 6" & 8" force mains

Option 9 is essentially the same as Option 6. The only difference is that instead of using dual 6-inch force mains, 6-inch and 8-inch force mains will be used. This change will help increase the lift station capacity accommodate Subareas 2 and 3, should they be considered for public sewer systems in the future. However, it will only be able to accommodate Subareas 2 and 3 under their current developed conditions.

The proposed lift station will ultimately be equipped with four duty pumps and one standby pump, all rated at 12 HP with constant speed. The installation of these pumps will be phased in alignment with the construction phasing of the gravity sewer. During the initial low-flow phases, two smaller 6.5 HP pumps (one duty and one standby) will be utilized. As construction progresses and the area develops, the 6.5 HP pumps will be replaced with 12 HP pumps, and additional pumps will be installed to meet increasing flow demands. The final configuration will consist of four duty pumps and one standby pump, all of the same 12 HP model.

During the initial phases, low flows will be directed through the 6-inch force main. As the project progresses and flow rates increase, the lift station discharge will be directed to the 8-inch force main. In Phases 5-8 (buildout), flows from the lift station will be pumped through both the 6-inch and 8-inch force mains. Figure 6.35 illustrates the functionality of the lift station system for Option 9, showing how it handles varying flow rates and indicating how many pumps and which force mains to use as the phases progress and design flows increase.

The proposed wet well will be a 15' x 18.5' rectangular structure, featuring an interior wall with knockouts to create a separate 8.5' x 18.5' section. This section will serve as the wet well during the early phases of the project, accommodating one duty pump, one standby pump, and one future pump.

Figure 6.19, located in Section 6.5.6, shows an illustration of the proposed wet well geometry for this option.

An initial pump recommendation was provided by Flygt and is summarized below.

Pumps for Phase 1 (existing and buildout) and Phase 2 (existing)

- Model: NP 3102 SH 3~ Adaptive 256
- Impeller diameter: 135 mm
- Impeller type: Adaptive N-impeller
- Motor: 6.5 HP
- Power Requirements: 460V 3 phase
- Constant Speed Pump

Pumps for Phases beyond Phase 2 (existing)

- Model: NP 3127 SH 3~ Adaptive 249
- Impeller diameter: 146 mm
- Impeller type: Adaptive N-impeller
- Motor: 12 HP
- Power Requirements: 460V 3 phase
- Constant Speed Pump

LIFT STATION 1 - OPTION 9
FLYGT NP3102 6.5HP & 3127 12HP (5 PUMPS) - 6-INCH & 8-INCH FORCE MAINS

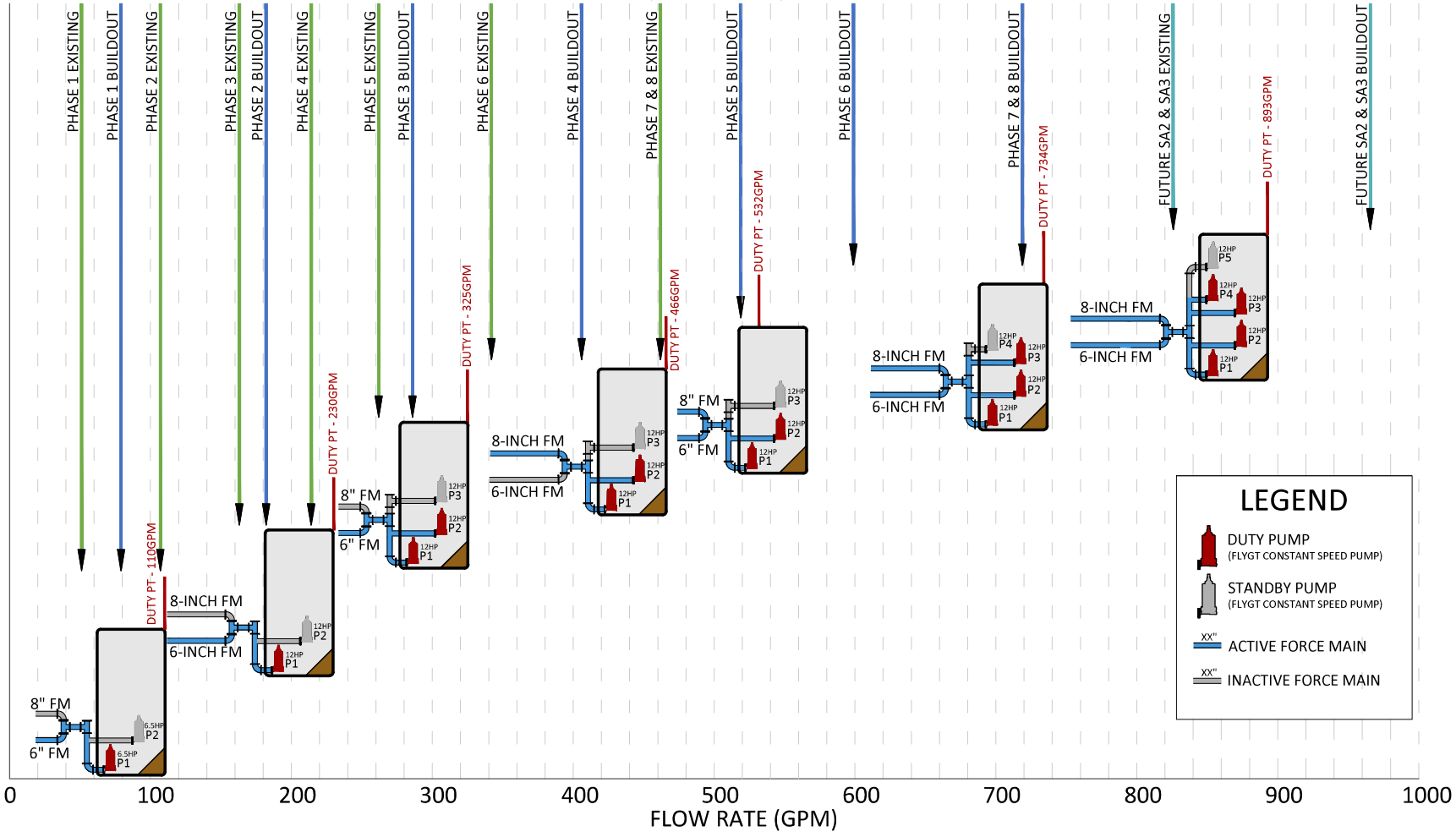

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FIGURE 6.35

OPT. 9-LS CONFIGURATION

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The advantages and disadvantages of 4+1 lift station configuration can be found in Section 6.5.6, mirroring those of Option 6. Option 9 offers additional advantages as listed below:

1. For Quail Valley Subarea 4, three duty pumps and one standby pump in a 3+1 configuration are required to handle its fully phased buildout conditions.

2. Option 9 has the added benefit of managing the extra inflows from Subareas 2 and 3. However, this capability is limited to the current developed conditions of these subareas and does not extend to their buildout conditions.

Figures 6.36 through 6.39 illustrate the system curves alongside the pump curves for the 6.5 HP Flygt pump and four duty 12 HP Flygt pumps. Figure 6.36 shows that the 6.5 HP Flygt pump will operate at approximately 110 gpm, which can meet the wastewater demands for Phase 1 (both existing and buildout) and Phase 2 (existing). The 6.5 HP Flygt pump will operate more to the left of the curve but within the permissible limits. When the project advances to Phase 2 buildout, the 6.5 HP Flygt pumps will be replaced with 12 HP pumps. The 12 HP pumps operate near the middle of the pump curve. Figures 6.37 through 6.39 indicate that operating one to three 12 HP pumps in this lift station will place its operating range between 230 gpm to 734 gpm, effectively covering the design flow requirements from Phase 2 through Phase 8. In the event that Subareas 2 and 3 connect to Lift Station 1, an additional 12 HP pump can be added, creating a 4+1 configuration. This adjustment would enable the lift station to handle the additional flows from the existing developed parcels of Subareas 2 and 3. Table 6.32 provides a summary of the lift station system's operating conditions by phase, specifying the number of pumps to be used and identifying which force mains will be utilized in each phase.

A redundant system is in place for phases using only the 6-inch force main, with the 8-inch force main serving as the backup. Redundancy measures need assessment for phases using the 8-inch line or both 6-inch and 8-inch lines. In these phases, when only the 6-inch line is available, the lift station's capacity will decrease. Thus, it is necessary to evaluate how the lift station will perform compared to the average day inflow and peak inflow. When only the 6-inch force main is available, the lift station operating condition is detailed in Table 6.33. As indicated, the lift station can handle the average daily inflow at all phases. On the other hand, the lift station's pump rate falls below the peak flow rate when only the 6-inch force main is online. This causes sewage to accumulate in the wet well, ranging from 1.7 to 9.9 feet above the low water level. For reference, the gravity sewer invert is about 4.4 feet above low-water level. Sewage will backflow into the gravity mains, taking approximately 70 to 110 minutes to reduce to the low-water level. This pumping duration includes 60 minutes of peak flow occurrence and additional pumping time after the peak flow has subsided. These results are outlined in Table 6.34.

Minor surcharges into the gravity main can occur without causing overflow into sewer laterals due to the depth of the gravity main. Based on the 30% plans, the deepest existing lateral has an invert of 1486 feet, roughly 10 feet above the low water level. Thus, the sewer system is not expected to experience lateral overflow because the sewage in the wet well does not rise 10 feet past the low water level.

Table 6.32: Flygt NP3127 4+1 Pumps and Dual 6" & 8" Force Mains - Operating Conditions by Phase

Phase	Design Capacity (gpm)	Pump Model	Number of pumps	Force Main Diameter	Pump flow rate (gpm)	Velocity in Force Main (fps)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (Non-peak) (min)	Time to Drain (min)	Pump Cycle Time (min)
1 Existing[1]	51	NP3102	1+1	6-inch	110	1.3	700	0.74	48	6	25
1 Buildout[1]	79	NP3102	1+1	6-inch	110	1.3	700	0.74	31	6	25
2 Existing[1]	107	NP3102	1+1	6-inch	110	1.3	700	0.74	23	6	25
2 Buildout[1]	182	NP3127	1+1	6-inch	230	2.6	1300	1.35	25	6	23
3 Existing[1]	163	NP3127	1+1	6-inch	230	2.6	1300	1.35	28	6	23
3 Buildout[1]	286	NP3127	2+1	6-inch	325	3.7	1800	1.84	22	6	22
4 Existing[1]	214	NP3127	1+1	6-inch	230	2.3	1300	1.35	21	6	23
4 Buildout[1]	406	NP3127	2+1	8-inch	466	3.0	2700	2.68	23	6	23
5 Existing[1]	262	NP3127	2+1	6-inch	325	3.7	1800	1.84	24	6	22
5 Buildout[1]	519	NP3127	2+1	6-inch & 8-inch	532	2.2	3000	2.95	20	6	23
6 Existing[1]	342	NP3127	2+1	8-inch	466	3.0	3000	2.95	19	6	26
6 Buildout	599	NP3127	3+1	6-inch & 8-inch	734	3.0	4200	2.54	18	6	23
7 Existing[1]	462	NP3127	2+1	8-inch	466	3.0	3200	3.13	12	7	27
7 Buildout	729	NP3127	3+1	6-inch & 8-inch	734	3.0	4800	2.88	14	7	26
8 Existing[1]	462	NP3127	2+1	8-inch	466	3.0	3200	3.13	12	7	27
8 Buildout	729	NP3127	3+1	6-inch & 8-inch	734	3.0	4800	2.88	14	7	26
Future SA2 & SA3 connection (Existing)	826	NP3127	4+1	6-inch & 8-inch	893	3.7	6500	3.79	17	7	29

[1]Design wet well cycle volume in these phases is only within the 8.5'x 12' section of the wet well. In the early phases, only this portion of the wet well will be available for storage of sewer flows.

Table 6.33: Redundancy Check with Flygt NP3127 4+1 Pumps and Dual 6" Force Mains (run pump at full speed)

Maintenance Condition	Force Main Diameter Available	Phase	Number of Pumps	Pump Flow Rate at full speed (gpm)	Average Day Inflow at Phase (gpm)	Design Wet Well Cycle Volume (gal)	Drawdown Depth (ft)	Time to Fill (min)	Time to Drain (min)	Pump Cycle Time (min)
One 8-inch line down	6-inch	Phase 4 Buildout[1]	2+1	325	118	2700	2.68	23	8	33
		Phase 5 Buildout[1]	2+1	325	151	3000	2.95	20	9	37
		Phase 6 Existing[1]	2+1	325	156	3000	2.95	19	9	37
		Phase 7 Existing[1]	2+1	325	276	3200	3.13	12	10	39
		Phase 8 Existing[1]	2+1	325	276	3200	3.13	12	10	39
		Phase 6 Buildout	3+1	373	231	4200	2.54	18	11	45
		Phase 7 Buildout	3+1	373	351	4800	2.88	14	13	51
		Phase 8 Buildout	3+1	373	351	4800	2.88	14	13	51

[1]Design wet well cycle volume in these phases is only within the 8.5'x 12' section of the wet well. In the early phases, only this portion of the wet well will be available for storage of sewer flows.

Table 6.34: Redundancy Check with Flygt NP3127 4+1 Pumps and Dual 6" Force Mains (peak flow for an hour)

Maintenance Condition	Force Main Diameter Available	Phase	Number of Pumps	Pump Flow Rate at full speed (gpm)	Peak Flow (gpm)	Volume of sewage post 1-hr peak (gallons)	Depth of sewage post 1-hr peak[2] (ft)	Time to Drain[1] (min)
8-inch FM down for maintenance	6-inch	Phase 4 Buildout[4]	2+1	325	338.1	3400	3.3	70
		Phase 5 Buildout[4]	2+1	325	432.1	6600	6.0	80
		Phase 6 Existing[4]	2+1	325	297.5	1700	1.7	65
		Phase 7 Existing[4]	2+1	325	417.5	8100	7.3	85
		Phase 8 Existing[4]	2+1	325	417.5	8100	7.3	85
		Phase 6 Buildout	3+1	373	512.1	11400	6.3	90
		Phase 7 Buildout	3+1	373	632.1	18400	9.9	110
		Phase 8 Buildout	3+1	373	632.1	18400	9.9	110

[1]Time to drain includes 60 minutes of pumping time during peak flow along with additional time to pump out excess volume after the 1-hour peak period.
[2]This is the calculated depth above the LWL of the wet well.
[3]This is peak flow without the 20% factor of safety.
[4]Available wet well volume in these phases is only within the 8.5'x 12' section of the wet well. In the early phases, only this portion of the wet well will be available for storage of sewer flows.

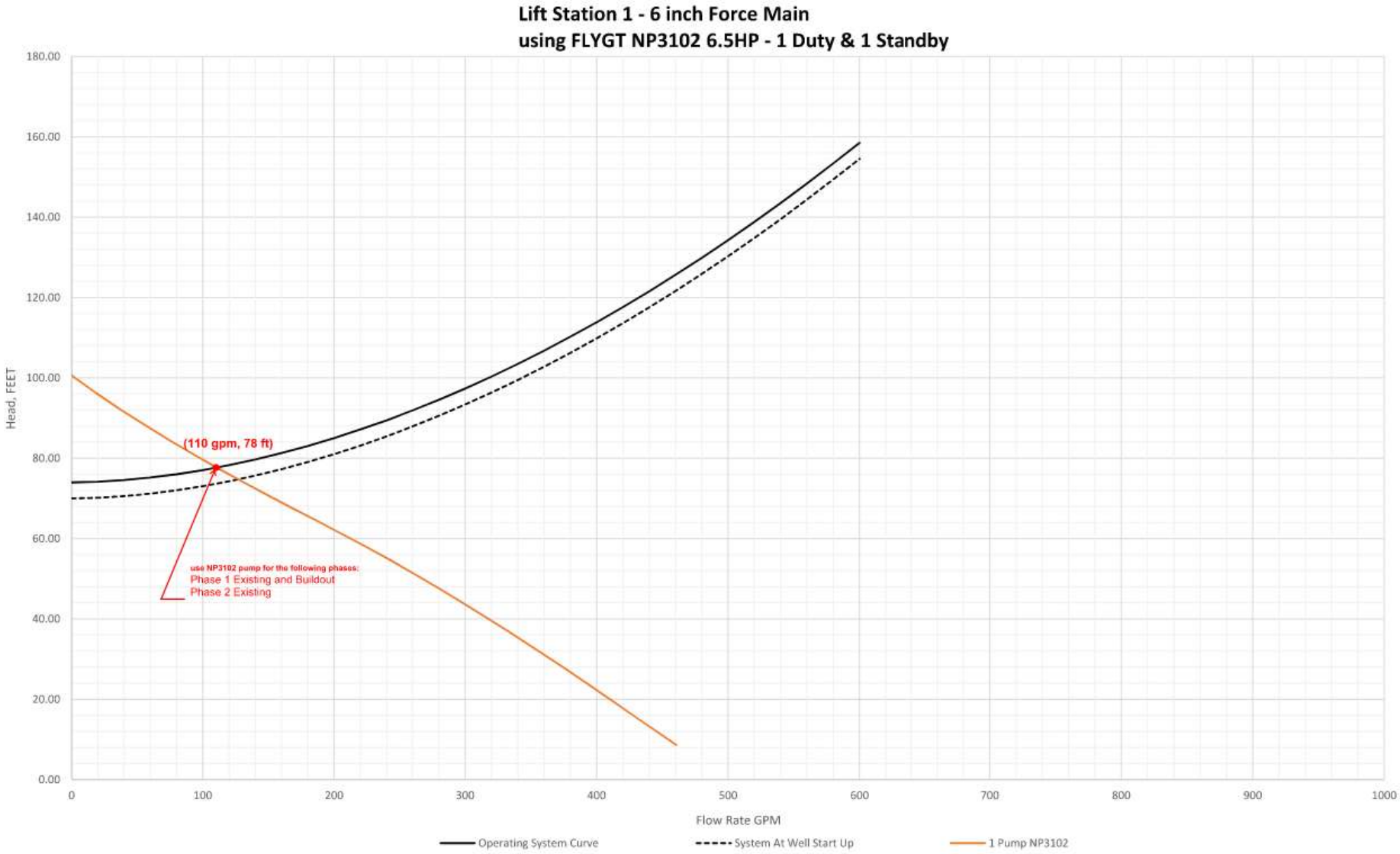


Figure 6.36: Lift station 1 – 6-inch System Curve with Flygt NP3102 1+1 Pump Curves

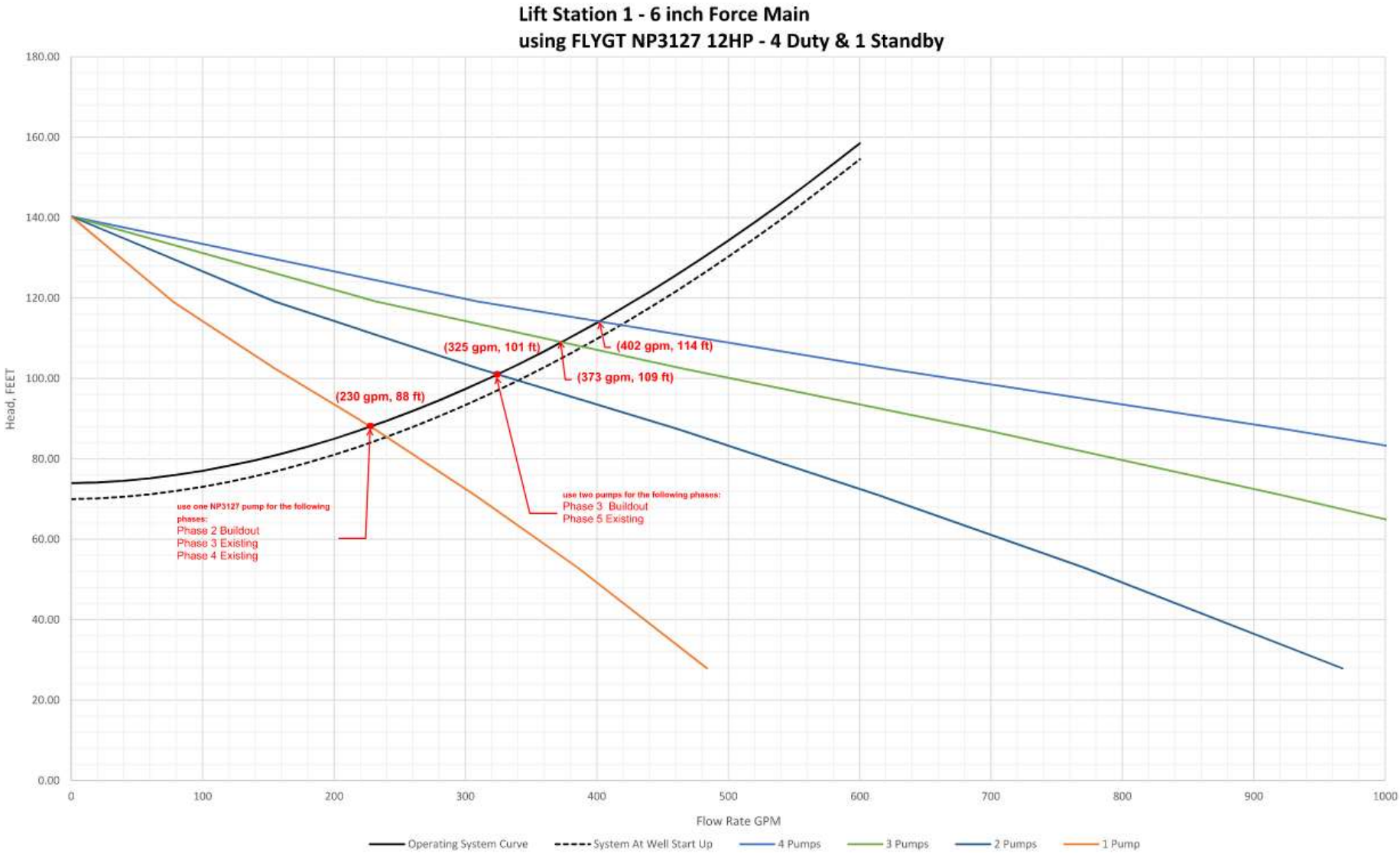


Figure 6.37: Lift station 1 – 6-inch System Curve with Flygt NP3127 4+1 Pump Curves

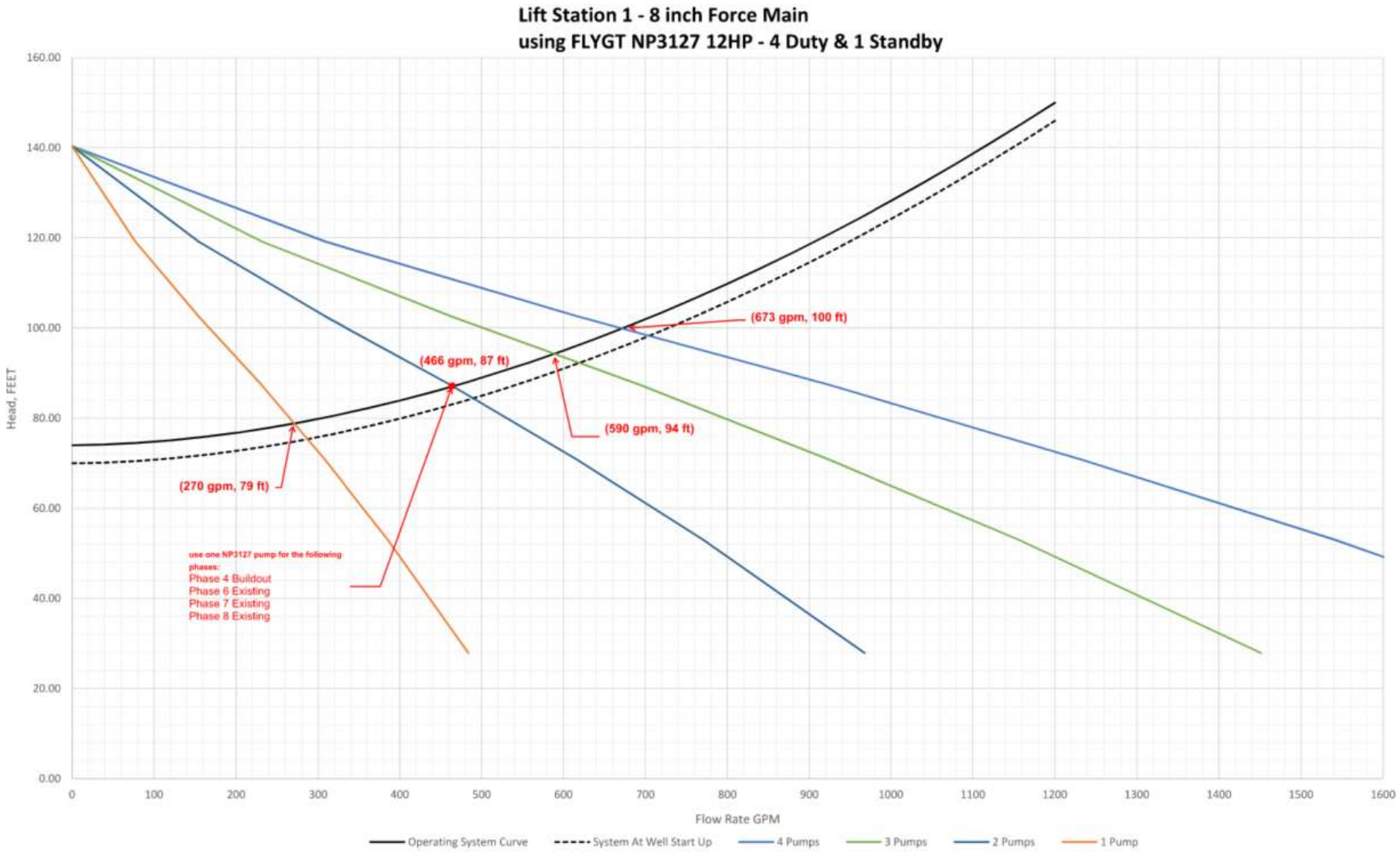


Figure 6.38: Lift station 1 – 8-inch System Curve with Flygt NP3127 4+1 Pump Curves

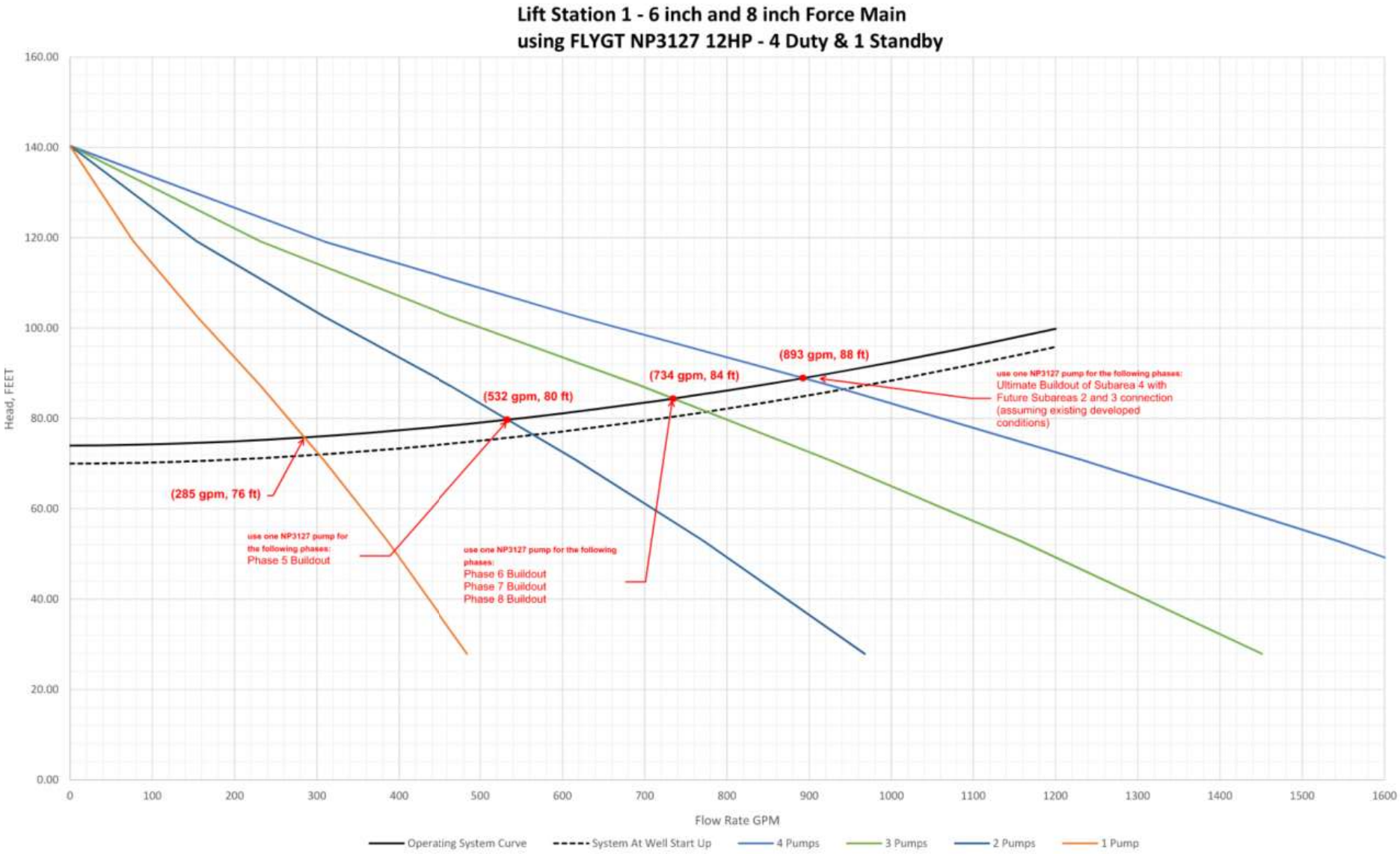


Figure 6.39: Lift station 1 – 8-inch System Curve with Flygt NP3127 4+1 Pump Curves

6.6 Conclusion

Option 2, which uses Flygt pumps equipped with VFD and dual 6" force mains, is the recommended option. This option appears to be the best match for the necessary sewer capacity upgrades and also is expected to require the least amount of maintenance. If Subareas 2 and 3 sewer into SA4 in the future, then Option 7 is recommended. Option 7 is a variation of Option 2, using the same pump model and wet well, but with 6-inch and 8-inch force mains instead of dual 6-inch force mains.

Although Option 2 and 7 may have high upfront costs and require maintenance staff to be familiar with operating the VFD controls, they are the most durable choice, capable of operating with minimal disruptions or downtime. As construction phases progress and inflows increase, there will be no need to switch out the pump, impeller or add another pump. The same pump model will be used throughout the operational lifespan of LS1, with adjustments needed only for the wet well floats/levels and the force main through which the sewage flows. The system will need to use the larger force main or both force mains to accommodate the increasing flows.

If there is uncertainty about the connections for SA2 and SA3, proceeding with Option 2 using dual 6-inch force mains is recommended. One of the force mains can be upsized to 8 inches in the future if other subareas need to be served by LS-1.

As LS-1 moves into final design, the site layout and configuration will ultimately depend on the property EMWD is able to acquire. At that time, LS-1 recommendations should be revisited and the sizing of the force main should also be reassessed (e.g. 4-inch and 8-inch force main combination can be considered).

7. ELECTRICAL INFRASTRUCTURE UPGRADES

Upgrading the existing power infrastructure to provide 3-phase power service to all lift station sites in Quail Valley SA4 is preferred. Although it is essential only for the regional lift station LS-1, having 3-phase power at all sites would be beneficial. If 3-phase power cannot be provided to the smaller lift stations (LS-1 through LS-4), single-phase power will suffice for operating smaller grinder pumps, although it will not support the Flygt Concerter system at these sites.

EMWD is engaged in discussions with Southern California Edison regarding power infrastructure upgrades. This section provides the preliminary load sizing for the lift stations, which can be used to facilitate these discussions and plan the necessary upgrades.

For lift station LS-1, two service sizing alternatives are analyzed: the preferred alternative (Option 6 in Section 6) and the worst-case alternative (Option 3 in Section 6, which uses the largest horsepower pumps). The electrical service for the preferred alternative will be sized for two 45 HP pumps, two aerator blowers, and auxiliary electrical loads. For the worst-case alternative, the electrical service will be sized for two 50 HP pumps, two aerator blowers, and auxiliary electrical loads. The recommended service size for both alternatives is 200A.

Table 7.1: LS-1 Service Sizing - Alternative 1

LS-1 LOAD SCHEDULE (Preferred) 480V, 3PH SERVICE			
LOAD DESCRIPTION	**KVA**	**HP**	**AMP**
15KVA XFMR	15		18
PUMP 1		45	59
PUMP 2		45	59
AERATOR BLOWER 1		1.5	3
AERATOR BLOWER 2		1.5	3
25% LARGEST LOAD		-	15
TOTAL LOAD			**156**
RECOMMENDED SERVICE SIZE			***200A***

Table 7.2: LS-1 Service Sizing - Alternative 2

LS-1 LOAD SCHEDULE (Worst-Case) 480V, 3PH SERVICE			
LOAD DESCRIPTION	**KVA**	**HP**	**AMP**
15KVA XFMR	15		18
PUMP 1		50	65
PUMP 2		50	65
AERATOR BLOWER 1		1.5	3
AERATOR BLOWER 2		1.5	3
25% LARGEST LOAD		-	16
TOTAL LOAD			**170**
RECOMMENDED SERVICE SIZE			***200A***

For lift stations LS-2 through LS-4, two service sizing alternatives are analyzed: the preferred alternative (Flygt concertor system) and the secondary alternative (Sierra Peak system). The electrical service for the preferred alternative will be sized for two 3 HP pumps using 480V 3-phase power, two aerator blowers, and auxiliary electrical loads. For the secondary alternative, the electrical service will be sized for two 3 HP pumps using 230V 1-phase power, two aerator blowers, and auxiliary electrical loads. The recommended service size for both alternatives is 100A.

Table 7.3: LS-2/3/4 Service Sizing - Alternative 1

LS-2/3/4 LOAD SCHEDULE (Preferred) 480V, 3PH SERVICE			
LOAD DESCRIPTION	**KVA**	**HP**	**AMP**
15KVA XFMR	15		18
PUMP 1		3	5
PUMP 2		3	5
AERATOR BLOWER 1		1.5	3
AERATOR BLOWER 2		1.5	3
25% LARGEST LOAD		-	5
TOTAL LOAD			**38**
RECOMMENDED SERVICE SIZE			***100A***

Table 7.4: LS-2/3/4 Service Sizing - Alternative 2

LS-2/3/4 LOAD SCHEDULE (Secondary) 240V, 1PH SERVICE			
LOAD DESCRIPTION	**KVA**	**HP**	**AMP**
AUXILIARY LOADS			20
PUMP 1		3	16
PUMP 2		3	16
AERATOR BLOWER 1		1.5	10
AERATOR BLOWER 2		1.5	10
25% LARGEST LOAD		-	5
TOTAL LOAD			**77**
RECOMMENDED SERVICE SIZE			***100A***

For lift station LS-5, two service sizing alternatives are analyzed: the preferred alternative (Flygt concertor system) and the secondary alternative (Sierra Peak system). The electrical service for the preferred alternative will be sized for two 3 HP pumps using 480V 3-phase power, two aerator blowers, and auxiliary electrical loads. For the secondary alternative, the electrical service will be sized for two 2 HP pumps using 208V 1-phase power, two aerator blowers, and auxiliary electrical loads. The recommended service size for both alternatives is 100A.

Table 7.5: LS-5 Service Sizing – Alternative 1

LS-5 LOAD SCHEDULE (Preferred) 480V, 3 PH SERVICE			
LOAD DESCRIPTION	**KVA**	**HP**	**AMP**
15KVA XFMR	15		18
PUMP 1		3	5
PUMP 2		3	5
AERATOR BLOWER 1		1.5	3
AERATOR BLOWER 2		1.5	3
25% LARGEST LOAD		-	5
TOTAL LOAD			**38**
RECOMMENDED SERVICE SIZE			***100A***

Table 7.6: LS-5 Service Sizing – Alternative 2

LS-5 LOAD SCHEDULE (Secondary) 208V, 1PH SERVICE			
LOAD DESCRIPTION	**KVA**	**HP**	**AMP**
AUXILIARY LOADS			20
PUMP 1		2	12
PUMP 2		2	12
AERATOR BLOWER 1		1.5	10
AERATOR BLOWER 2		1.5	10
25% LARGEST LOAD		-	5
TOTAL LOAD			**78**
RECOMMENDED SERVICE SIZE			***100A***

7.1 Lift Station Generators

The 30% design drawings for the lift station sites allocate space for generator parking. The use of a portable or permanent generator should be reviewed and decided during the final design phase.

APPENDIX A – LS-1 Pump Selection Options

APPENDIX A – LS-1 Pump Selection Options

Option 1 – Flygt NP3202 with VFD and Dual 4” & 6” Force Mains

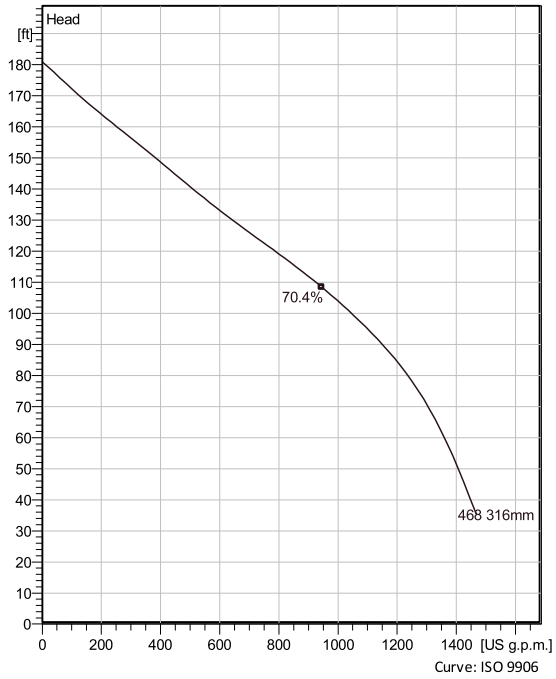
NP 3202 HT 3~ 468

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.

Technical specification



Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N3202.095 30-19-4AA-W 45hp

Installation type
P - Semi permanent, Wet

Impeller diameter
316 mm

Discharge diameter
4 inch

Pump information

Impeller diameter
316 mm

Discharge diameter
4 inch

Inlet diameter
200 mm

Maximum operating speed
1770 rpm

Number of blades
2

Max. fluid temperature
40 °C

Material

Impeller
Hard-Iron ™

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

Technical specification

Motor - General

Motor number N3202.095 30-19-4AA-W 45hp	**Phases** 3~	**Rated speed** 1770 rpm	**Rated power** 45 hp
ATEX approved FM	**Number of poles** 4	**Rated current** 51 A	**Stator variant** 4
Frequency 60 Hz	**Rated voltage** 460 V	**Insulation class** H	**Type of Duty** S1
Version code 095			

Motor - Technical

Power factor - 1/1 Load 0.91	**Motor efficiency - 1/1 Load** 90.7 %	**Total moment of inertia** 8.34 lb ft²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.89	**Motor efficiency - 3/4 Load** 91.7 %	**Starting current, direct starting** 315 A	
Power factor - 1/2 Load 0.82	**Motor efficiency - 1/2 Load** 91.7 %	**Starting current, star-delta** 105 A	

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

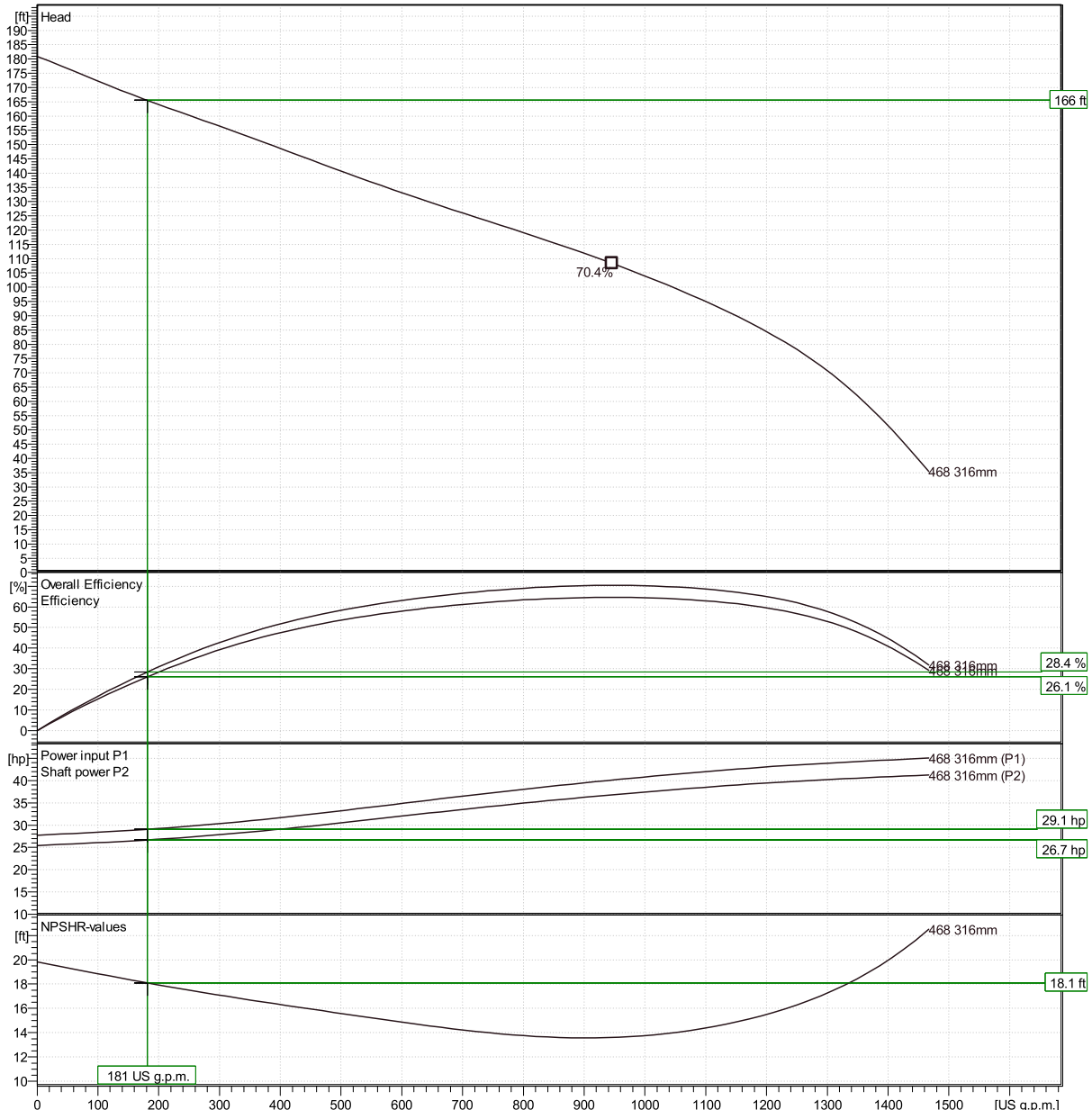
NP 3202 HT 3~ 468

Performance curve

Duty point

Flow	Head
181 US g.p.m.	166 ft

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

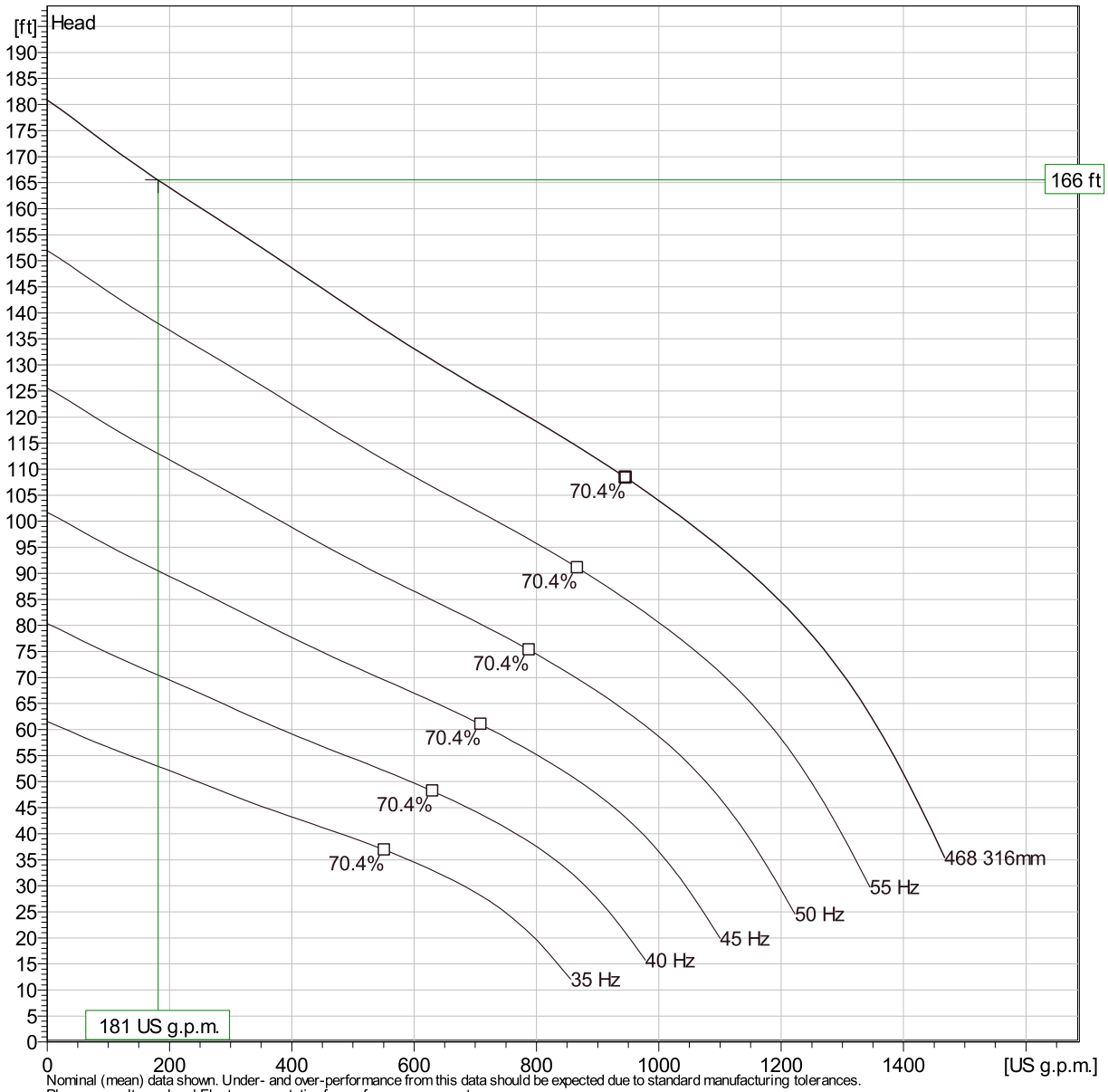
Curve: ISO 9906

Quail LS1			Alan Dahlqvist		
0		**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

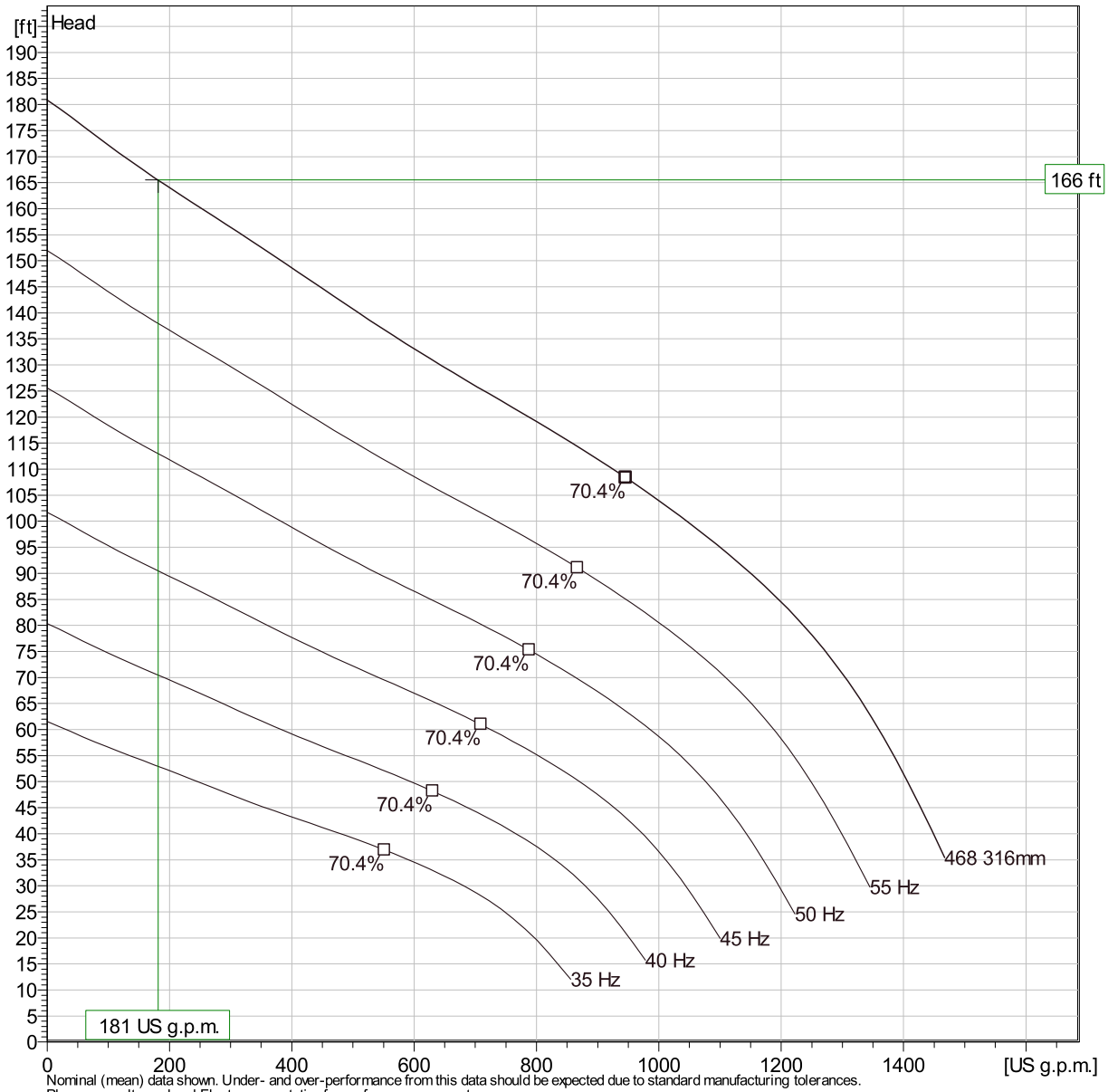
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
5	181	166	26.7	181	166	26.7	28.4 %	1990	18.1
4	365	151	28.6	365	151	28.6	48.8 %	1060	16.6
3	458	144	29.9	458	144	29.9	55.8 %	884	15.9

Project		**Created by**	Alan Dahlqvist		
Block	Quail LS1	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

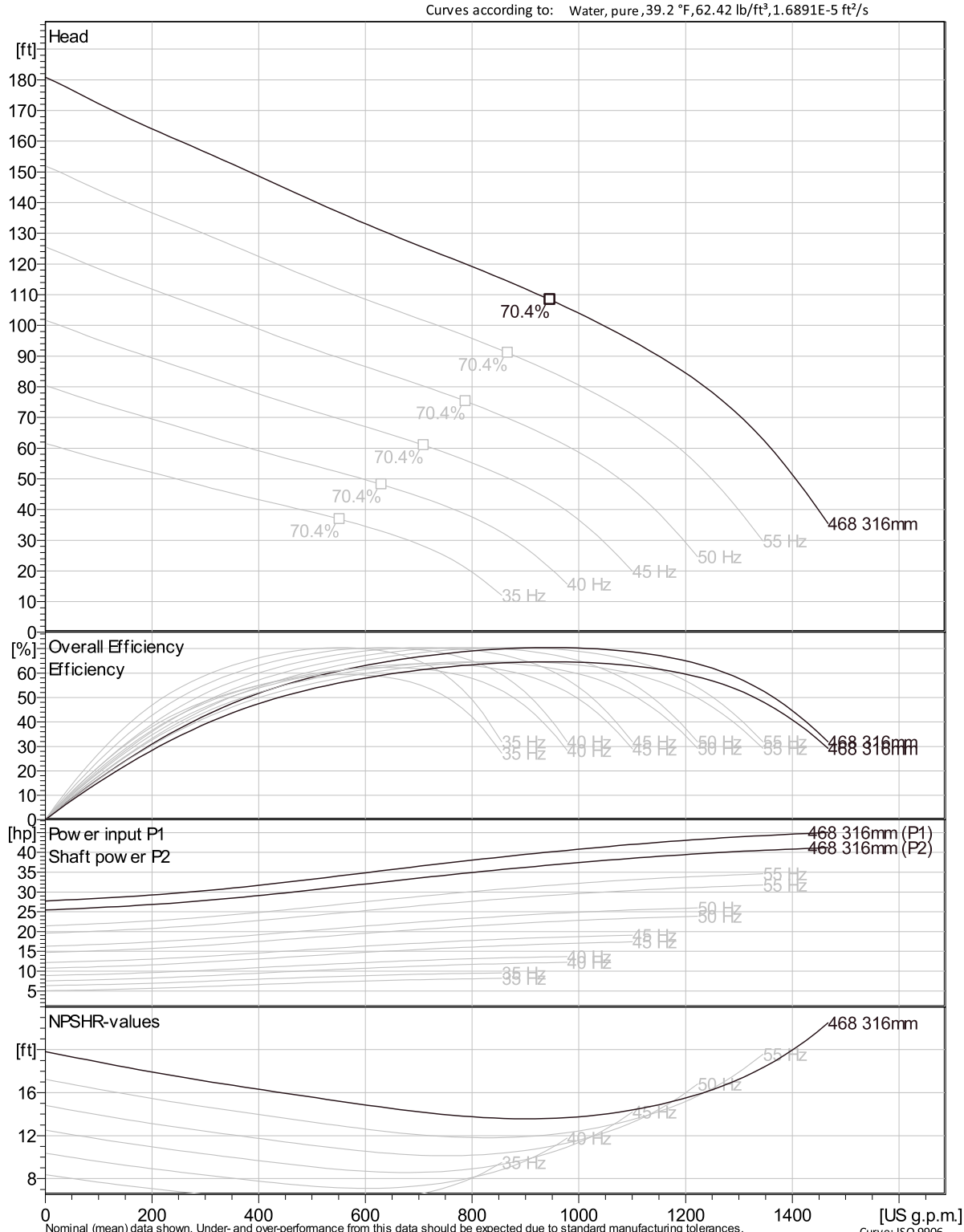
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2	520	139	30.8	520	139	30.8	59.4 %	801	15.4
1	732	124	34	732	124	34	67.5 %	628	14.1

Project		**Created by**	Alan Dahlqvist		
Block	Quail LS1	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Curve

Curves according to: Water, pure , 39.2 °F, 62.42 lb/ft³, 1.6891E-5 ft²/s



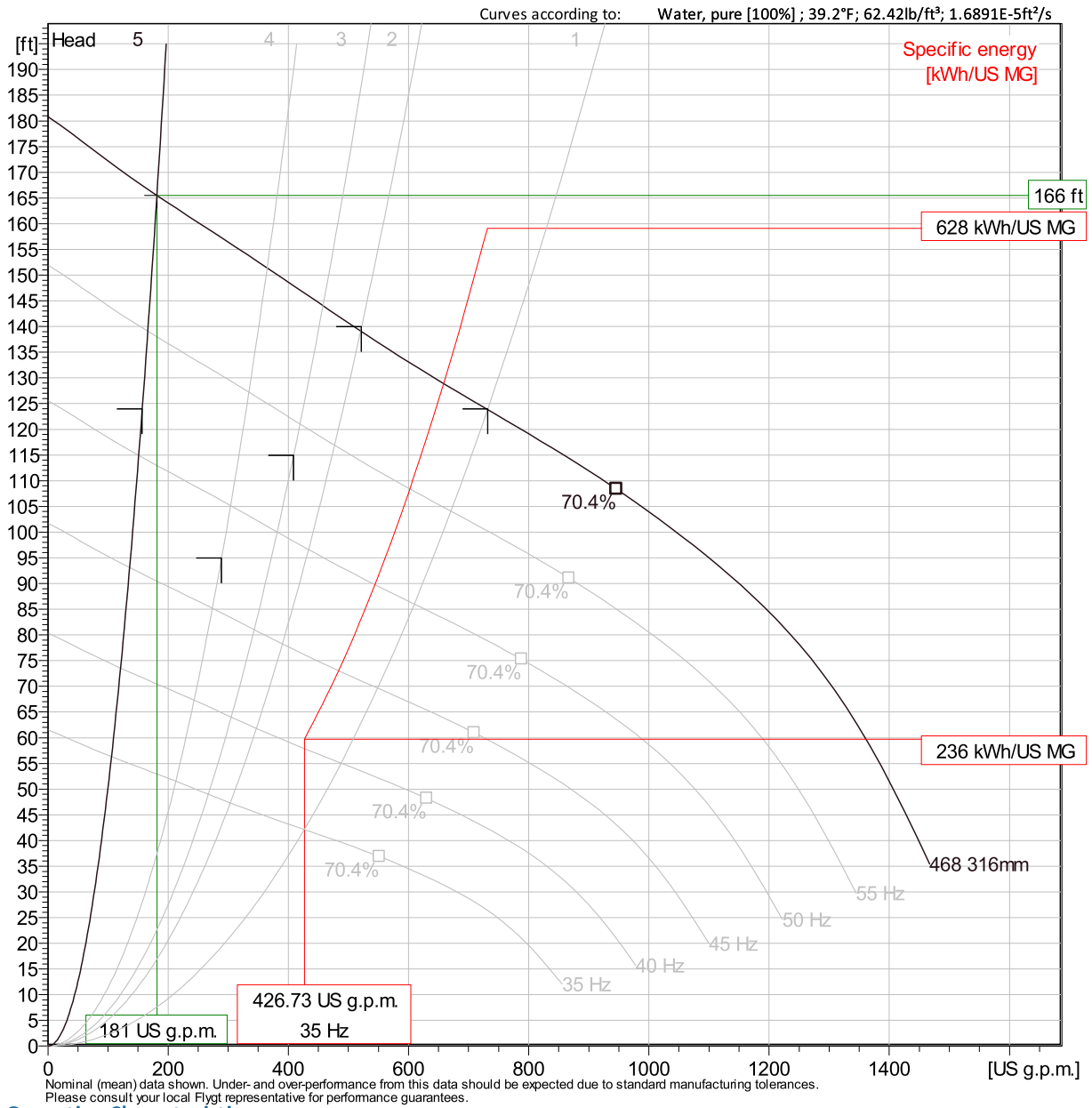
Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Curve: ISO 9906

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

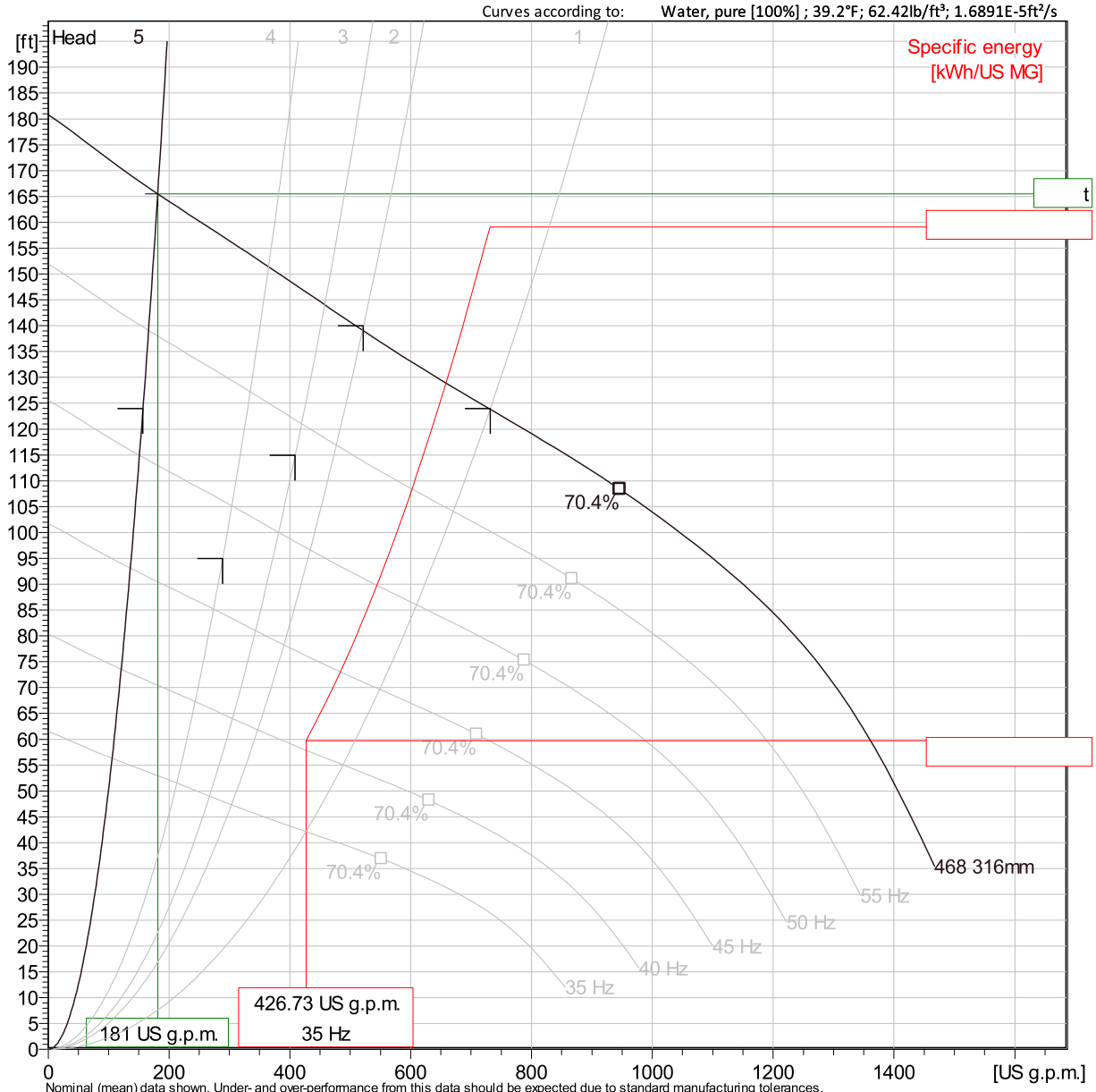
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
5	60 Hz	181	166	26.7	181	166	26.7	28.4 %	1990	18.1
5	55 Hz	166	139	20.6	166	139	20.6	28.4 %	1680	15.7
5	50 Hz	151	115	15.4	151	115	15.4	28.4 %	1400	13.5
5	45 Hz	136	93.1	11.3	136	93.1	11.3	28.4 %	1160	11.4

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

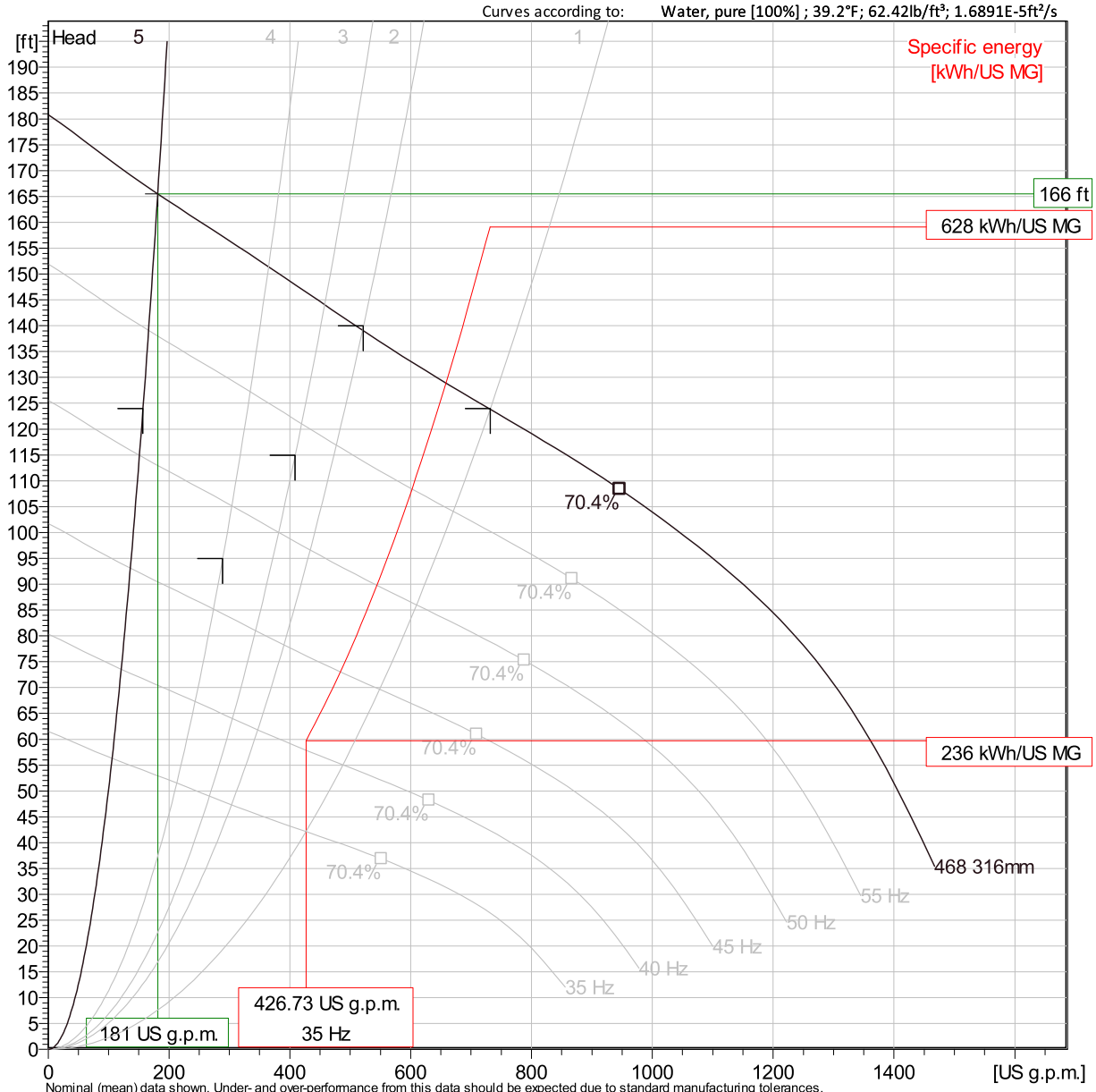
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
5	40 Hz	121	73.6	7.91	121	73.6	7.91	28.4 %	954	9.46
5	35 Hz	106	56.3	5.3	106	56.3	5.3	28.4 %	776	7.64
4	60 Hz	365	151	28.6	365	151	28.6	48.8 %	1060	16.6
4	55 Hz	334	127	22	334	127	22	48.8 %	894	14.4

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

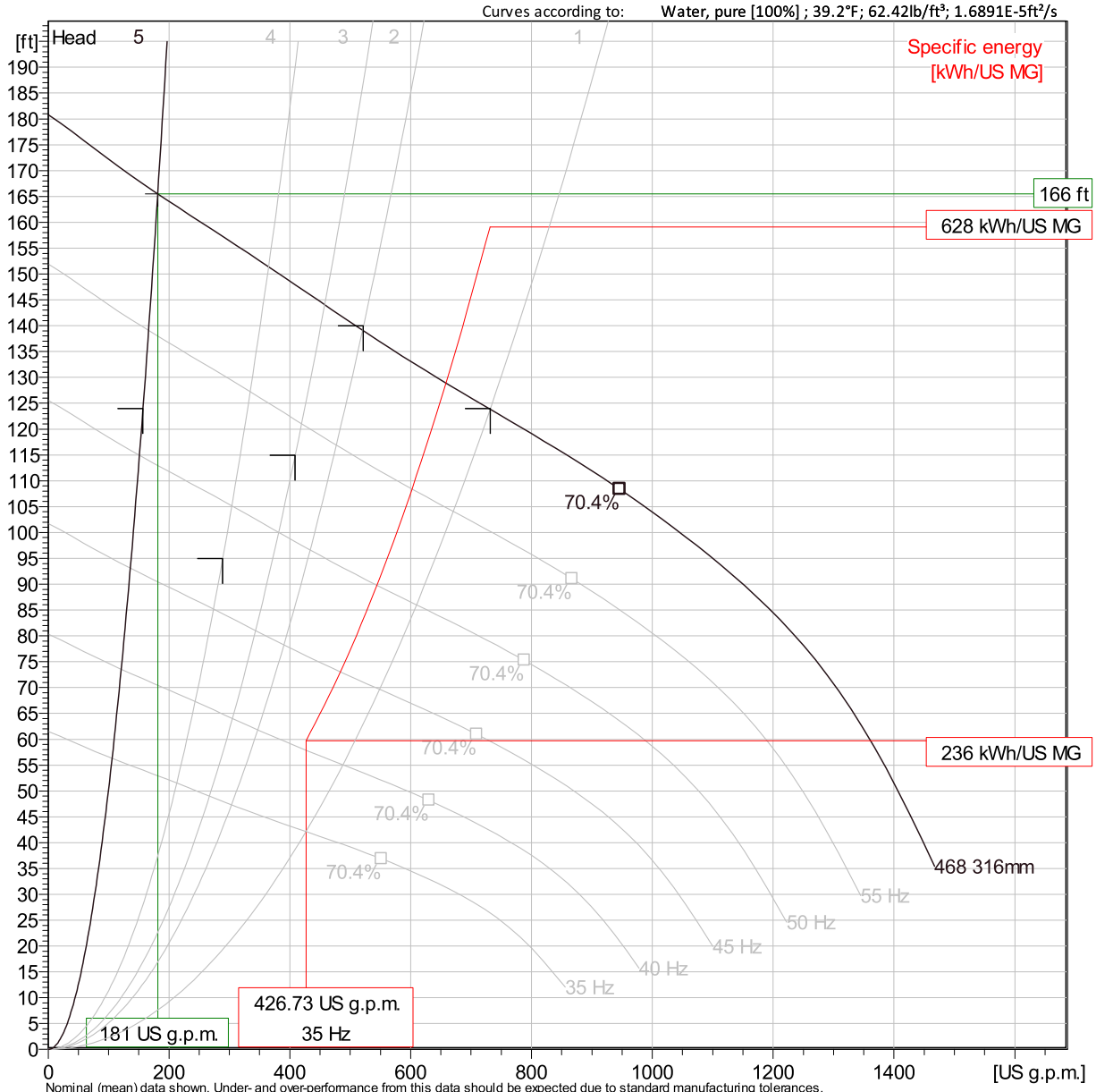
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
4	50 Hz	304	105	16.6	304	105	16.6	48.8 %	745	12.4
4	45 Hz	274	85.2	12.1	274	85.2	12.1	48.8 %	615	10.5
4	40 Hz	243	67.3	8.48	243	67.3	8.48	48.8 %	504	8.67
4	35 Hz	213	51.5	5.68	213	51.5	5.68	48.8 %	409	7

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

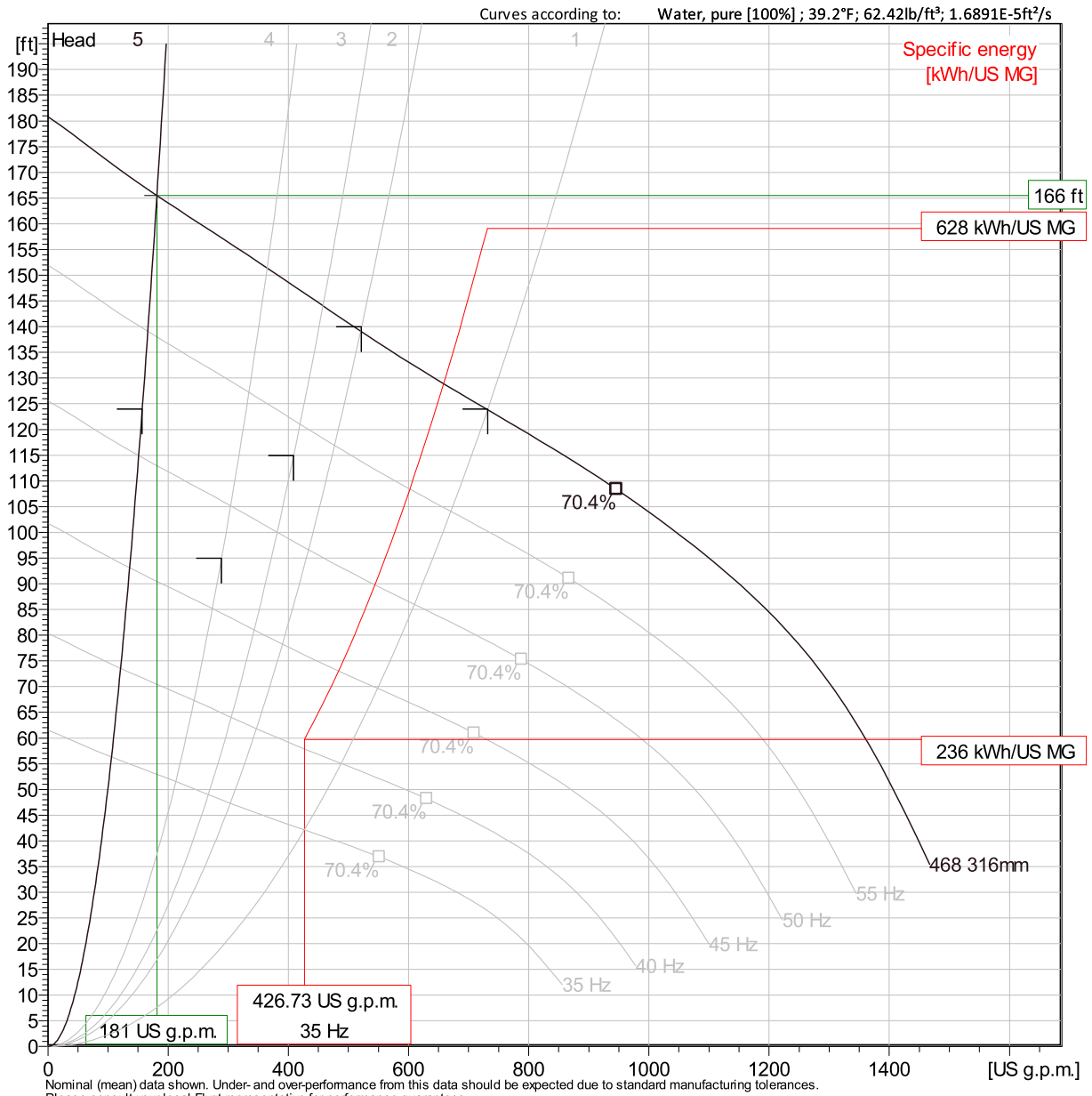
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3	60 Hz	458	144	29.9	458	144	29.9	55.8 %	884	15.9
3	55 Hz	420	121	23	420	121	23	55.8 %	743	13.8
3	50 Hz	381	100	17.3	381	100	17.3	55.8 %	619	11.9
3	45 Hz	343	81	12.6	343	81	12.6	55.8 %	510	10

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

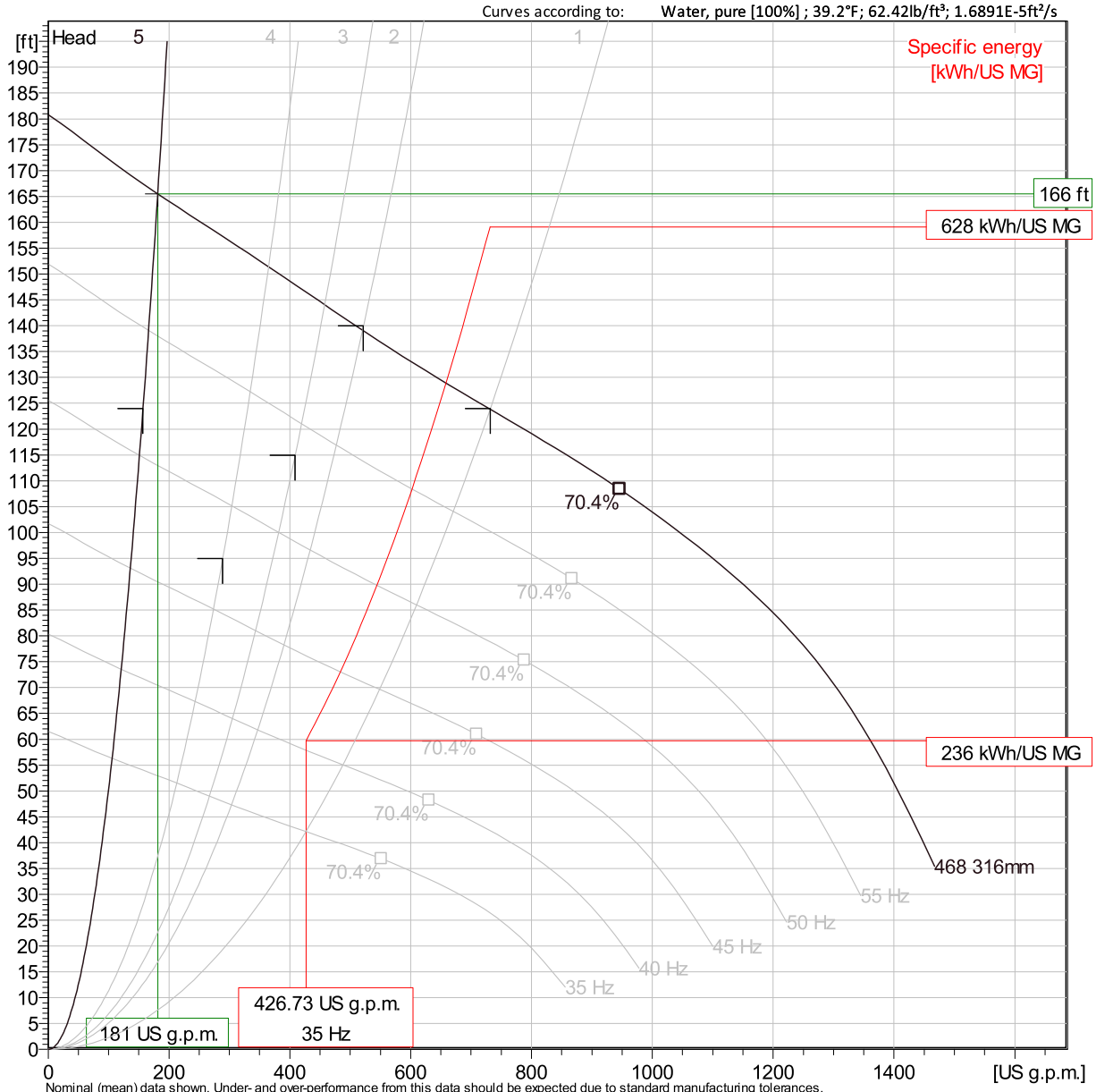
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3	40 Hz	305	64	8.86	305	64	8.86	55.8 %	417	8.31
3	35 Hz	267	49	5.93	267	49	5.93	55.8 %	338	6.71
2	60 Hz	520	139	30.8	520	139	30.8	59.4 %	801	15.4
2	55 Hz	477	117	23.7	477	117	23.7	59.4 %	674	13.4

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

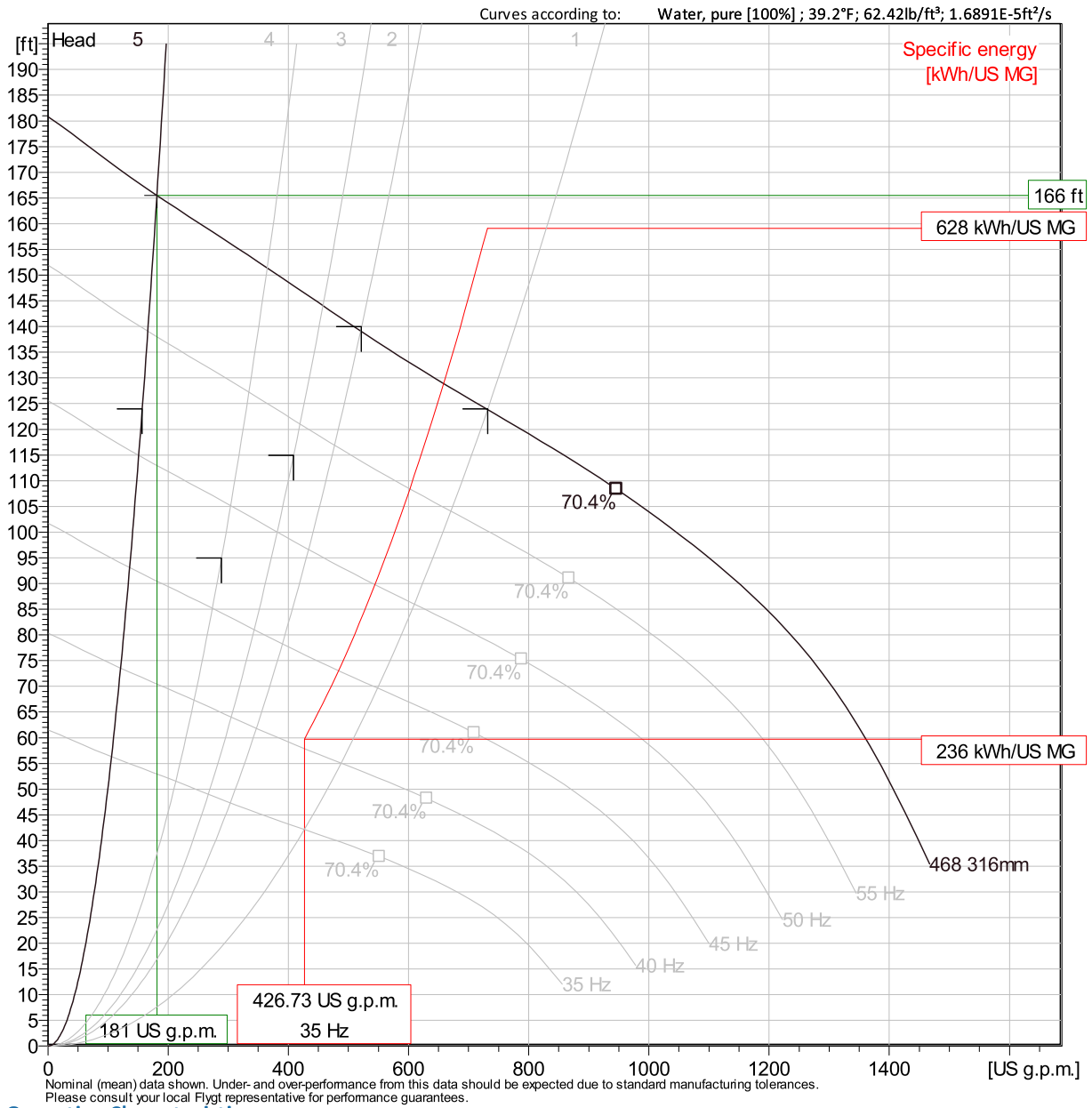
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2	50 Hz	434	96.6	17.8	434	96.6	17.8	59.4 %	561	11.5
2	45 Hz	390	78.3	13	390	78.3	13	59.4 %	462	9.74
2	40 Hz	347	61.8	9.13	347	61.8	9.13	59.4 %	377	8.07
2	35 Hz	304	47.3	6.12	304	47.3	6.12	59.4 %	305	6.51

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

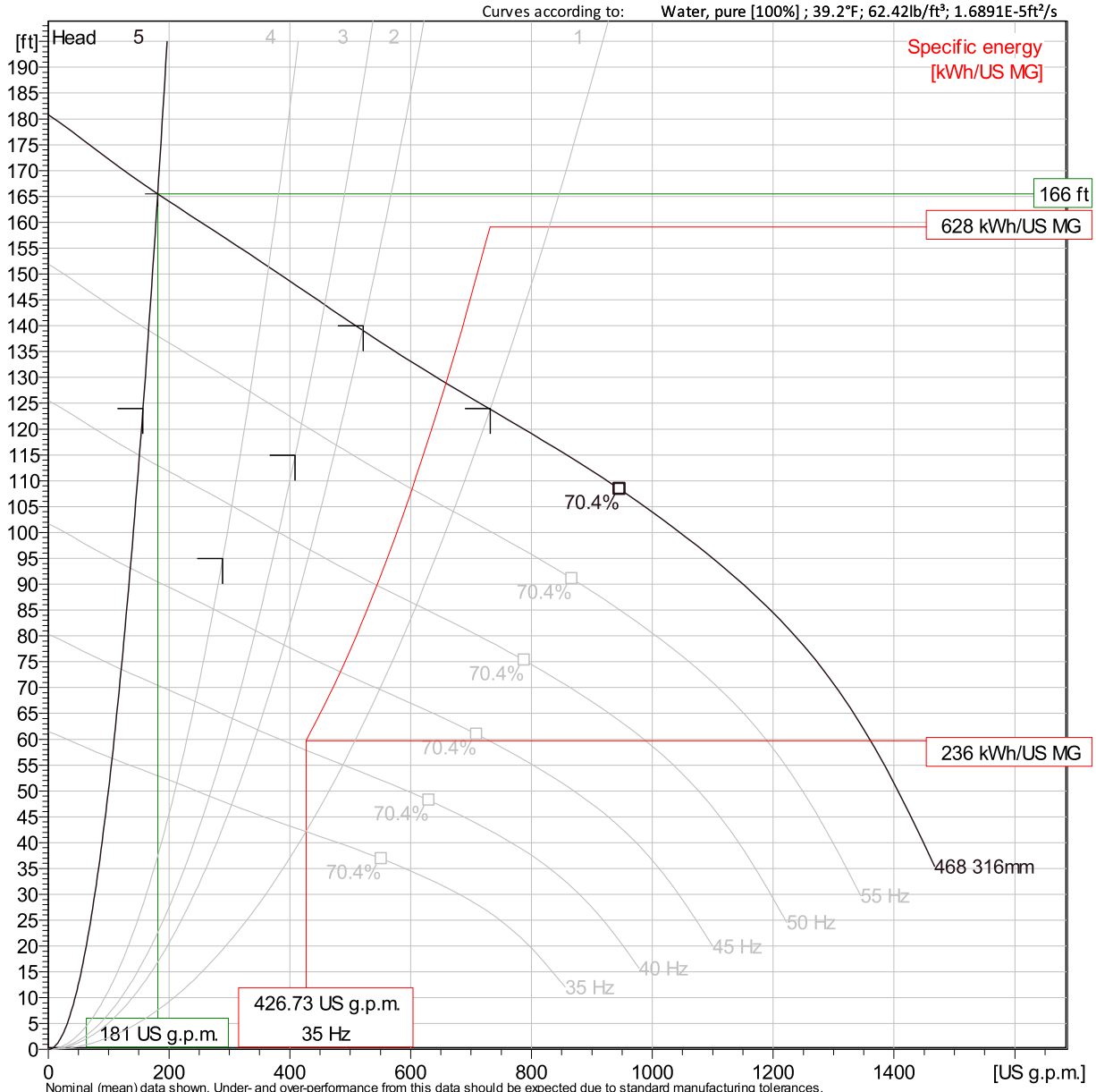
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1	60 Hz	732	124	34	732	124	34	67.5 %	628	14.1
1	55 Hz	671	104	26.2	671	104	26.2	67.5 %	528	12.2
1	50 Hz	610	86	19.7	610	86	19.7	67.5 %	438	10.5
1	45 Hz	549	69.7	14.3	549	69.7	14.3	67.5 %	360	8.87

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

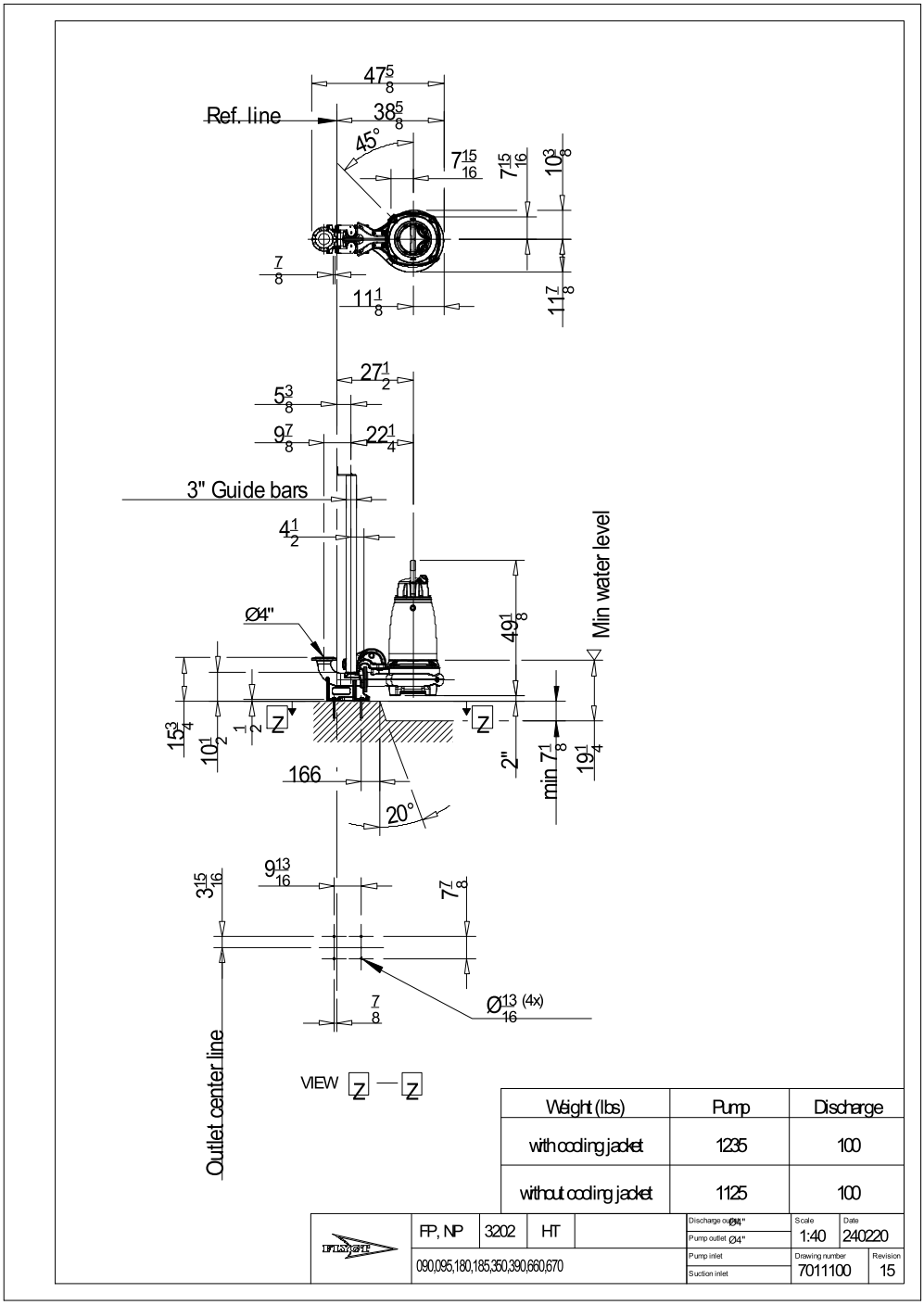
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1	40 Hz	488	55	10.1	488	55	10.1	67.5 %	293	7.34
1	35 Hz	427	42.1	6.74	427	42.1	6.74	67.5 %	236	5.93

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

Dimensional drawing



Weight (lbs)	Pump	Discharge
with cooling jacket	1235	100
without cooling jacket	1125	100

FP, NP	3202	HT		Discharge outlet Ø4"	Scale 1:40	Date 240220
090,095,180,185,350,390,660,670				Pump outlet Ø4"		
				Pump inlet	Drawing number 7011100	Revision 15
				Suction inlet		

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

APPENDIX A – LS-1 Pump Selection Options

Option 2 – Flygt NP3202 with VFD and Dual 6” Force Mains

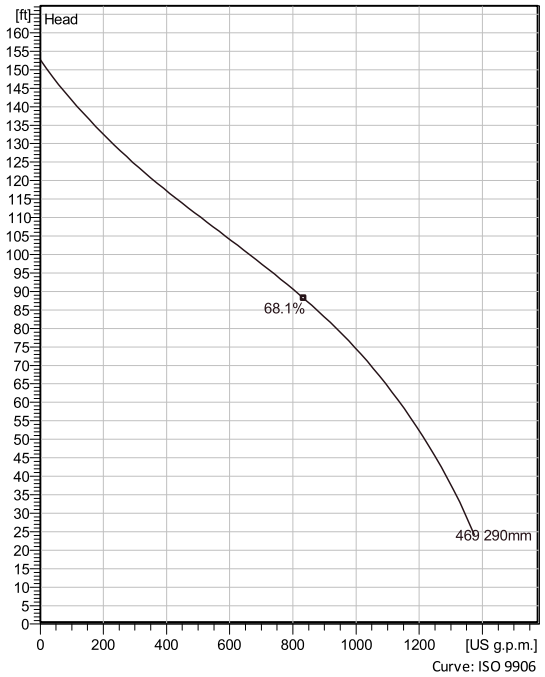
NP 3202 HT 3~ 469

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.

Technical specification



Curves according to: Water, pure Water, pure [100%], 39.2 °F, 62.42 lb/ft³, 1.6891E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N3202.185 30-19-4AA-W 45hp

Installation type
P - Semi permanent, Wet

Impeller diameter
290 mm

Discharge diameter
4 inch

Pump information

Impeller diameter
290 mm

Discharge diameter
4 inch

Inlet diameter
200 mm

Maximum operating speed
1775 rpm

Number of blades
2

Max. fluid temperature
40 °C

Material

Impeller
Hard-Iron ™

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

Technical specification

Motor - General

Motor number N3202.185 30-19-4AA-W 45hp	**Phases** 3~	**Rated speed** 1775 rpm	**Rated power** 45 hp
ATEX approved FM	**Number of poles** 4	**Rated current** 52 A	**Stator variant** 1
Frequency 60 Hz	**Rated voltage** 460 V	**Insulation class** H	**Type of Duty** S1
Version code 095			

Motor - Technical

Power factor - 1/1 Load 0.89	**Motor efficiency - 1/1 Load** 91.0 %	**Total moment of inertia** 8.02 lb ft²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.85	**Motor efficiency - 3/4 Load** 91.5 %	**Starting current, direct starting** 365 A	
Power factor - 1/2 Load 0.77	**Motor efficiency - 1/2 Load** 91.0 %	**Starting current, star-delta** 122 A	

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

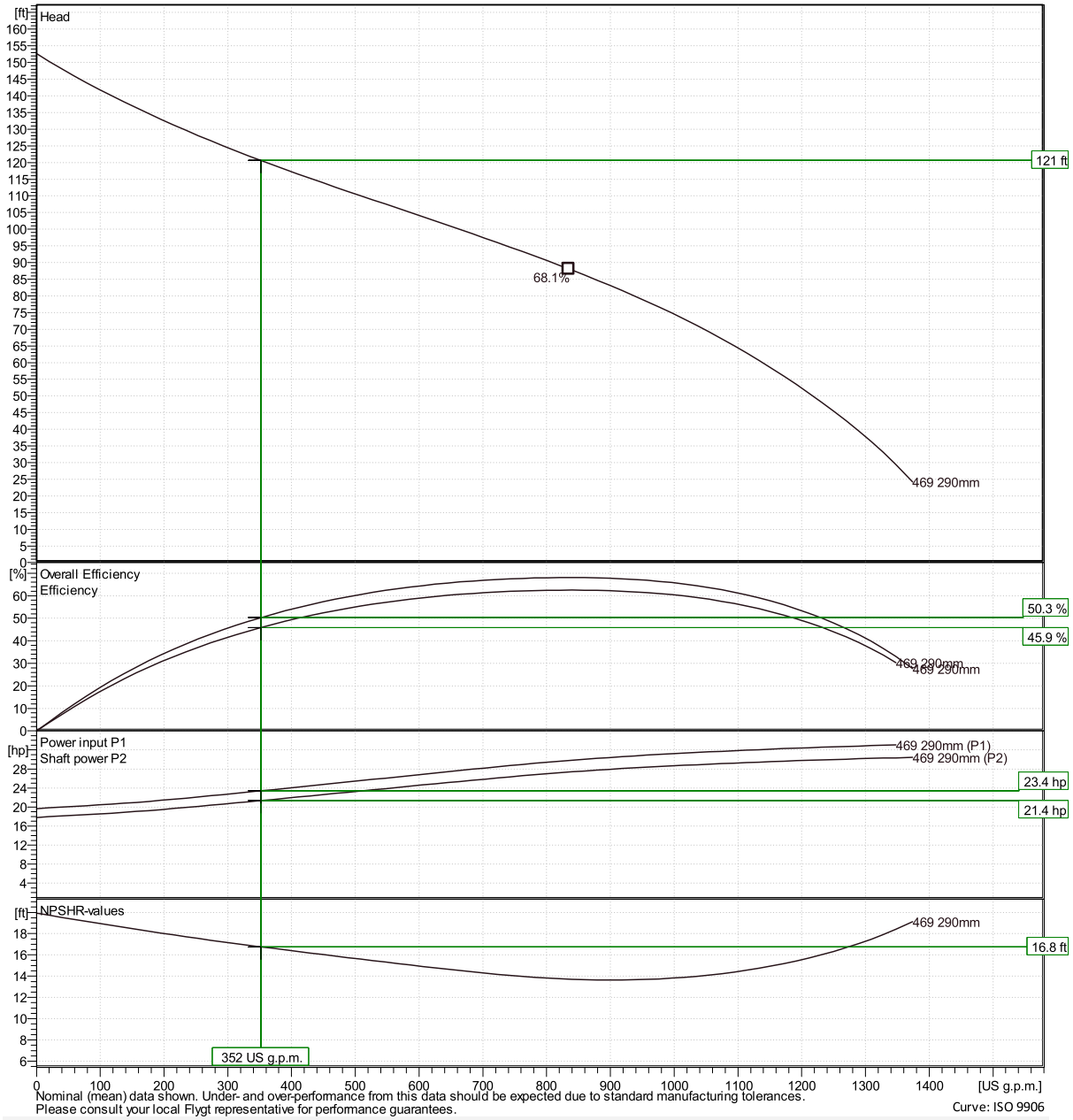
NP 3202 HT 3~ 469

Performance curve

Duty point

Flow	Head
352 US g.p.m.	121 ft

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

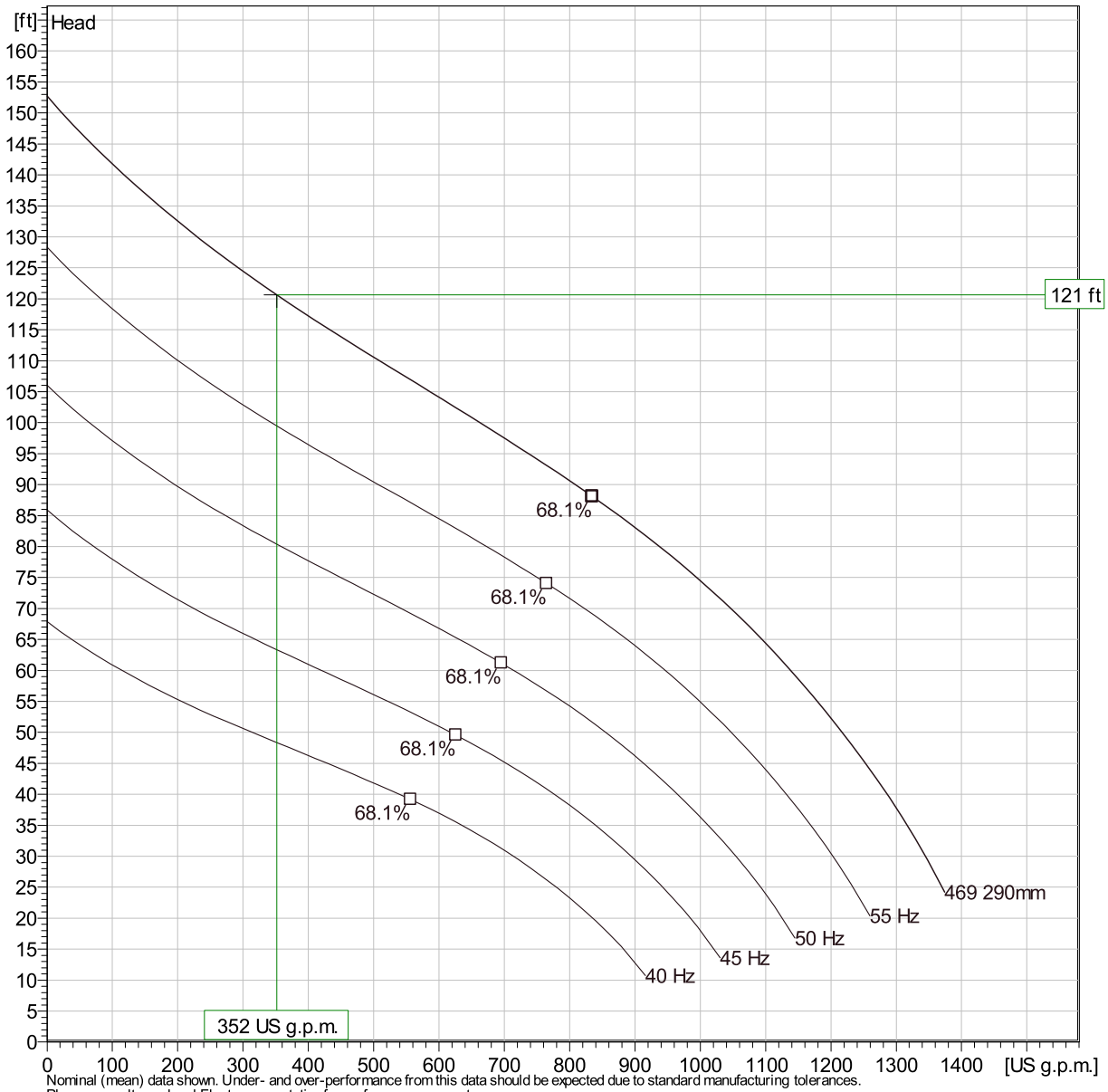
Curve: ISO 9906

Quail LS1 - dual 6 inch			WYNNETH REQUIERON		
0		**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



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Please consult your local Flygt representative for performance guarantees.

Operating characteristics

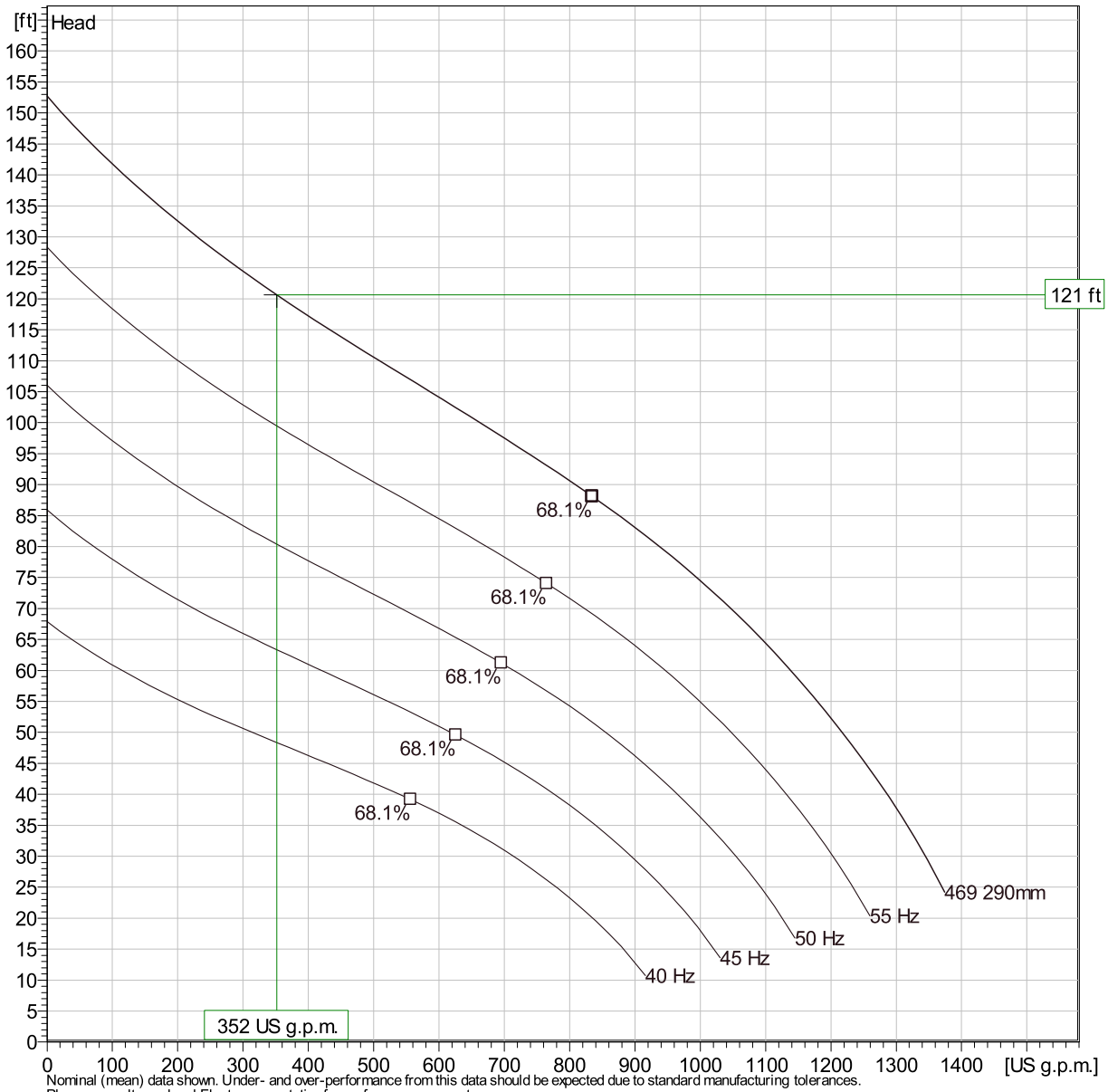
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
6 E	407	117	22.1	407	117	22.1	54.5 %	738	16.3
7/8 E	651	101	25.2	651	101	25.2	65.8 %	525	14.6
1 B	378	119	21.7	378	119	21.7	52.4 %	781	16.6

Project		**Created by**	WYNNETH REQUIERON		
Block	Quail LS1 - dual 6 inch	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



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Please consult your local Flygt representative for performance guarantees.

Operating characteristics

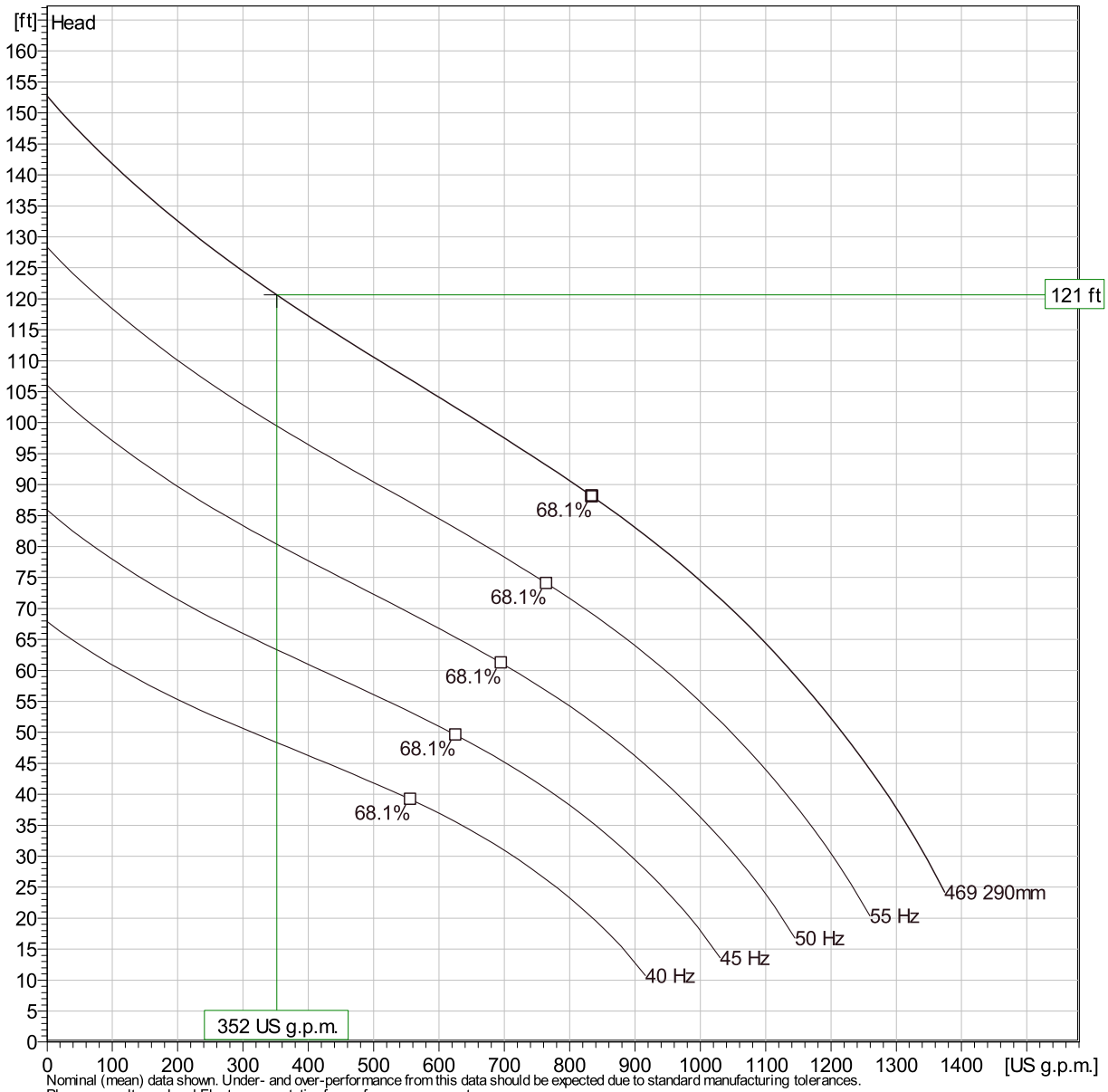
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 B	387	118	21.8	387	118	21.8	53 %	767	16.5
3 B	411	116	22.1	411	116	22.1	54.8 %	731	16.3
4 B	405	117	22	405	117	22	54.4 %	740	16.4

Project		**Created by**	WYNNETH REQUIERON		
Block	Quail LS1 - dual 6 inch	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



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Please consult your local Flygt representative for performance guarantees.

Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
5 B	706	97.1	25.9	706	97.1	25.9	67 %	497	14.3
6 B	710	96.9	25.9	710	96.9	25.9	67 %	495	14.2
7/8 B	721	96.1	26.1	721	96.1	26.1	67.2 %	490	14.2

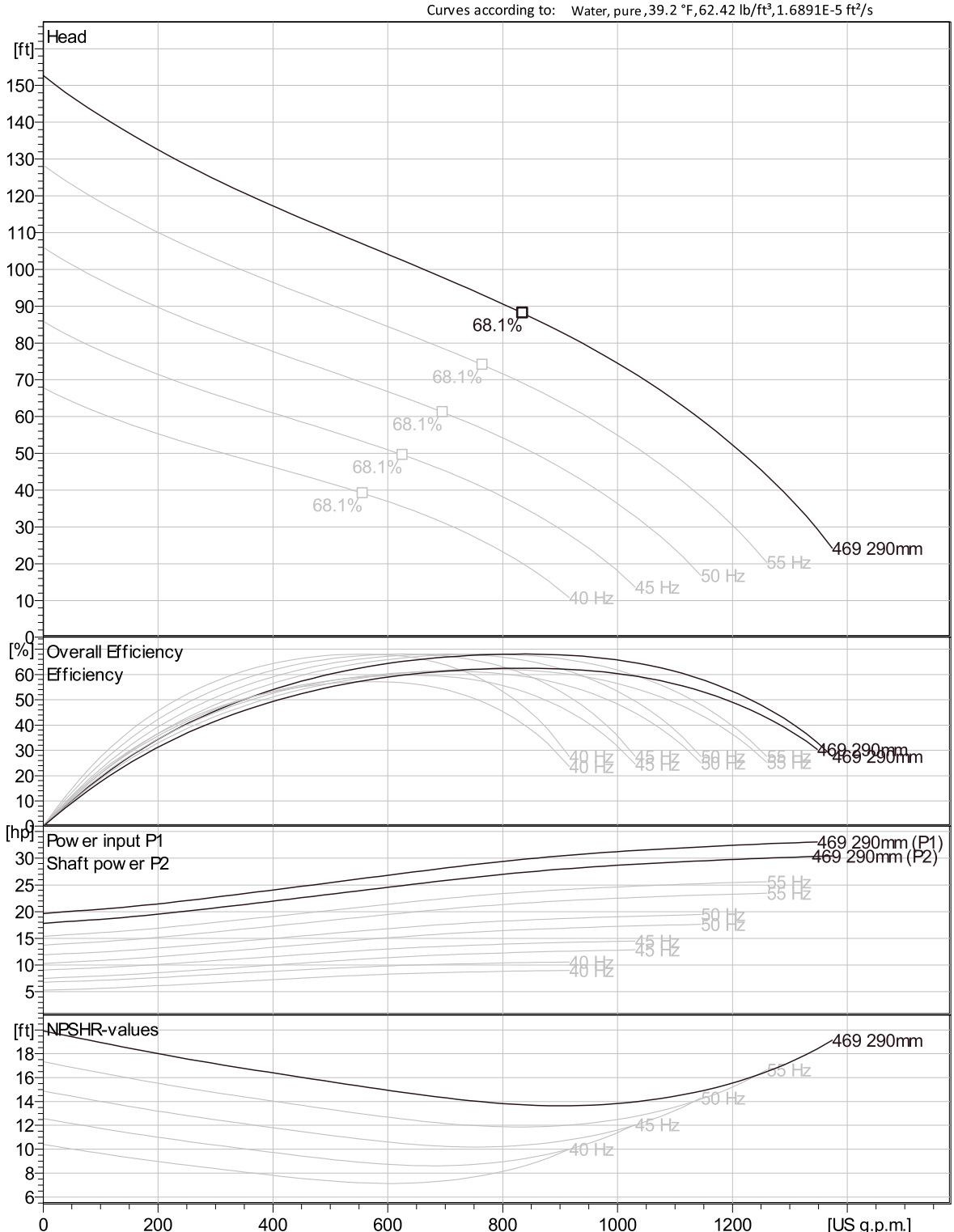
Project		**Created by**	WYNNETH REQUIERON		
Block	Quail LS1 - dual 6 inch	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

VFD Curve

FLYGT
a xylem brand

Curves according to: Water, pure ,39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

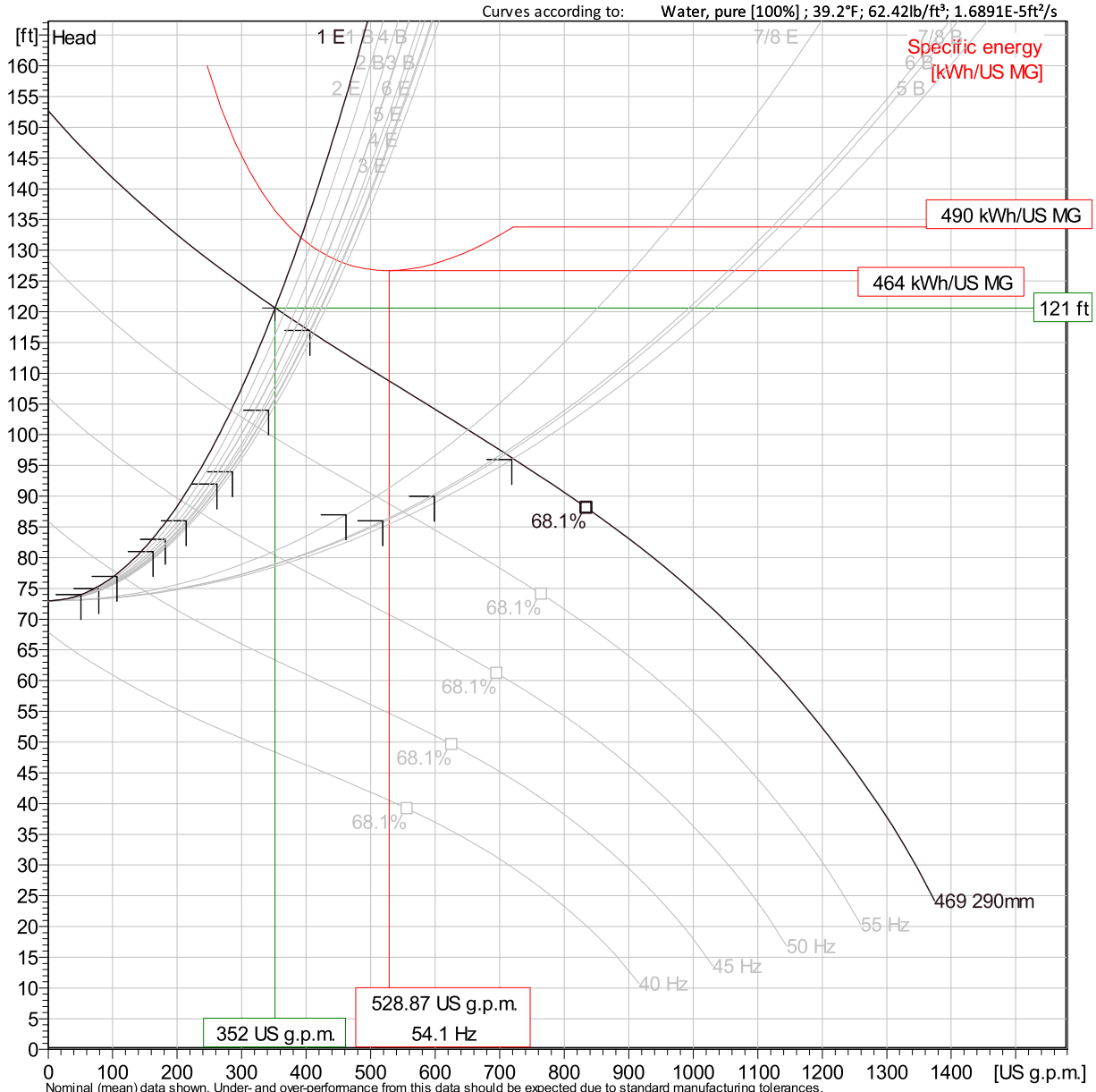
Curve: ISO 9906

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



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Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
6 E	60 Hz	407	117	22.1	407	117	22.1	54.5 %	738	16.3
6 E	55 Hz	326	101	16.5	326	101	16.5	50.6 %	697	14.6
6 E	50 Hz	234	87.5	11.8	233.6597611991	87.5	11.8	43.7 %	716	12.9
6 E	45 Hz	118	76.7	8.05	118	76.7	8.05	28.5 %	1010	11.6

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

VFD Analysis

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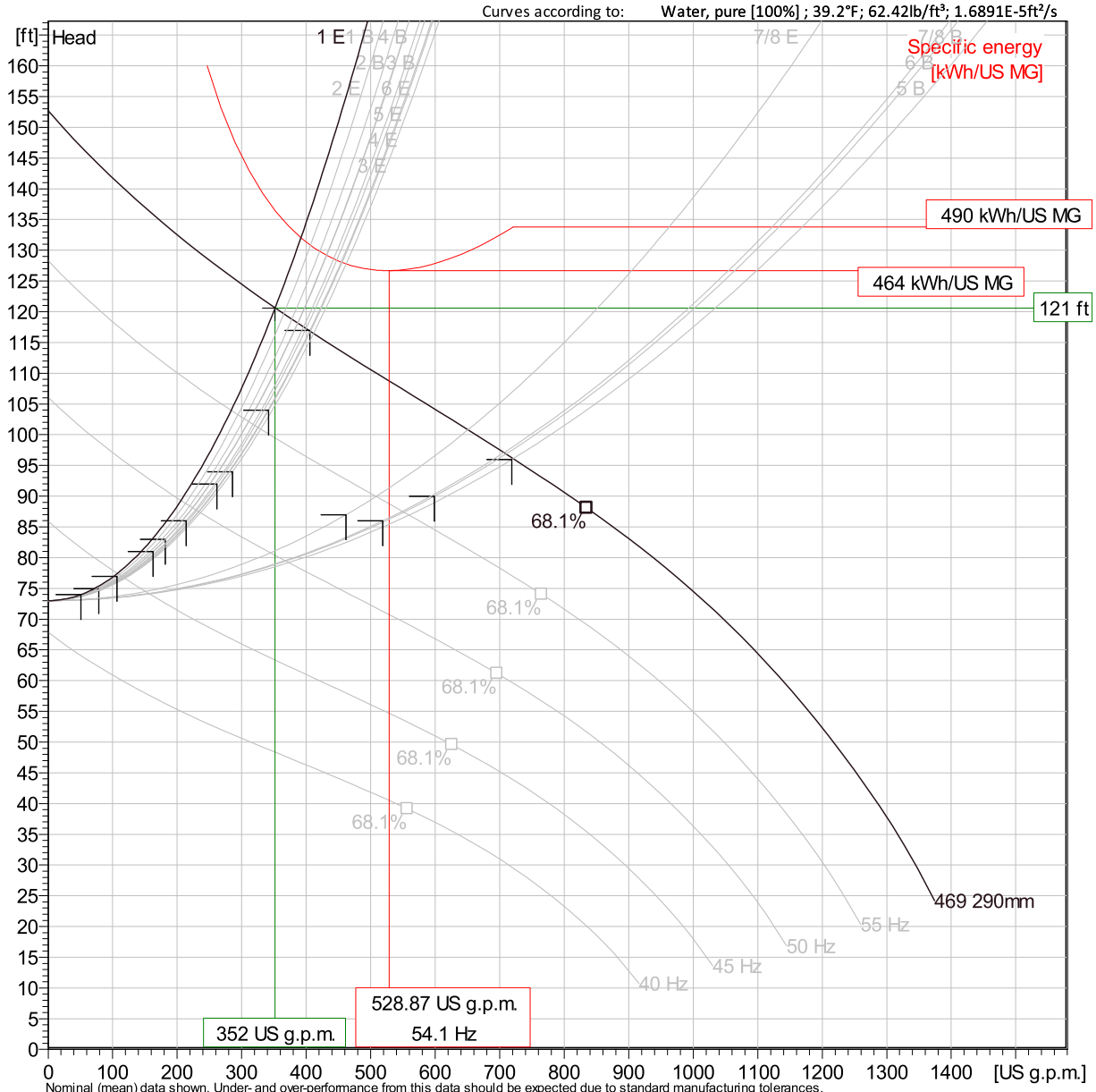

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		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
6 E	40 Hz									
7/8 E	60 Hz	651	101	25.2	651	101	25.2	65.8 %	525	14.6
7/8 E	55 Hz	508	90	18.5	508	90	18.5	62.7 %	497	13.3
7/8 E	50 Hz	345	80.8	12.8	345	80.8	12.8	55 %	522	12.2

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

VFD Analysis

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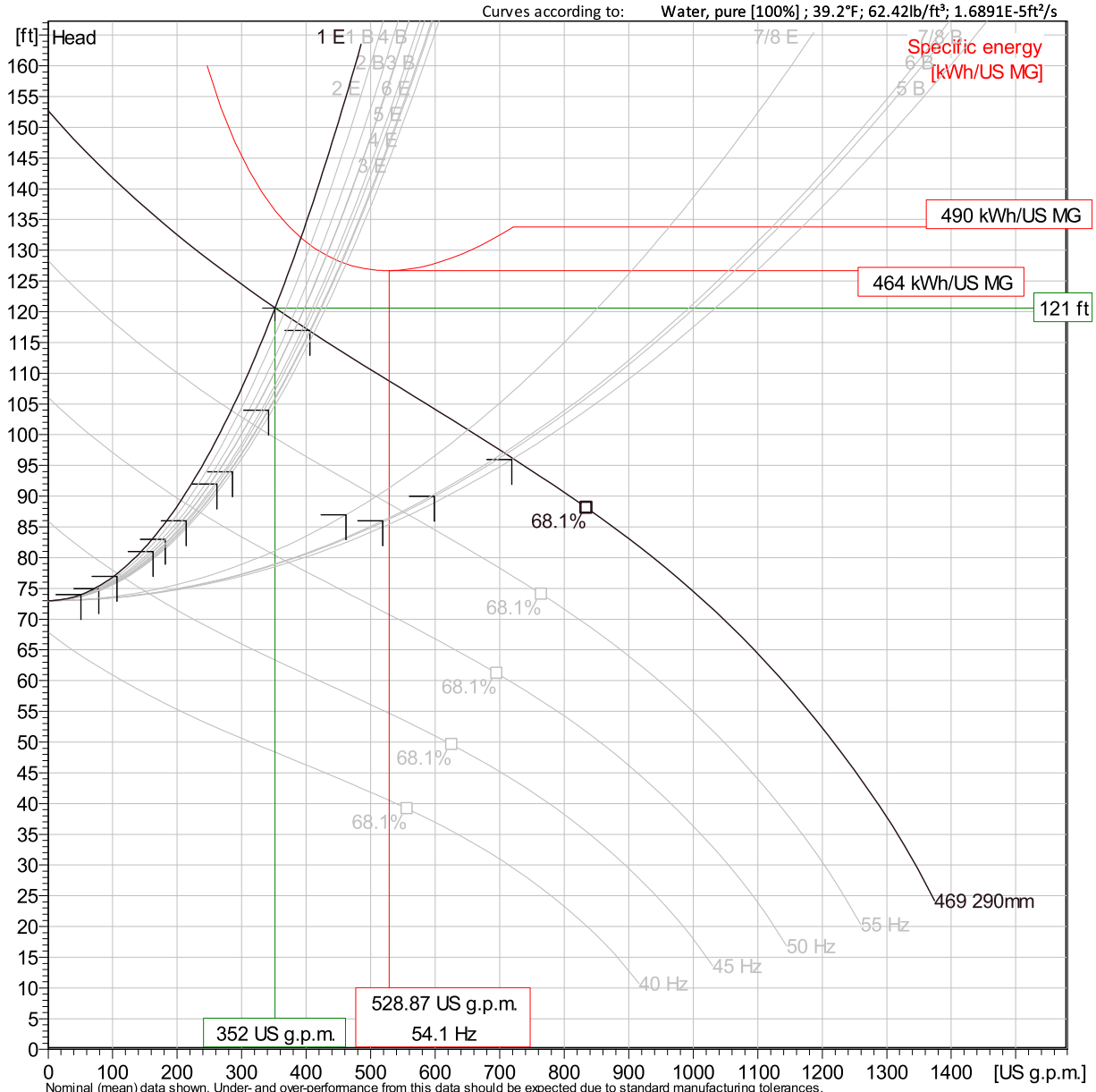

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		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
7/8 E	45 Hz	151	74.5	8.24	151	74.5	8.24	34.5 %	806	11.4
7/8 E	40 Hz									
1 B	60 Hz	378	119	21.7	378	119	21.7	52.4 %	781	16.6
1 B	55 Hz	304	103	16.2	304	103	16.2	48.5 %	737	14.7

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

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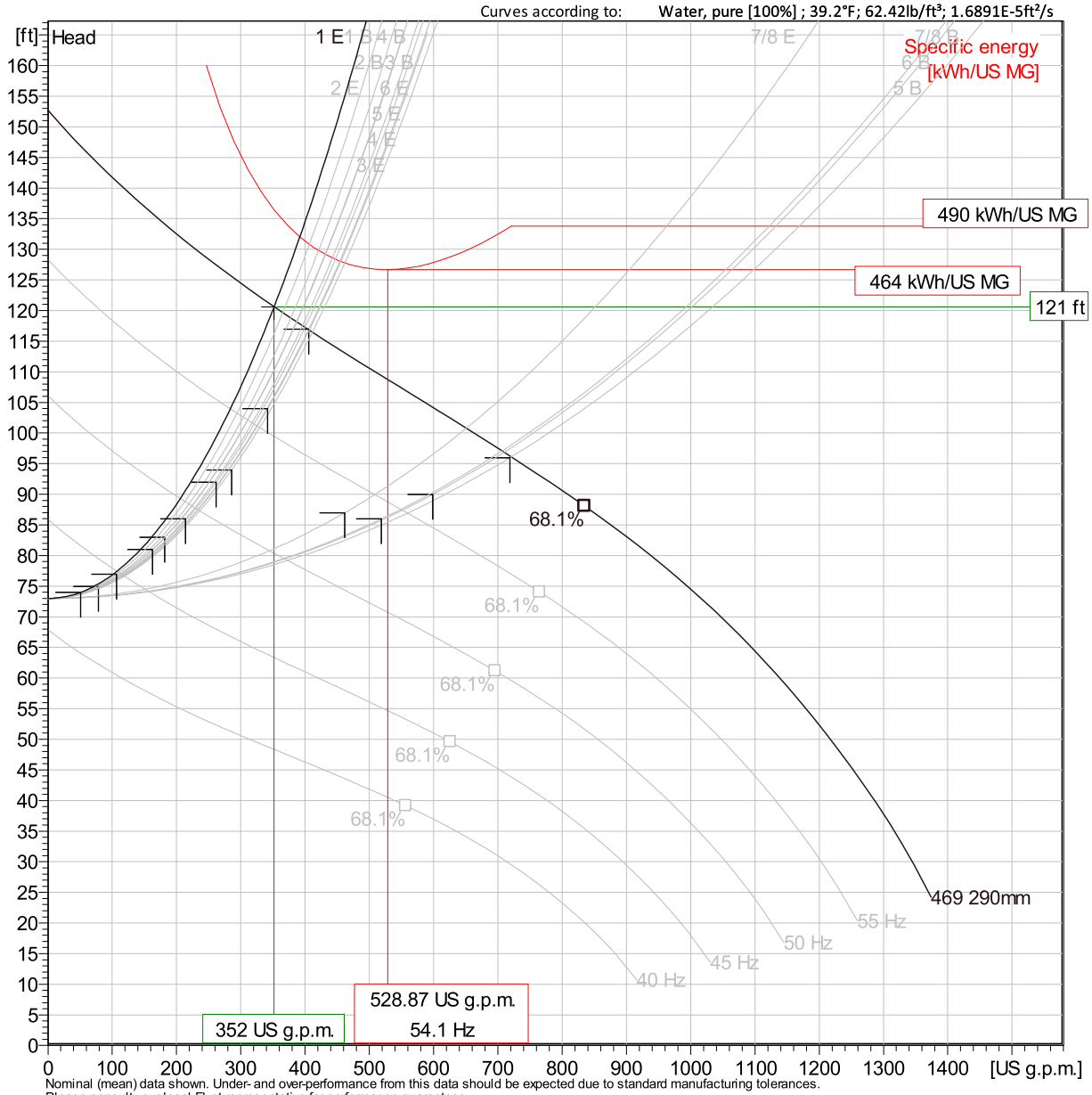

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		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 B	50 Hz	219	88.4	11.7	219	88.4	11.7	41.8 %	756	13
1 B	45 Hz	113	77.1	8.02	113	77.1	8.02	27.4 %	1060	11.7
1 B	40 Hz									
2 B	60 Hz	387	118	21.8	387	118	21.8	53 %	767	16.5

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

VFD Analysis

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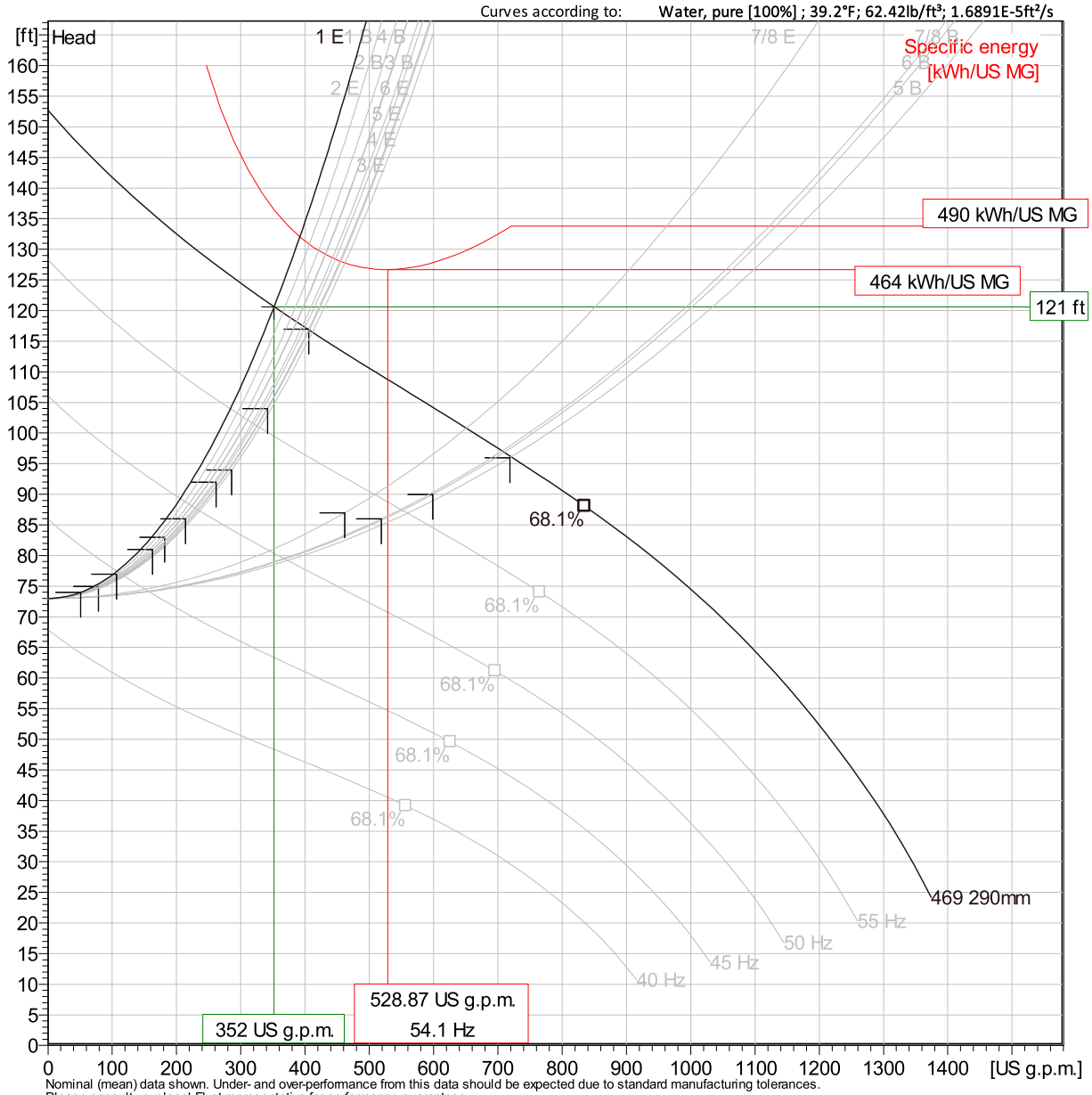

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		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 B	55 Hz	311	102	16.3	311	102	16.3	49.2 %	724	14.7
2 B	50 Hz	224	88.1	11.8	224	88.1	11.8	42.4 %	743	13
2 B	45 Hz	114	76.9	8.03	114	76.9	8.03	27.7 %	1040	11.6
2 B	40 Hz									

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

VFD Analysis

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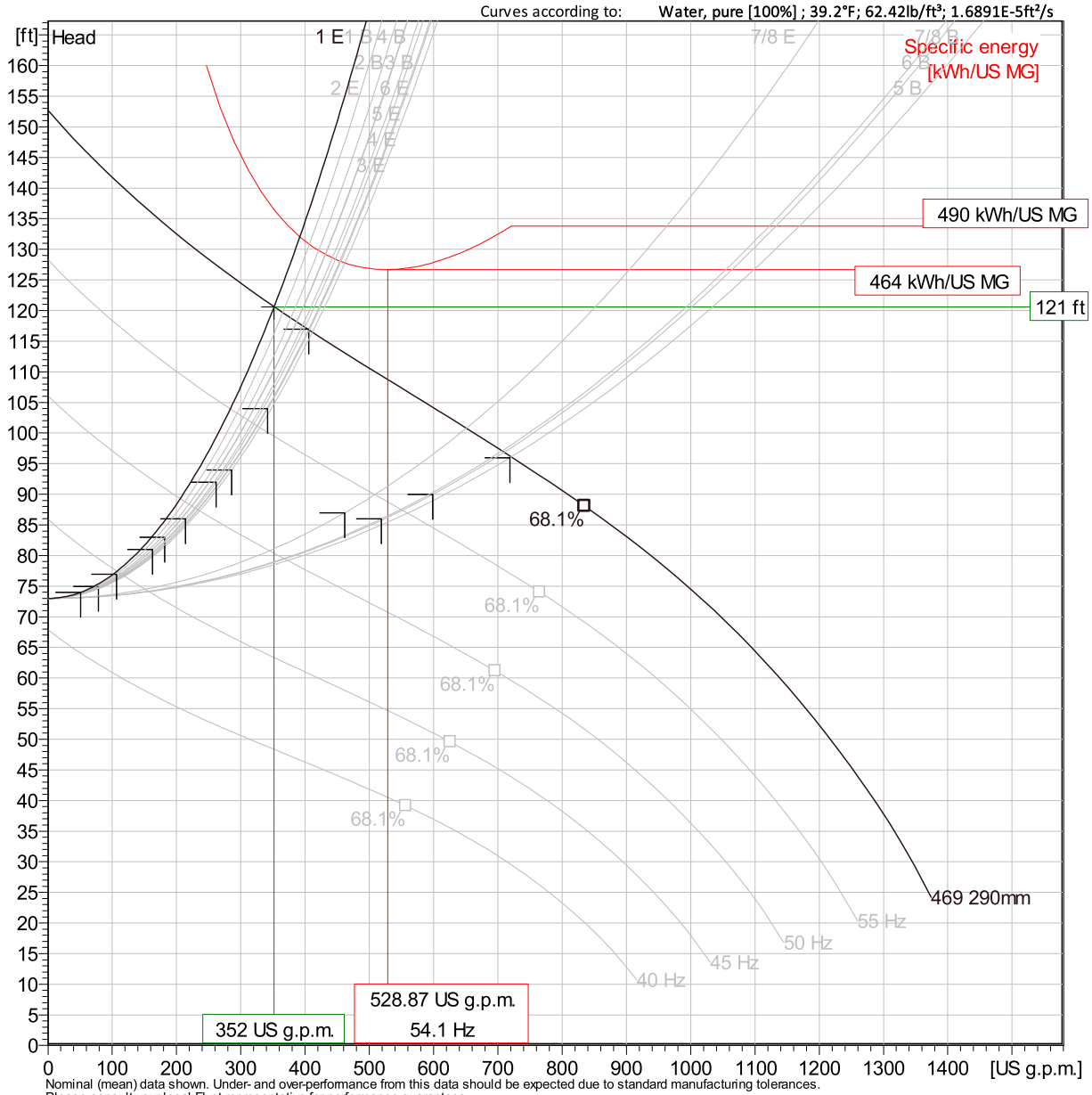

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Operating Characteristics

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		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3 B	60 Hz	411	116	22.1	411	116	22.1	54.8 %	731	16.3
3 B	55 Hz	330	101	16.5	330	101	16.5	50.9 %	690	14.5
3 B	50 Hz	236	87.3	11.9	236	87.3	11.9	44 %	710	12.9
3 B	45 Hz	119	76.6	8.05	119	76.6	8.05	28.6 %	1000	11.6

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

VFD Analysis

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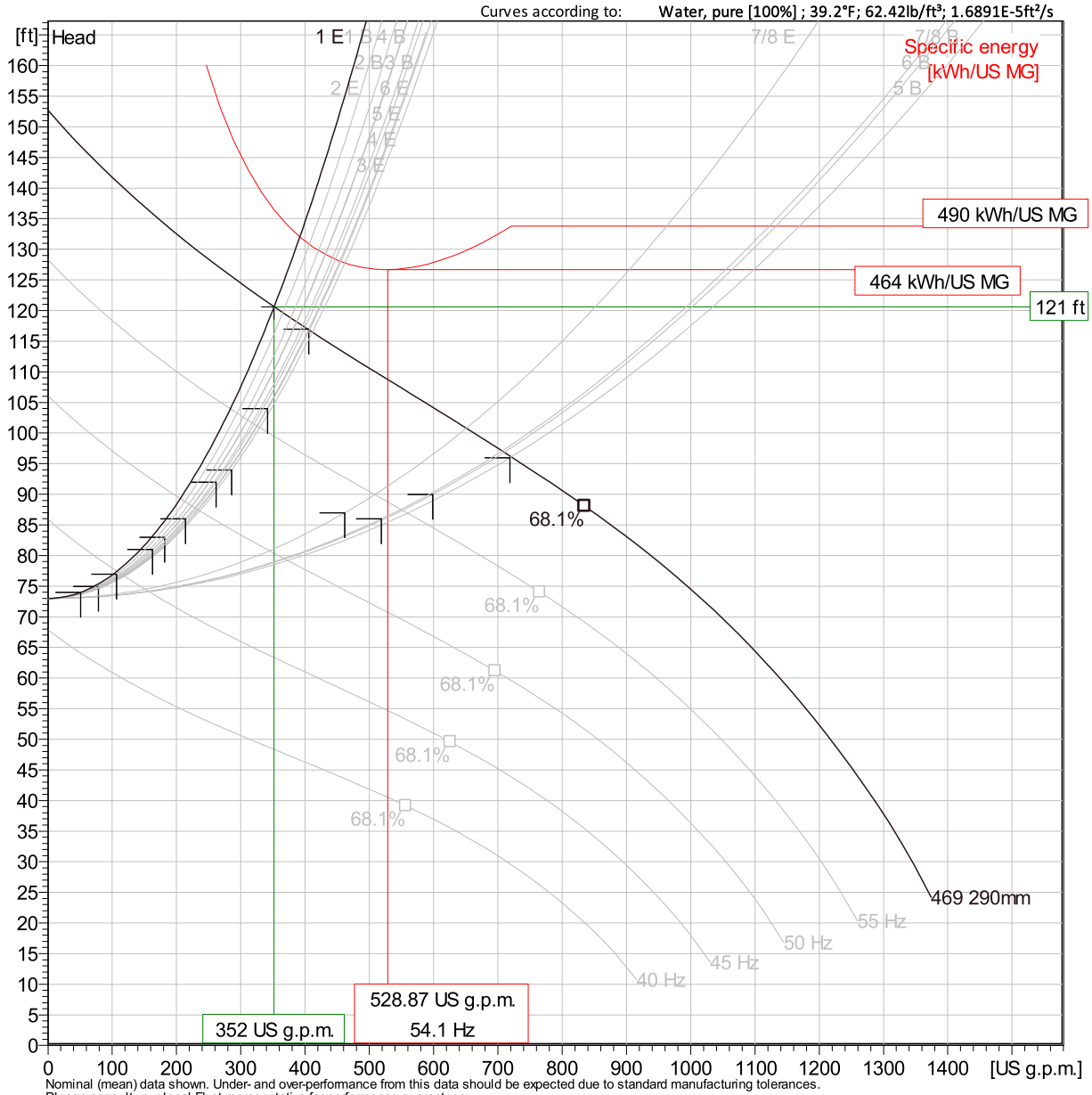

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3 B	40 Hz									
4 B	60 Hz	405	117	22	405	117	22	54.4 %	740	16.4
4 B	55 Hz	325	101	16.5	325	101	16.5	50.5 %	698	14.6
4 B	50 Hz	233	87.5	11.8	233	87.5	11.8	43.6 %	717	12.9

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

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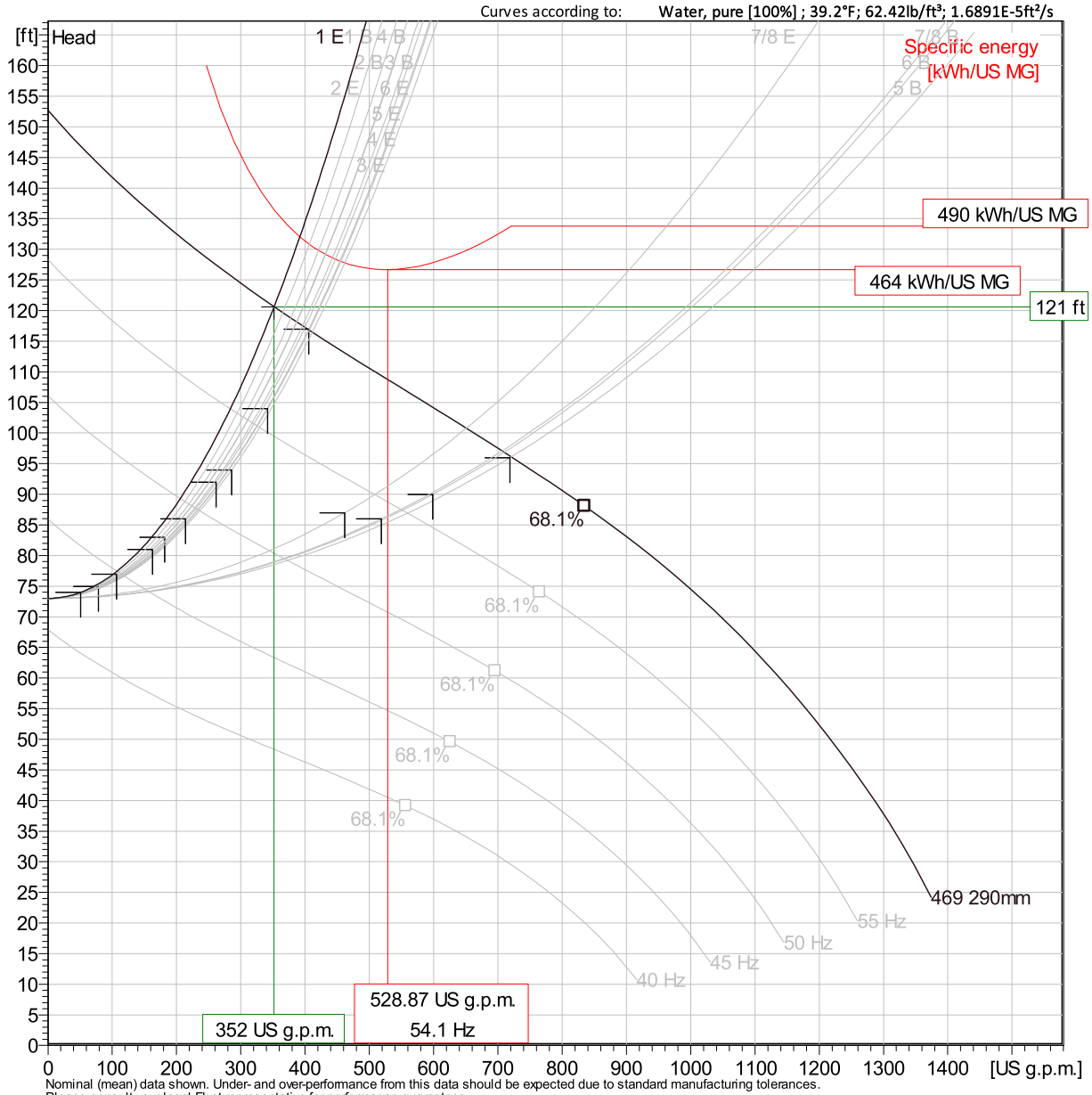

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4 B	45 Hz	118	76.7	8.04	118	76.7	8.04	28.4 %	1010	11.6
4 B	40 Hz									
5 B	60 Hz	706	97.1	25.9	706	97.1	25.9	67 %	497	14.3
5 B	55 Hz	549	87.5	18.9	549	87.5	18.9	64.3 %	471	13

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

VFD Analysis

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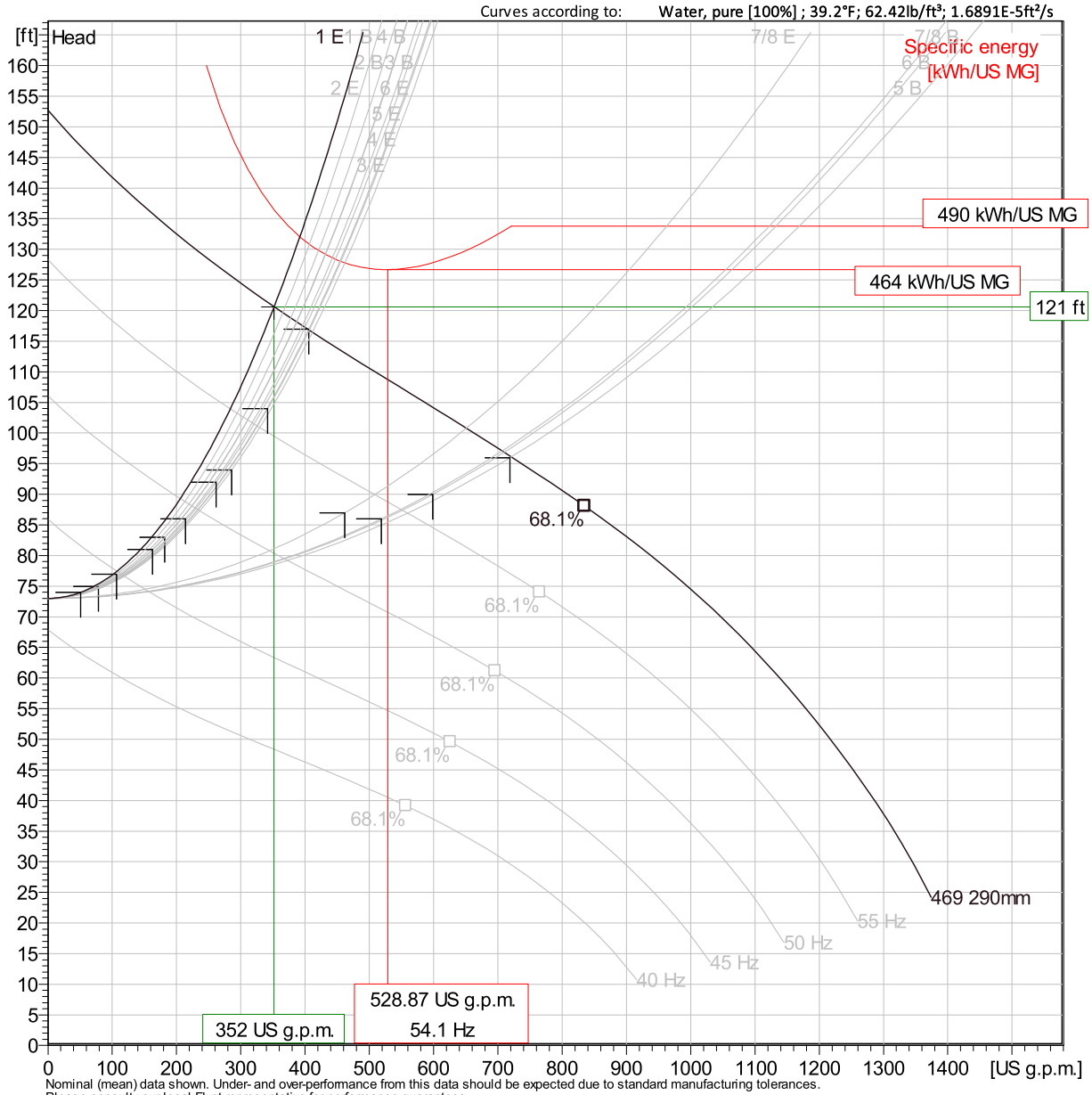

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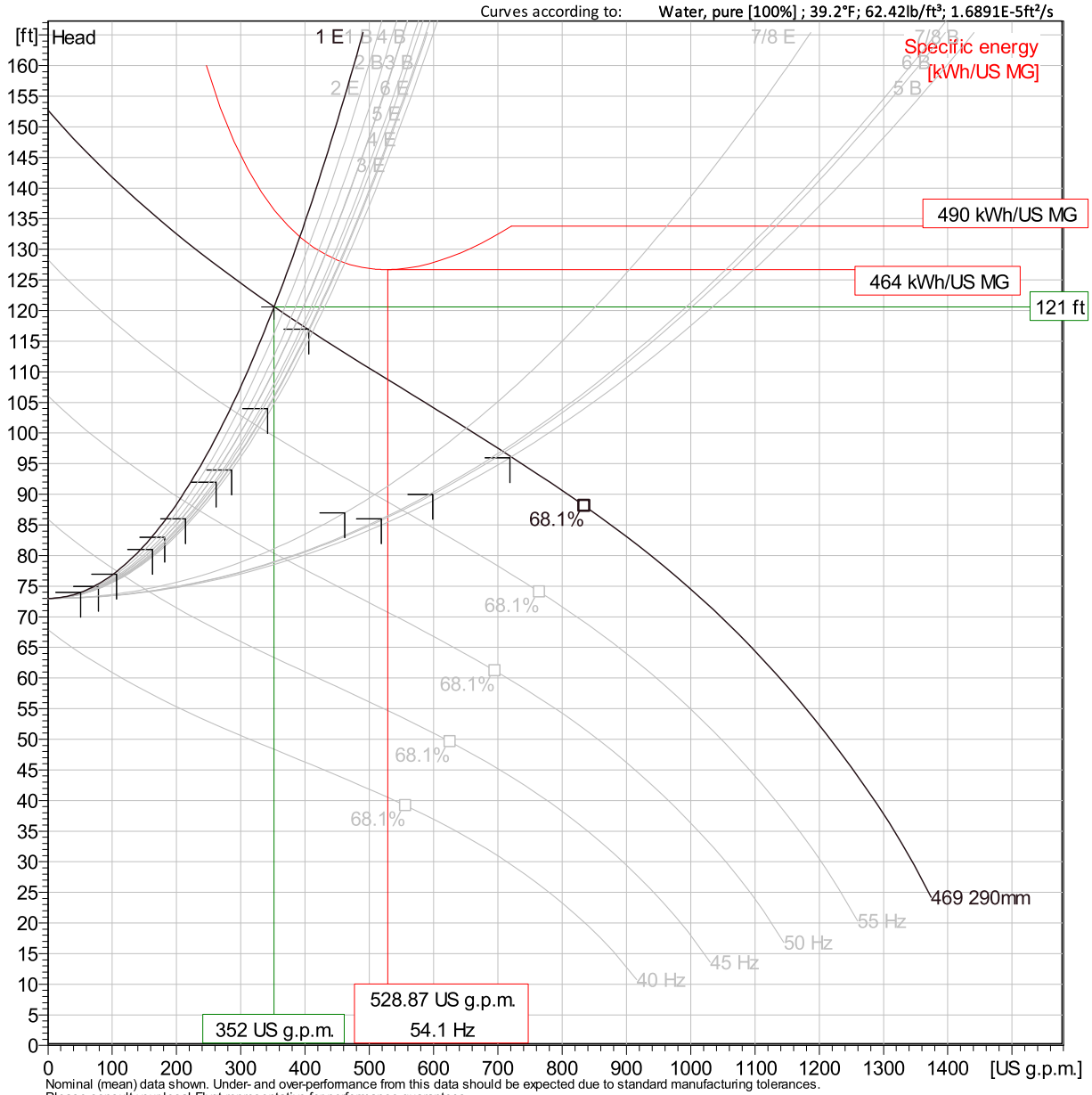
5 B	45 Hz	156	74.2	8.27	156	74.2	8.27	35.4 %	783	11.3
5 B	40 Hz									
6 B	60 Hz	710	96.9	25.9	710	96.9	25.9	67 %	495	14.2

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

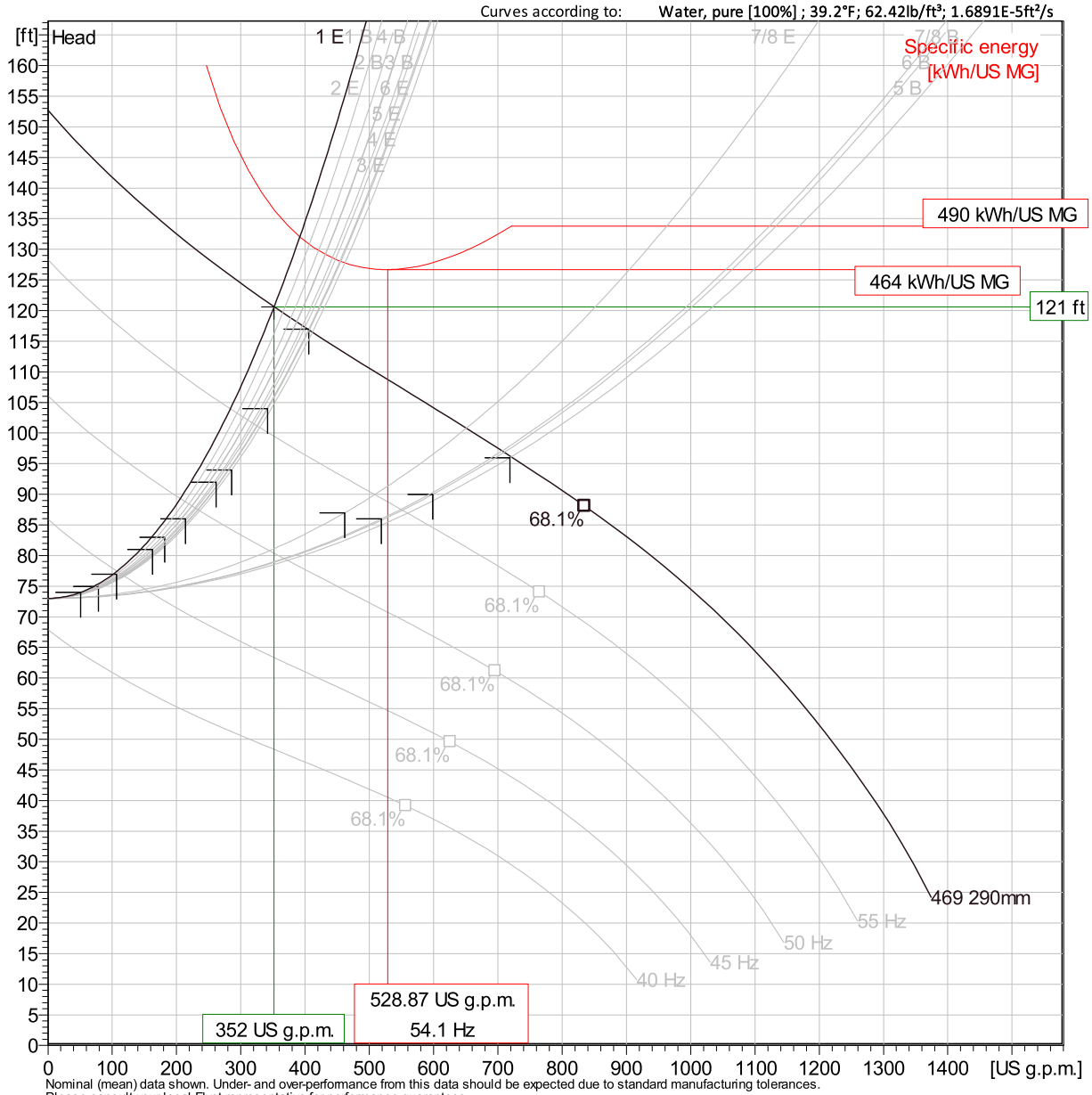
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
6 B	55 Hz	551	87.4	18.9	551	87.4	18.9	64.4 %	470	13
6 B	50 Hz	369	79.4	13	369	79.4	13	56.9 %	495	12
6 B	45 Hz	156	74.2	8.27	156	74.2	8.27	35.4 %	782	11.3
6 B	40 Hz									

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

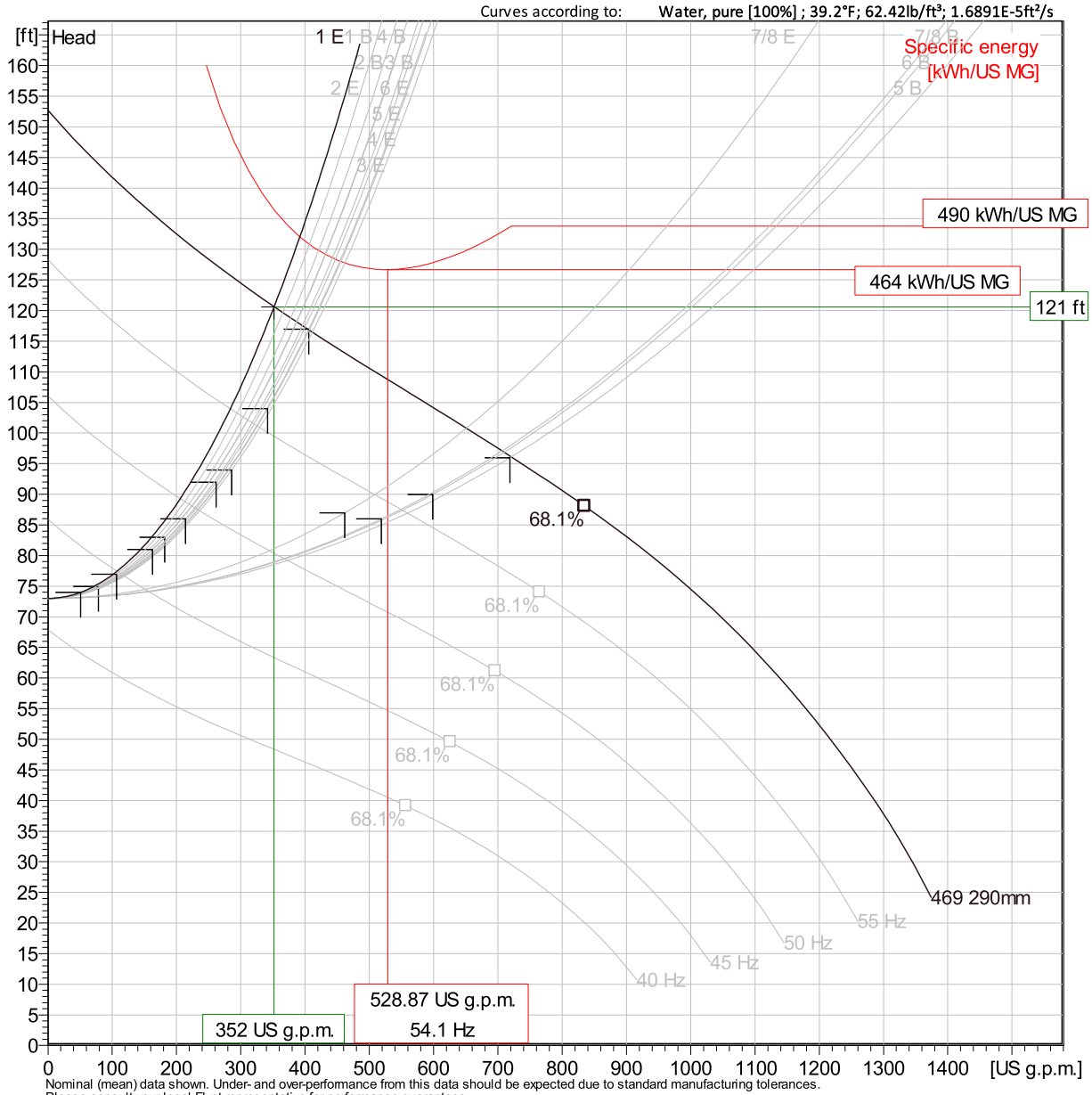
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
7/8 B	60 Hz	721	96.1	26.1	721	96.1	26.1	67.2 %	490	14.2
7/8 B	55 Hz	559	86.9	19	559	86.9	19	64.7 %	465	12.9
7/8 B	50 Hz	373	79.2	13.1	373	79.2	13.1	57.2 %	491	12
7/8 B	45 Hz	157	74.1	8.28	157	74.1	8.28	35.6 %	777	11.3

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

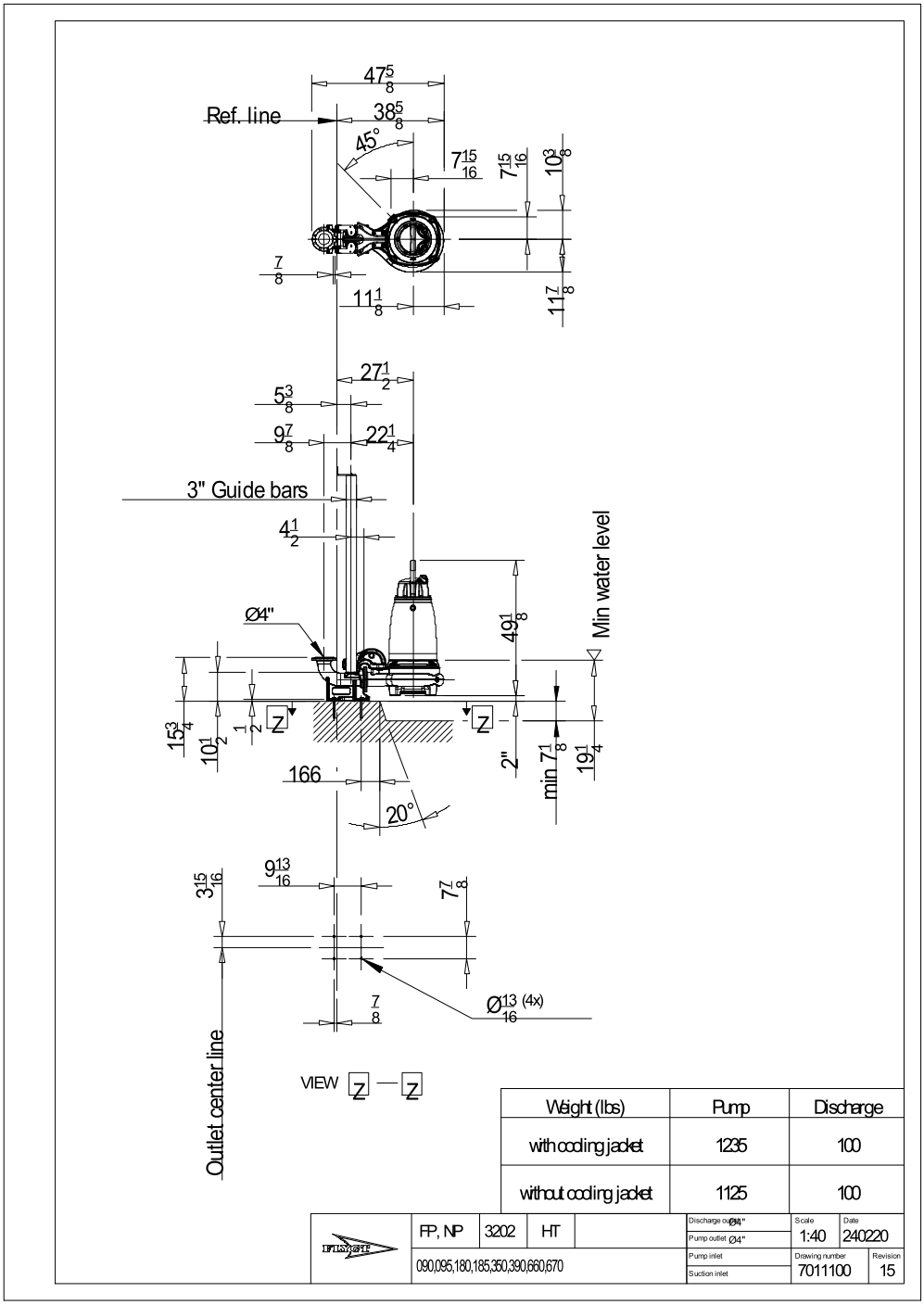
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
7/8 B	40 Hz									

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

NP 3202 HT 3~ 469

Dimensional drawing



Weight (lbs)	Pump	Discharge
with cooling jacket	1235	100
without cooling jacket	1125	100

FP, NP	3202	HT		Discharge outlet Ø4"	Scale 1:40	Date 240220
090,095,180,185,350,390,660,670				Pump outlet Ø4"		
				Pump inlet	Drawing number 7011100	Revision 15
				Suction inlet		

Project	Quail LS1 - dual 6 inch	**Created by**	WYNNETH REQUIERON		
Block	0	**Created on**	7/9/2024	**Last update**	7/9/2024

APPENDIX A – LS-1 Pump Selection Options

Option 3 – Keen Grinder/Chopper Pumps and Dual 4” & 6” Force Mains

Buildout Phases
1A and 1B

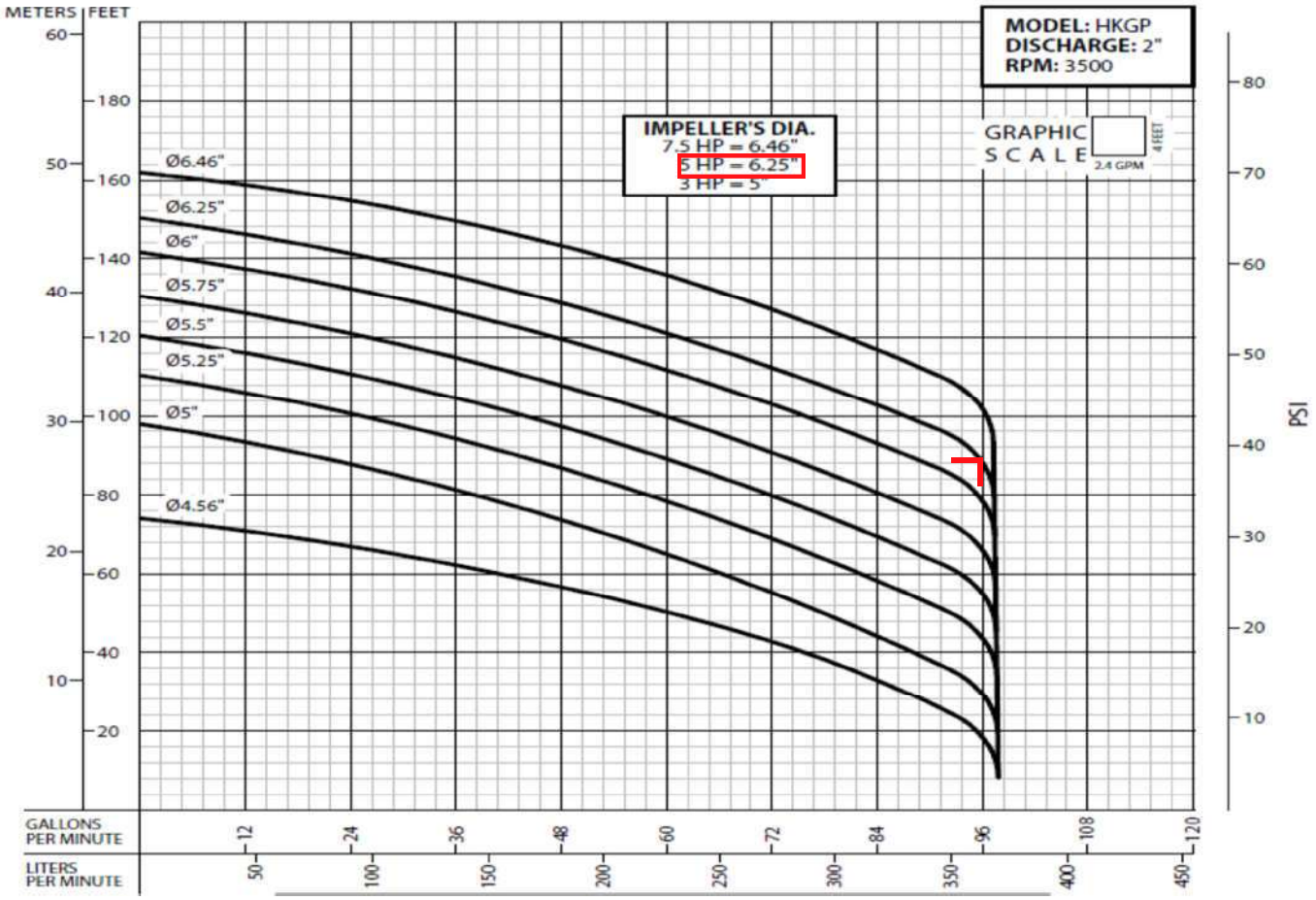
Sierra Peak
Pump Systems

HKGP – 2” Grinder

Motor Data	
HP/Power Supply	See Model Table
Rated Speed	3450 RPM
Insulation Class	F Class
Start Capacitor	External
Cooling	Oil-Filled
Mechanical Seal	Dual Silicon Carbide
Grinding Mechanism	Axial Slicer or Radial Grinder Available
Discharge	2” FPT Vertical

Model Options				
HP	Volts	Phase	Full Load Amps	Weight (lb)
3	230	1	23	188
3	230	3	13	188
3	460	3	6.5	188
5	230	1	39	199
5	230	3	20	199
5	460	3	10	199
7.5	230	3	24	203
7.5	460	3	12	203

Performance Curve

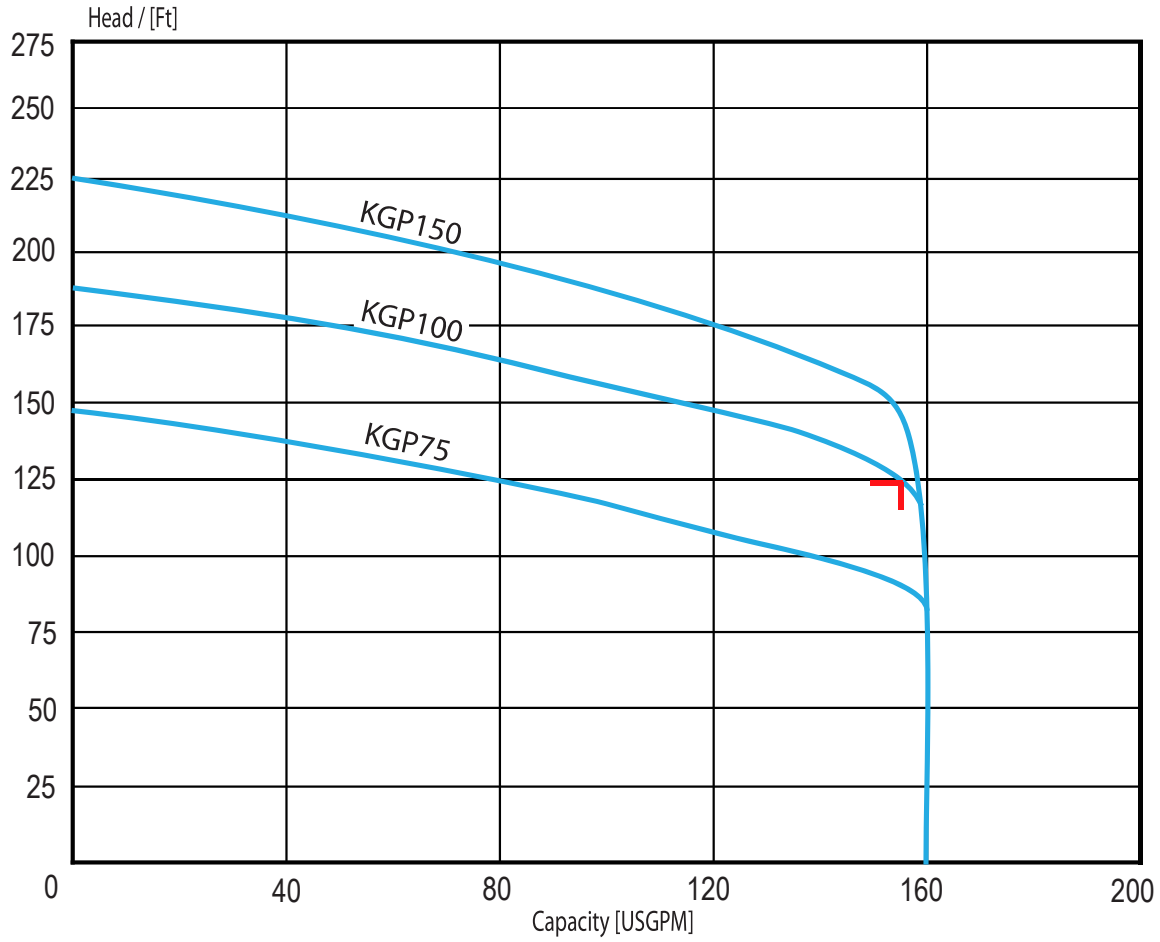


Buildout Phase 1C

KEEN PUMP

GENERAL	KGP(X)75/100/150	MOTOR DATA	
Pump Model		HP / Power Supply	7.5-15HP / 3 ϕ, 60 Hz
PUMP DATA		Poles / Rated Speed	2 P / 3450 rpm
Date	01/09/2017	Insulation Class	H Class
Discharge Flange	2-1/2 & 3" ANSI Horizontal	Full Load Amps	See Chart
Grinder Ring	Hardened SST		
Impeller Type / Std. Dia.	Recessed / As Shown		

PERFORMANCE CURVE



Models	Electrical Data			
	HP	Volts	Phase	Full Load Amps
KGP(X)75-03	7.5	208	3	39.8
KGP(X)75-23	7.5	230	3	34.5
KGP(X)75-43	7.5	460	3	17.3
KGP(X)100-03	10	208	3	55.6
KGP(X)100-23	10	230	3	48.5
KGP(X)100-43	10	460	3	24.3
KGP(X)150-03	15	208	3	68.5
KGP(X)150-23	15	230	3	59.5
KGP(X)150-43	15	460	3	29.8

* Performance with clear water and ambient temp 20°C (68°F)

Rev. 01/2017

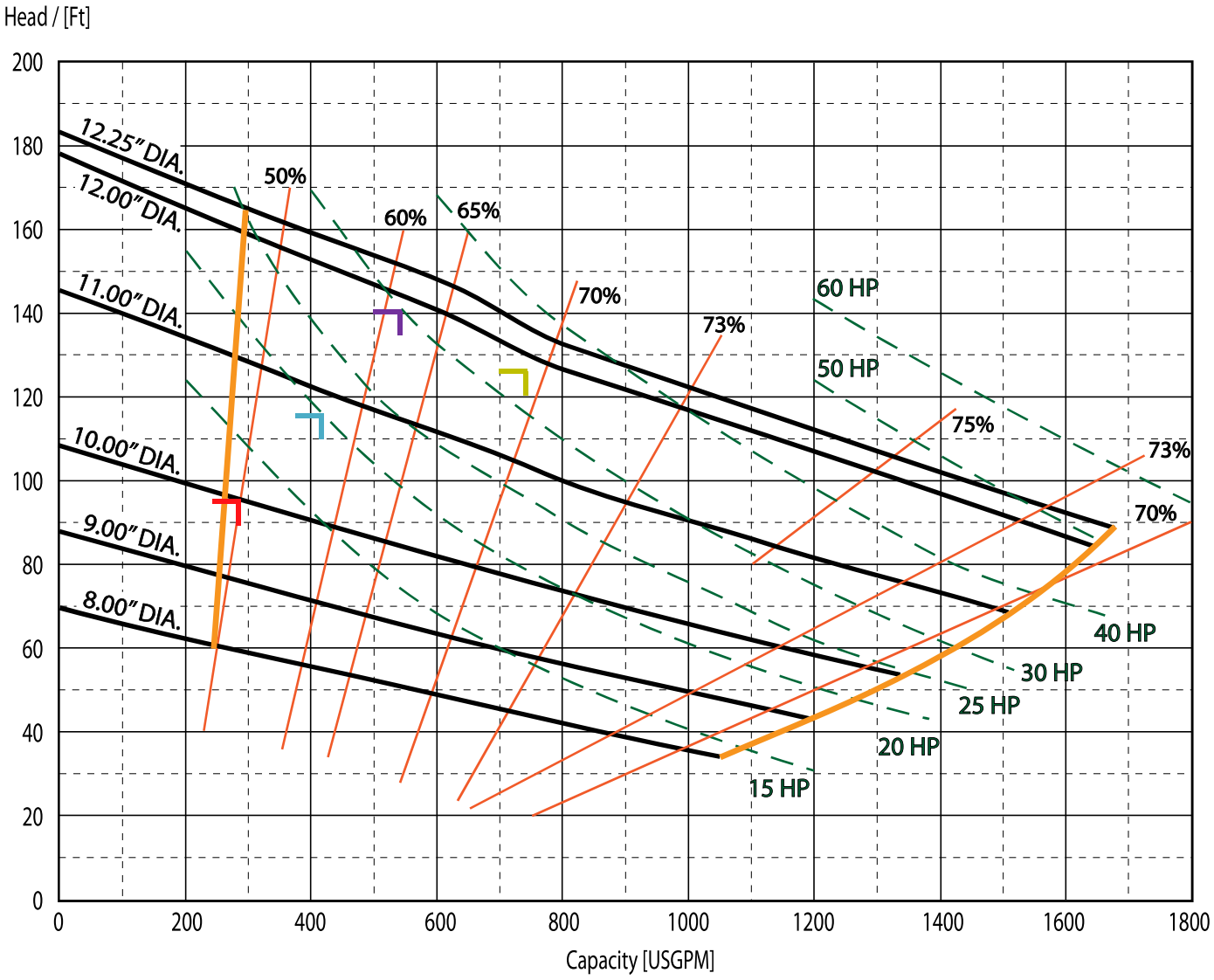
Buildout Phase 2 | Buildout Phase 4 | Buildout Phase 3 | Buildout Phase 5

KEEN PUMP

Section **ENCLOSED**
Date FEB. 2023

Pump Series	**K4VBCH**		4″ SUBMERSIBLE CHOPPER PUMPS		
Speed	**1750 RPM**	Discharge	**4″**		

GPM: _____ TDH: _____



The curves reflect maximum performance characteristics without exceeding full load.
Operation is recommended in the bounded area with operational point within the curve limit.
Performance curves are based on actual tests with clear water at 70° F and 1280 feet site elevation.

File: K4VBCH_1750

Pump Data Sheet - Keen Pump Inc.

Company: Michael Baker International
Name: WYNNETH REQUIERON
Date: 07/10/2024

Pump:

Size:	K4VB	Dimensions:	
Type:	Submersible Sewage	Suction:	---
Synch Speed:	1800 rpm	Discharge:	4 in
Dia:	10.0625 in		
Curve:	---		

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Search Criteria:

Flow:	519 US gpm	Near Miss:	---
Head:	86 ft	Static Head:	73 ft

Pump Limits:

Temperature:	---	Sphere Size:	3.19 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	30 hp
Enclosure:	TEFC	Speed:	1800 rpm
Frame:	286T		
Sizing Criteria:	Max Power on Design Curve		

Pump Selection Warnings:

None

--- Duty Point ---

Flow:	524 US gpm
Head:	86.3 ft
Eff:	65.1%
Power:	17.5 hp
NPSHr:	---
Speed:	1750 rpm

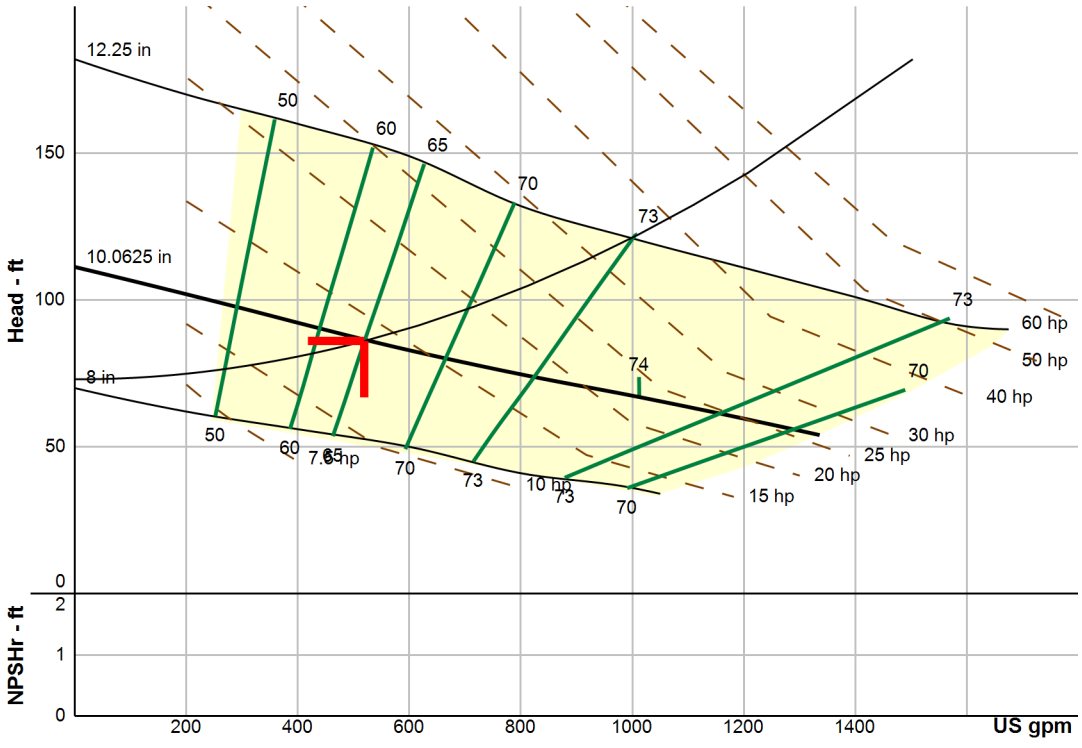
--- Design Curve ---

Shutoff Head:	111 ft
Shutoff dP:	48.2 psi
Min Flow:	--- US gpm

BEP: 74% @ 1013 US gpm
NOL Power:
26.4 hp @ 1336 US gpm

--- Max Curve ---

Max Power:
53.6 hp @ 1675 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
623	1750	81.9	68.3	18.8	---
519	1750	86.5	64.9	17.5	---
415	1750	91.5	58.4	16.3	---
311	1750	96.6	51.4	14.7	---
208	1750	102	46.3	11.5	---

Pump Data Sheet - Keen Pump Inc.

Company: Michael Baker International
Name: WYNNETH REQUIERON
Date: 07/09/2024

Pump:

Size:	K4VB	Dimensions:	
Type:	Submersible Sewage	Suction:	---
Synch Speed:	1800 rpm	Discharge:	4 in
Dia:	10.8125 in		
Curve:	---		

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Search Criteria:

Flow:	406 US gpm	Near Miss:	---
Head:	115 ft	Static Head:	73 ft

Pump Limits:

Temperature:	---	Sphere Size:	3.19 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	40 hp
Enclosure:	TEFC	Speed:	1800 rpm
Frame:	324T		
Sizing Criteria:	Max Power on Design Curve		

Pump Selection Warnings:

None

--- Duty Point ---

Flow:	408 US gpm
Head:	115 ft
Eff:	56.1%
Power:	21.1 hp
NPSHr:	---
Speed:	1750 rpm

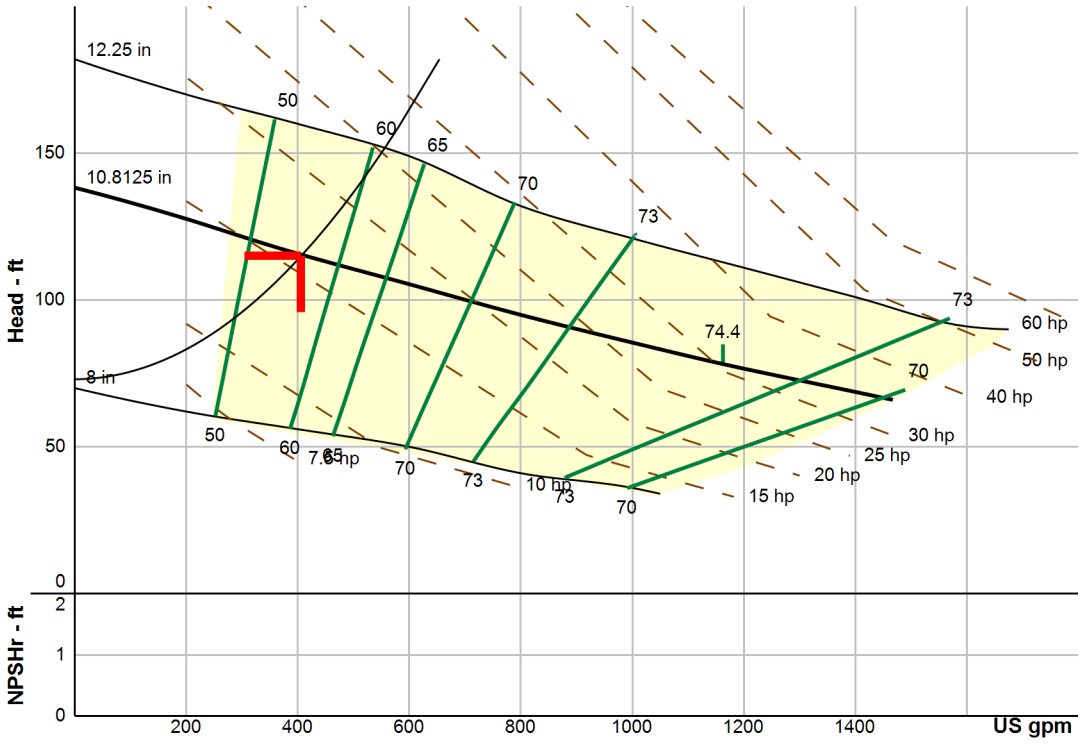
--- Design Curve ---

Shutoff Head:	138 ft
Shutoff dP:	59.9 psi
Min Flow:	--- US gpm

BEP: 74.4% @ 1163 US gpm
NOL Power:
35 hp @ 1467 US gpm

--- Max Curve ---

Max Power:
53.6 hp @ 1675 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
487	1750	111	60.8	22.5	---
406	1750	116	55.9	21	---
325	1750	120	50.7	19.4	---
244	1750	125	47	16.2	---
162	1750	---	---	---	---

Pump Data Sheet - Keen Pump Inc.

Company: Michael Baker International
Name: WYNNETH REQUIERON
Date: 07/09/2024

Pump:

Size:	K4VB	Dimensions:	
Type:	Submersible Sewage	Suction:	---
Synch Speed:	1800 rpm	Discharge:	4 in
Dia:	10.8125 in		
Curve:	---		

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Search Criteria:

Flow:	406 US gpm	Near Miss:	---
Head:	115 ft	Static Head:	73 ft

Pump Limits:

Temperature:	---	Sphere Size:	3.19 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	40 hp
Enclosure:	TEFC	Speed:	1800 rpm
Frame:	324T		
Sizing Criteria:	Max Power on Design Curve		

Pump Selection Warnings:

None

--- Duty Point ---

Flow:	408 US gpm
Head:	115 ft
Eff:	56.1%
Power:	21.1 hp
NPSHr:	---
Speed:	1750 rpm

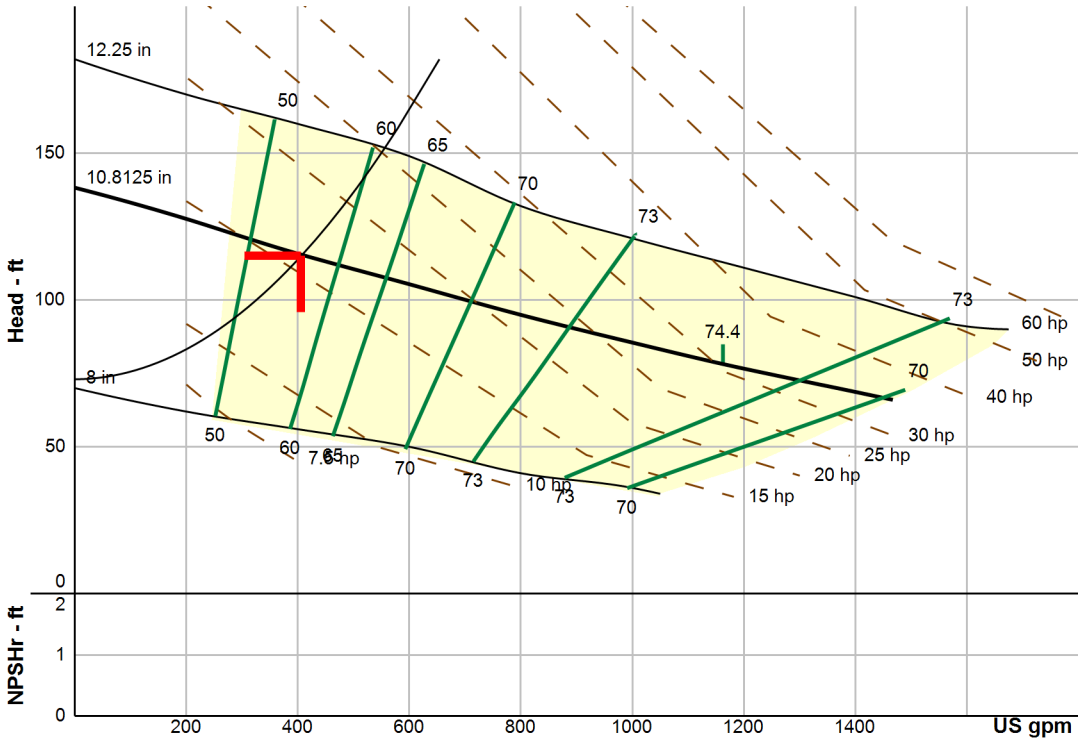
--- Design Curve ---

Shutoff Head:	138 ft
Shutoff dP:	59.9 psi
Min Flow:	--- US gpm

BEP: 74.4% @ 1163 US gpm
NOL Power:
35 hp @ 1467 US gpm

--- Max Curve ---

Max Power:
53.6 hp @ 1675 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
487	1750	111	60.8	22.5	---
406	1750	116	55.9	21	---
325	1750	120	50.7	19.4	---
244	1750	125	47	16.2	---
162	1750	---	---	---	---

APPENDIX A – LS-1 Pump Selection Options

Option 4 – Keen Grinder/Chopper Pumps and Dual 6” Force Mains

Buildout Phases
1A and 1B

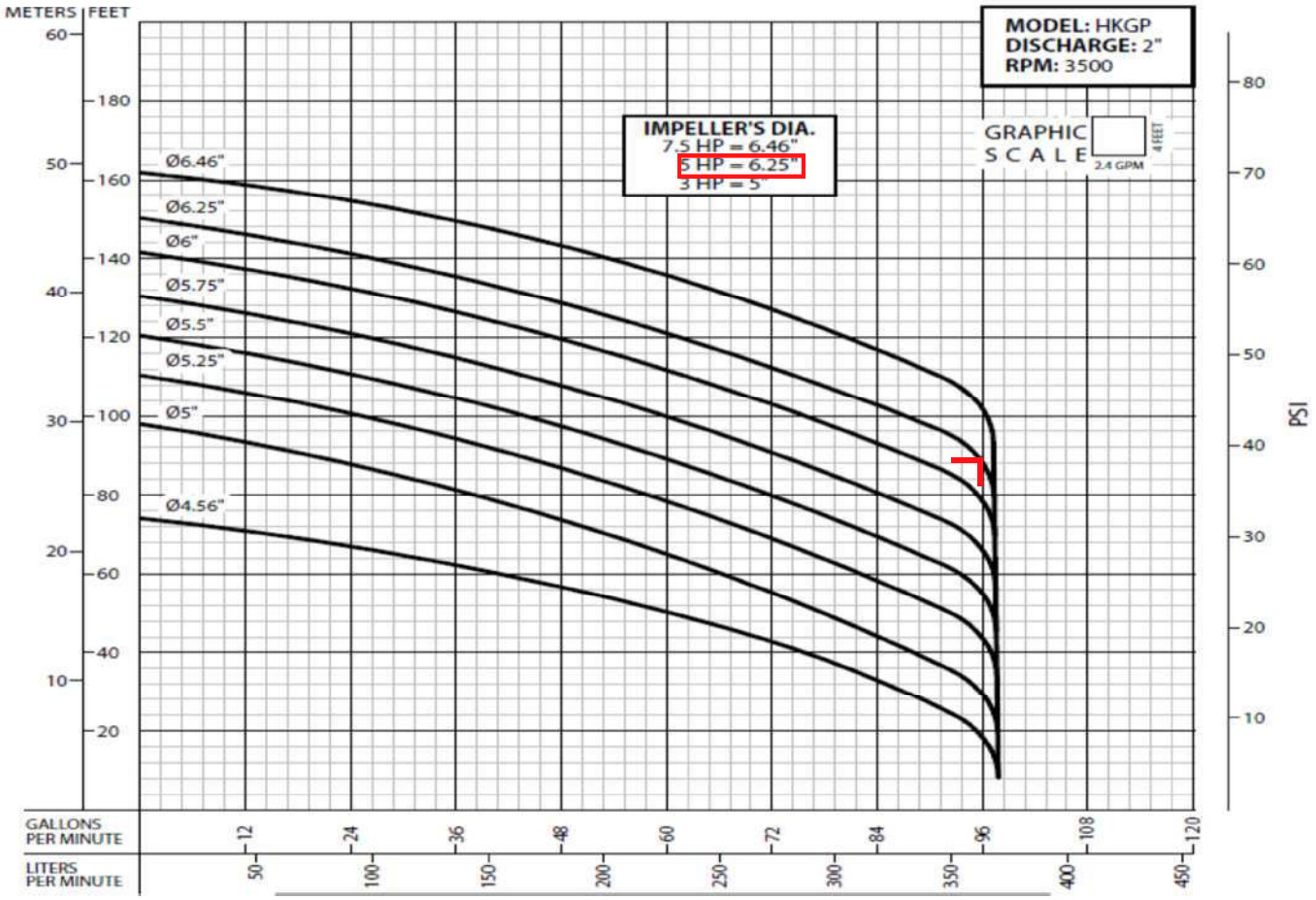
Sierra Peak
Pump Systems

HKGP – 2” Grinder

Motor Data	
HP/Power Supply	See Model Table
Rated Speed	3450 RPM
Insulation Class	F Class
Start Capacitor	External
Cooling	Oil-Filled
Mechanical Seal	Dual Silicon Carbide
Grinding Mechanism	Axial Slicer or Radial Grinder Available
Discharge	2” FPT Vertical

Model Options				
HP	Volts	Phase	Full Load Amps	Weight (lb)
3	230	1	23	188
3	230	3	13	188
3	460	3	6.5	188
5	230	1	39	199
5	230	3	20	199
5	460	3	10	199
7.5	230	3	24	203
7.5	460	3	12	203

Performance Curve

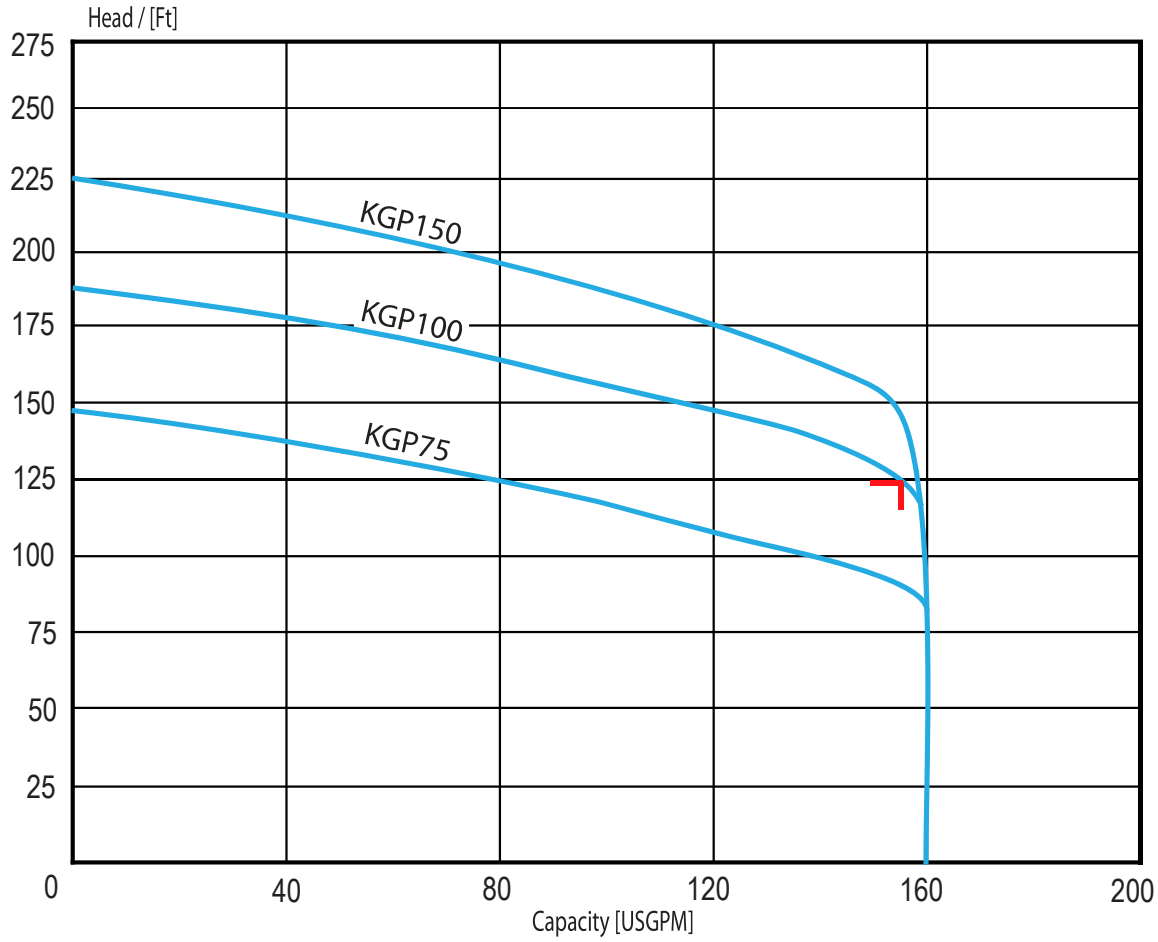


Buildout Phase 1C

KEEN PUMP

GENERAL	KGP(X)75/100/150	MOTOR DATA	
Pump Model		HP / Power Supply	7.5-15HP / 3 ϕ, 60 Hz
PUMP DATA		Poles / Rated Speed	2 P / 3450 rpm
Date	01/09/2017	Insulation Class	H Class
Discharge Flange	2-1/2 & 3" ANSI Horizontal	Full Load Amps	See Chart
Grinder Ring	Hardened SST		
Impeller Type / Std. Dia.	Recessed / As Shown		

PERFORMANCE CURVE



Models	Electrical Data			
	HP	Volts	Phase	Full Load Amps
KGP(X)75-03	7.5	208	3	39.8
KGP(X)75-23	7.5	230	3	34.5
KGP(X)75-43	7.5	460	3	17.3
KGP(X)100-03	10	208	3	55.6
KGP(X)100-23	10	230	3	48.5
KGP(X)100-43	10	460	3	24.3
KGP(X)150-03	15	208	3	68.5
KGP(X)150-23	15	230	3	59.5
KGP(X)150-43	15	460	3	29.8

* Performance with clear water and ambient temp 20°C (68°F)

Rev. 01/2017

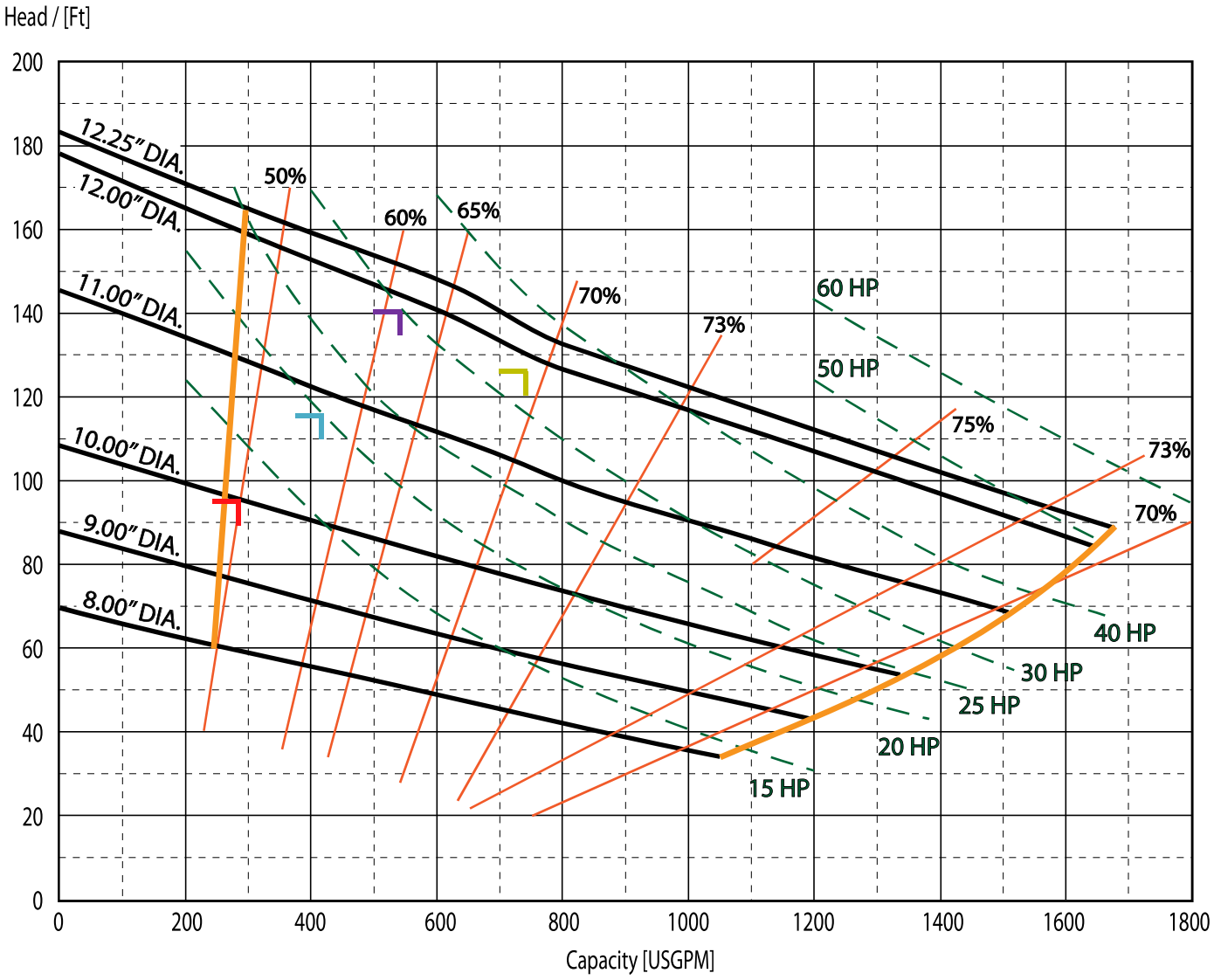
Buildout Phase 2 | Buildout Phase 4 | Buildout Phase 3 | Buildout Phase 5

KEEN PUMP

Section **ENCLOSED**
Date FEB. 2023

Pump Series	**K4VBCH**		4″ SUBMERSIBLE CHOPPER PUMPS		
Speed	**1750 RPM**	Discharge	**4″**		

GPM: _____ TDH: _____



The curves reflect maximum performance characteristics without exceeding full load.
Operation is recommended in the bounded area with operational point within the curve limit.
Performance curves are based on actual tests with clear water at 70° F and 1280 feet site elevation.

File: K4VBCH_1750

Pump Data Sheet - Keen Pump Inc.

Company: Michael Baker International
Name: WYNNETH REQUIERON
Date: 07/10/2024

Pump:

Size:	K4VB	Dimensions:	
Type:	Submersible Sewage	Suction:	---
Synch Speed:	1800 rpm	Discharge:	4 in
Dia:	10.0625 in		
Curve:	---		

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Search Criteria:

Flow:	519 US gpm	Near Miss:	---
Head:	86 ft	Static Head:	73 ft

Pump Limits:

Temperature:	---	Sphere Size:	3.19 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	30 hp
Enclosure:	TEFC	Speed:	1800 rpm
Frame:	286T		
Sizing Criteria:	Max Power on Design Curve		

Pump Selection Warnings:

None

--- Duty Point ---

Flow:	524 US gpm
Head:	86.3 ft
Eff:	65.1%
Power:	17.5 hp
NPSHr:	---
Speed:	1750 rpm

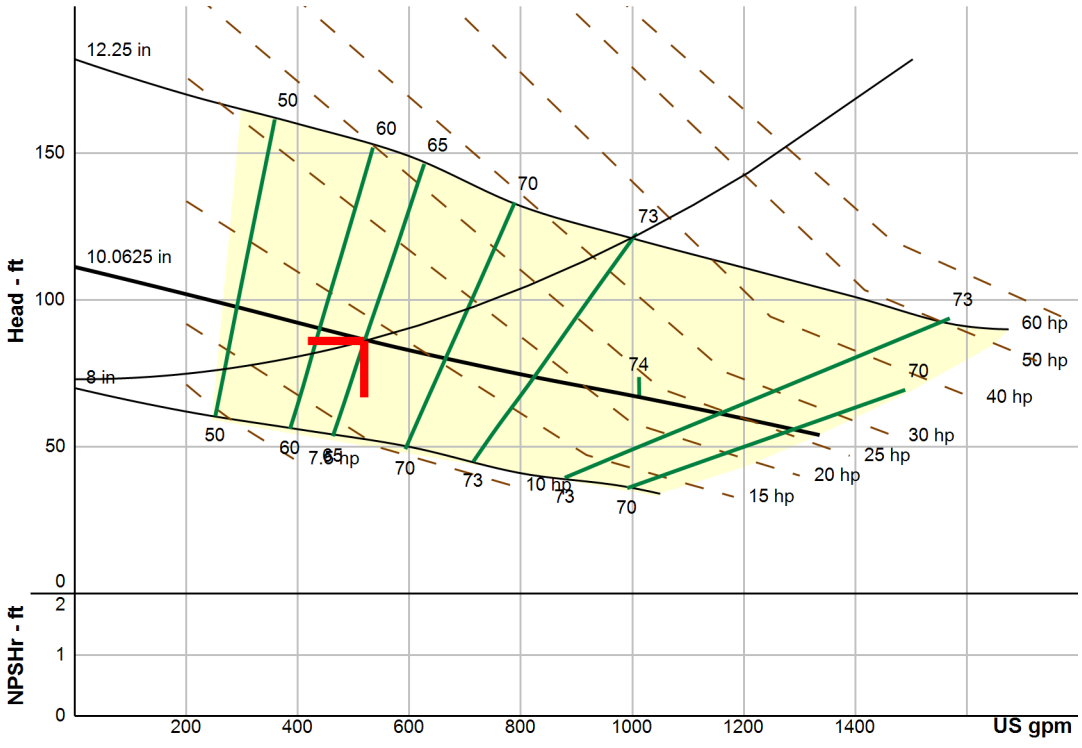
--- Design Curve ---

Shutoff Head:	111 ft
Shutoff dP:	48.2 psi
Min Flow:	--- US gpm

BEP: 74% @ 1013 US gpm
NOL Power:
26.4 hp @ 1336 US gpm

--- Max Curve ---

Max Power:
53.6 hp @ 1675 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
623	1750	81.9	68.3	18.8	---
519	1750	86.5	64.9	17.5	---
415	1750	91.5	58.4	16.3	---
311	1750	96.6	51.4	14.7	---
208	1750	102	46.3	11.5	---

Pump Data Sheet - Keen Pump Inc.

Company: Michael Baker International
Name: WYNNETH REQUIERON
Date: 07/10/2024

Pump:

Size:	K4VB	Dimensions:	
Type:	Submersible Sewage	Suction:	---
Synch Speed:	1800 rpm	Discharge:	4 in
Dia:	10.3125 in		
Curve:	---		

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Search Criteria:

Flow:	599 US gpm	Near Miss:	---
Head:	90 ft	Static Head:	73 ft

Pump Limits:

Temperature:	---	Sphere Size:	3.19 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	30 hp
Enclosure:	TEFC	Speed:	1800 rpm
Frame:	286T		
Sizing Criteria:	Max Power on Design Curve		

Pump Selection Warnings:

None

--- Duty Point ---

Flow:	603 US gpm
Head:	90.2 ft
Eff:	67.1%
Power:	20.5 hp
NPSHr:	---
Speed:	1750 rpm

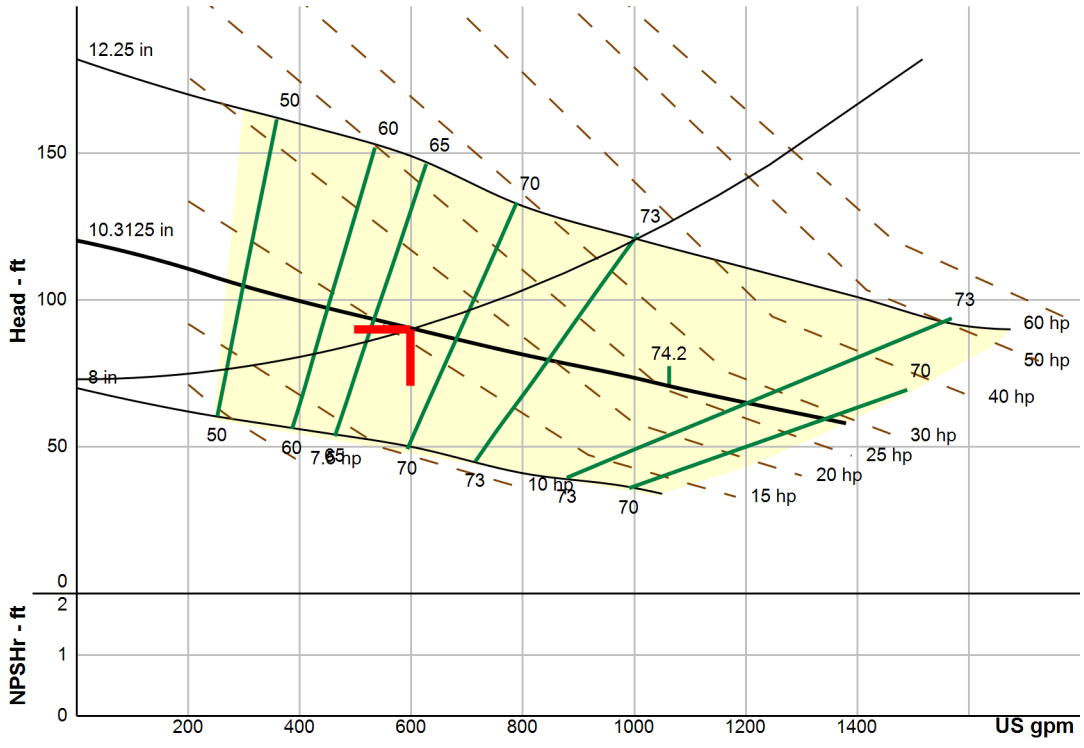
--- Design Curve ---

Shutoff Head:	120 ft
Shutoff dP:	52.1 psi
Min Flow:	--- US gpm

BEP: 74.2% @ 1063 US gpm
NOL Power:
29.2 hp @ 1380 US gpm

--- Max Curve ---

Max Power:
53.6 hp @ 1675 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
719	1750	85	70.8	21.7	---
599	1750	90.4	67	20.4	---
479	1750	95.9	61.8	18.7	---
359	1750	102	54	16.8	---
240	1750	108	47.7	13.7	---

Pump Data Sheet - Keen Pump Inc.

Company: Michael Baker International
Name: WYNNETH REQUIERON
Date: 07/10/2024

Pump:

Size:	K4VB	Dimensions:	
Type:	Submersible Sewage	Suction:	---
Synch Speed:	1800 rpm	Discharge:	4 in
Dia:	10.3125 in		
Curve:	---		

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Search Criteria:

Flow:	599 US gpm	Near Miss:	---
Head:	90 ft	Static Head:	73 ft

Pump Limits:

Temperature:	---	Sphere Size:	3.19 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	30 hp
Enclosure:	TEFC	Speed:	1800 rpm
Frame:	286T		
Sizing Criteria:	Max Power on Design Curve		

Pump Selection Warnings:

None

--- Duty Point ---

Flow:	603 US gpm
Head:	90.2 ft
Eff:	67.1%
Power:	20.5 hp
NPSHr:	---
Speed:	1750 rpm

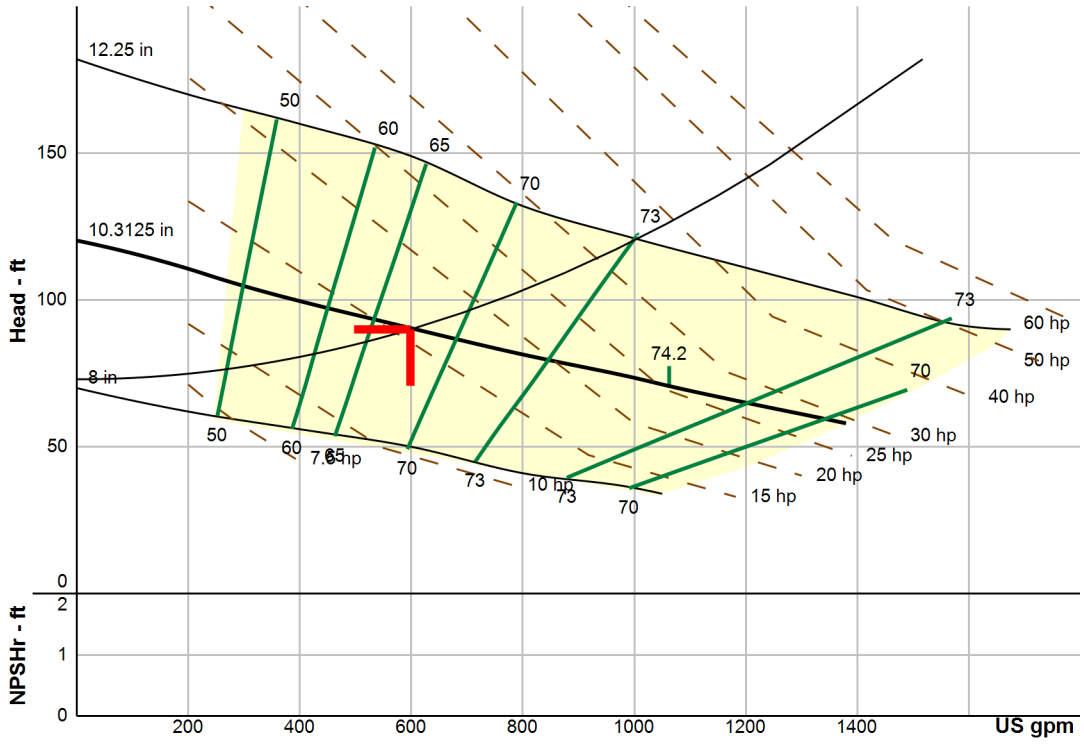
--- Design Curve ---

Shutoff Head:	120 ft
Shutoff dP:	52.1 psi
Min Flow:	--- US gpm

BEP: 74.2% @ 1063 US gpm
NOL Power:
29.2 hp @ 1380 US gpm

--- Max Curve ---

Max Power:
53.6 hp @ 1675 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
719	1750	85	70.8	21.7	---
599	1750	90.4	67	20.4	---
479	1750	95.9	61.8	18.7	---
359	1750	102	54	16.8	---
240	1750	108	47.7	13.7	---

APPENDIX A – LS-1 Pump Selection Options

Option 5 – Flygt NP3127 (4+1 configuration) and Dual 6” Force Mains

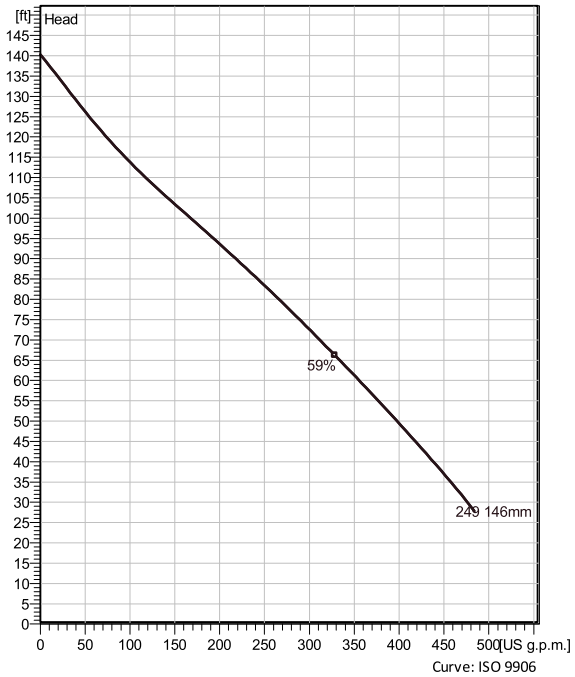
NP 3127 SH 3~ Adaptive 249

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.

Technical specification



Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N3127.930 21-11-2AS-W IE3 12hp

Installation type
P - Semi permanent, Wet

Impeller diameter
146 mm

Discharge diameter
3 inch

Pump information

Impeller diameter
146 mm

Discharge diameter
3 inch

Inlet diameter
90 mm

Maximum operating speed
3600 rpm

Number of blades
2

Max. fluid temperature
40 °C

Material

Impeller
Hard-Iron ™

Stator housing material
Grey cast iron

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Technical specification

Motor - General

Motor number N3127.930 21-11-2AS-W IE3 12hp	**Phases** 3~	**Rated speed** 3600 rpm	**Rated power** 12 hp
ATEX approved FM	**Number of poles** 2	**Rated current** 14 A	**Stator variant** 60
Frequency 60 Hz	**Rated voltage** 460 V	**Insulation class** H	**Type of Duty** S1
Version code 930			

Motor - Technical

Power factor - 1/1 Load 0.91	**Motor efficiency - 1/1 Load** 91.4 %	**Total moment of inertia** 0.482 lb ft²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.90	**Motor efficiency - 3/4 Load** 91.2 %	**Starting current, direct starting** 120 A	
Power factor - 1/2 Load 0.86	**Motor efficiency - 1/2 Load** 89.3 %	**Starting current, star-delta** 40 A	

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Block		**Created on**	8/28/2024	**Last update**	8/28/2024

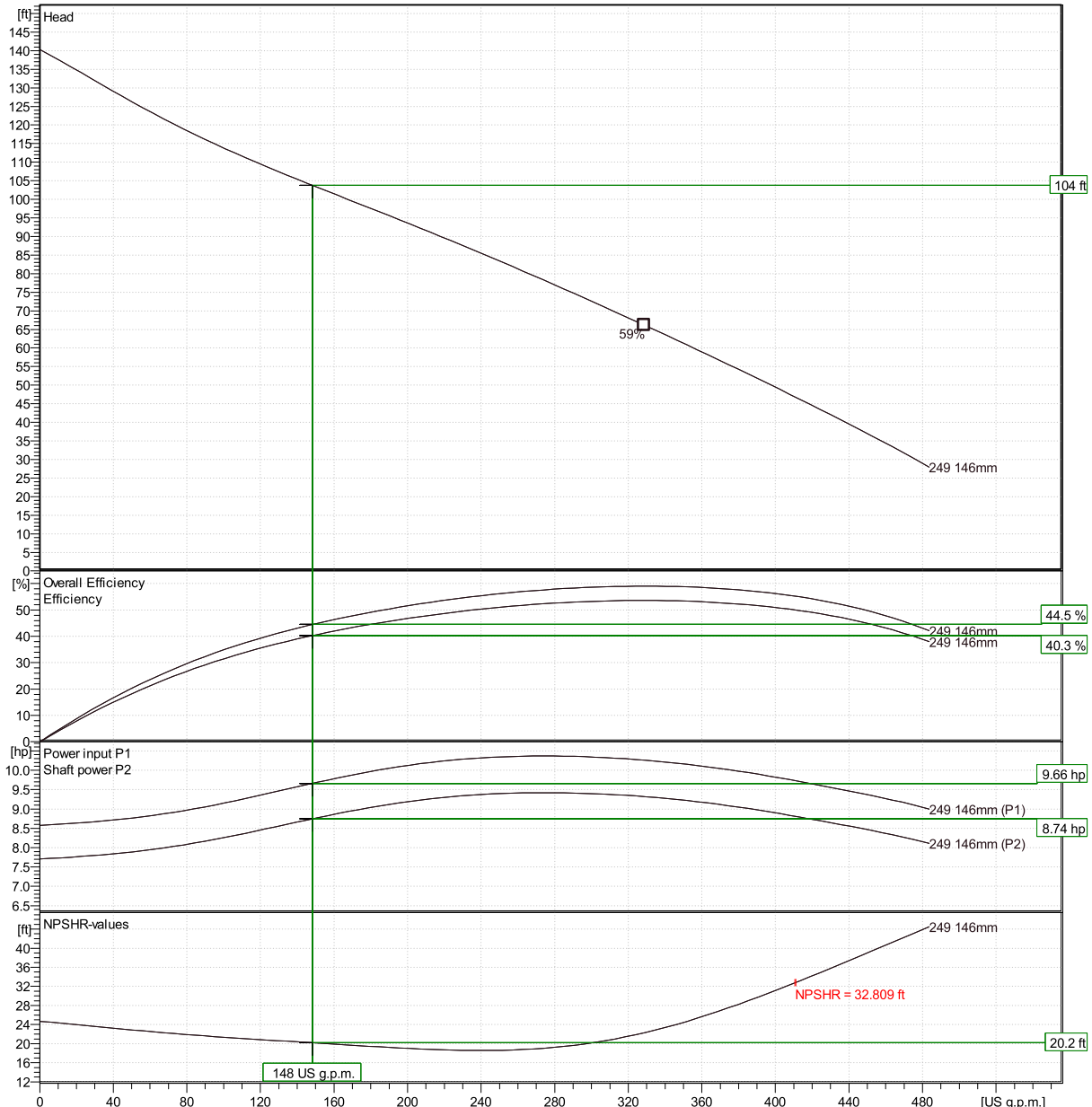
NP 3127 SH 3~ Adaptive 249

Performance curve

Duty point

Flow	Head
148 US g.p.m.	104 ft

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

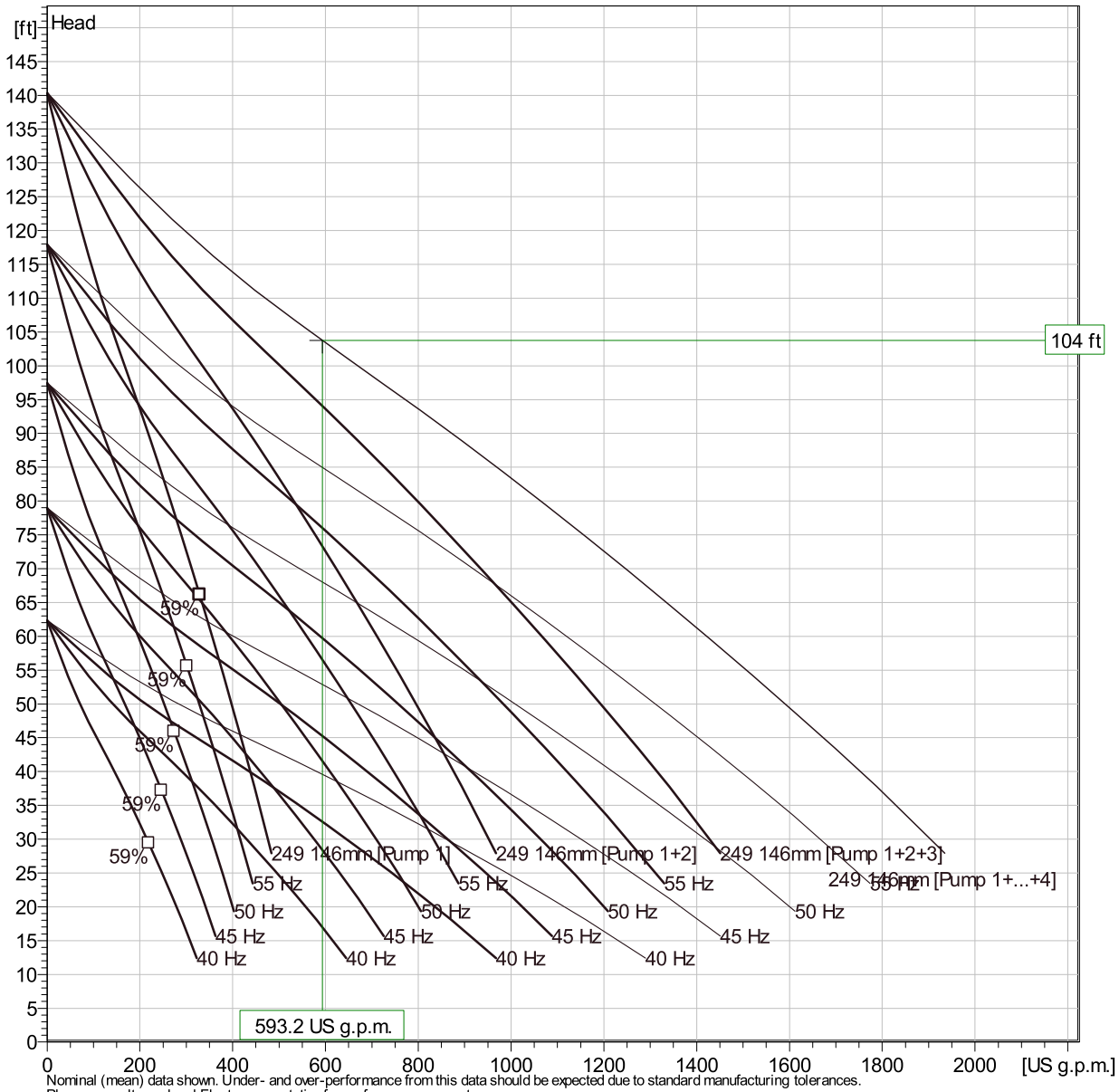
Curve: ISO 9906

Xylect-20524157		Alan Dahlqvist	
	Created on	8/28/2024 **Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

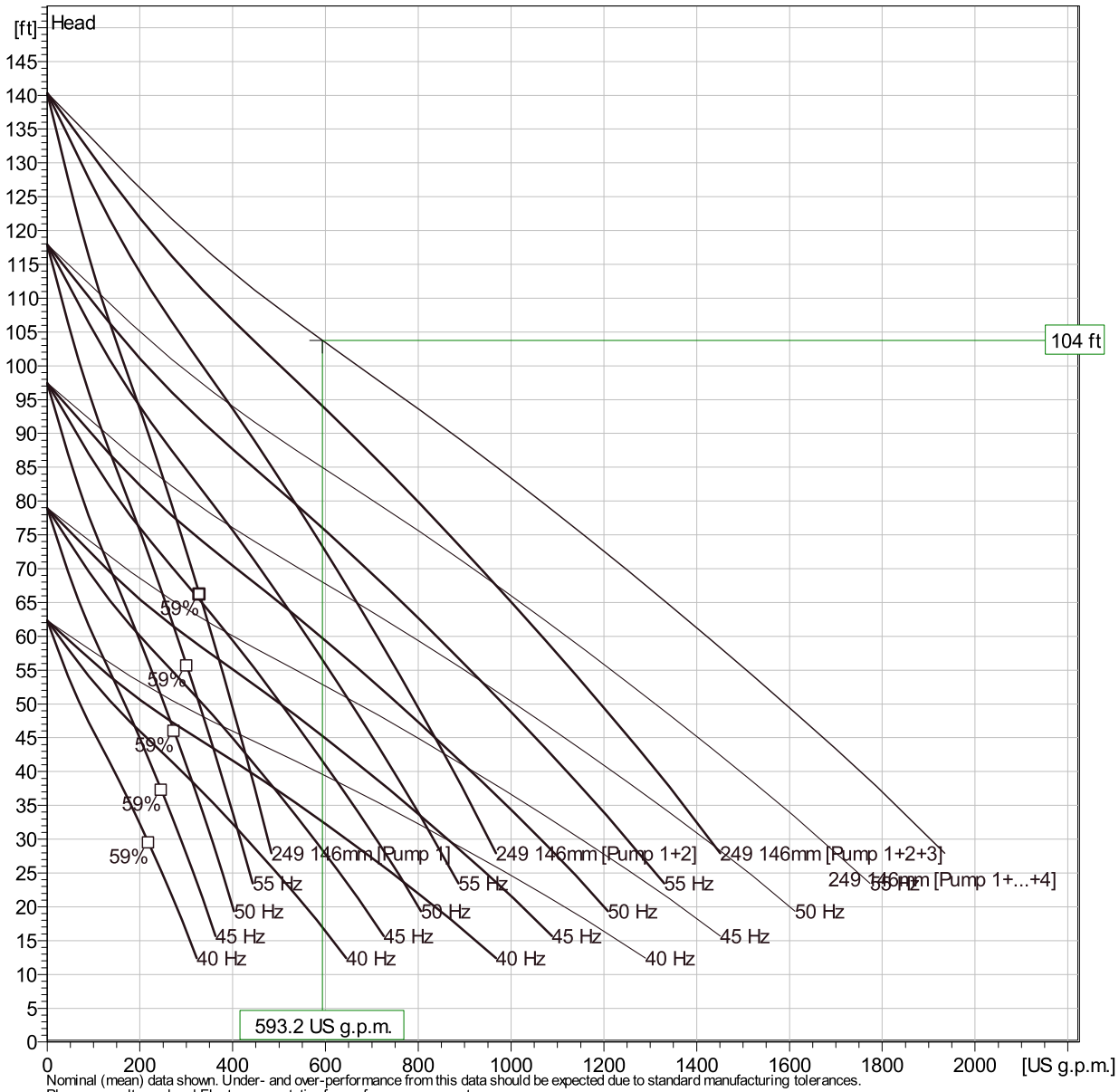
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 3	405	48.3	8.86	405	48.3	8.86	55.8 %	300	31.8
4 / 2	94.7	115	8.21	379	115	32.8	33.6 %	1190	21.5
3 / 2	123	109	8.48	368	109	25.4	39.9 %	950	20.8

Project		**Created by**	Alan Dahlqvist		
Block	Xylect-20524157	**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



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Please consult your local Flygt representative for performance guarantees.

Operating characteristics

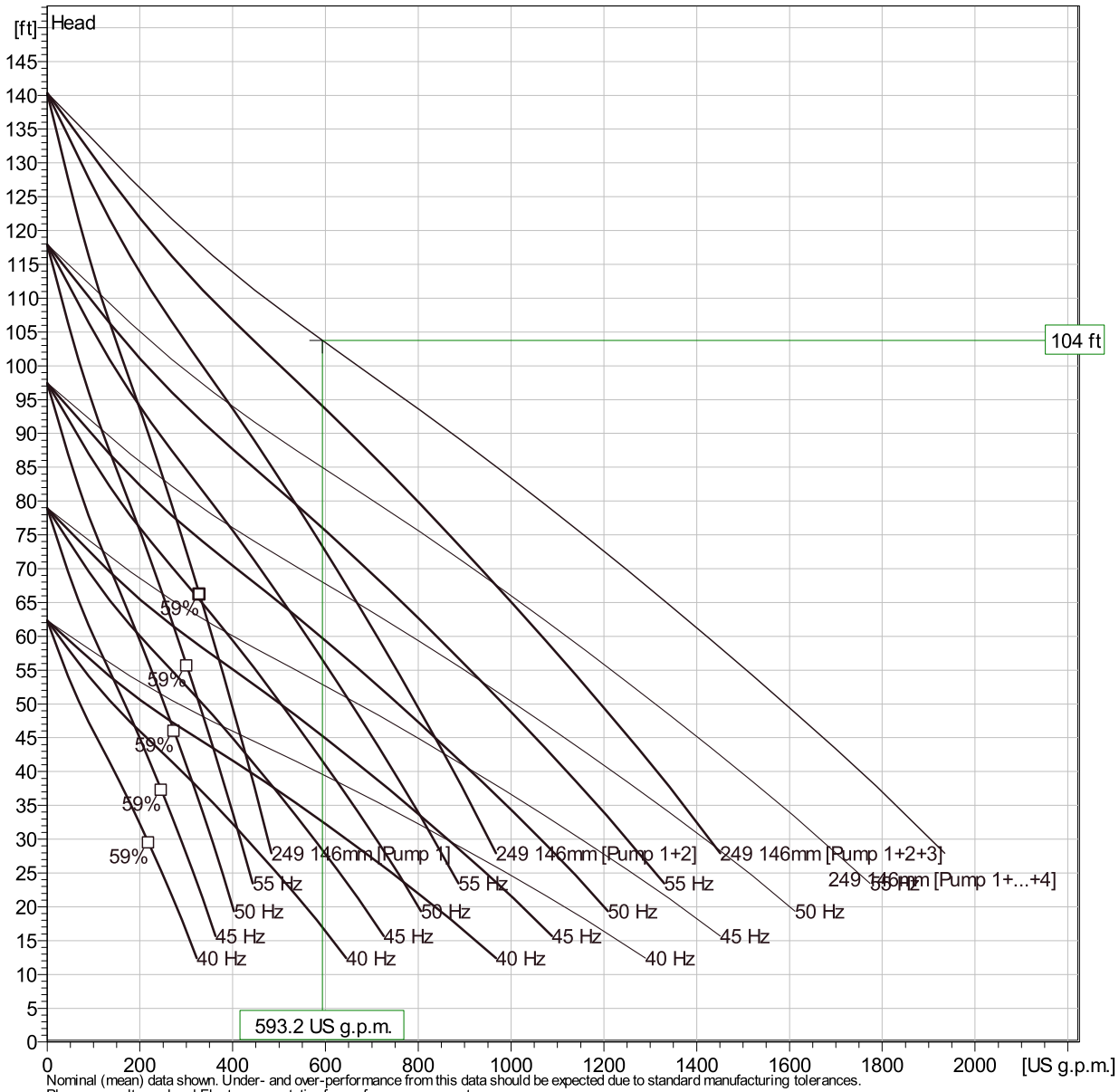
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 2	175	98.5	9	350	98.5	18	48.5 %	704	19.5
1 / 2	301	72.5	9.4	301	72.5	9.4	58.6 %	428	20.2
4 / 1	54.9	125	7.92	220	125	31.7	21.9 %	1990	22.7

Project		**Created by**	Alan Dahlqvist		
Block	Xylect-20524157	**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3 / 1	71.9	121	8.02	216	121	24.1	27.3 %	1540	22.2
2 / 1	104	113	8.3	209	113	16.6	35.9 %	1100	21.2
1 / 1	192	95.3	9.13	192	95.3	9.13	50.6 %	652	19.2

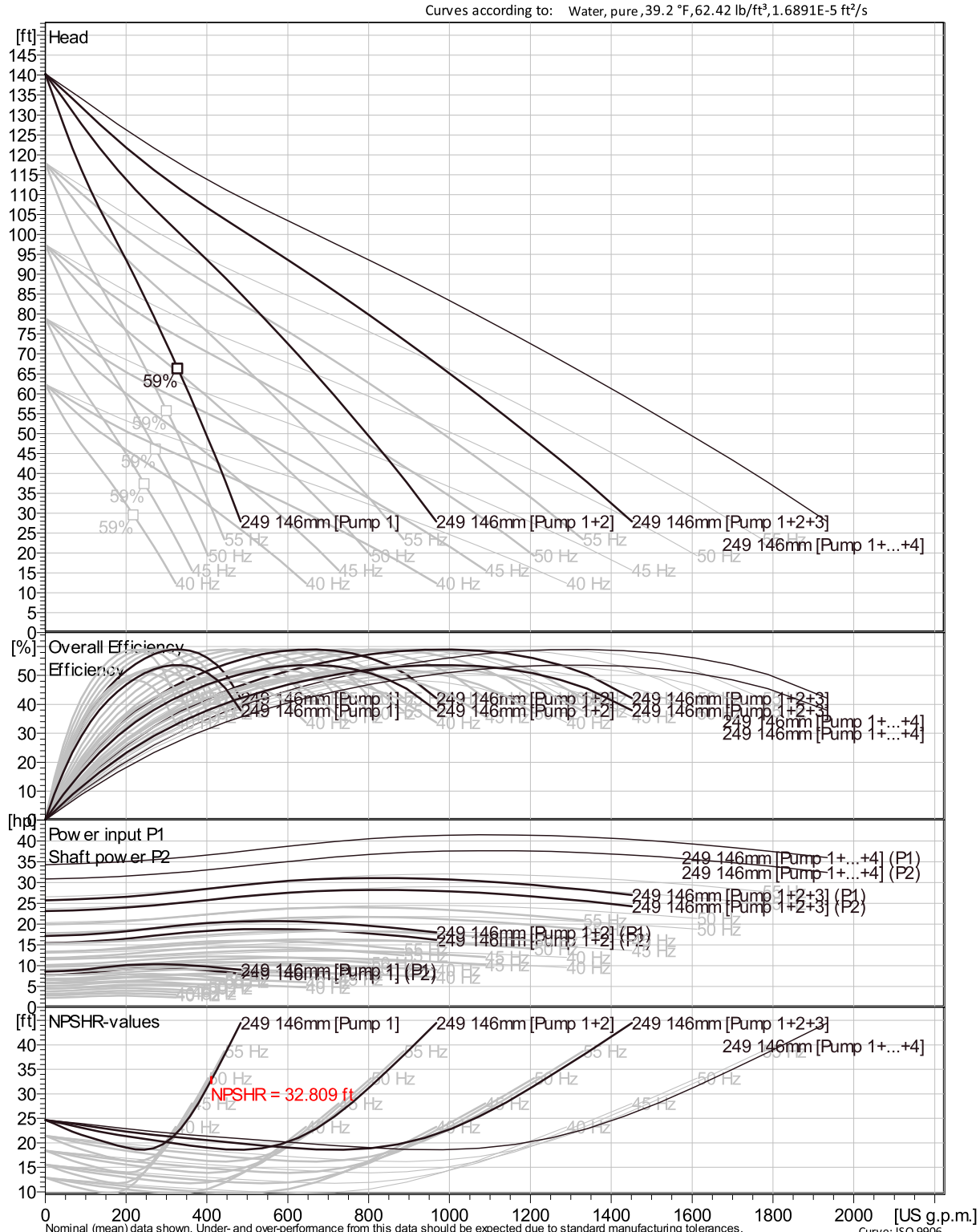
Project		**Created by**	Alan Dahlqvist		
Block	Xylect-20524157	**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Curve

FLYGT a xylem brand

Curves according to: Water, pure ,39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



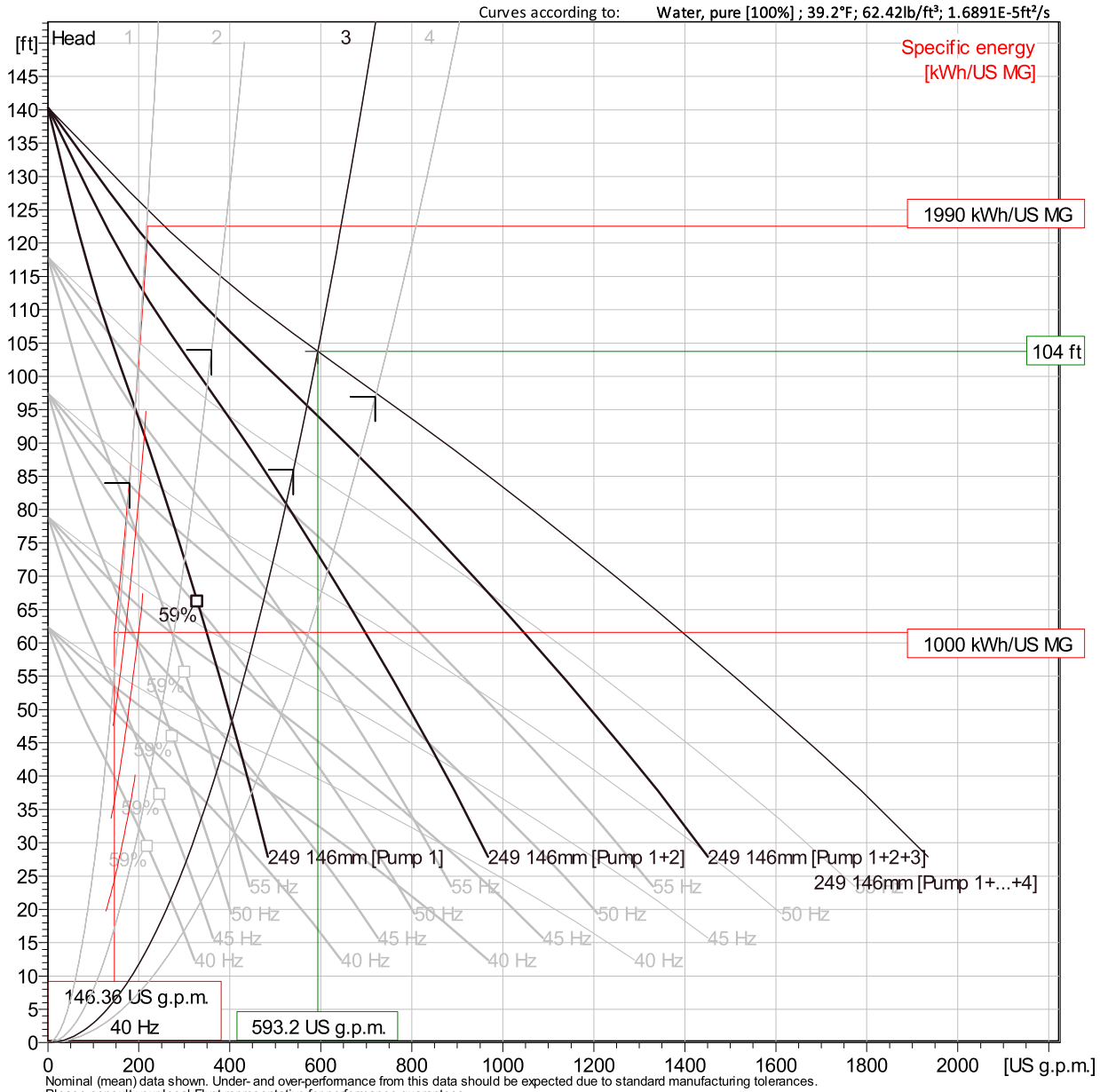
Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Curve: ISO 9906

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

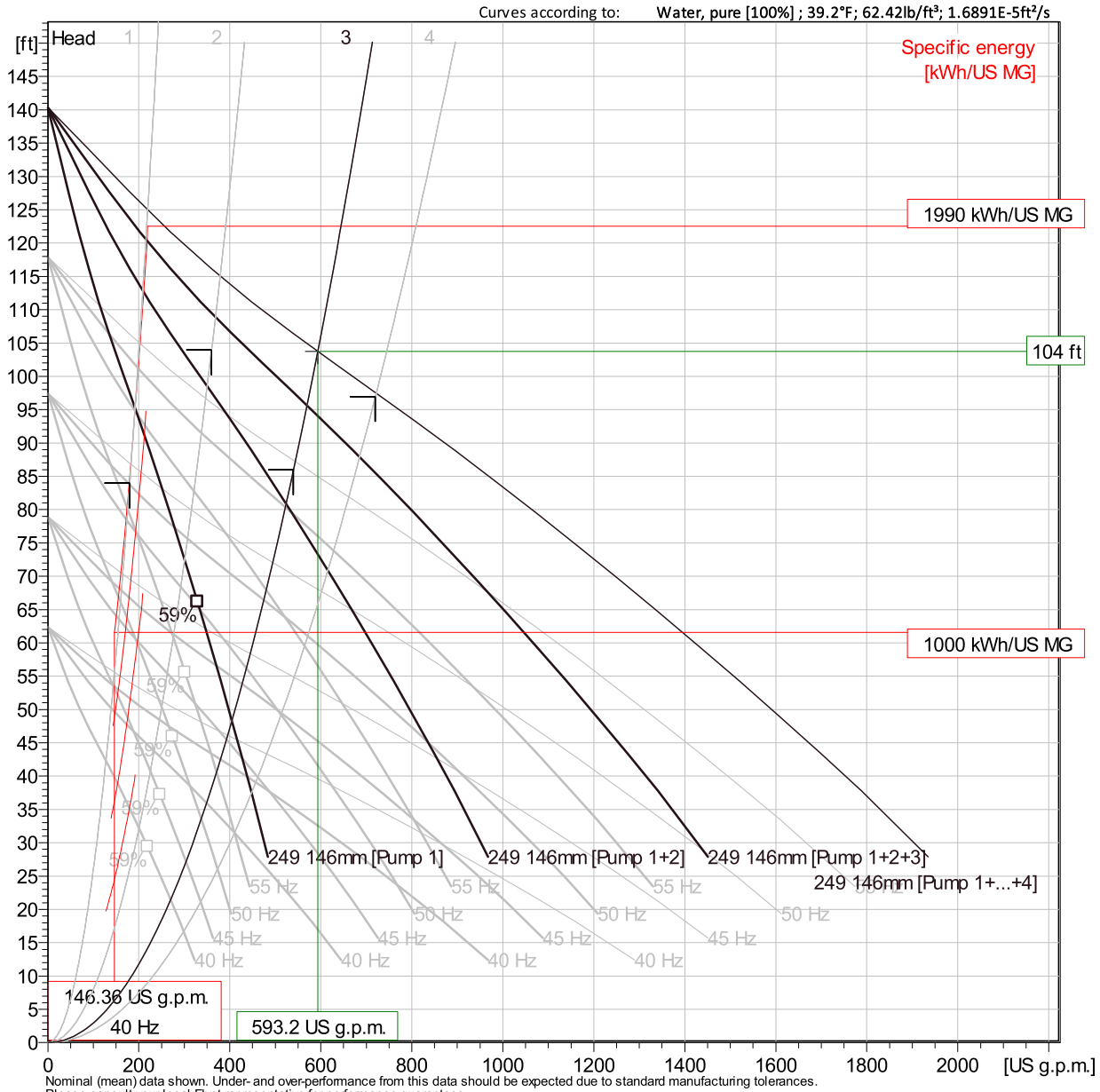
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 3	60 Hz	405	48.3	8.86	405	48.3	8.86	55.8 %	300	31.8
1 / 3	55 Hz	371	40.6	6.82	371	40.6	6.82	55.8 %	254	27.7
1 / 3	50 Hz	337	33.5	5.13	337.2623792502	33.5	5.13	55.8 %	214	23.8
1 / 3	45 Hz	304	27.2	3.74	304	27.2	3.74	55.8 %	178	20.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

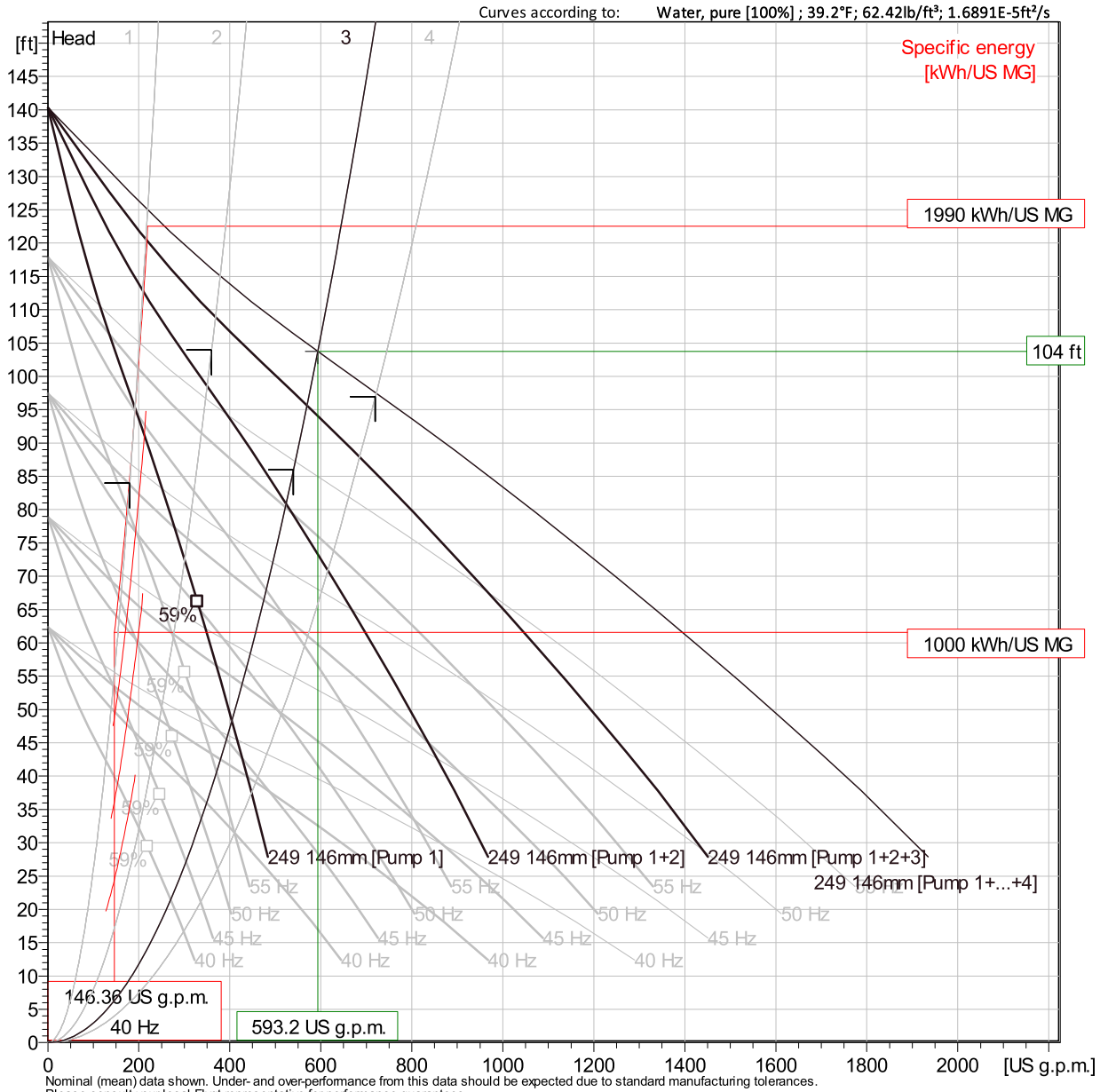
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 3	40 Hz	270	21.5	2.63	270	21.5	2.63	55.8 %	149	16.6
4 / 2	60 Hz	94.7	115	8.21	379	115	32.8	33.6 %	1190	21.5
4 / 2	55 Hz	86.8	96.7	6.32	347	96.7	25.3	33.6 %	1010	18.7
4 / 2	50 Hz	78.9	79.9	4.75	316	79.9	19	33.6 %	851	16.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

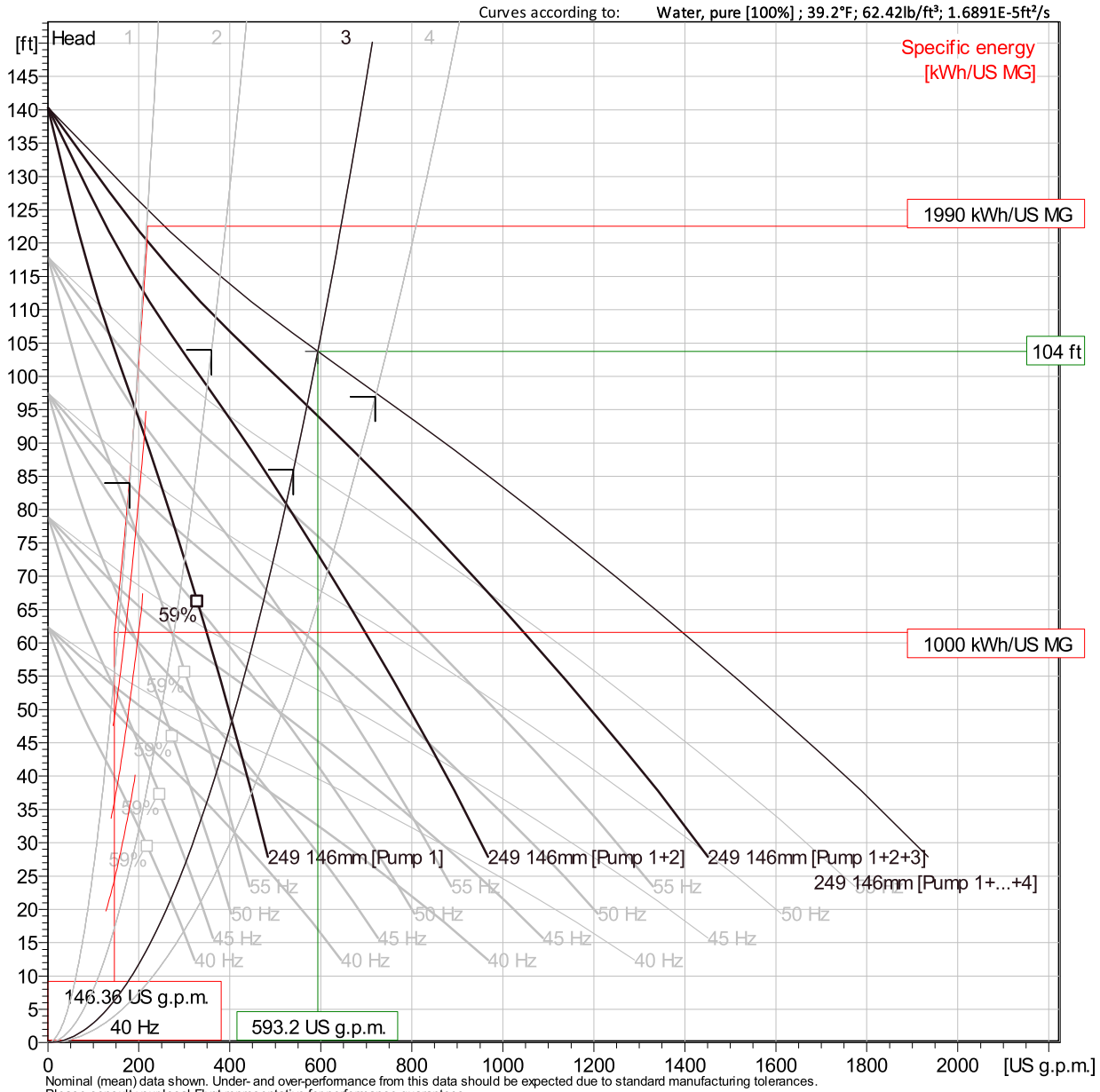
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
4 / 2	45 Hz	71	64.7	3.46	284	64.7	13.9	33.6 %	712	13.6
4 / 2	40 Hz	63.1	51.1	2.43	252	51.1	9.73	33.6 %	597	11.2
3 / 2	60 Hz	123	109	8.48	368	109	25.4	39.9 %	950	20.8
3 / 2	55 Hz	113	91.5	6.53	338	91.5	19.6	39.9 %	803	18.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



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Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3 / 2	50 Hz	102	75.6	4.91	307	75.6	14.7	39.9 %	676	15.5
3 / 2	45 Hz	92.1	61.3	3.58	276	61.3	10.7	39.9 %	565	13.1
3 / 2	40 Hz	81.9	48.4 ft	2.51	246	48.4	7.54	39.9 %	473	10.9
2 / 2	60 Hz	175	98.5	9	350	98.5	18	48.5 %	704	19.5

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

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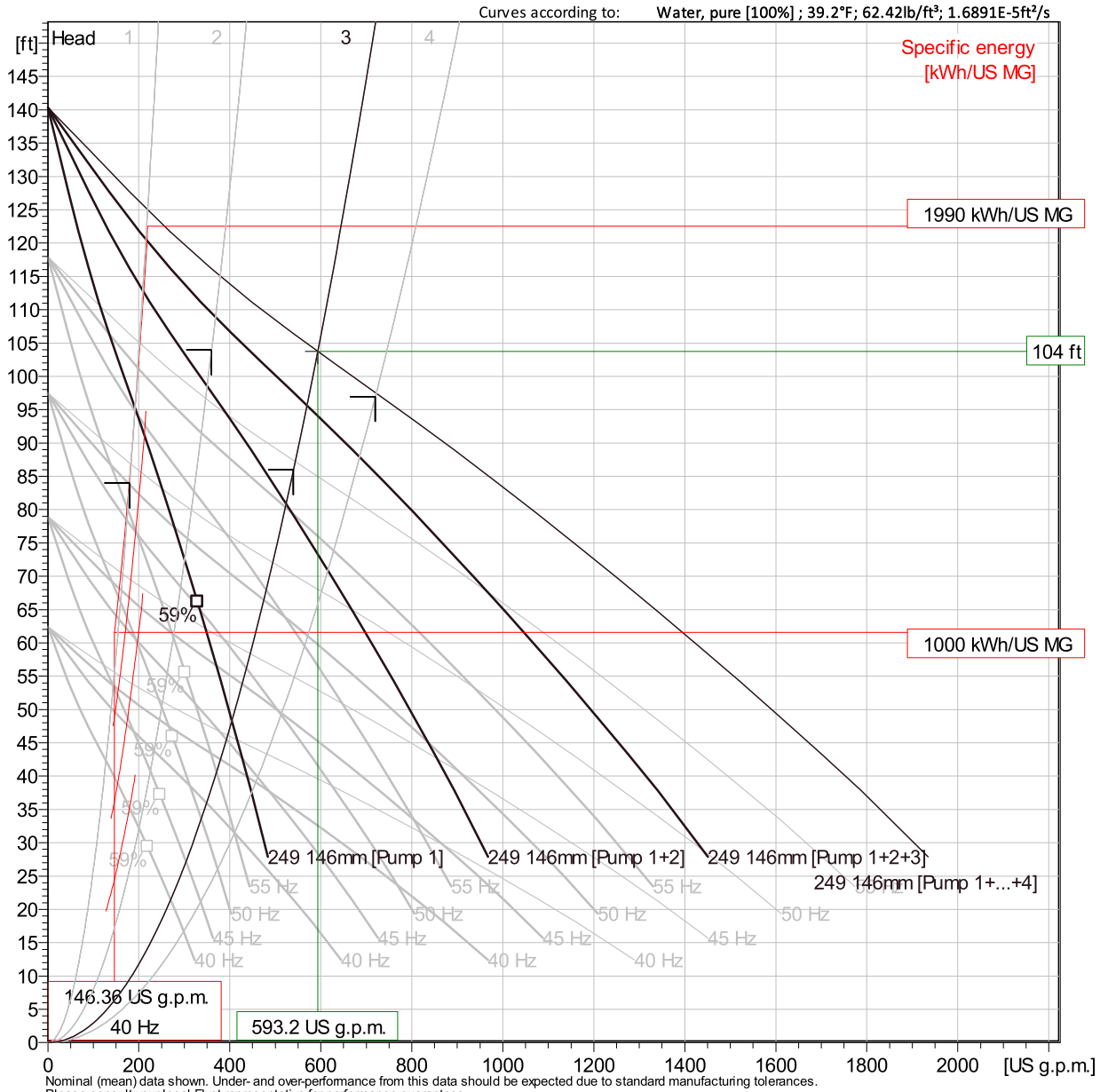
VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
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Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 2	55 Hz	161	82.8	6.93	321	82.8	13.9	48.5 %	595	17
2 / 2	50 Hz	146	68.4	5.21	292	68.4	10.4	48.5 %	501	14.6
2 / 2	45 Hz	131	55.4	3.8	263	55.4	7.59	48.5 %	417	12.3
2 / 2	40 Hz	117	43.8	2.67	234	43.8	5.33	48.5 %	347	10.2

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

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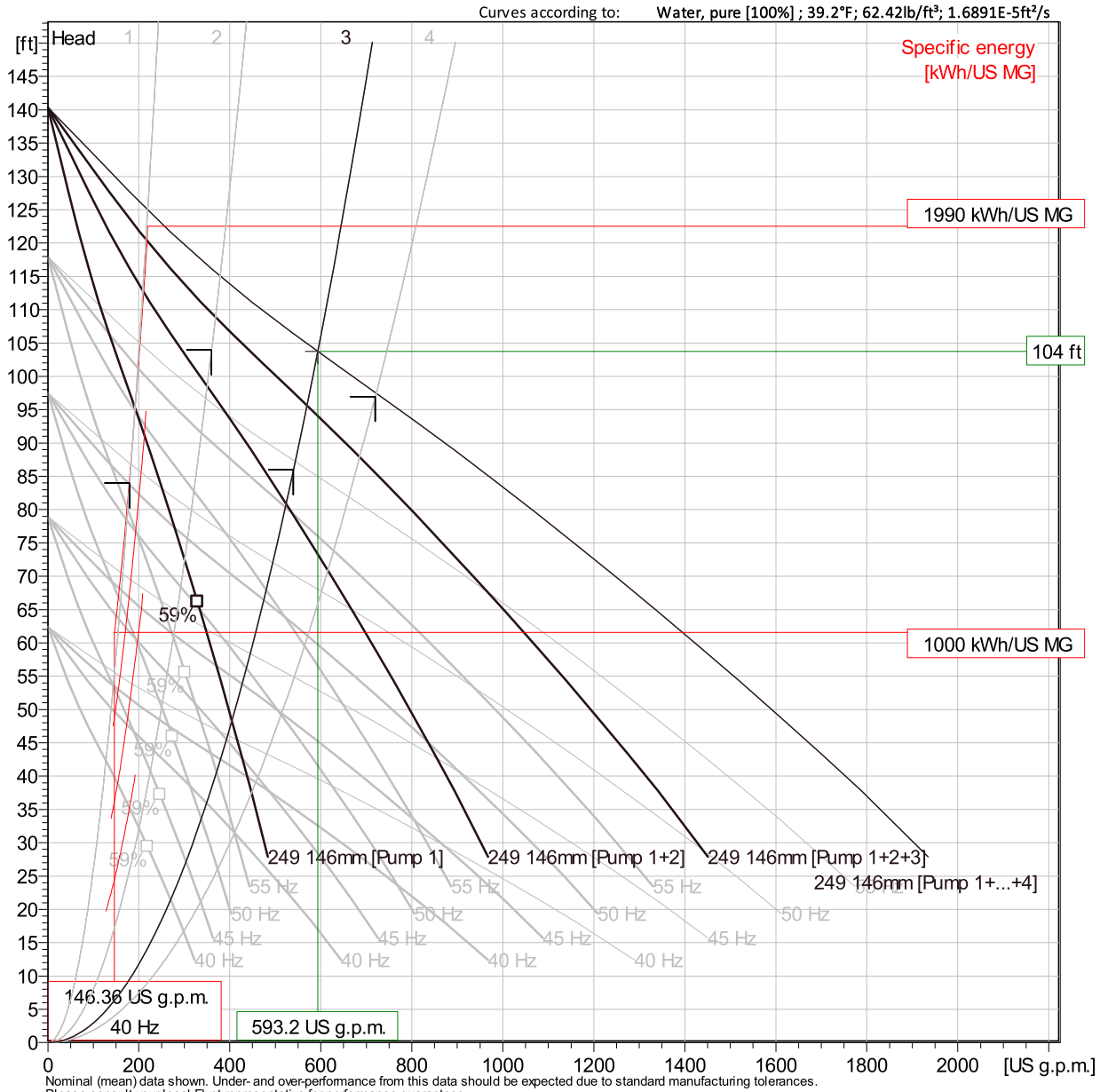
VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 2	60 Hz	301	72.5	9.4	301	72.5	9.4	58.6 %	428	20.2
1 / 2	55 Hz	275	60.9	7.24	275	60.9	7.24	58.6 %	361	17.6
1 / 2	50 Hz	250	50.3	5.44	250	50.3	5.44	58.6 %	304	15.1
1 / 2	45 Hz	225	40.8	3.96	225	40.8	3.96	58.6 %	253	12.7

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

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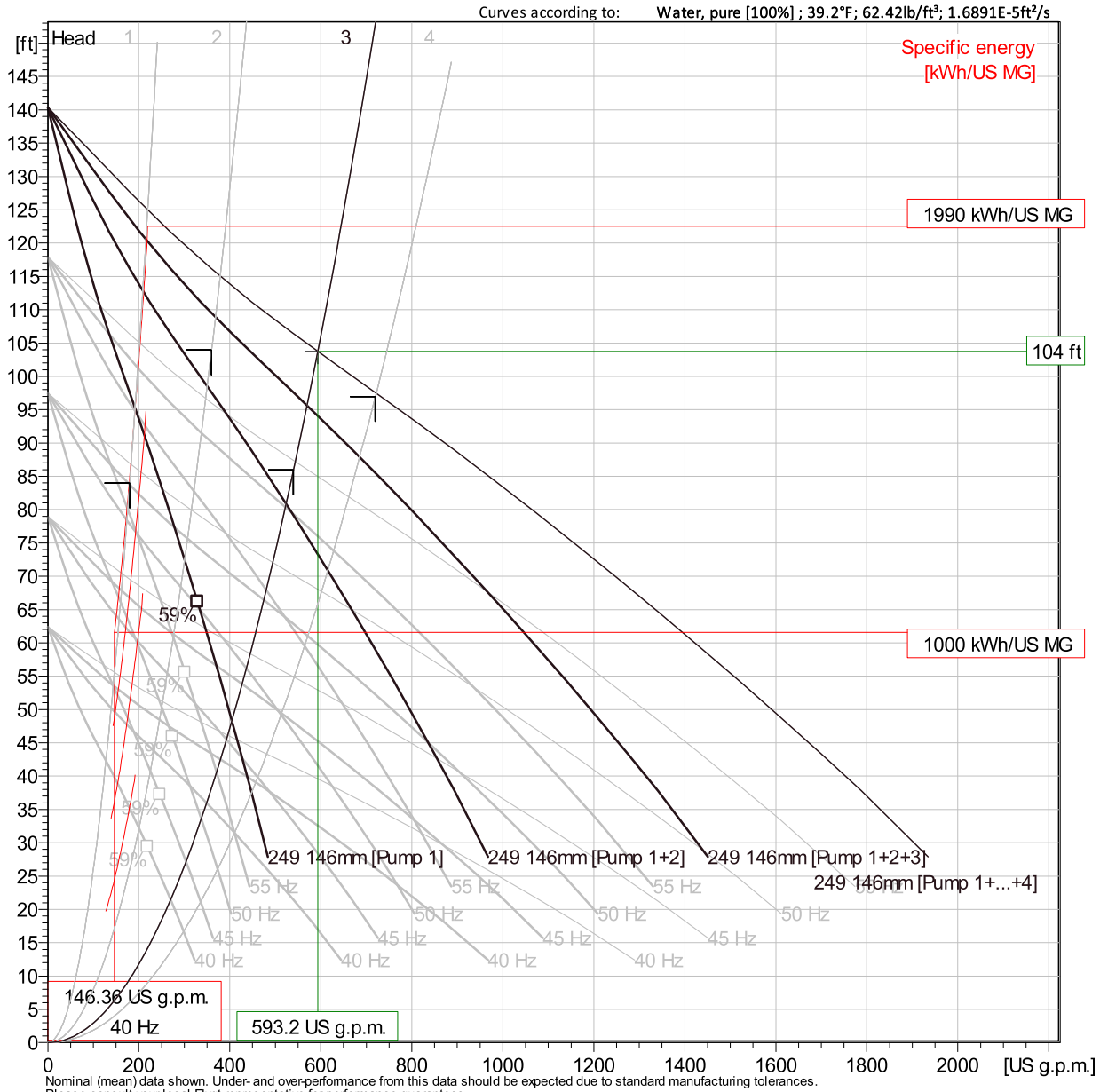
VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

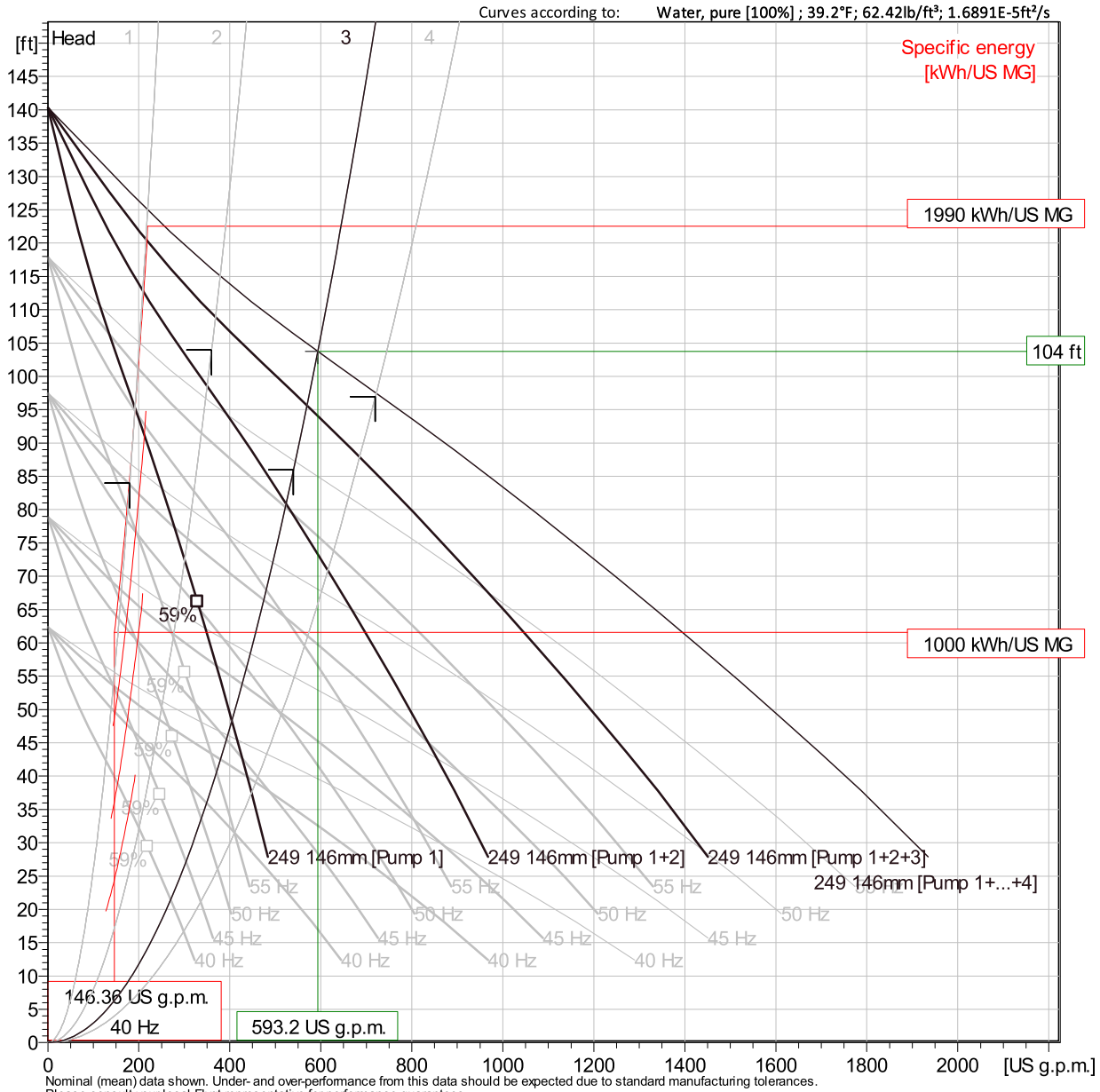
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 2	40 Hz	200	32.2	2.78	200	32.2	2.78	58.6 %	210	10.6
4 / 1	60 Hz	54.9	125	7.92	220	125	31.7	21.9 %	1990	22.7
4 / 1	55 Hz	50.3	105	6.1	201	105	24.4	21.9 %	1680	19.8
4 / 1	50 Hz	45.7	86.8	4.58	183	86.8	18.3	21.9 %	1420	17

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

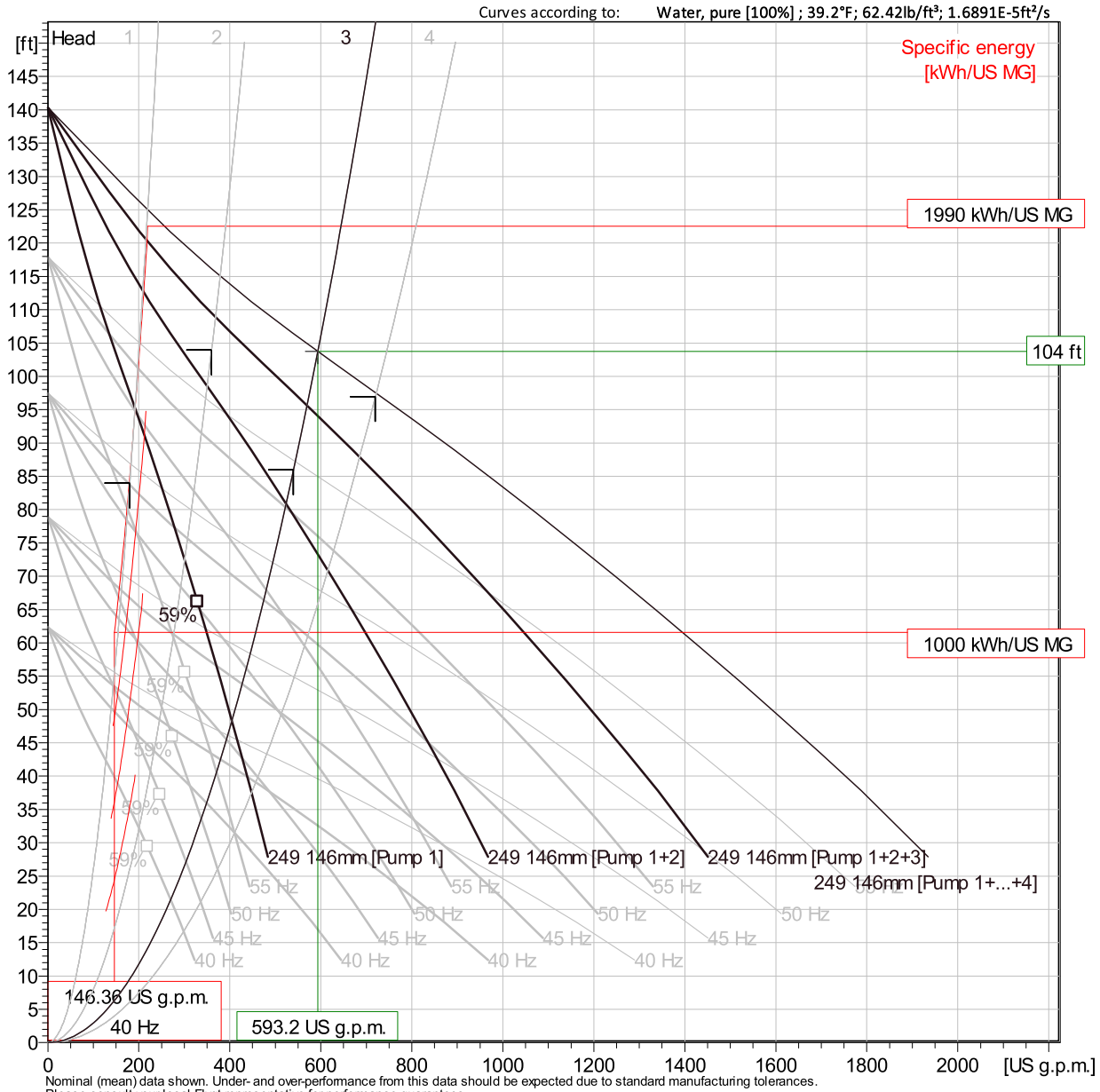
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
4 / 1	45 Hz	41.2	70.3	3.34	165	70.3	13.4	21.9 %	1190	14.3
4 / 1	40 Hz	36.6	55.5	2.35	146	55.5	9.38	21.9 %	1000	11.9
3 / 1	60 Hz	71.9	121	8.02	216	121	24.1	27.3 %	1540	22.2
3 / 1	55 Hz	65.9	101	6.18	198	101	18.5	27.3 %	1300	19.3

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

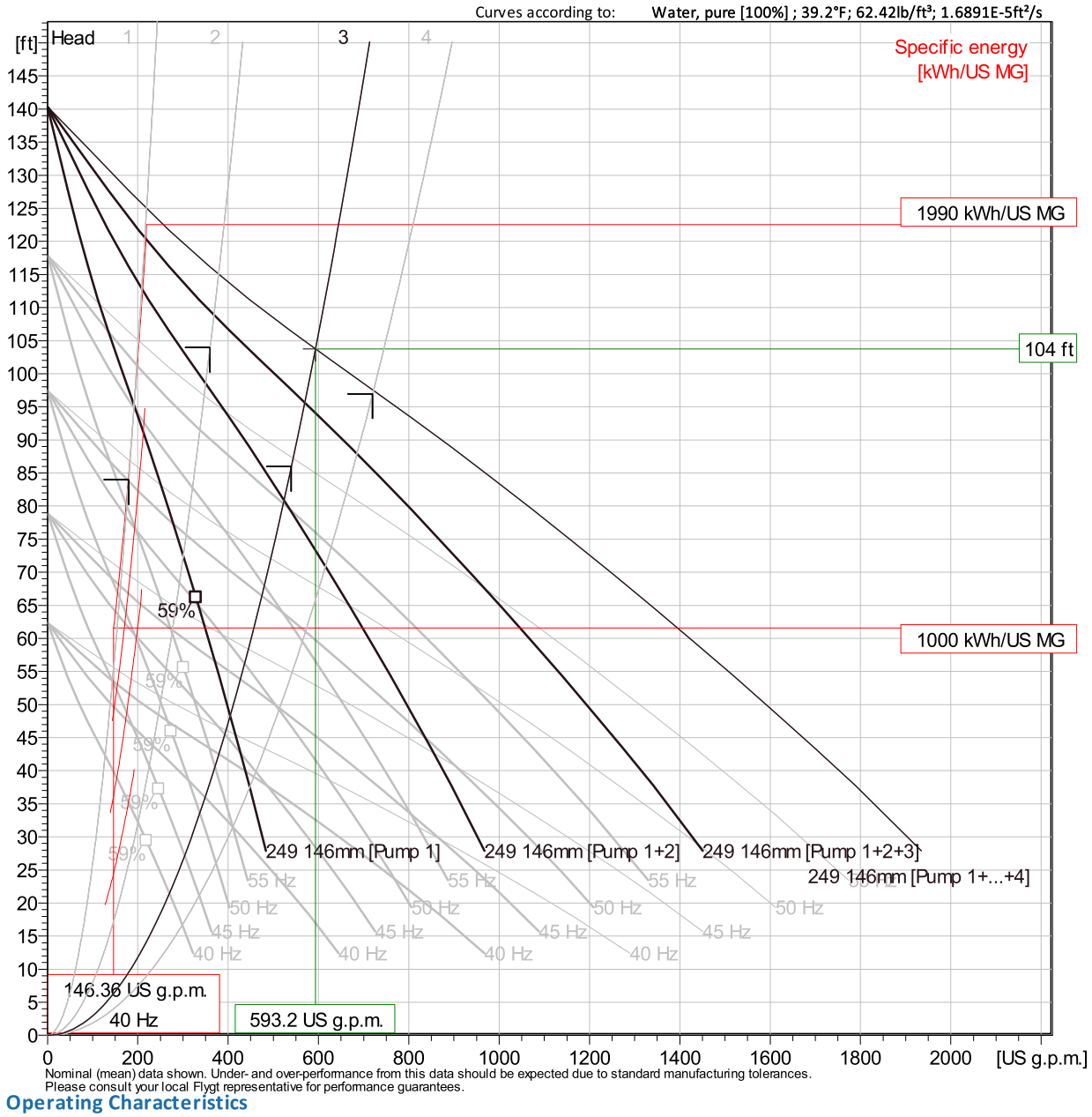
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3 / 1	50 Hz	59.9	83.7	4.64	180	83.7	13.9	27.3 %	1100	16.5
3 / 1	45 Hz	53.9	67.8	3.39	162	67.8	10.2	27.3 %	920	14
3 / 1	40 Hz	47.9	53.6	2.38	144	53.6	7.13	27.3 %	772	11.6
2 / 1	60 Hz	104	113	8.3	209	113	16.6	35.9 %	1100	21.2

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



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Please consult your local Flygt representative for performance guarantees.

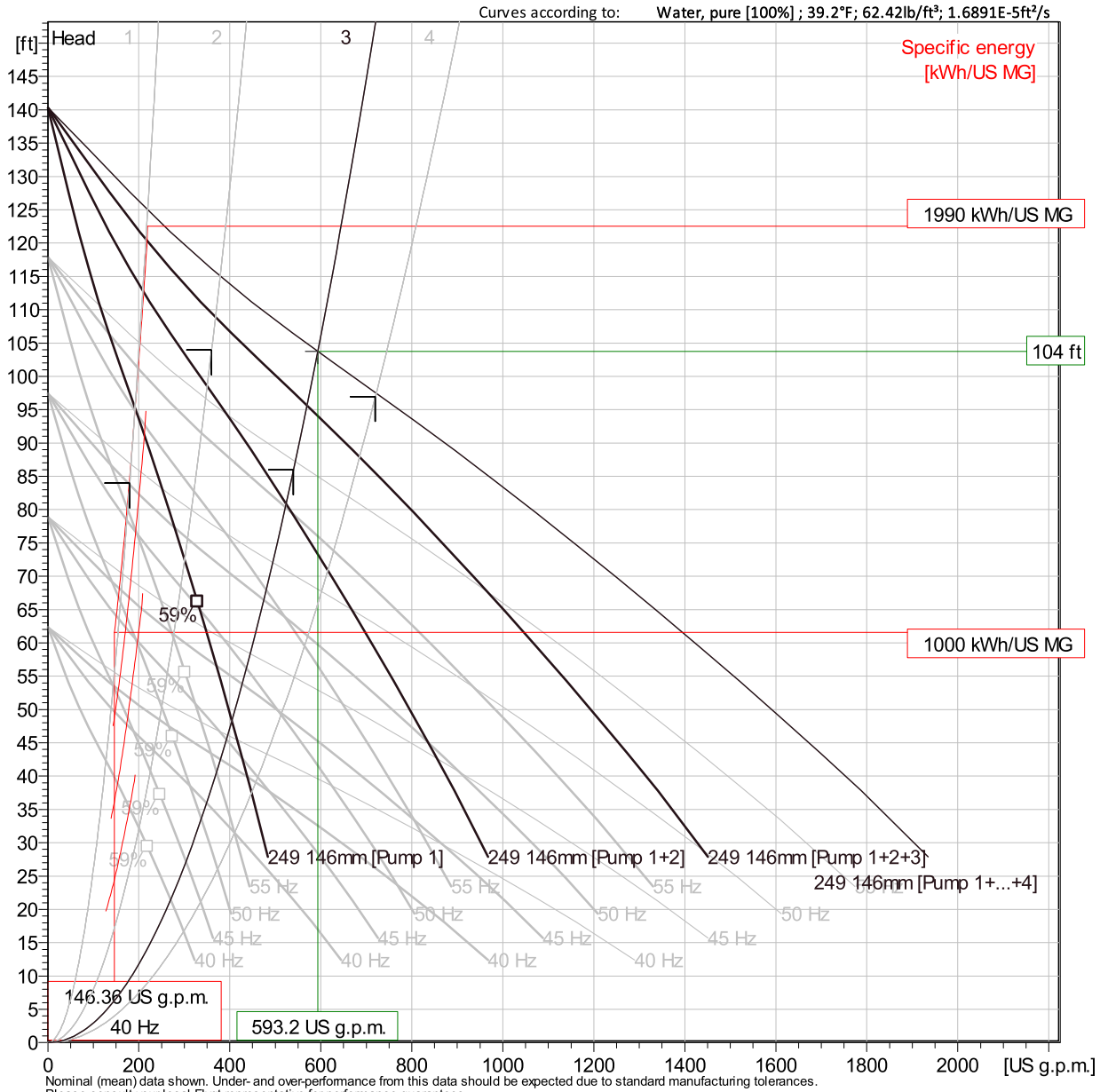
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 1	55 Hz	95.6	94.8	6.39	191	94.8	12.8	35.9 %	925	18.5
2 / 1	50 Hz	86.9	78.4	4.8	174	78.4	9.6	35.9 %	780	15.9
2 / 1	45 Hz	78.2	63.5	3.5	156	63.5	7	35.9 %	652	13.4
2 / 1	40 Hz	69.5	50.2	2.46	139	50.2	4.92	35.9 %	547	11.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

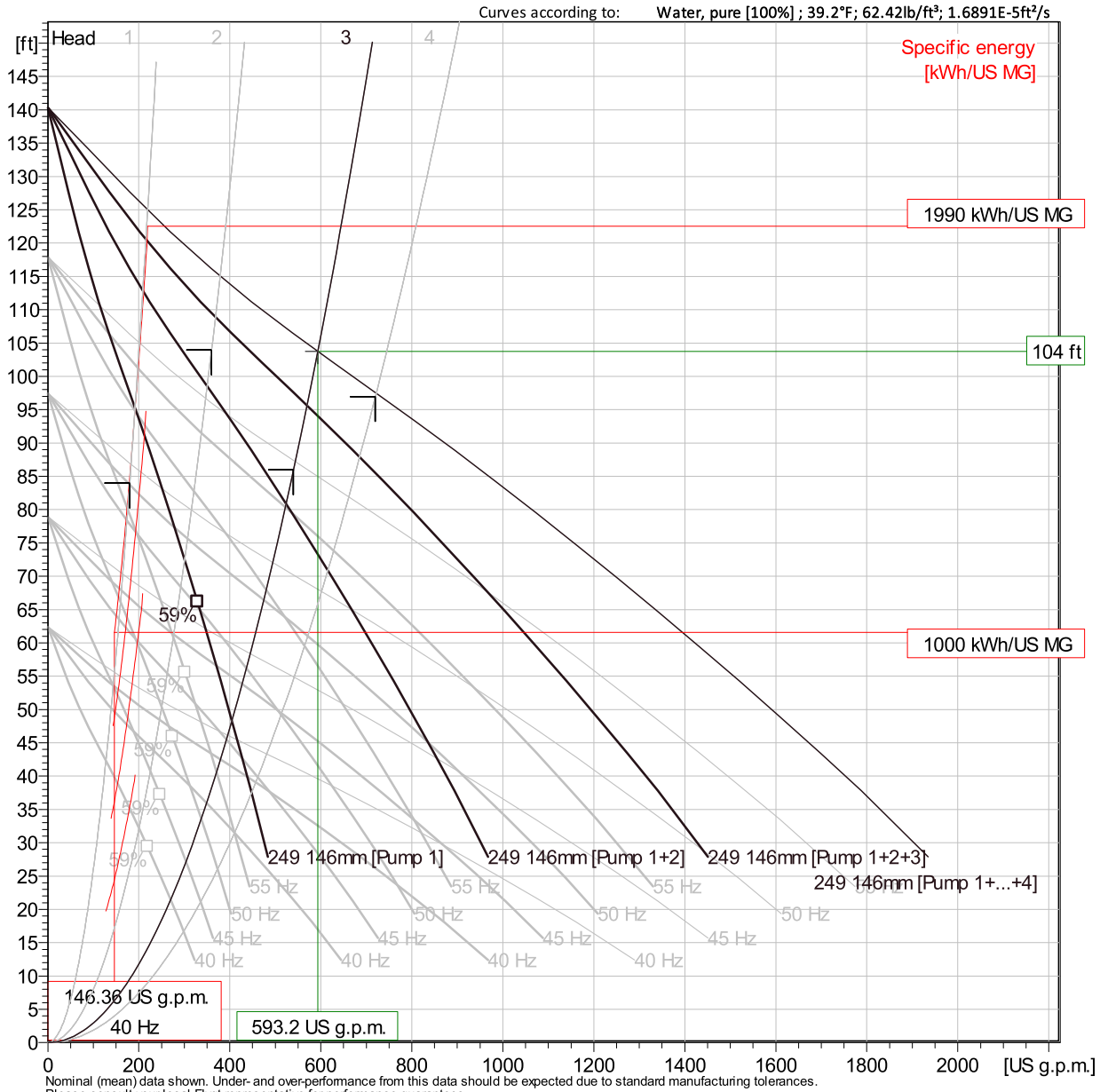
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 1	60 Hz	192	95.3	9.13	192	95.3	9.13	50.6 %	652	19.2
1 / 1	55 Hz	176	80.1	7.03	176	80.1	7.03	50.6 %	551	16.7
1 / 1	50 Hz	160	66.2	5.28	160	66.2	5.28	50.6 %	464	14.3
1 / 1	45 Hz	144	53.6	3.85	144	53.6	3.85	50.6 %	386	12.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

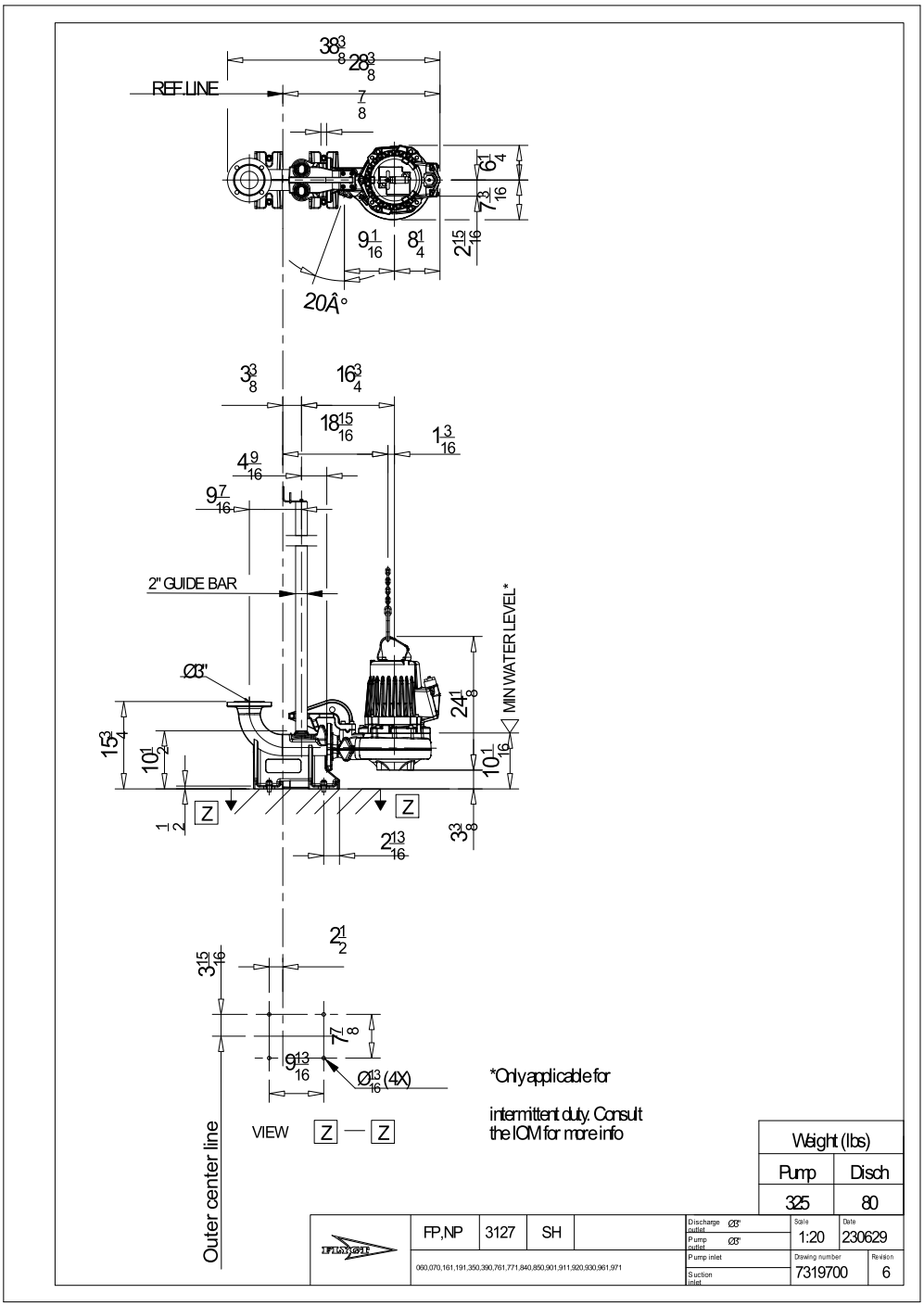
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 1	40 Hz	128	42.3	2.71	128	42.3	2.71	50.6 %	321	10

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Dimensional drawing



Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

APPENDIX A – LS-1 Pump Selection Options

Option 6 – Flygt NP3102/NP3127 (4+1 configuration) and Dual 6” Force Mains

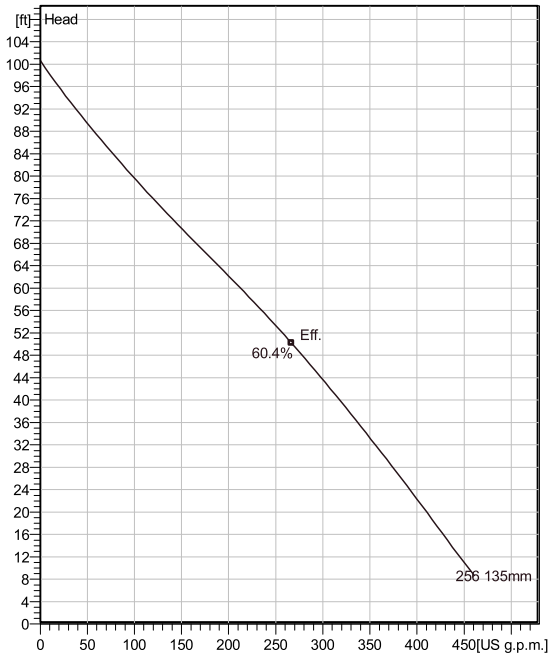
NP 3102 SH 3~ Adaptive 256

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.

Technical specification



Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6899E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N3102.760 18-10-2AL-W 6.5hp

Installation type
P - Semi permanent, Wet

Impeller diameter
135 mm

Discharge diameter
3 inch

Pump information

Impeller diameter
135 mm

Discharge diameter
3 inch

Inlet diameter
100 mm

Maximum operating speed
3440 rpm

Number of blades
2

Max. fluid temperature
40 °C

Material

Impeller
Stainless steel

Stator housing material
Grey cast iron

Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON		
Block		**Created on**	8/29/2024	**Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

Technical specification

Motor - General

Motor number N3102.760 18-10-2AL-W 6.5hp	**Phases** 3~	**Rated speed** 3440 rpm	**Rated power** 6.5 hp
ATEX approved No	**Number of poles** 2	**Rated current** 8.2 A	**Stator variant** 12
Frequency 60 Hz	**Rated voltage** 460 V	**Insulation class** H	**Type of Duty** S1
Version code 760			

Motor - Technical

Power factor - 1/1 Load 0.94	**Motor efficiency - 1/1 Load** 78.9 %	**Total moment of inertia** 0.349 lb ft²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.94	**Motor efficiency - 3/4 Load** 80.5 %	**Starting current, direct starting** 56 A	
Power factor - 1/2 Load 0.91	**Motor efficiency - 1/2 Load** 79.6 %	**Starting current, star-delta** 18.7 A	

Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON		
Block		**Created on**	8/29/2024	**Last update**	8/29/2024

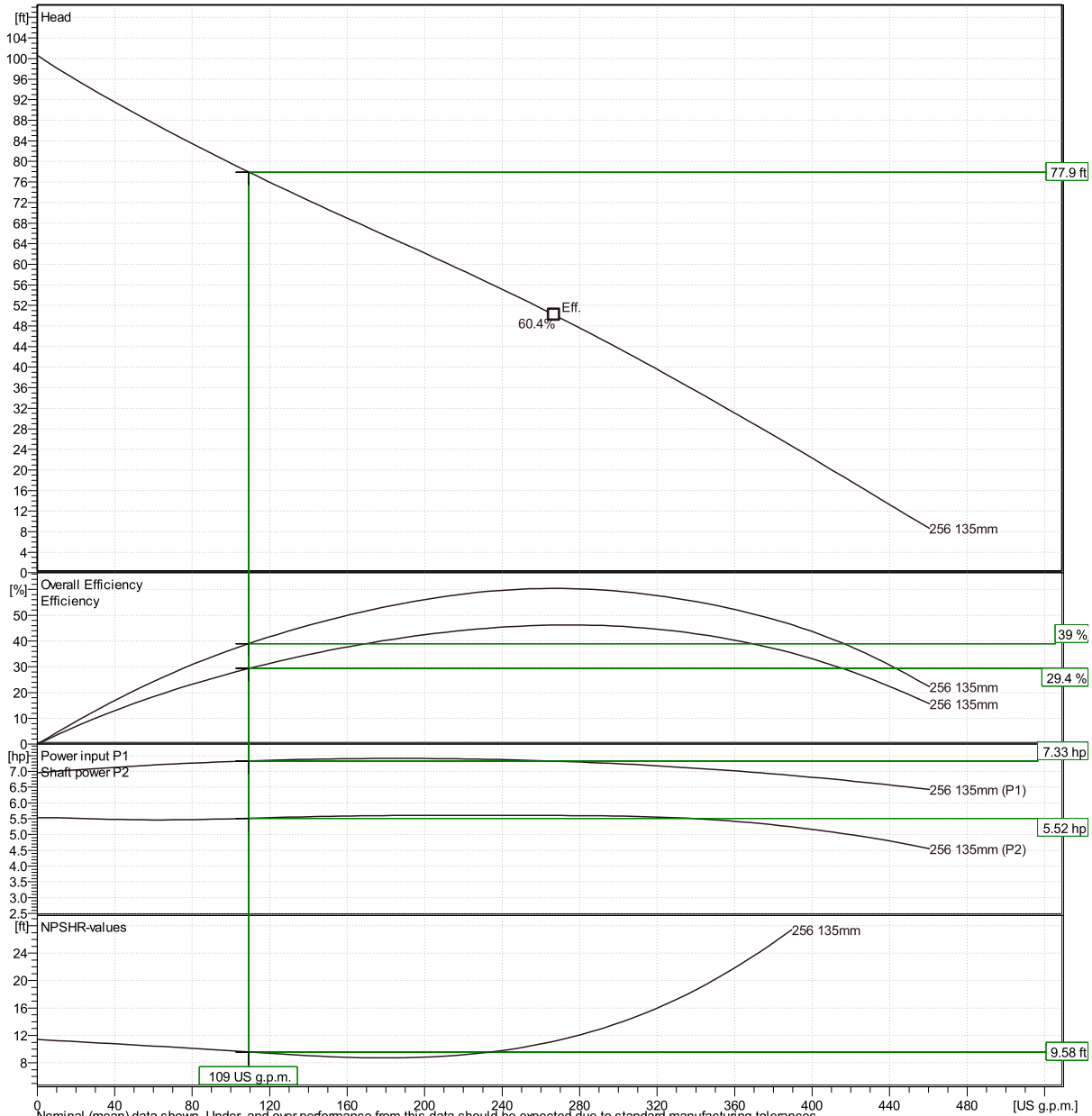
NP 3102 SH 3~ Adaptive 256

Performance curve

Duty point

Flow	Head
109 US g.p.m.	77.9 ft

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6899E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

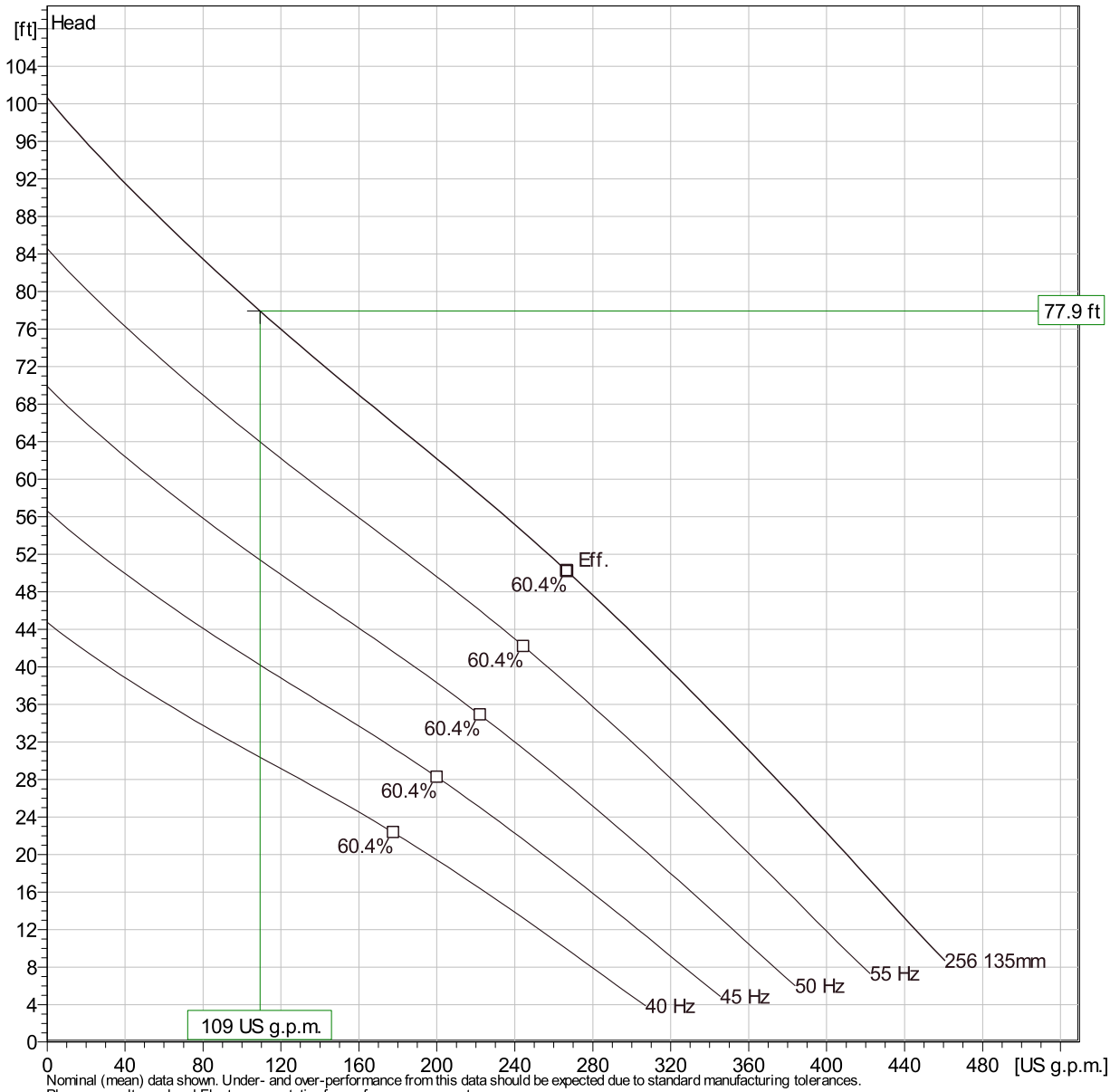
Curve: ISO 9906

Xylect-20536985		WYNNETH REQUIERON	
	Created on	8/29/2024 **Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.69E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

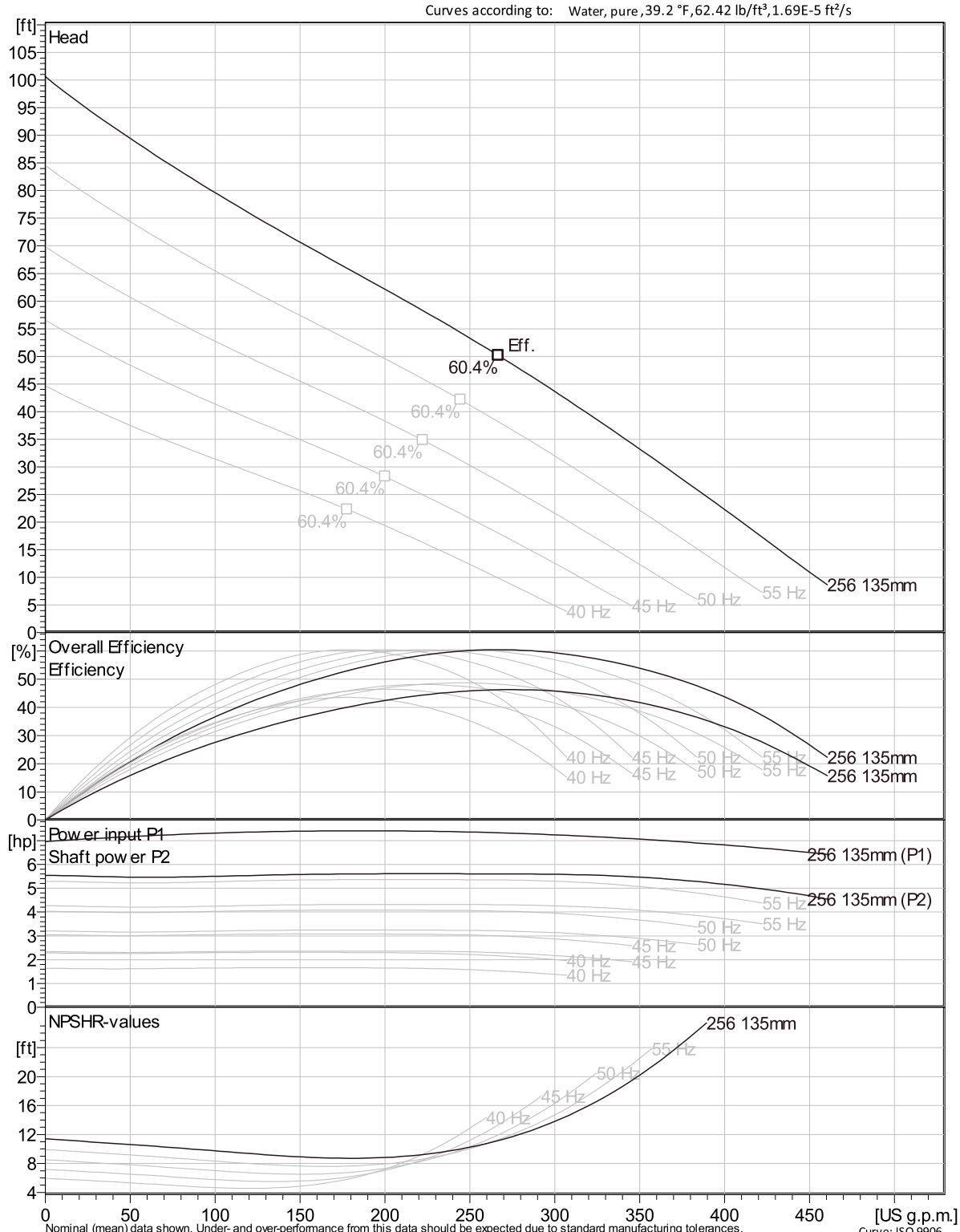
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1	109	77.9	5.52	109	77.9	5.52	39 %	834	9.58

Project		**Created by**	WYNNETH REQUIERON		
Block	Xylect-20536985	**Created on**	8/29/2024	**Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

VFD Curve

Curves according to: Water, pure ,39.2 °F,62.42 lb/ft³,1.69E-5 ft²/s



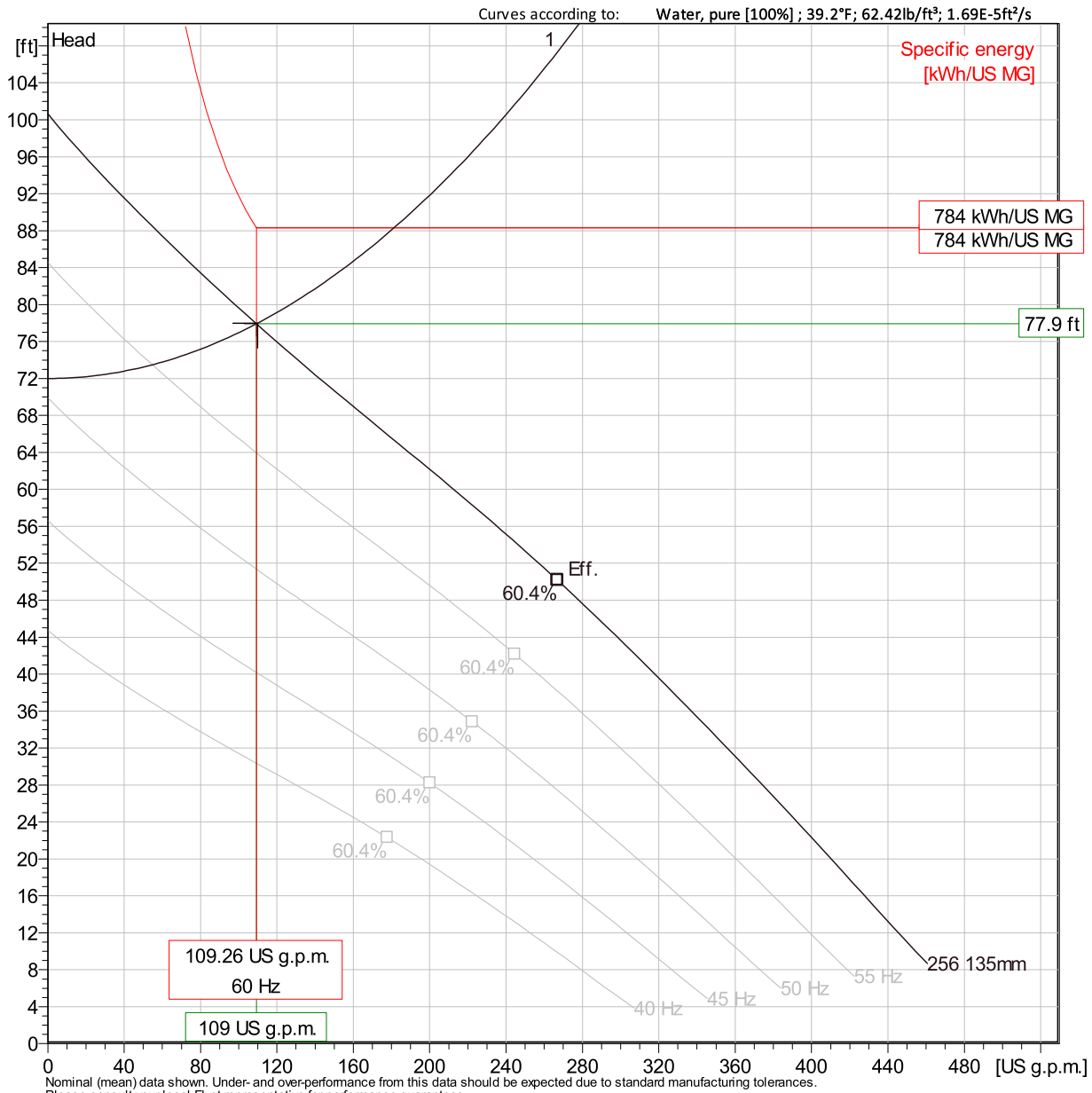
Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Curve: ISO 9906

Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON		
Block		**Created on**	8/29/2024	**Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

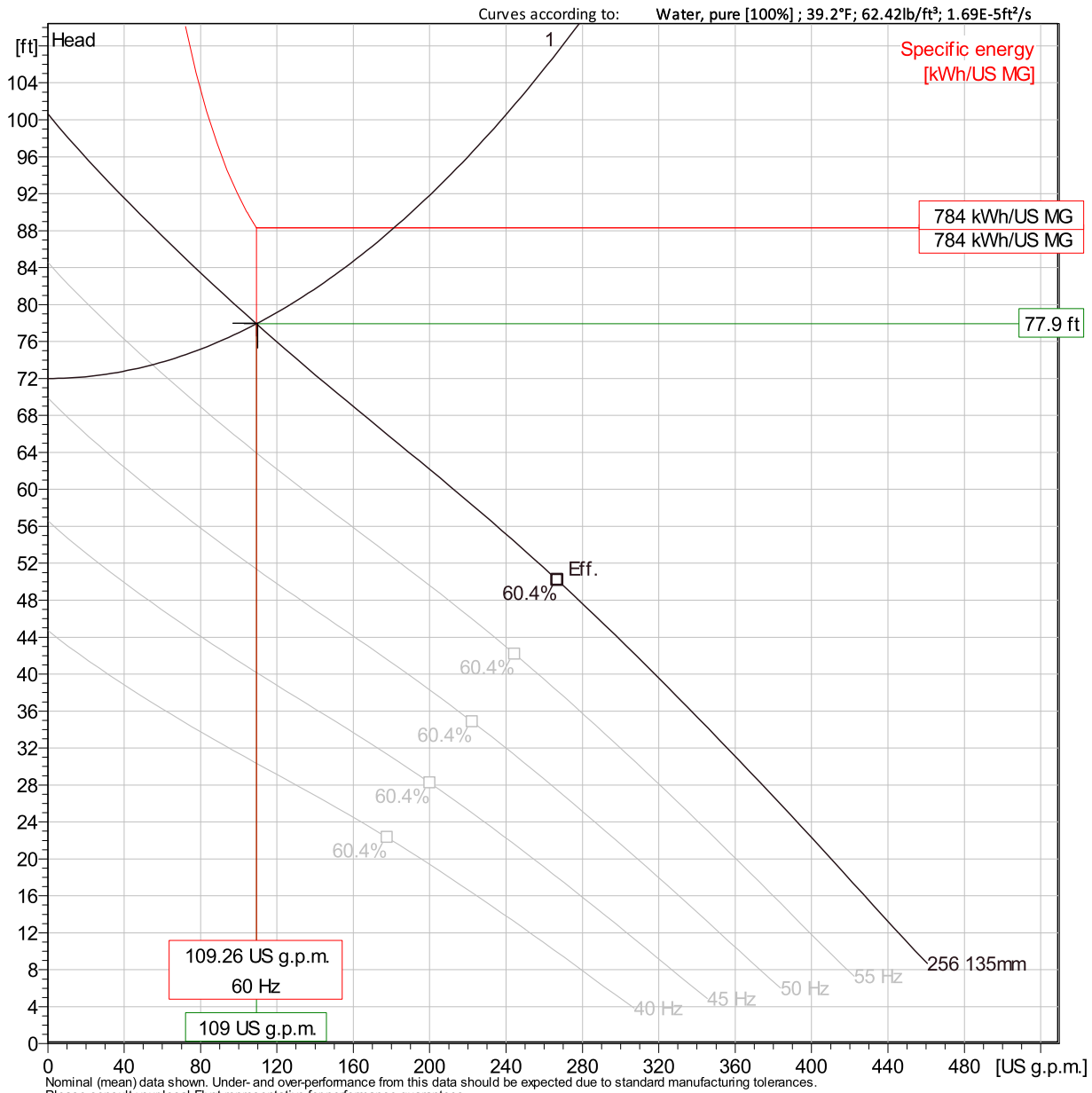
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1	60 Hz	109	77.9	5.52	109	77.9	5.52	39 %	834	9.58
1	55 Hz	54.8	73.5	4.21	54.8	73.5	4.21	24.2 %	1190	9.1
1	50 Hz									
1	45 Hz									

Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON		
Block		**Created on**	8/29/2024	**Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

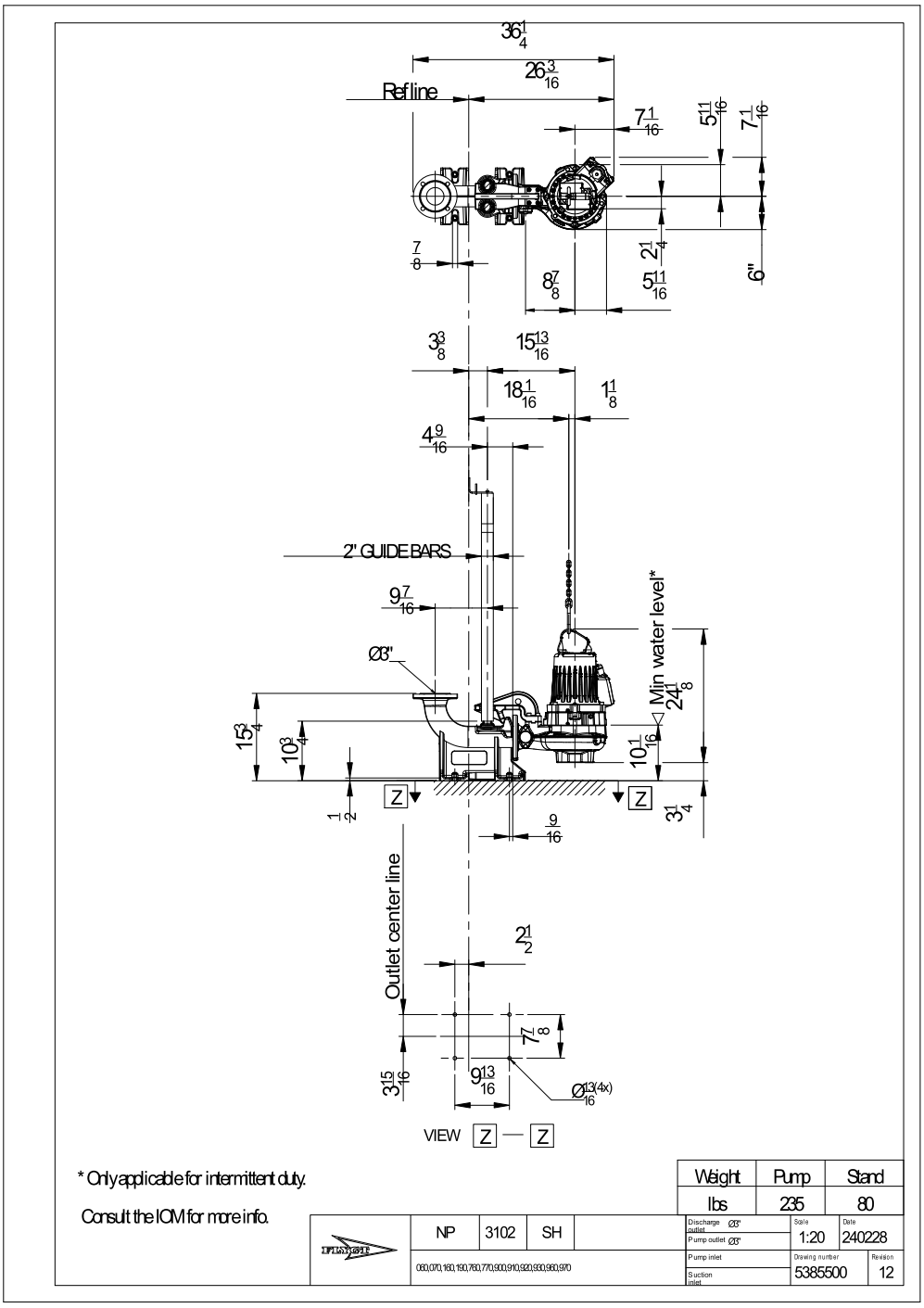
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1	40 Hz									

Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON		
Block		**Created on**	8/29/2024	**Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

Dimensional drawing



Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON
Block		**Created on**	8/29/2024 **Last update** 8/29/2024

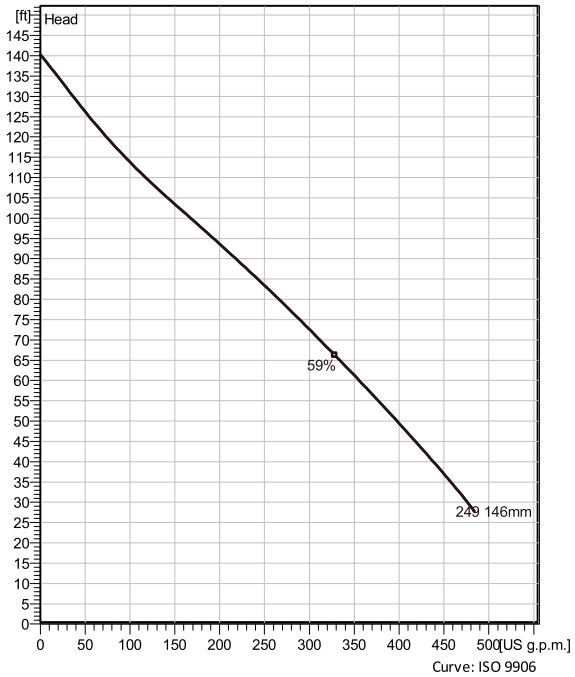
NP 3127 SH 3~ Adaptive 249

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.

Technical specification



Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N3127.930 21-11-2AS-W IE3 12hp

Installation type
P - Semi permanent, Wet

Impeller diameter
146 mm

Discharge diameter
3 inch

Pump information

Impeller diameter
146 mm

Discharge diameter
3 inch

Inlet diameter
90 mm

Maximum operating speed
3600 rpm

Number of blades
2

Max. fluid temperature
40 °C

Material

Impeller
Hard-Iron ™

Stator housing material
Grey cast iron

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Technical specification

Motor - General

Motor number N3127.930 21-11-2AS-W IE3 12hp	**Phases** 3~	**Rated speed** 3600 rpm	**Rated power** 12 hp
ATEX approved FM	**Number of poles** 2	**Rated current** 14 A	**Stator variant** 60
Frequency 60 Hz	**Rated voltage** 460 V	**Insulation class** H	**Type of Duty** S1
Version code 930			

Motor - Technical

Power factor - 1/1 Load 0.91	**Motor efficiency - 1/1 Load** 91.4 %	**Total moment of inertia** 0.482 lb ft²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.90	**Motor efficiency - 3/4 Load** 91.2 %	**Starting current, direct starting** 120 A	
Power factor - 1/2 Load 0.86	**Motor efficiency - 1/2 Load** 89.3 %	**Starting current, star-delta** 40 A	

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

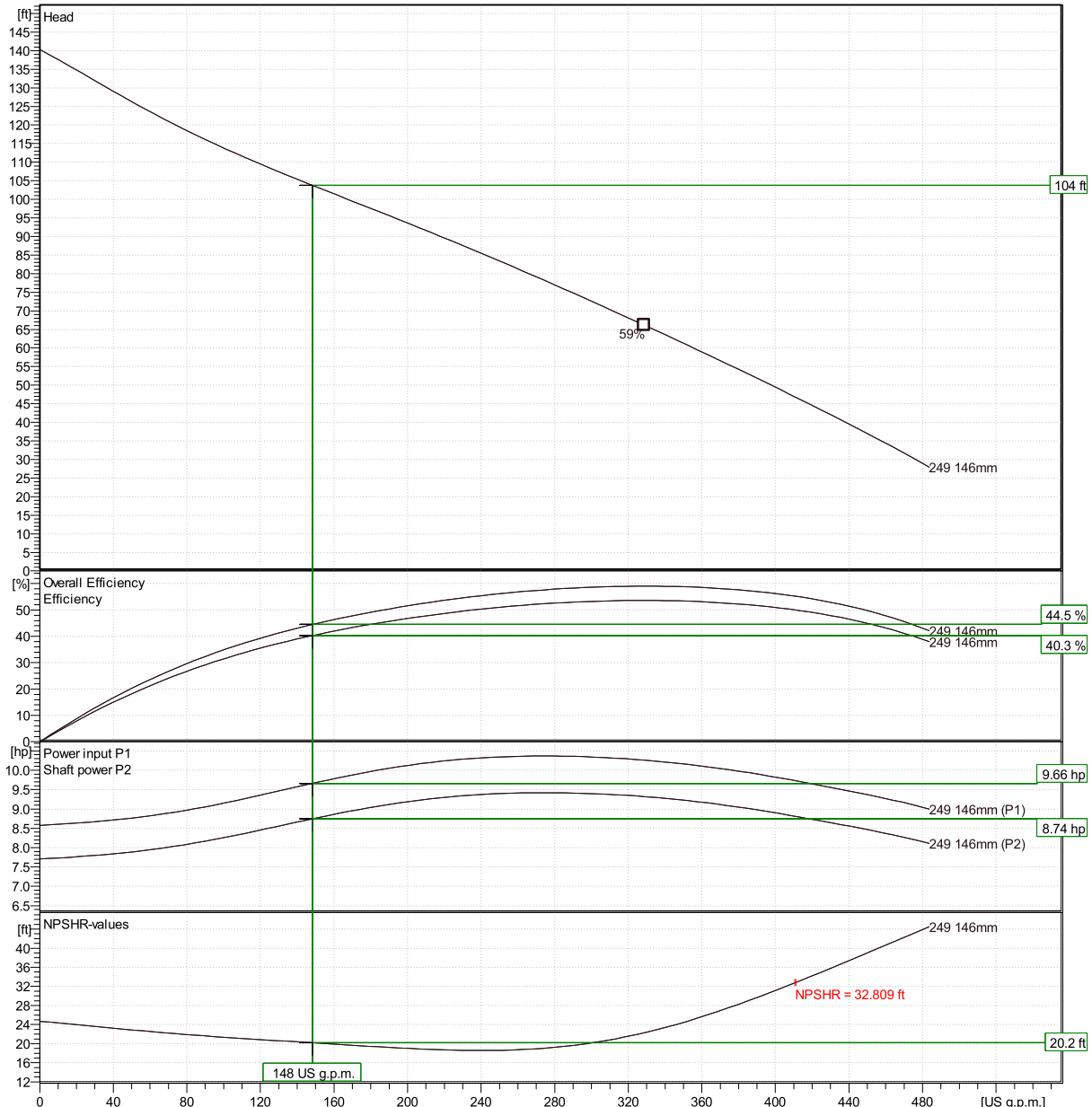
NP 3127 SH 3~ Adaptive 249

Performance curve

Duty point

Flow	Head
148 US g.p.m.	104 ft

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

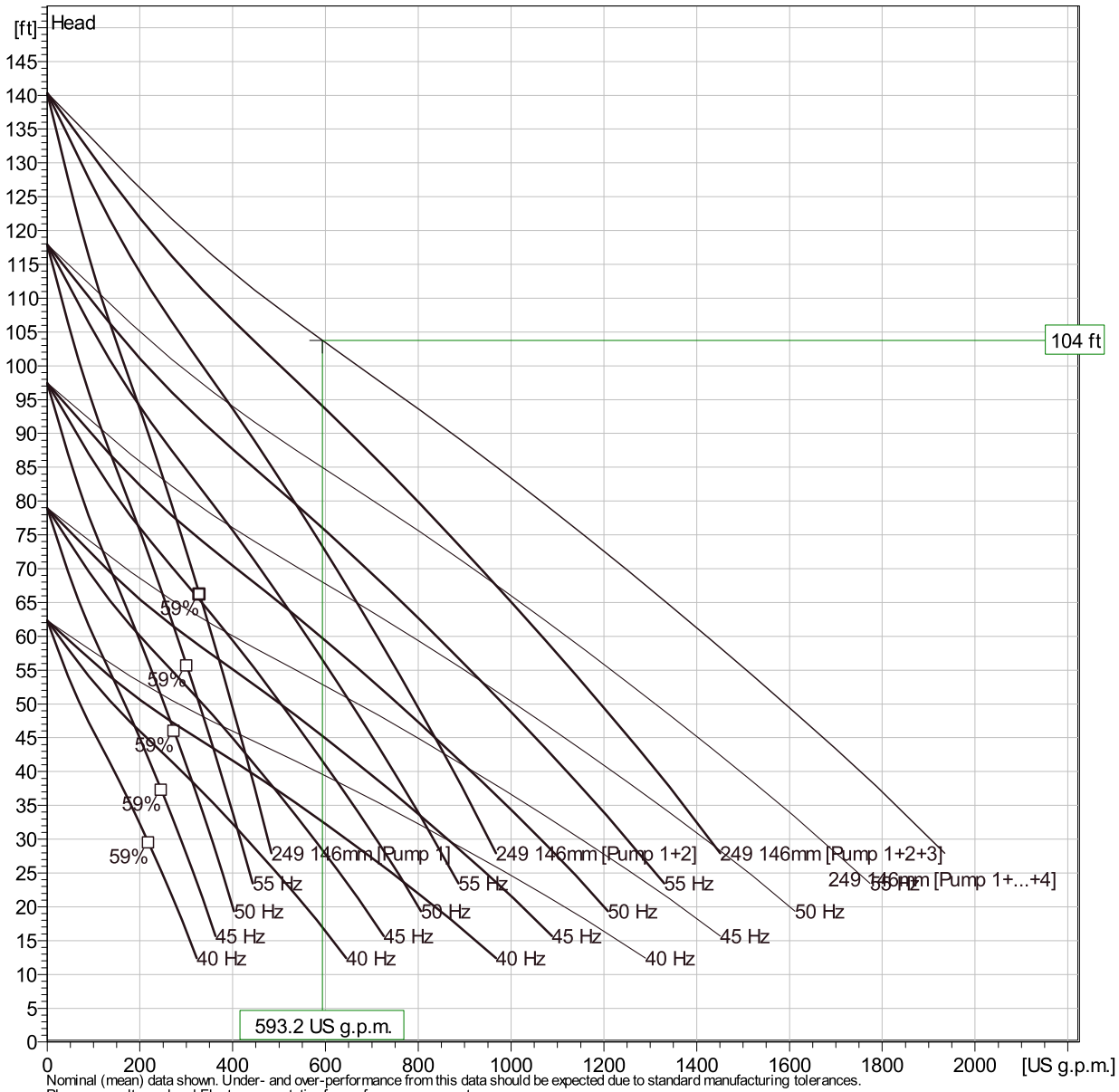
Curve: ISO 9906

Xylect-20524157		Alan Dahlqvist	
	Created on	8/28/2024 **Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

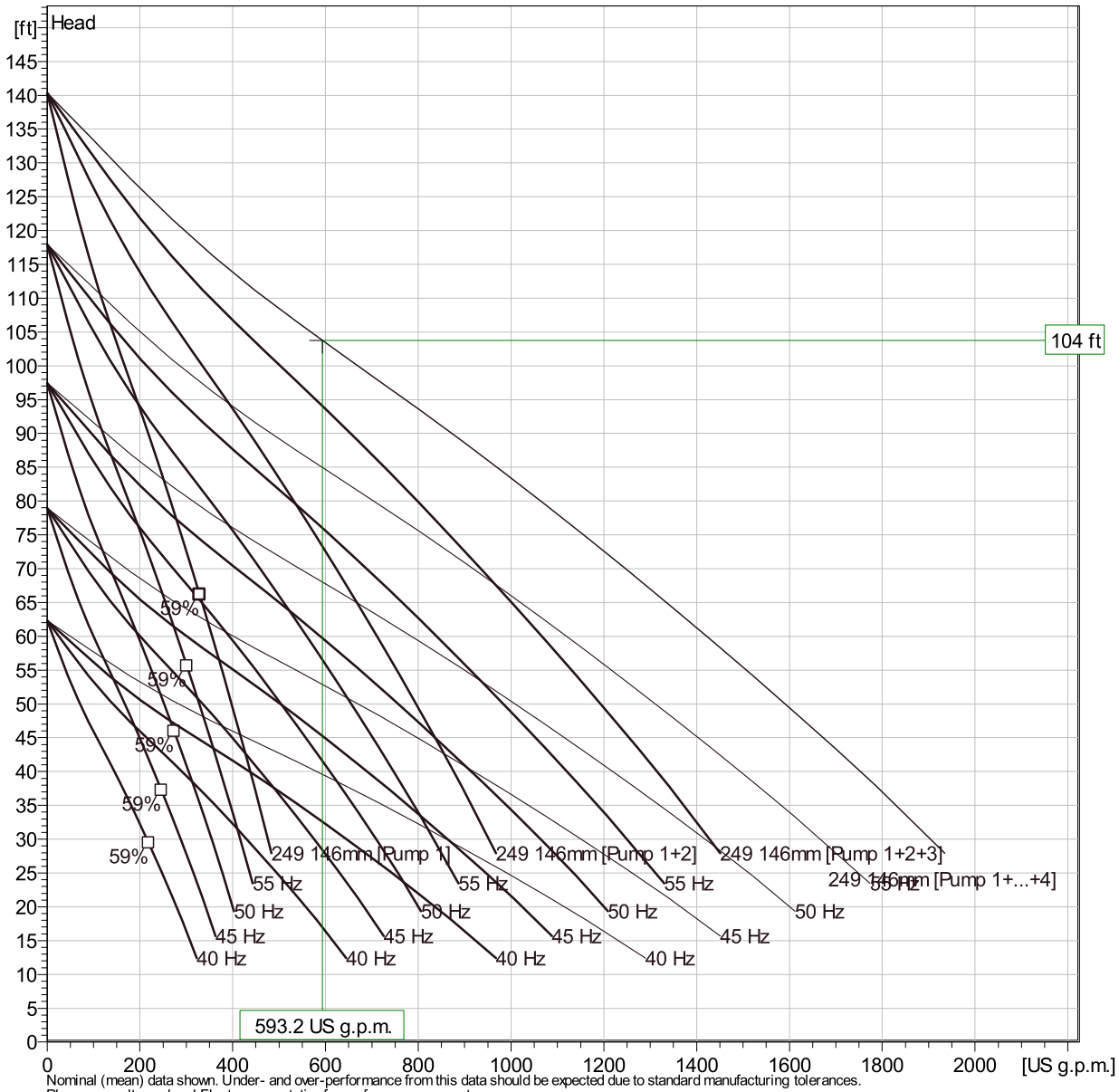
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 3	405	48.3	8.86	405	48.3	8.86	55.8 %	300	31.8
4 / 2	94.7	115	8.21	379	115	32.8	33.6 %	1190	21.5
3 / 2	123	109	8.48	368	109	25.4	39.9 %	950	20.8

Project		**Created by**	Alan Dahlqvist		
Block	Xylect-20524157	**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

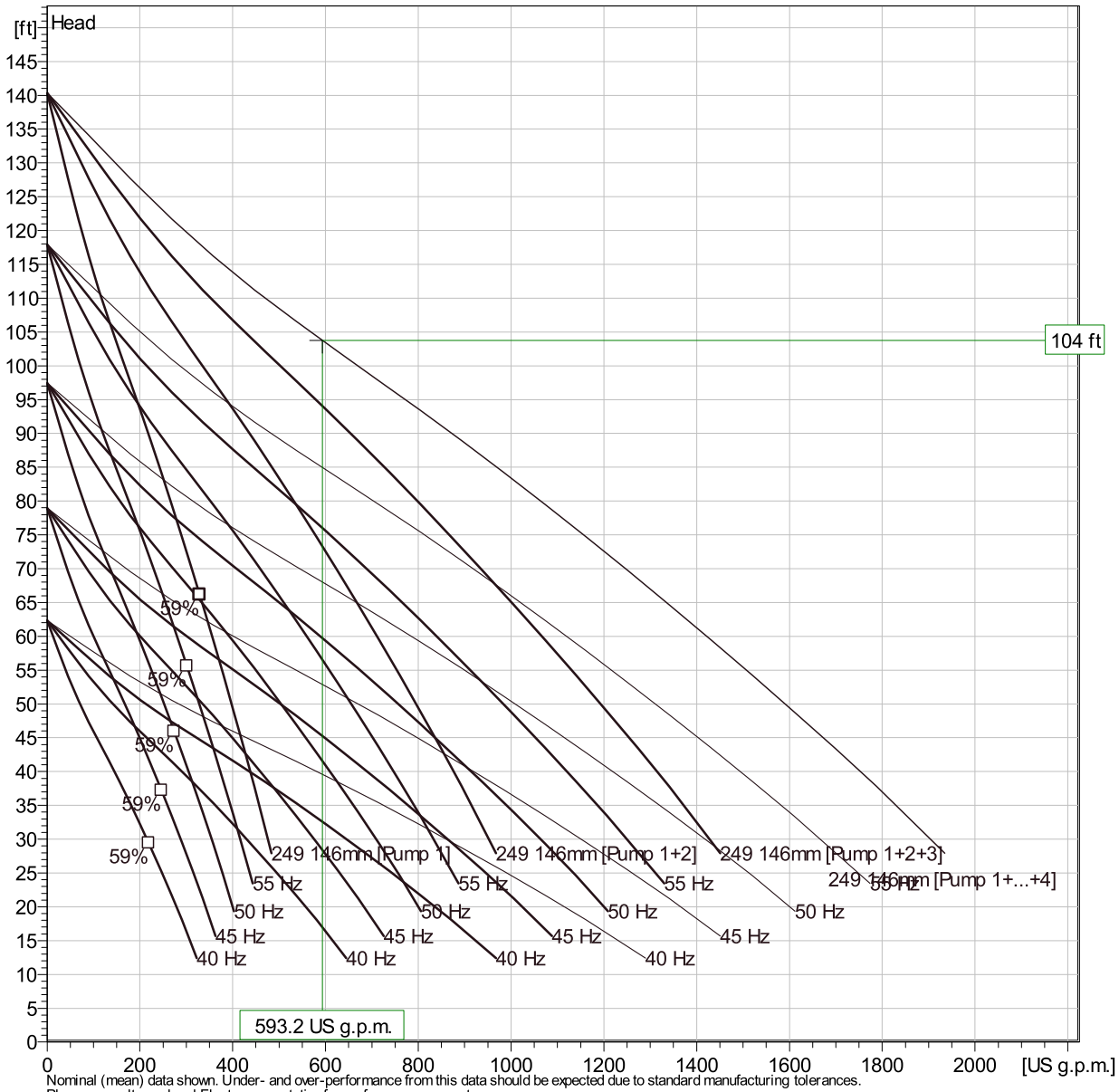
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 2	175	98.5	9	350	98.5	18	48.5 %	704	19.5
1 / 2	301	72.5	9.4	301	72.5	9.4	58.6 %	428	20.2
4 / 1	54.9	125	7.92	220	125	31.7	21.9 %	1990	22.7

Project		**Created by**	Alan Dahlqvist		
Block	Xylect-20524157	**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3 / 1	71.9	121	8.02	216	121	24.1	27.3 %	1540	22.2
2 / 1	104	113	8.3	209	113	16.6	35.9 %	1100	21.2
1 / 1	192	95.3	9.13	192	95.3	9.13	50.6 %	652	19.2

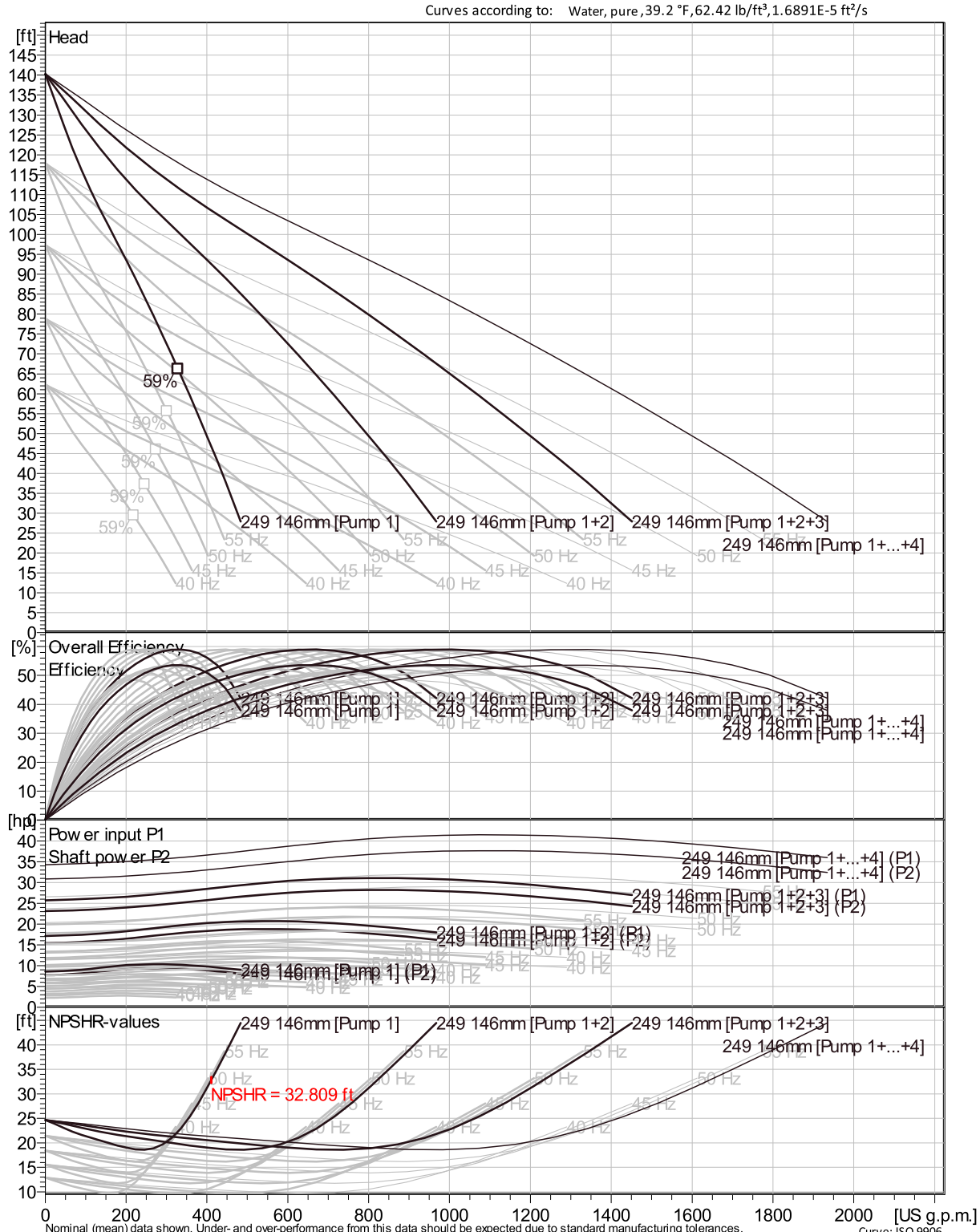
Project		**Created by**	Alan Dahlqvist		
Block	Xylect-20524157	**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Curve

FLYGT a xylem brand

Curves according to: Water, pure ,39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



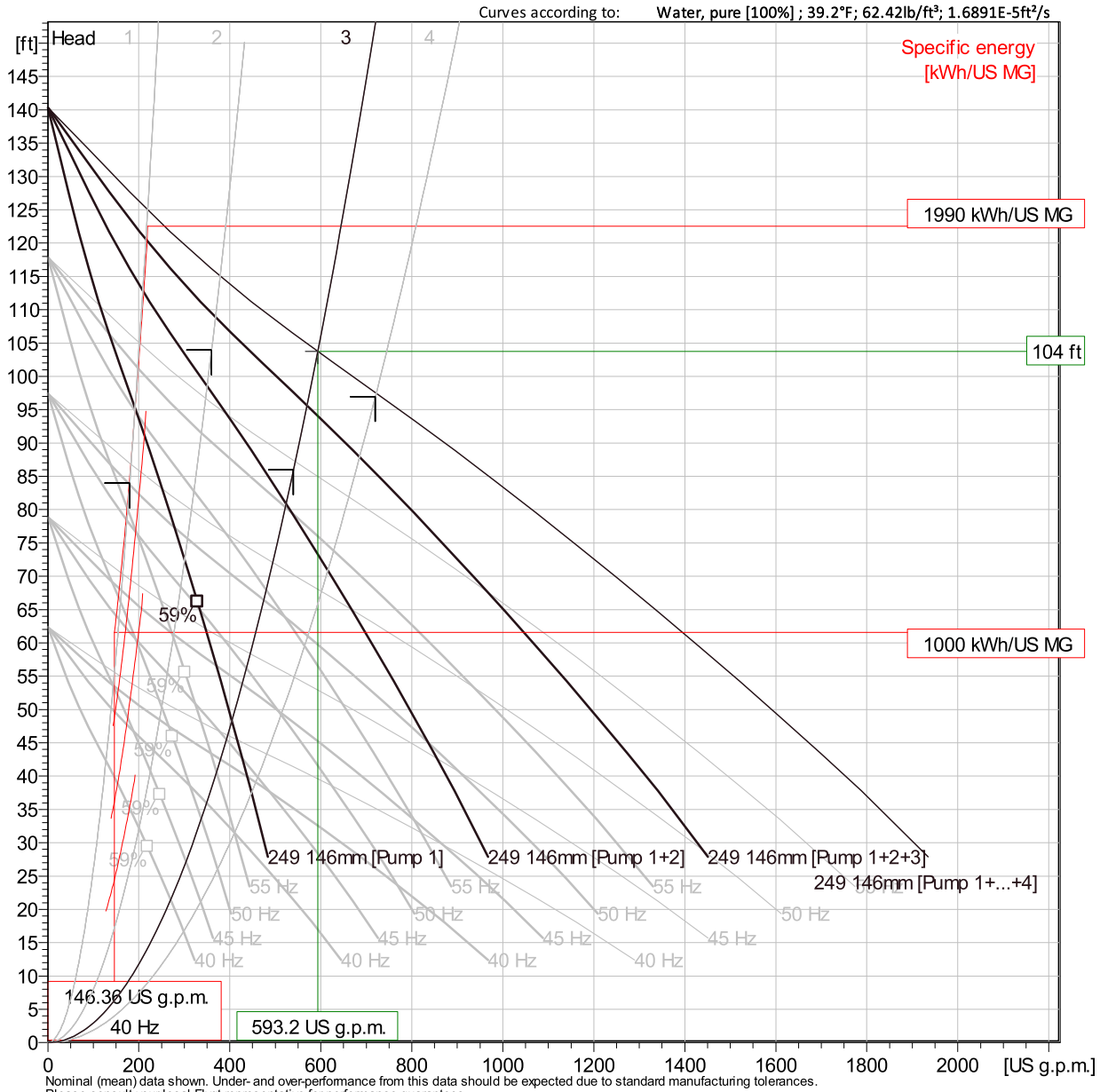
Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Curve: ISO 9906

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

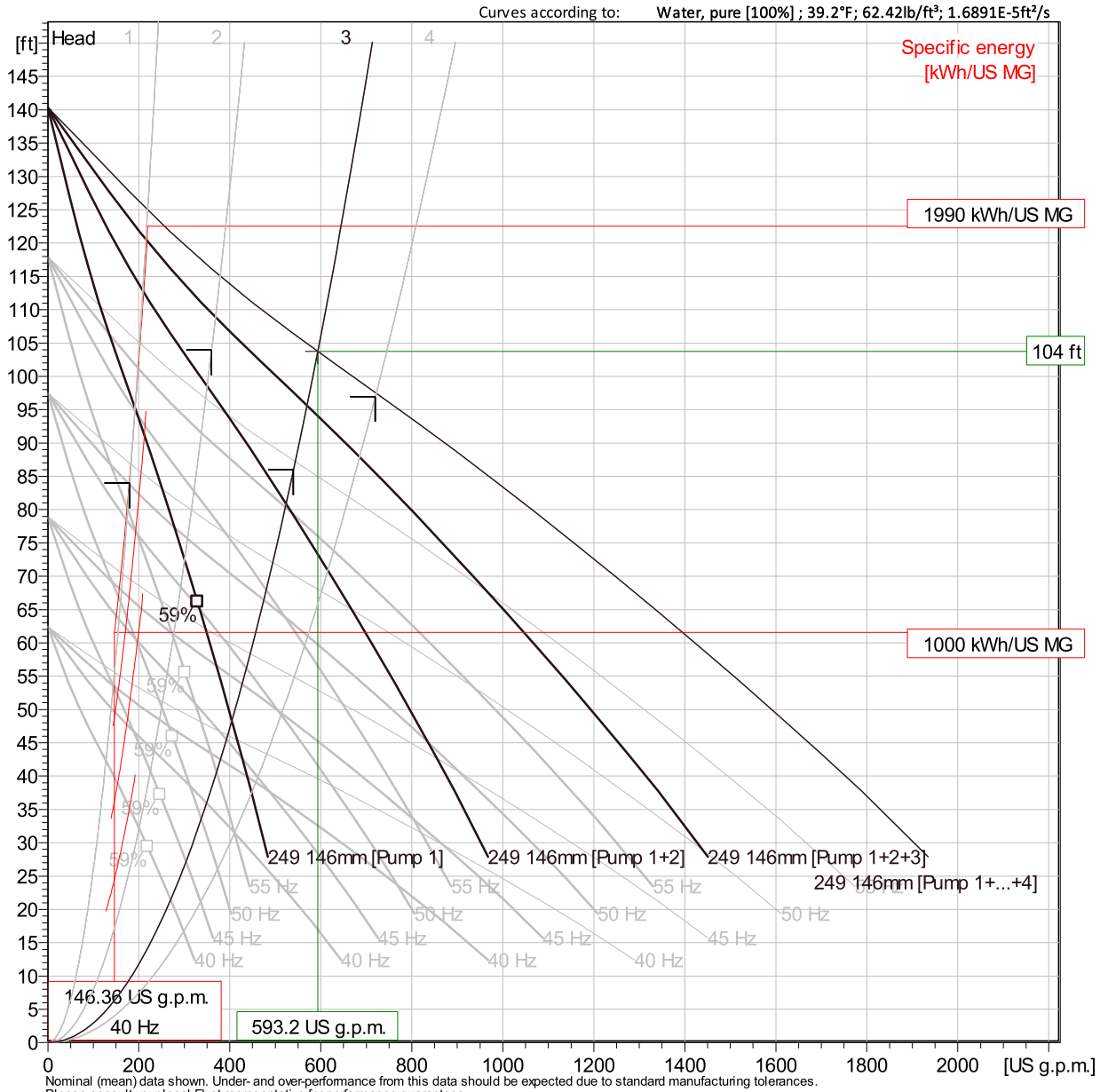
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 3	60 Hz	405	48.3	8.86	405	48.3	8.86	55.8 %	300	31.8
1 / 3	55 Hz	371	40.6	6.82	371	40.6	6.82	55.8 %	254	27.7
1 / 3	50 Hz	337	33.5	5.13	337.2623792502	33.5	5.13	55.8 %	214	23.8
1 / 3	45 Hz	304	27.2	3.74	304	27.2	3.74	55.8 %	178	20.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

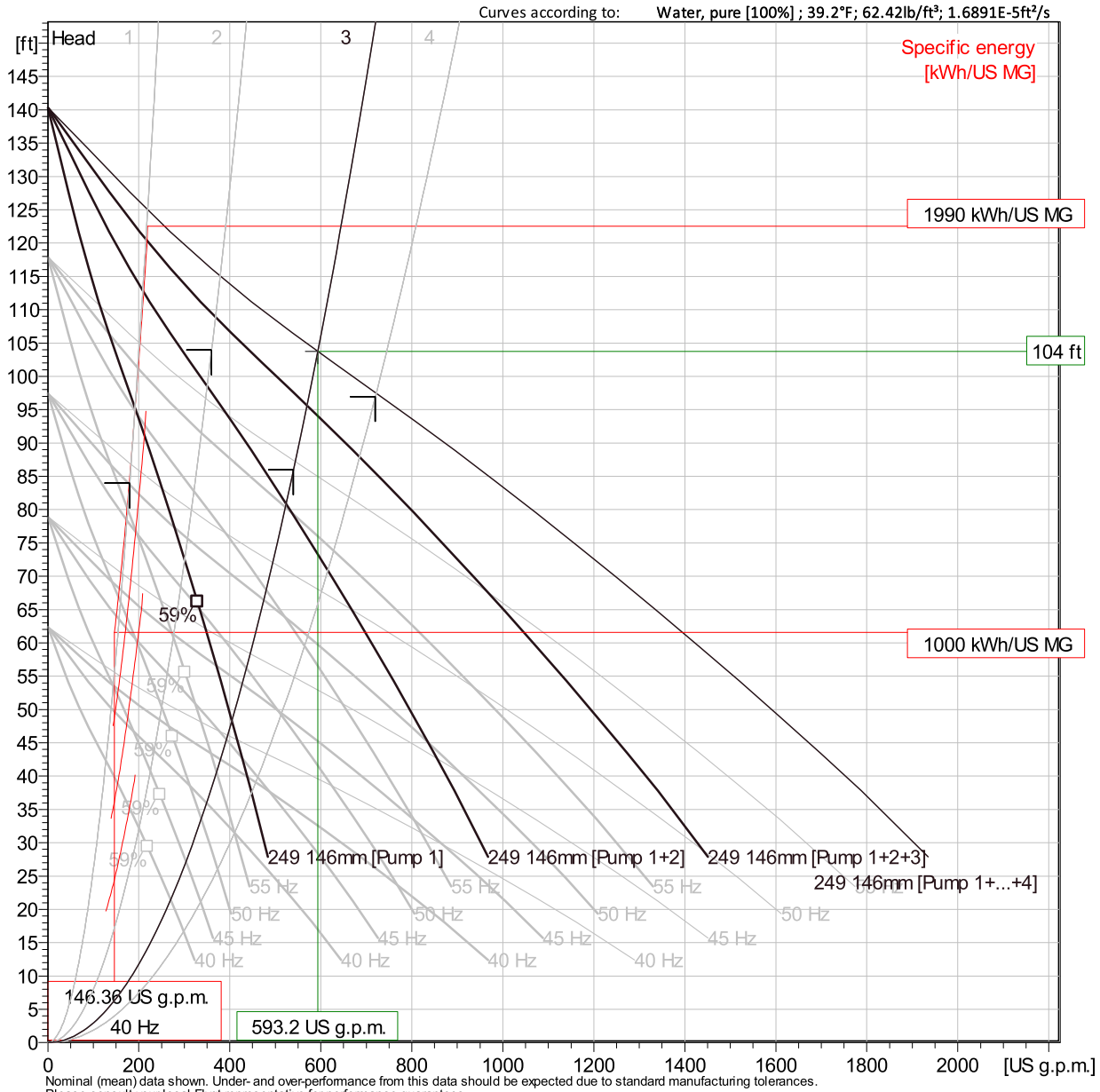
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 3	40 Hz	270	21.5	2.63	270	21.5	2.63	55.8 %	149	16.6
4 / 2	60 Hz	94.7	115	8.21	379	115	32.8	33.6 %	1190	21.5
4 / 2	55 Hz	86.8	96.7	6.32	347	96.7	25.3	33.6 %	1010	18.7
4 / 2	50 Hz	78.9	79.9	4.75	316	79.9	19	33.6 %	851	16.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

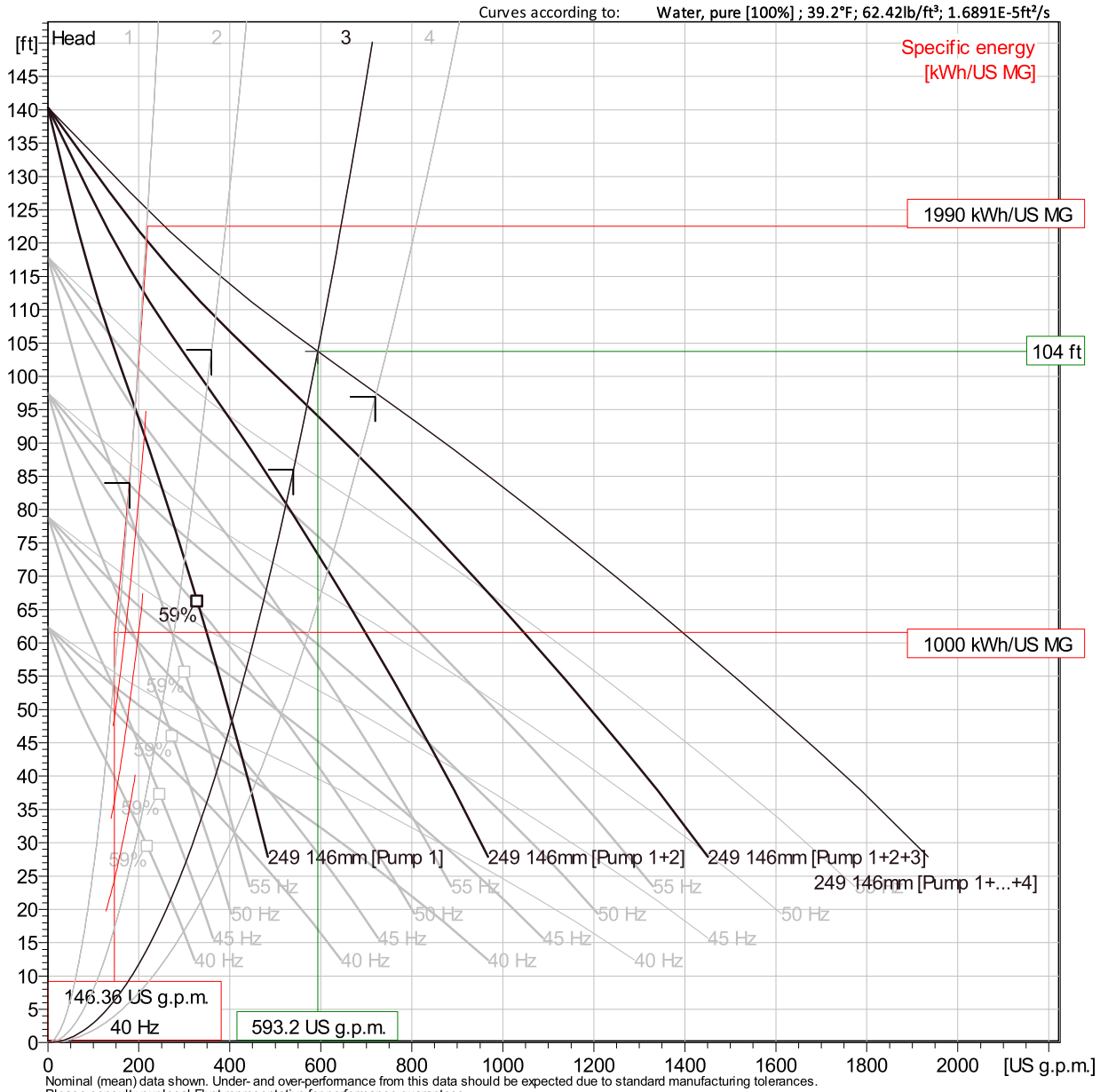
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
4 / 2	45 Hz	71	64.7	3.46	284	64.7	13.9	33.6 %	712	13.6
4 / 2	40 Hz	63.1	51.1	2.43	252	51.1	9.73	33.6 %	597	11.2
3 / 2	60 Hz	123	109	8.48	368	109	25.4	39.9 %	950	20.8
3 / 2	55 Hz	113	91.5	6.53	338	91.5	19.6	39.9 %	803	18.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

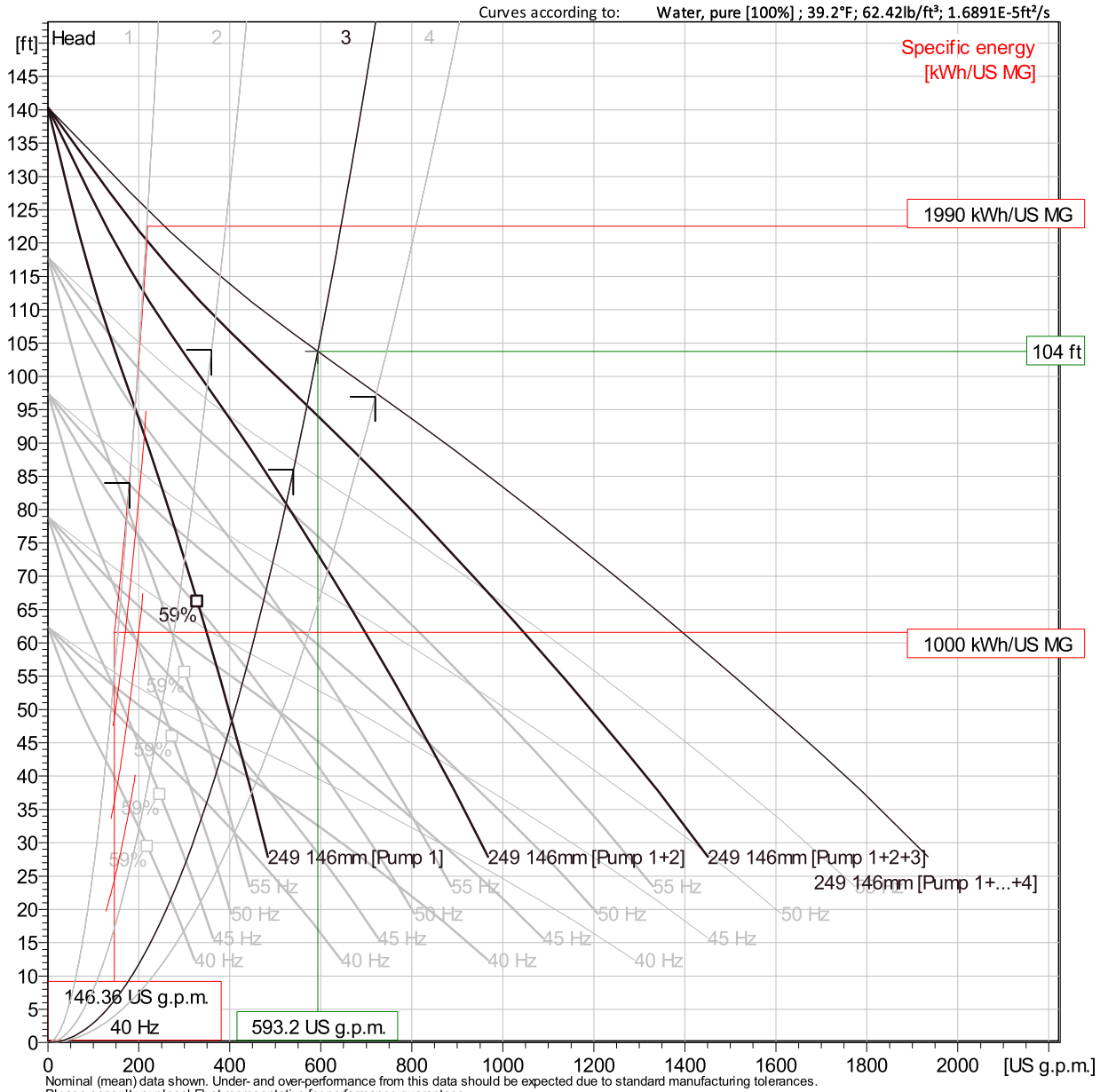
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3 / 2	50 Hz	102	75.6	4.91	307	75.6	14.7	39.9 %	676	15.5
3 / 2	45 Hz	92.1	61.3	3.58	276	61.3	10.7	39.9 %	565	13.1
3 / 2	40 Hz	81.9	48.4 ft	2.51	246	48.4	7.54	39.9 %	473	10.9
2 / 2	60 Hz	175	98.5	9	350	98.5	18	48.5 %	704	19.5

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

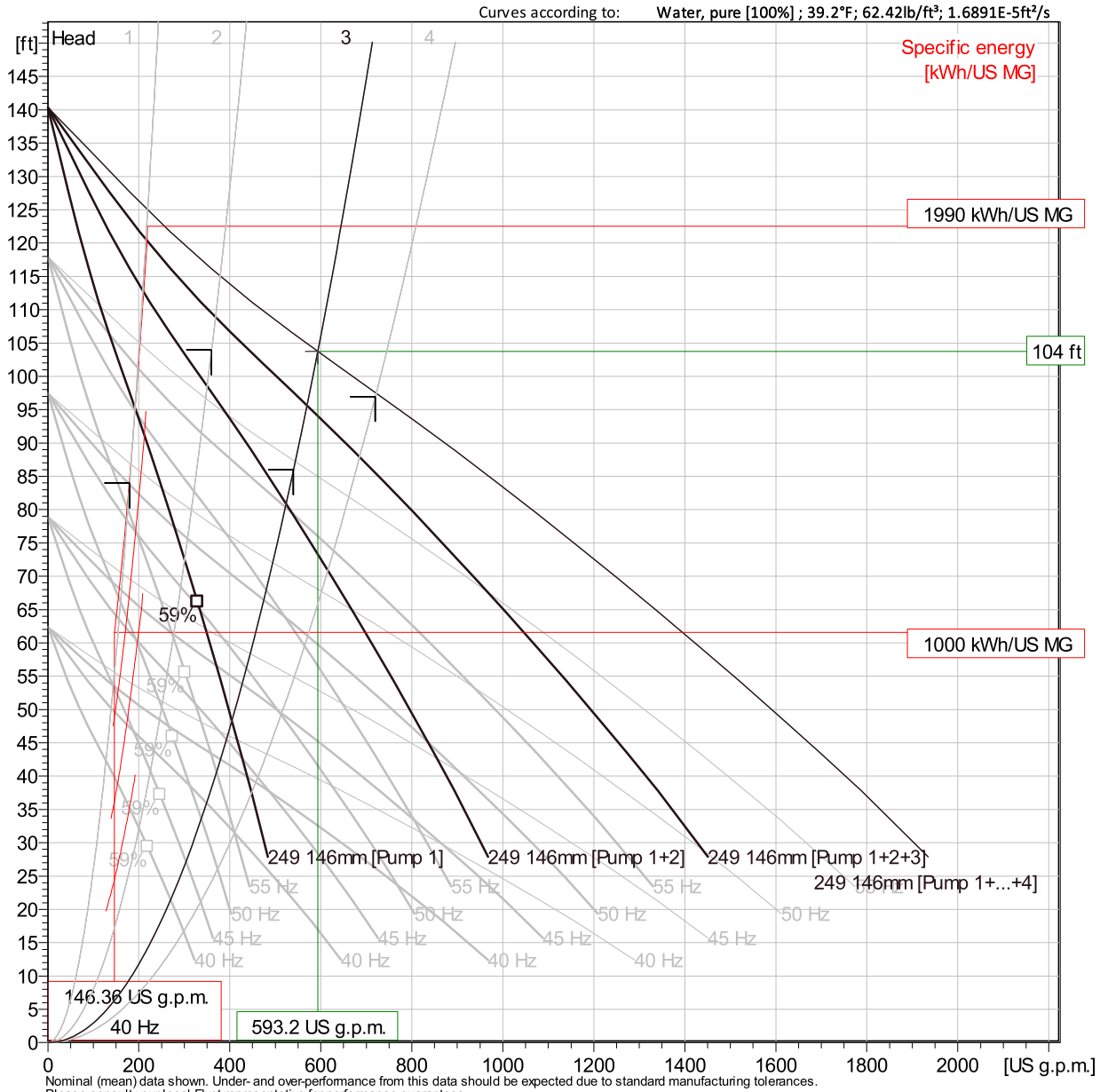
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 2	55 Hz	161	82.8	6.93	321	82.8	13.9	48.5 %	595	17
2 / 2	50 Hz	146	68.4	5.21	292	68.4	10.4	48.5 %	501	14.6
2 / 2	45 Hz	131	55.4	3.8	263	55.4	7.59	48.5 %	417	12.3
2 / 2	40 Hz	117	43.8	2.67	234	43.8	5.33	48.5 %	347	10.2

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

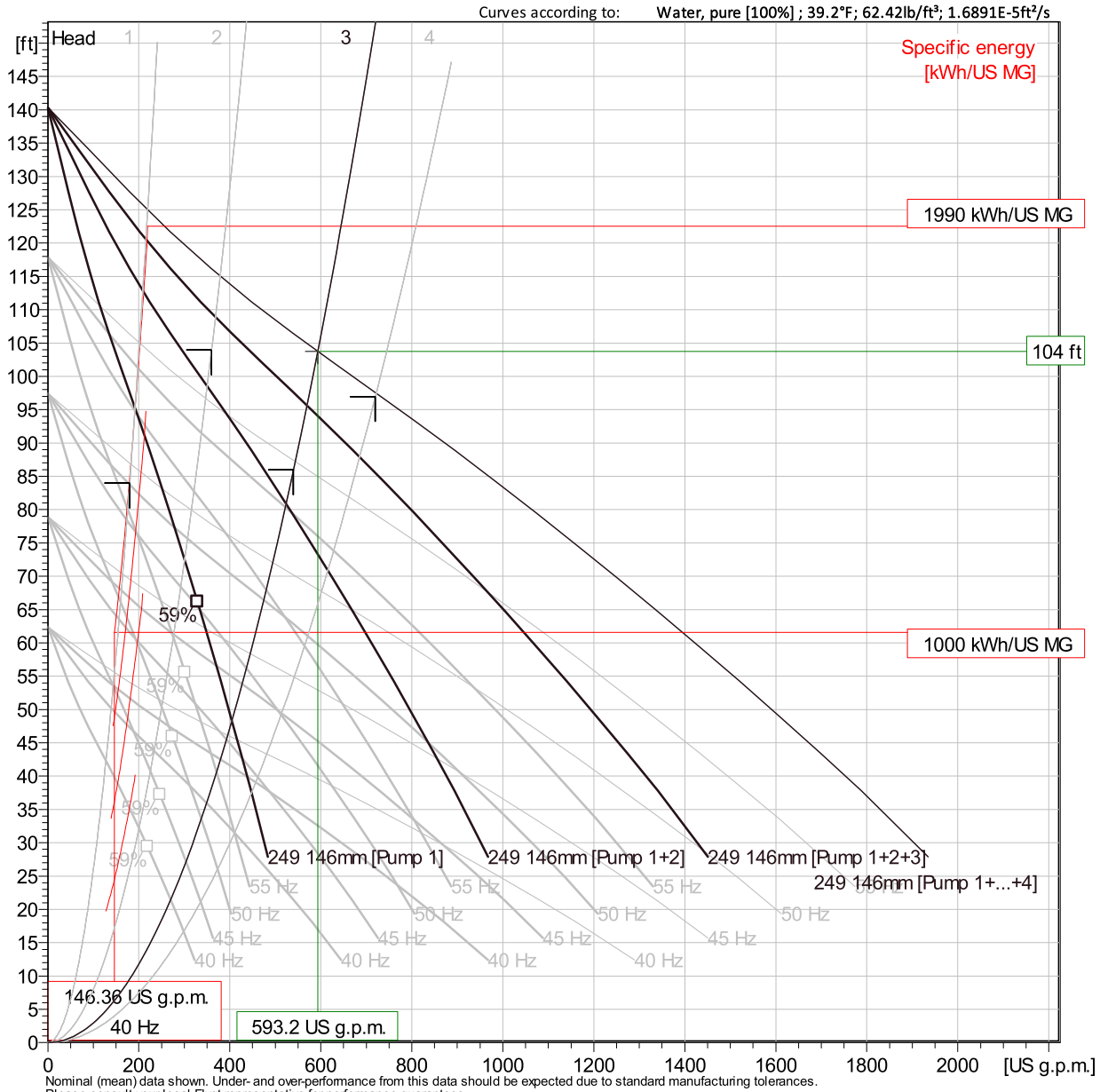
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 2	60 Hz	301	72.5	9.4	301	72.5	9.4	58.6 %	428	20.2
1 / 2	55 Hz	275	60.9	7.24	275	60.9	7.24	58.6 %	361	17.6
1 / 2	50 Hz	250	50.3	5.44	250	50.3	5.44	58.6 %	304	15.1
1 / 2	45 Hz	225	40.8	3.96	225	40.8	3.96	58.6 %	253	12.7

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

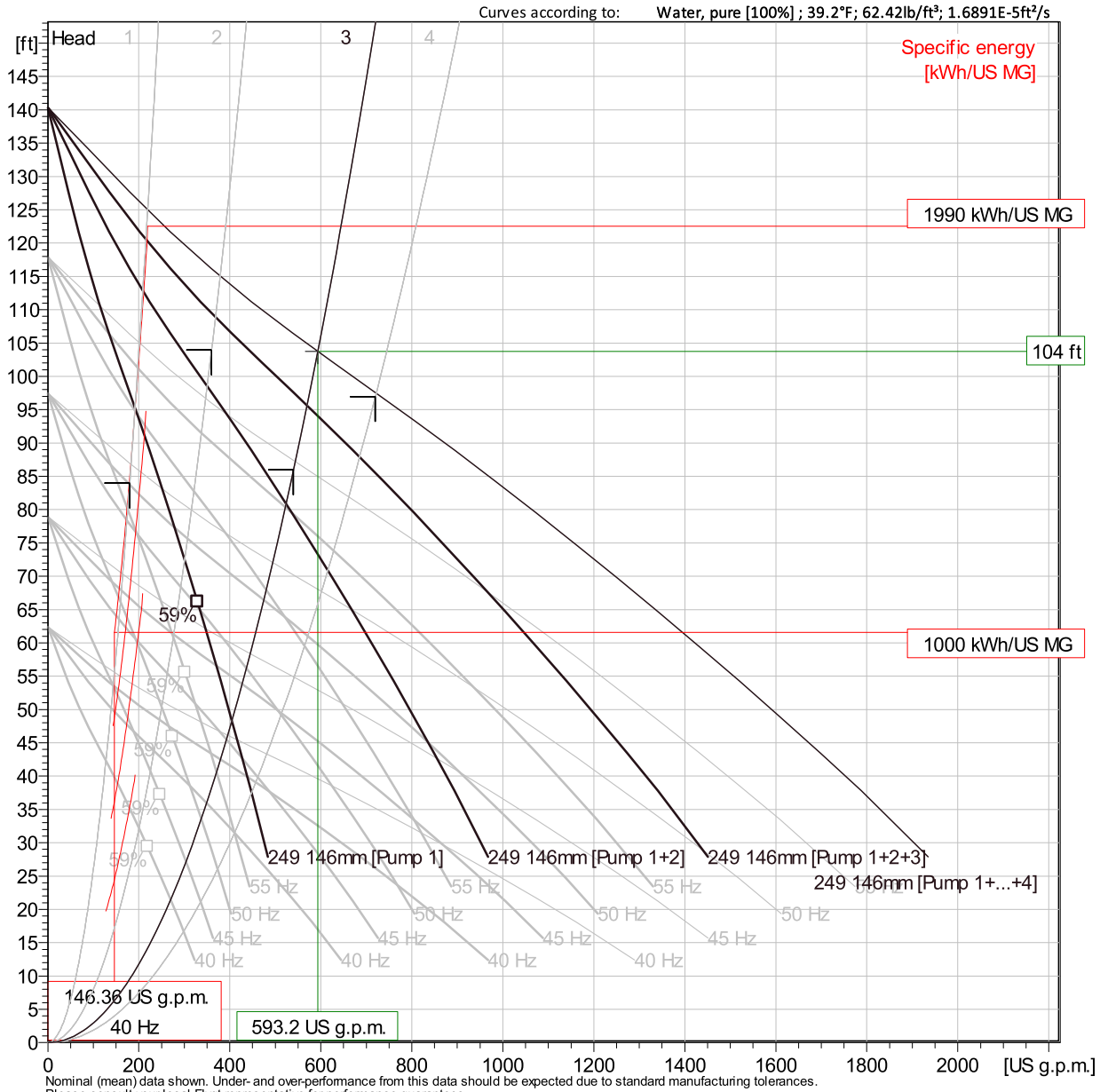
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 2	40 Hz	200	32.2	2.78	200	32.2	2.78	58.6 %	210	10.6
4 / 1	60 Hz	54.9	125	7.92	220	125	31.7	21.9 %	1990	22.7
4 / 1	55 Hz	50.3	105	6.1	201	105	24.4	21.9 %	1680	19.8
4 / 1	50 Hz	45.7	86.8	4.58	183	86.8	18.3	21.9 %	1420	17

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

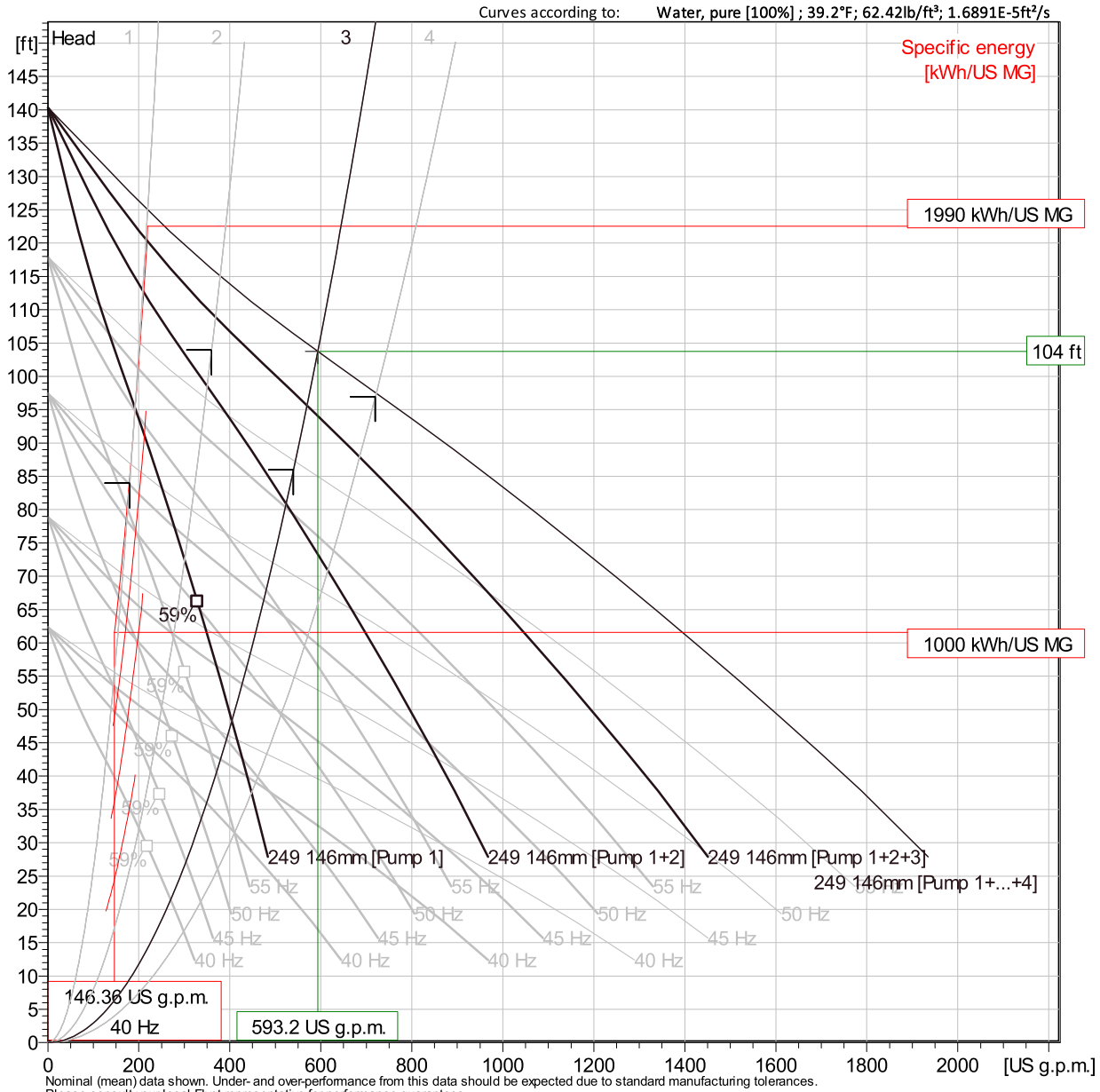
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
4 / 1	45 Hz	41.2	70.3	3.34	165	70.3	13.4	21.9 %	1190	14.3
4 / 1	40 Hz	36.6	55.5	2.35	146	55.5	9.38	21.9 %	1000	11.9
3 / 1	60 Hz	71.9	121	8.02	216	121	24.1	27.3 %	1540	22.2
3 / 1	55 Hz	65.9	101	6.18	198	101	18.5	27.3 %	1300	19.3

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

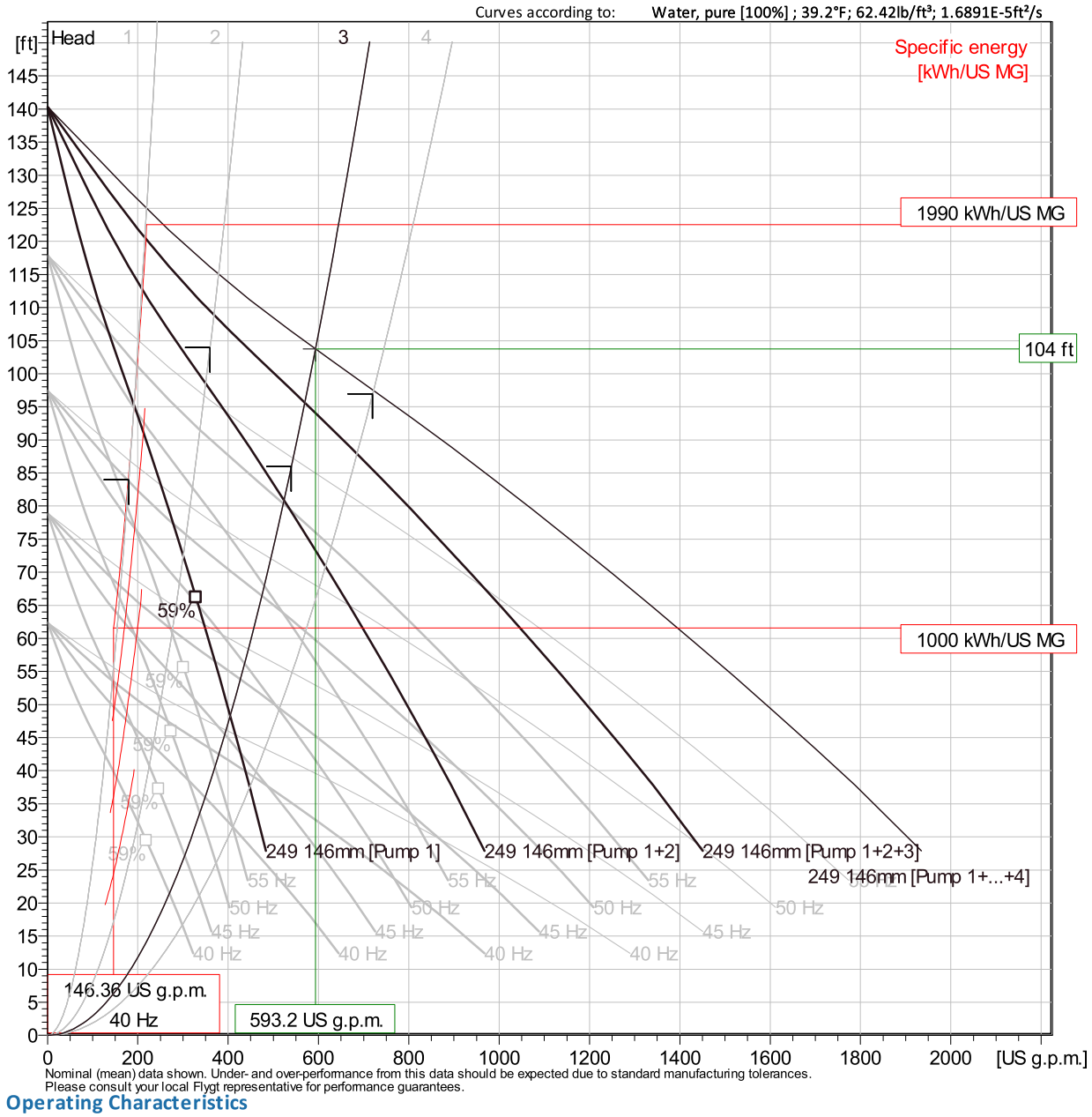
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3 / 1	50 Hz	59.9	83.7	4.64	180	83.7	13.9	27.3 %	1100	16.5
3 / 1	45 Hz	53.9	67.8	3.39	162	67.8	10.2	27.3 %	920	14
3 / 1	40 Hz	47.9	53.6	2.38	144	53.6	7.13	27.3 %	772	11.6
2 / 1	60 Hz	104	113	8.3	209	113	16.6	35.9 %	1100	21.2

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

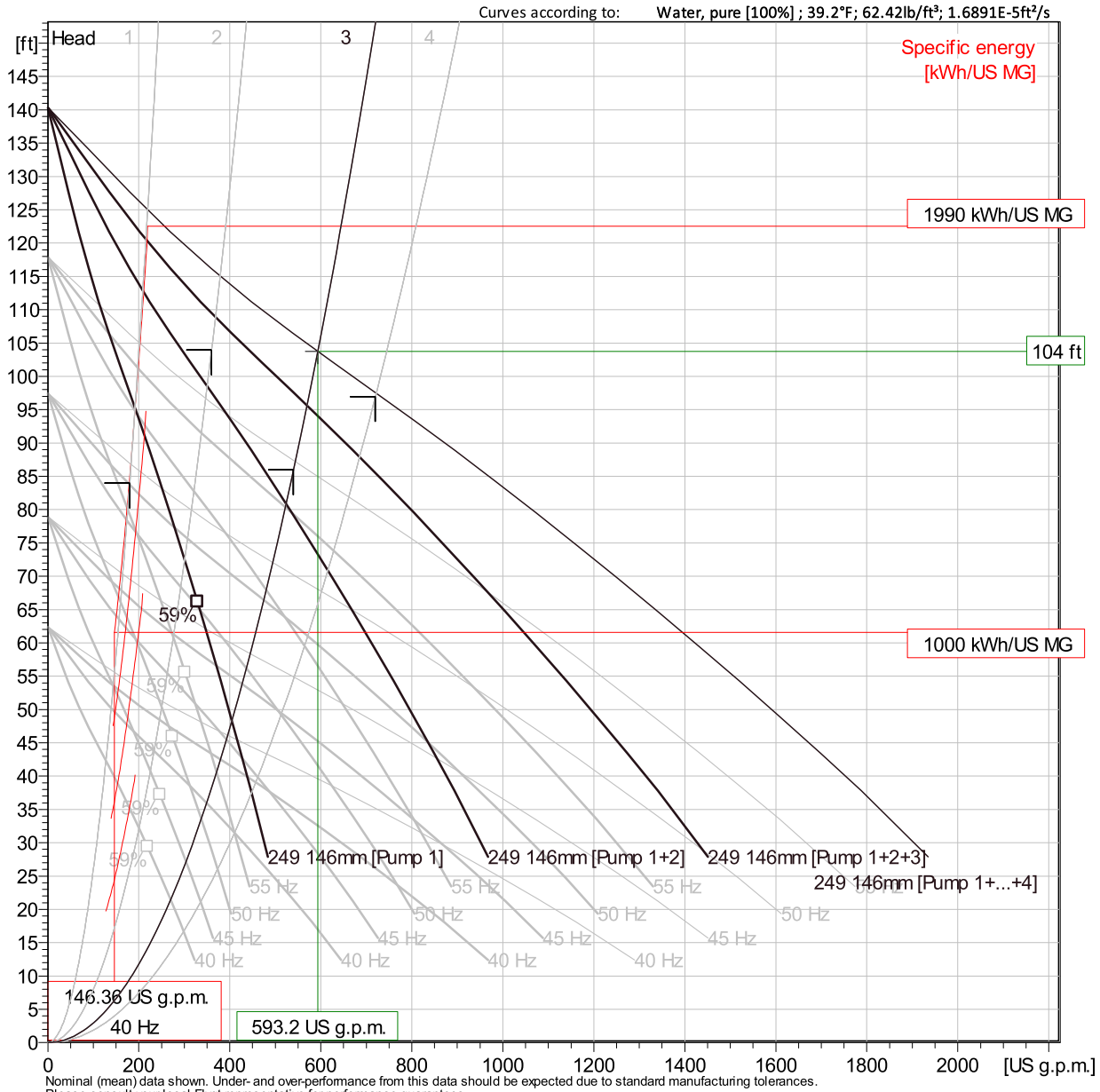
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 1	55 Hz	95.6	94.8	6.39	191	94.8	12.8	35.9 %	925	18.5
2 / 1	50 Hz	86.9	78.4	4.8	174	78.4	9.6	35.9 %	780	15.9
2 / 1	45 Hz	78.2	63.5	3.5	156	63.5	7	35.9 %	652	13.4
2 / 1	40 Hz	69.5	50.2	2.46	139	50.2	4.92	35.9 %	547	11.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



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Please consult your local Flygt representative for performance guarantees.

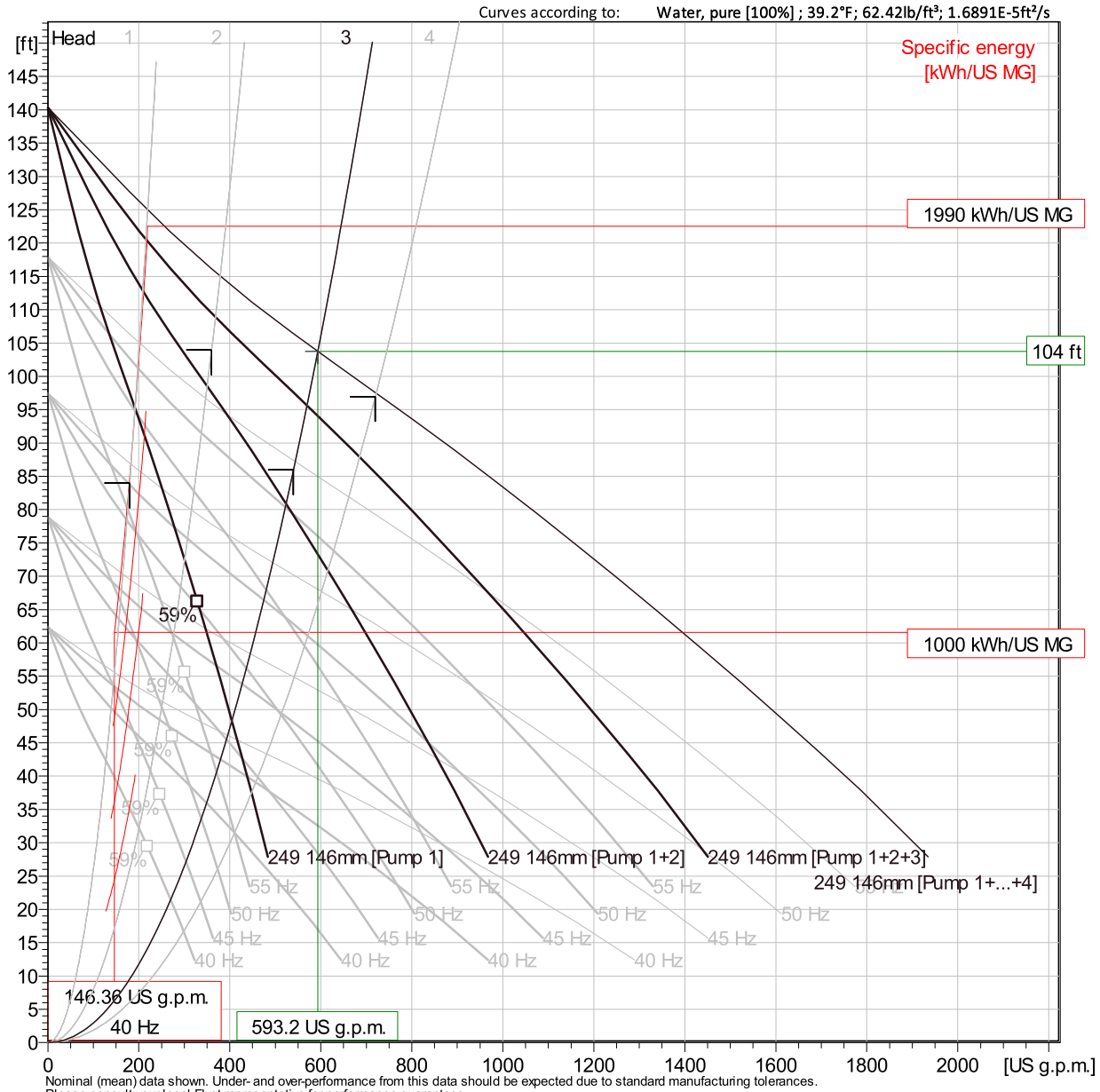
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 1	60 Hz	192	95.3	9.13	192	95.3	9.13	50.6 %	652	19.2
1 / 1	55 Hz	176	80.1	7.03	176	80.1	7.03	50.6 %	551	16.7
1 / 1	50 Hz	160	66.2	5.28	160	66.2	5.28	50.6 %	464	14.3
1 / 1	45 Hz	144	53.6	3.85	144	53.6	3.85	50.6 %	386	12.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



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Please consult your local Flygt representative for performance guarantees.

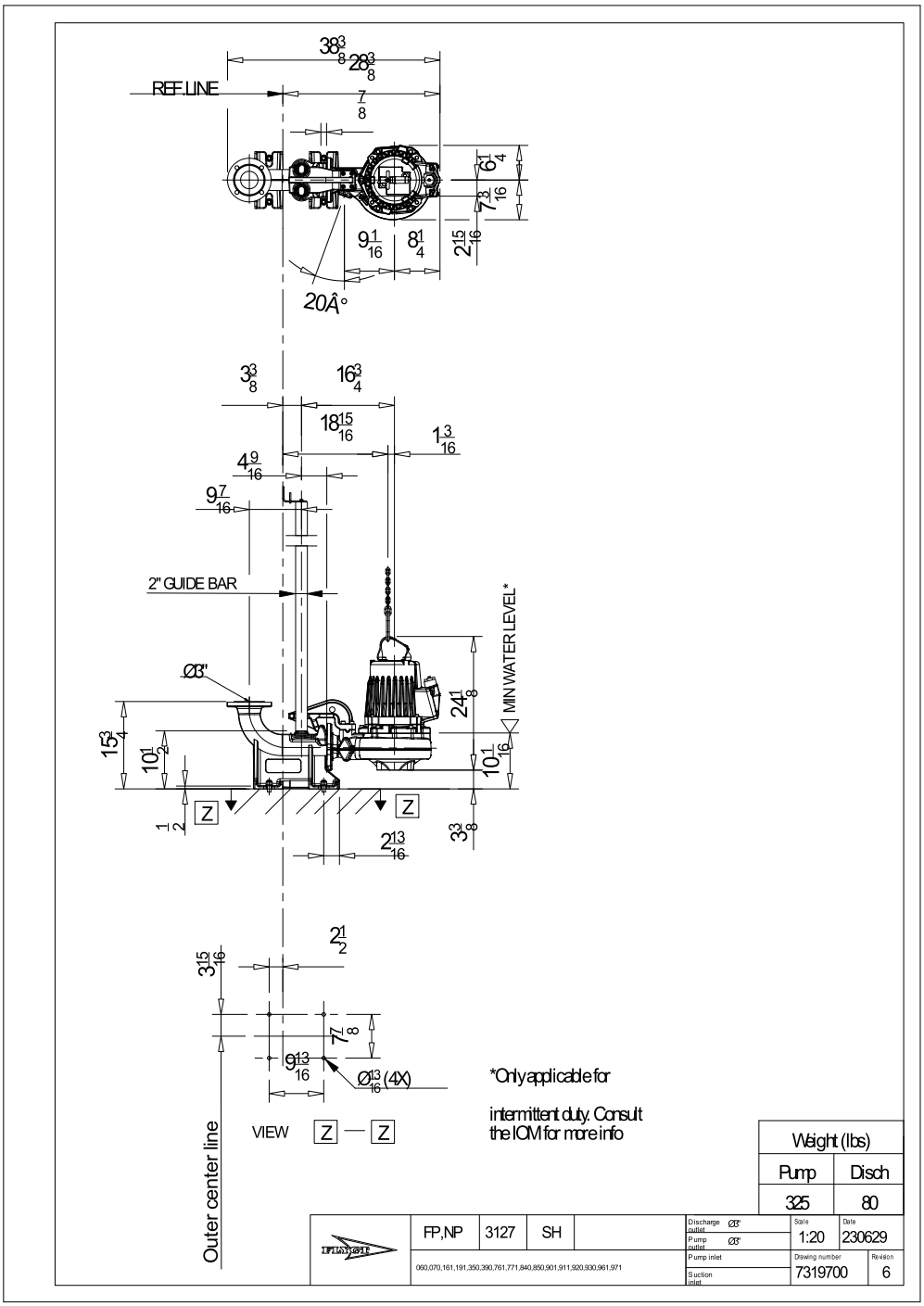
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 1	40 Hz	128	42.3	2.71	128	42.3	2.71	50.6 %	321	10

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Dimensional drawing



Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

APPENDIX A – LS-1 Pump Selection Options

Option 7 – Flygt NP3202 with VFD and Dual 6” & 8” Force Mains

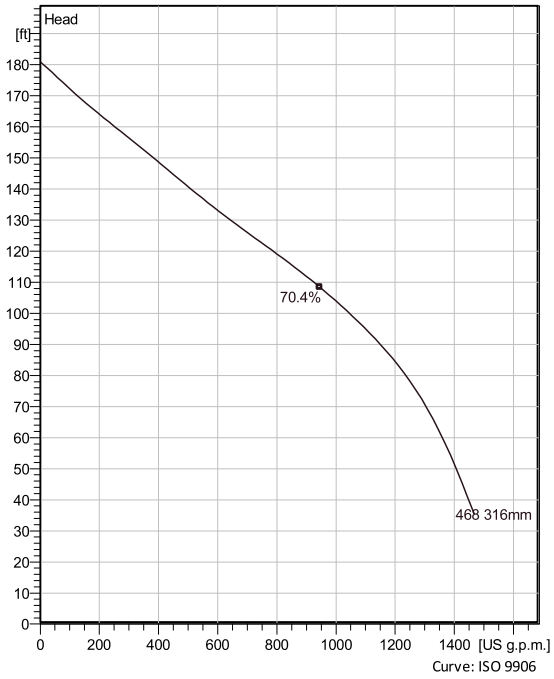
NP 3202 HT 3~ 468

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.

Technical specification



Curves according to: Water, pure Water, pure [100%], 39.2 °F, 62.42 lb/ft³, 1.6891E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N3202.095 30-19-4AA-W 45hp

Installation type
P - Semi permanent, Wet

Impeller diameter
316 mm

Discharge diameter
4 inch

Pump information

Impeller diameter
316 mm

Discharge diameter
4 inch

Inlet diameter
200 mm

Maximum operating speed
1770 rpm

Number of blades
2

Max. fluid temperature
40 °C

Material

Impeller
Hard-Iron ™

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

Technical specification

Motor - General

Motor number N3202.095 30-19-4AA-W 45hp	**Phases** 3~	**Rated speed** 1770 rpm	**Rated power** 45 hp
ATEX approved FM	**Number of poles** 4	**Rated current** 51 A	**Stator variant** 4
Frequency 60 Hz	**Rated voltage** 460 V	**Insulation class** H	**Type of Duty** S1
Version code 095			

Motor - Technical

Power factor - 1/1 Load 0.91	**Motor efficiency - 1/1 Load** 90.7 %	**Total moment of inertia** 8.34 lb ft²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.89	**Motor efficiency - 3/4 Load** 91.7 %	**Starting current, direct starting** 315 A	
Power factor - 1/2 Load 0.82	**Motor efficiency - 1/2 Load** 91.7 %	**Starting current, star-delta** 105 A	

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

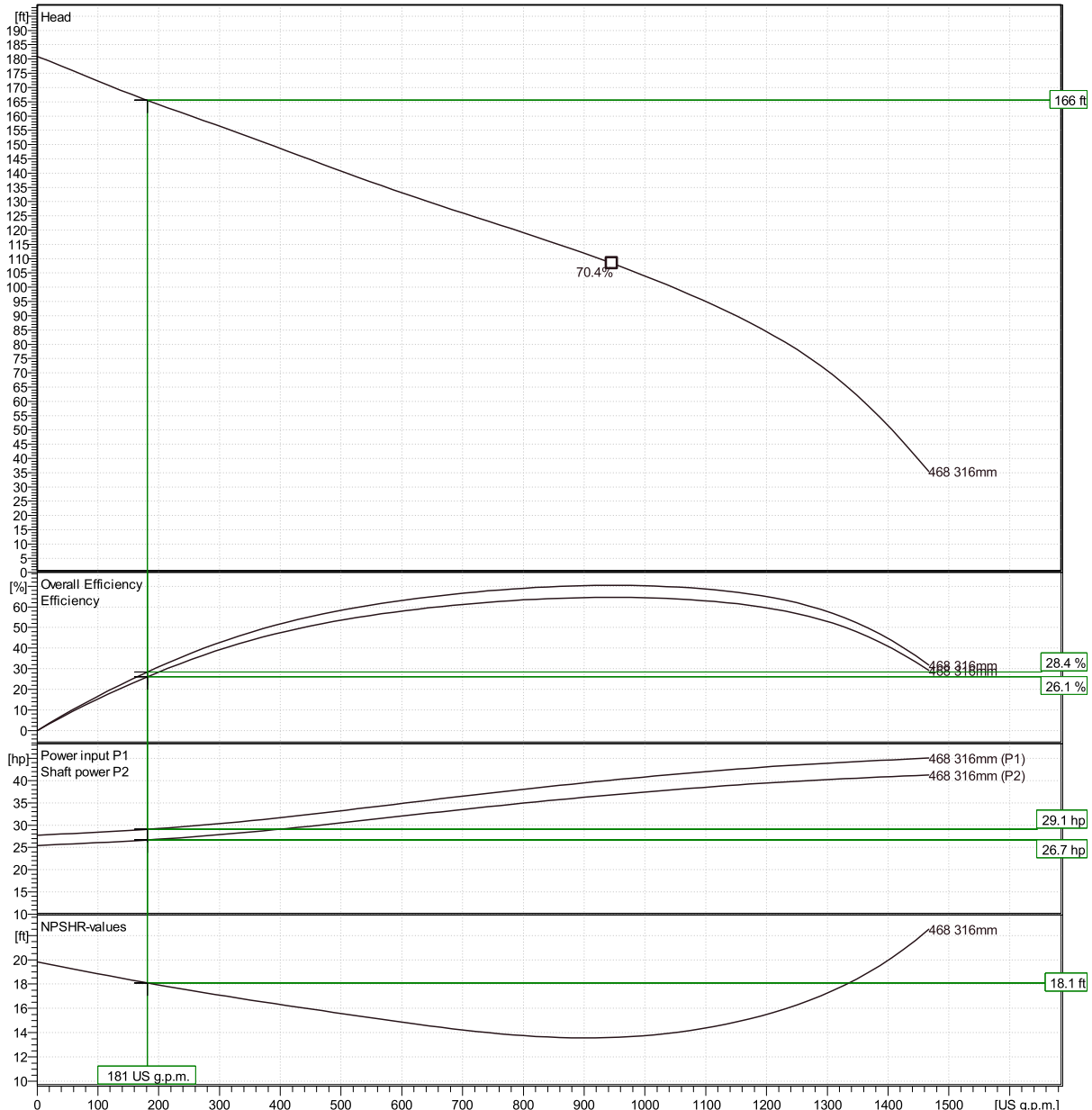
NP 3202 HT 3~ 468

Performance curve

Duty point

Flow	Head
181 US g.p.m.	166 ft

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

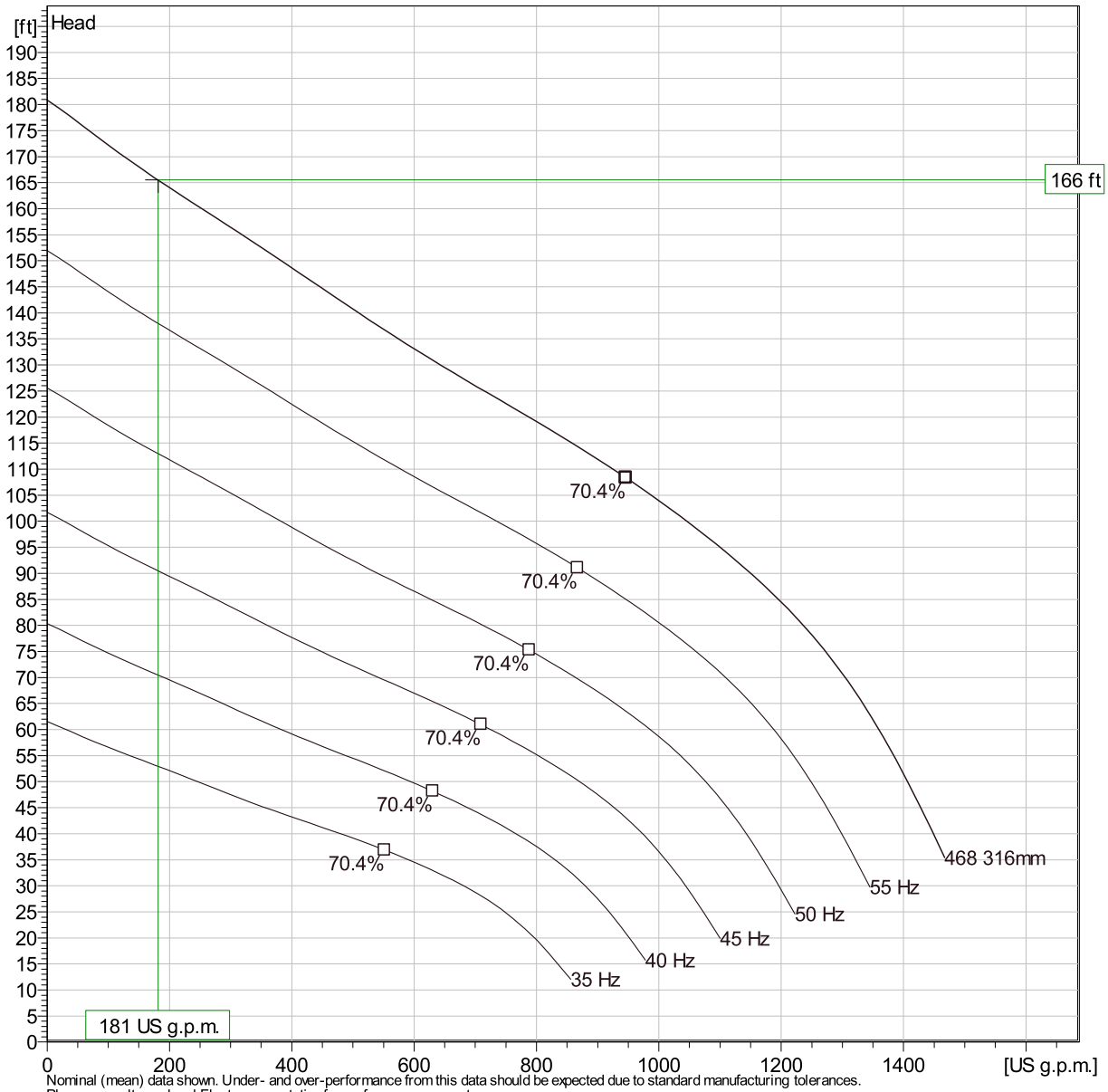
Curve: ISO 9906

Quail LS1			Alan Dahlqvist		
0		**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

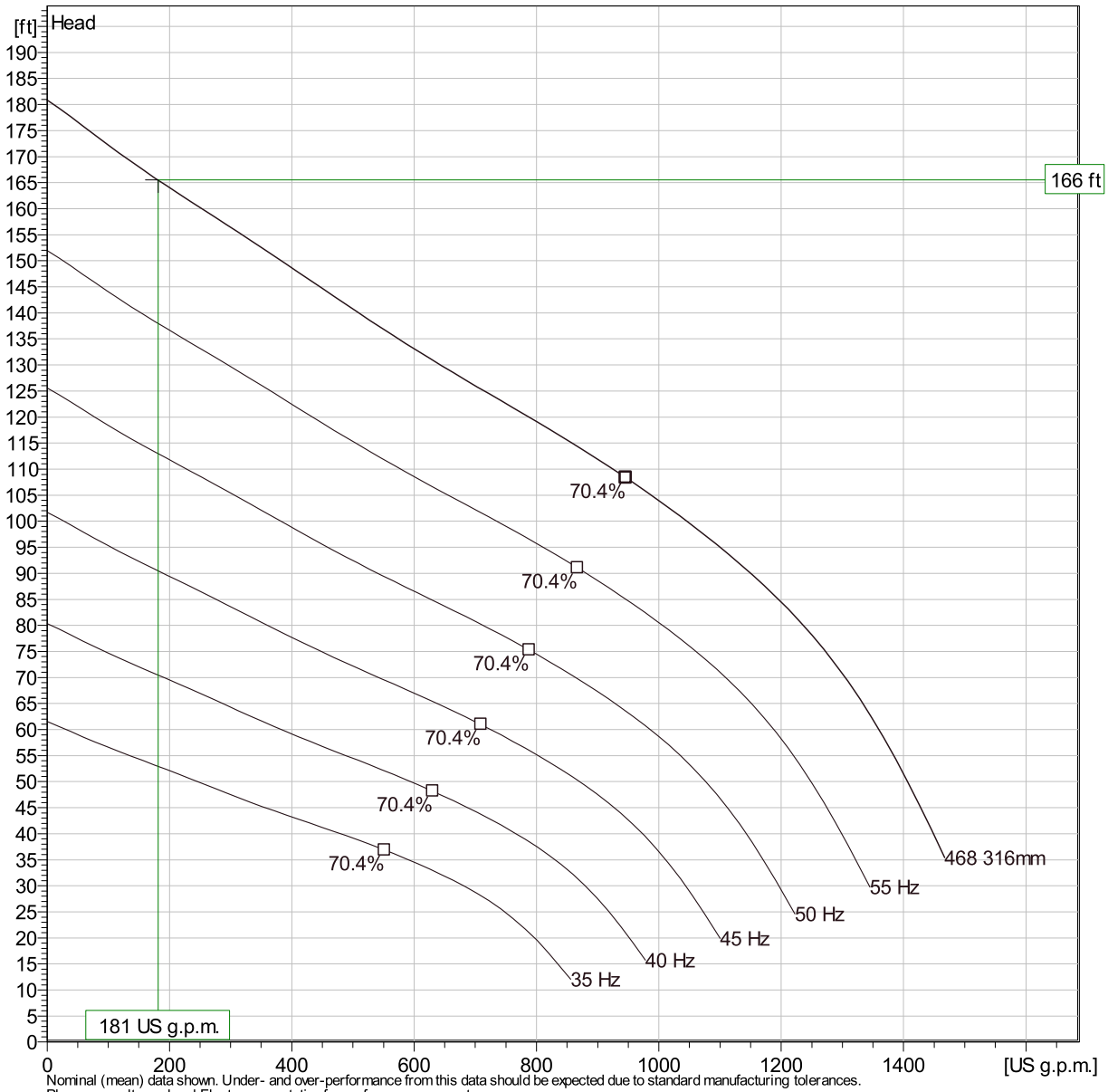
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
5	181	166	26.7	181	166	26.7	28.4 %	1990	18.1
4	365	151	28.6	365	151	28.6	48.8 %	1060	16.6
3	458	144	29.9	458	144	29.9	55.8 %	884	15.9

Project		**Created by**	Alan Dahlqvist		
Block	Quail LS1	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



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Please consult your local Flygt representative for performance guarantees.

Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2	520	139	30.8	520	139	30.8	59.4 %	801	15.4
1	732	124	34	732	124	34	67.5 %	628	14.1

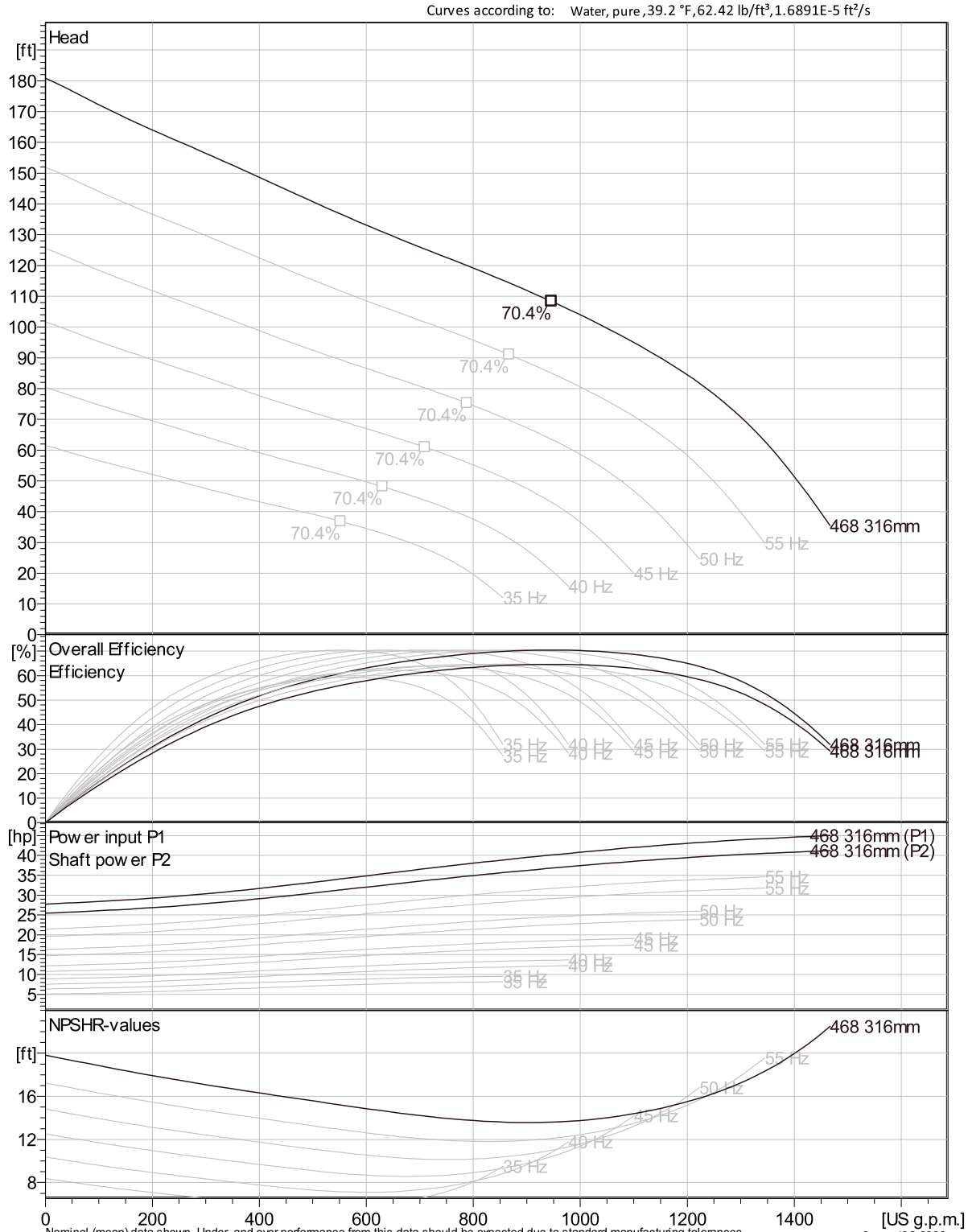
Project		**Created by**	Alan Dahlqvist		
Block	Quail LS1	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Curve

FLYGT
a xylem brand

Curves according to: Water, pure ,39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

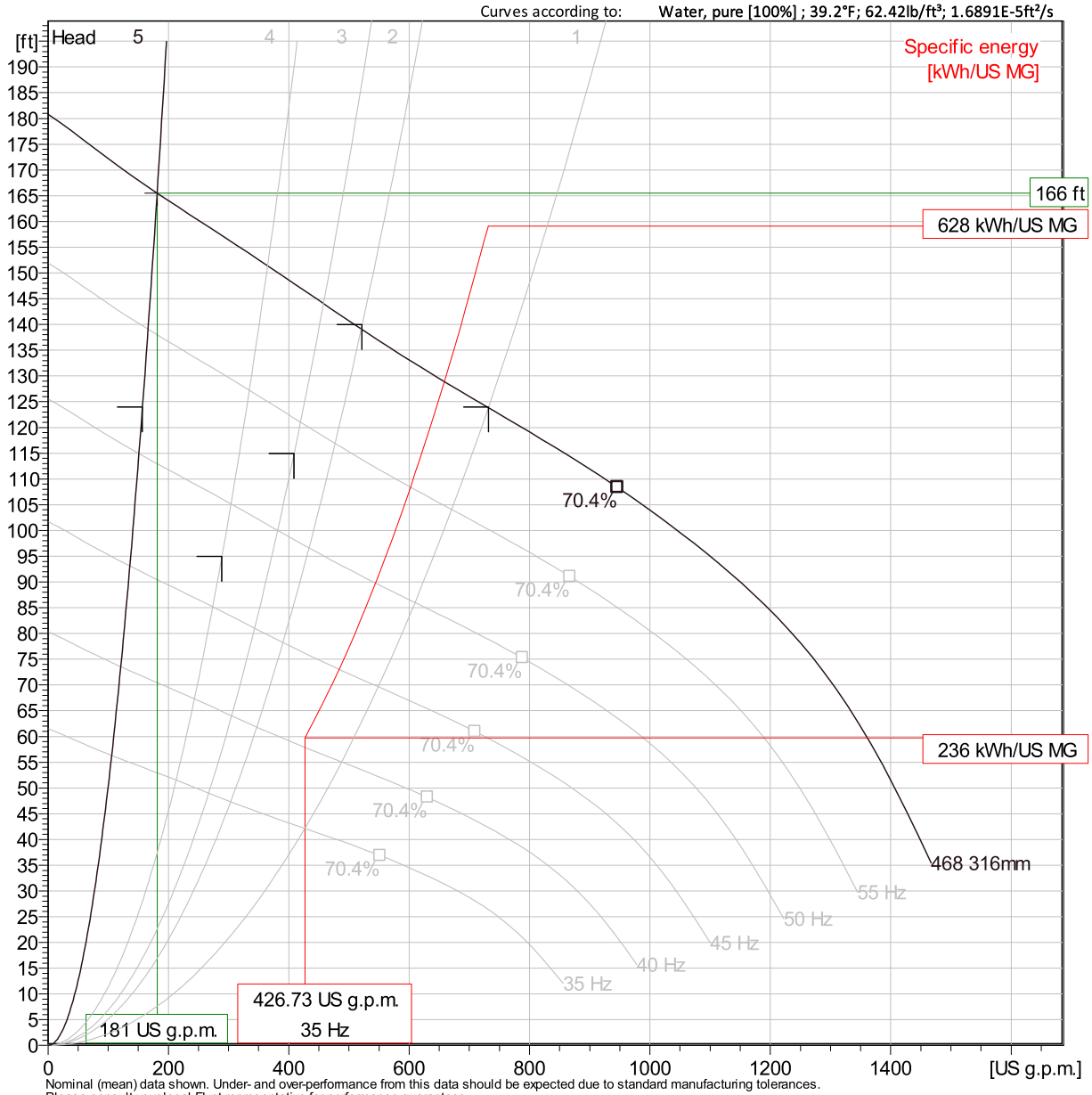
Curve: ISO 9906

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



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Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

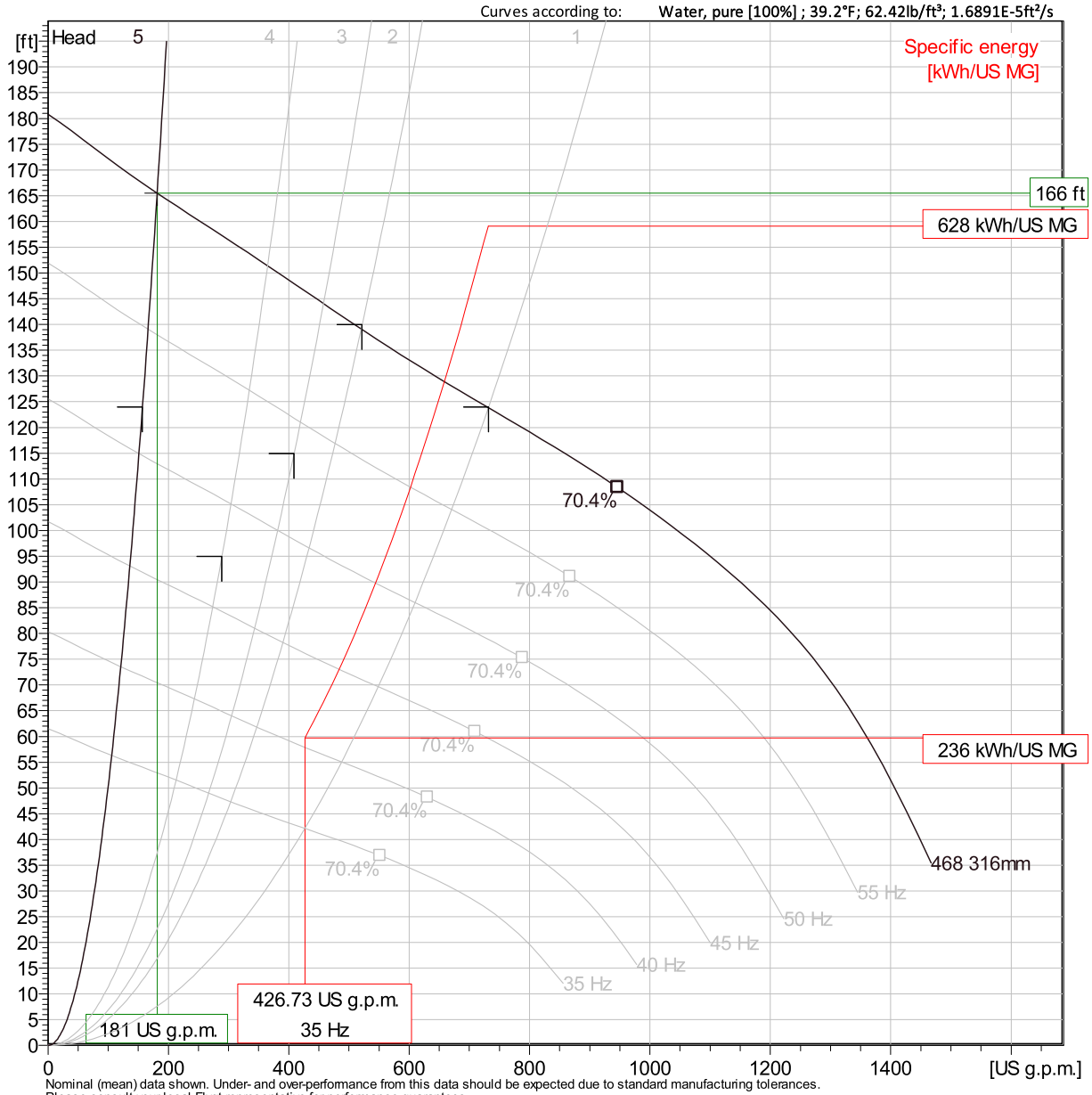
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
5	60 Hz	181	166	26.7	181	166	26.7	28.4 %	1990	18.1
5	55 Hz	166	139	20.6	166	139	20.6	28.4 %	1680	15.7
5	50 Hz	151	115	15.4	151	115	15.4	28.4 %	1400	13.5
5	45 Hz	136	93.1	11.3	136	93.1	11.3	28.4 %	1160	11.4

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

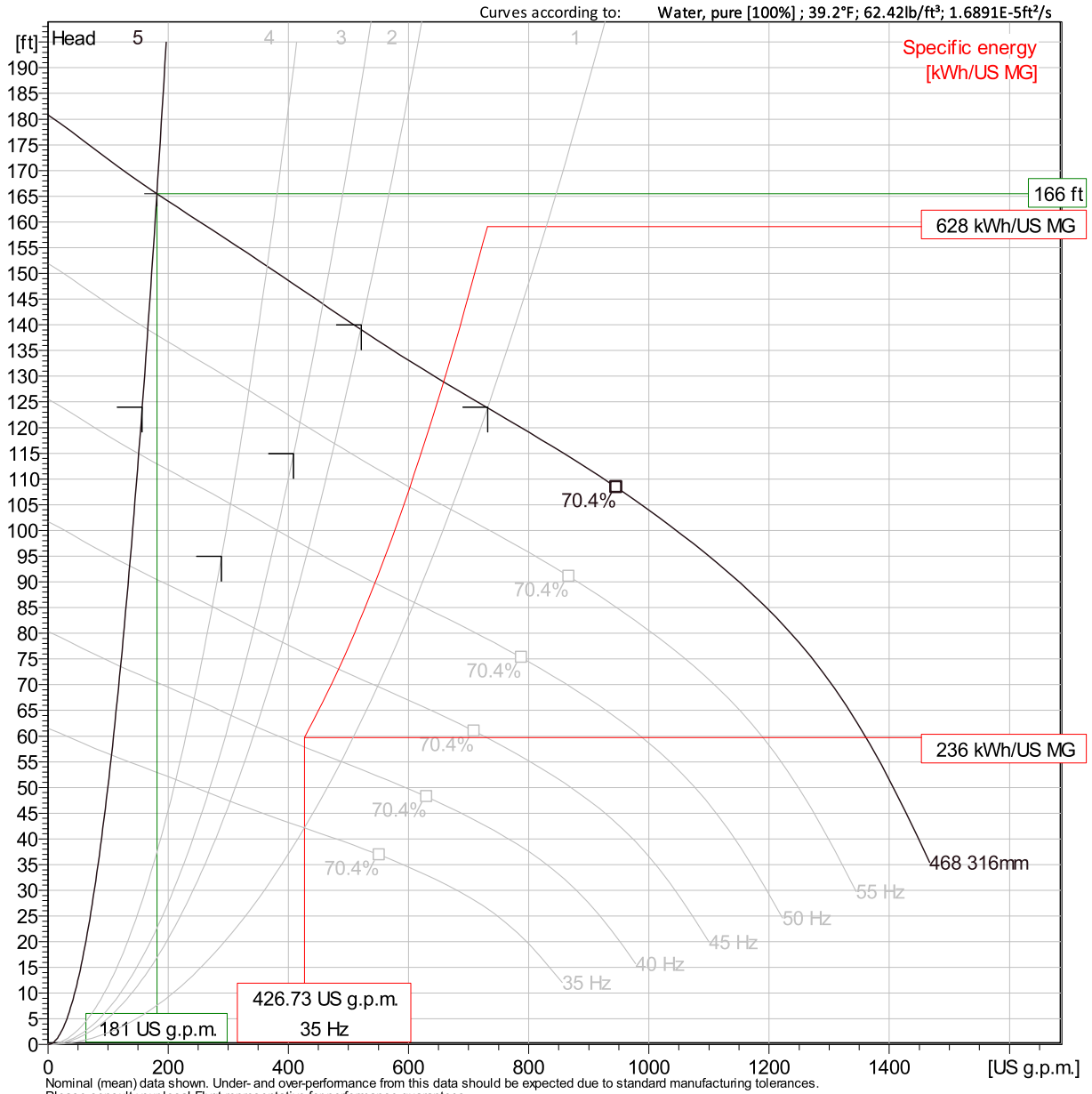
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
5	40 Hz	121	73.6	7.91	121	73.6	7.91	28.4 %	954	9.46
5	35 Hz	106	56.3	5.3	106	56.3	5.3	28.4 %	776	7.64
4	60 Hz	365	151	28.6	365	151	28.6	48.8 %	1060	16.6
4	55 Hz	334	127	22	334	127	22	48.8 %	894	14.4

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

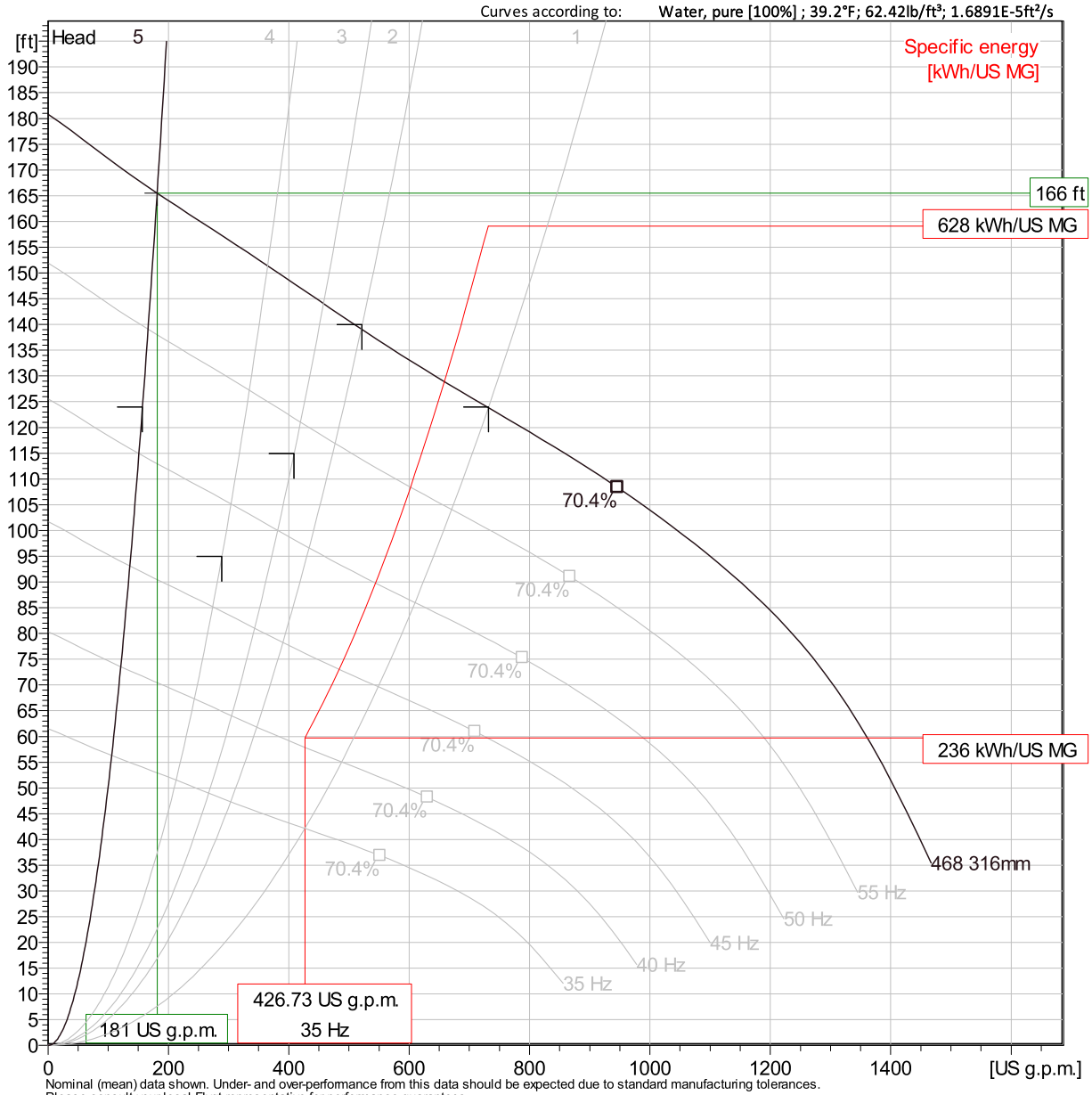
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
4	50 Hz	304	105	16.6	304	105	16.6	48.8 %	745	12.4
4	45 Hz	274	85.2	12.1	274	85.2	12.1	48.8 %	615	10.5
4	40 Hz	243	67.3	8.48	243	67.3	8.48	48.8 %	504	8.67
4	35 Hz	213	51.5	5.68	213	51.5	5.68	48.8 %	409	7

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

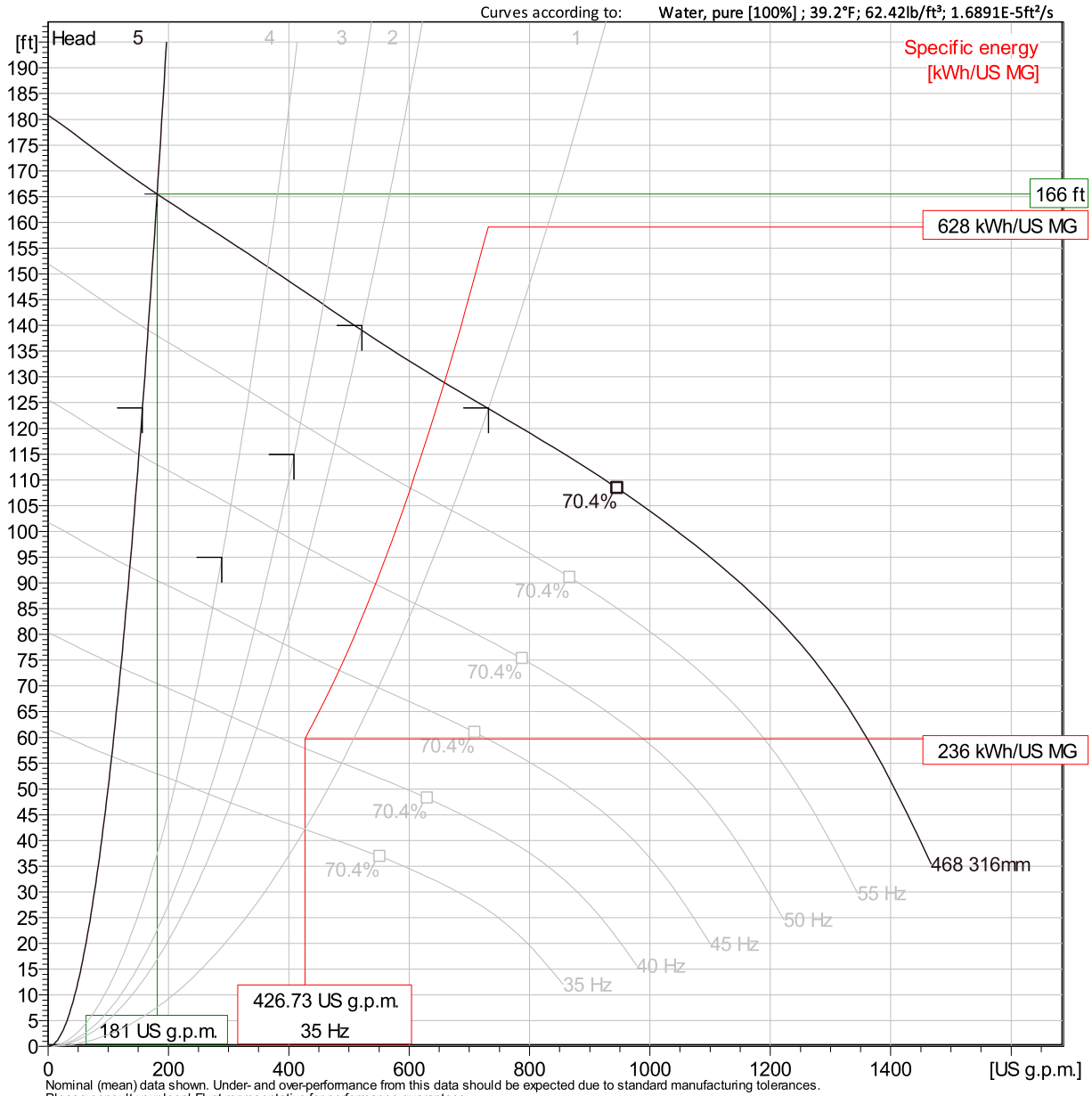
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3	60 Hz	458	144	29.9	458	144	29.9	55.8 %	884	15.9
3	55 Hz	420	121	23	420	121	23	55.8 %	743	13.8
3	50 Hz	381	100	17.3	381	100	17.3	55.8 %	619	11.9
3	45 Hz	343	81	12.6	343	81	12.6	55.8 %	510	10

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

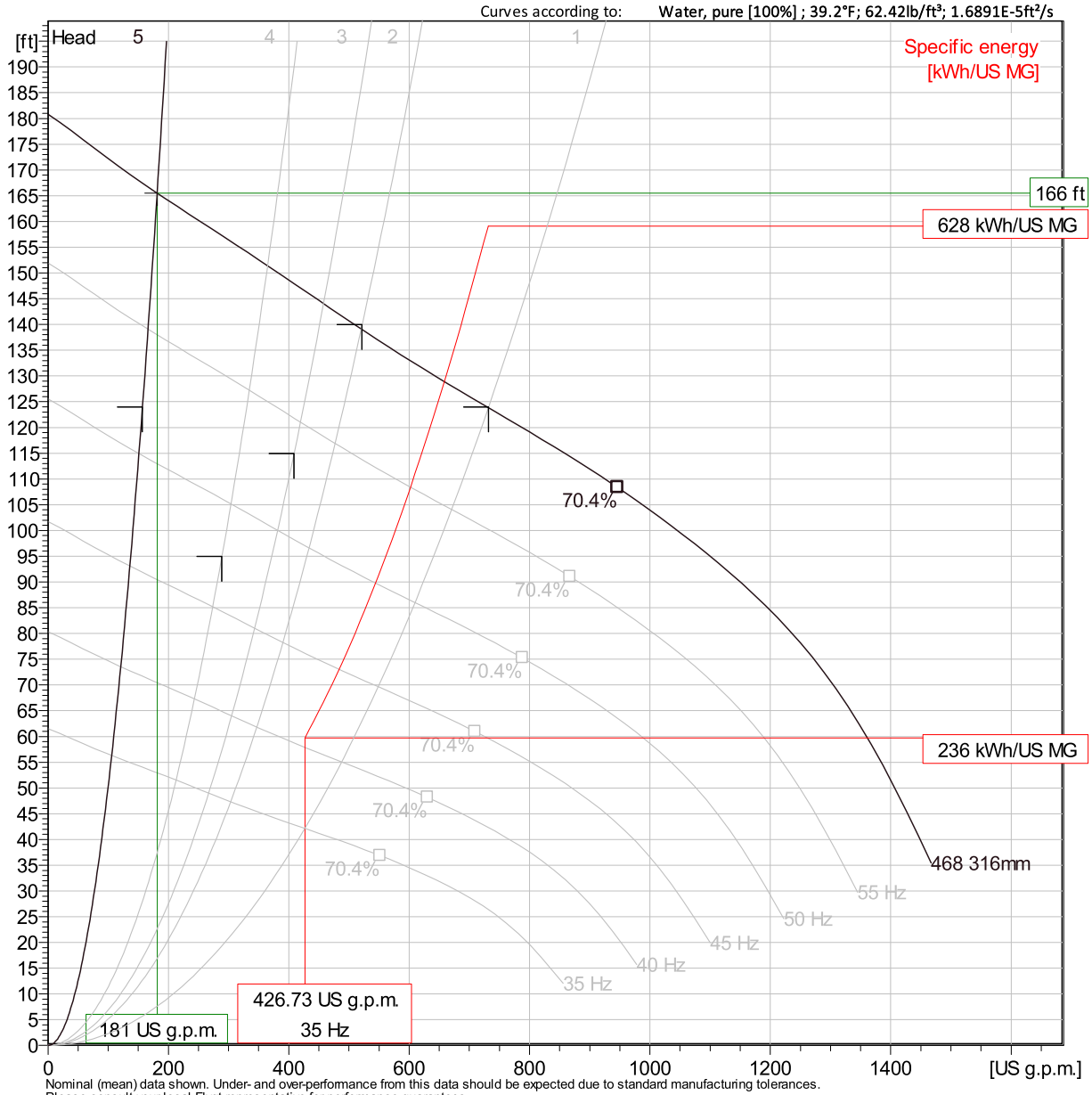
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3	40 Hz	305	64	8.86	305	64	8.86	55.8 %	417	8.31
3	35 Hz	267	49	5.93	267	49	5.93	55.8 %	338	6.71
2	60 Hz	520	139	30.8	520	139	30.8	59.4 %	801	15.4
2	55 Hz	477	117	23.7	477	117	23.7	59.4 %	674	13.4

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

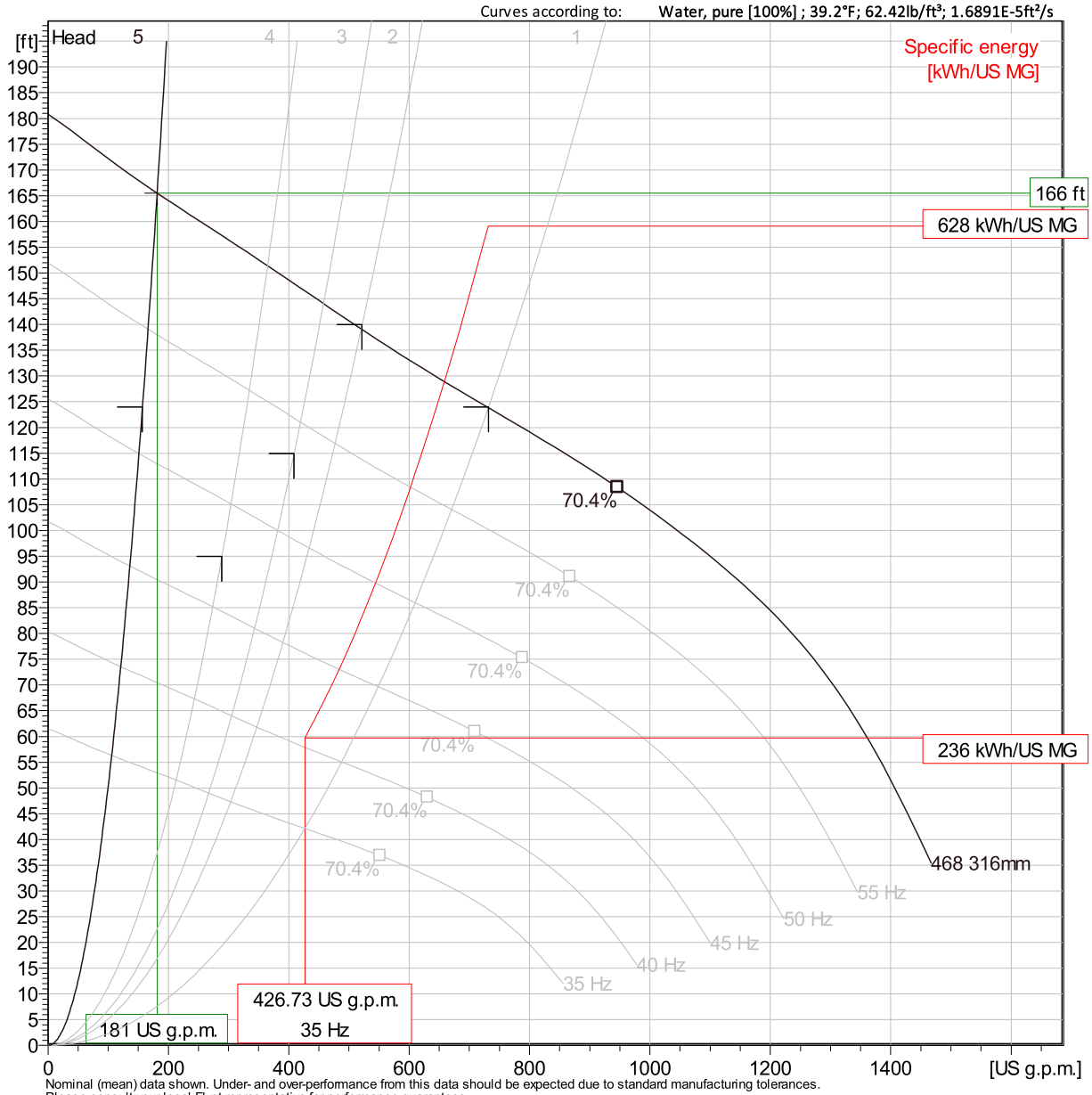
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2	50 Hz	434	96.6	17.8	434	96.6	17.8	59.4 %	561	11.5
2	45 Hz	390	78.3	13	390	78.3	13	59.4 %	462	9.74
2	40 Hz	347	61.8	9.13	347	61.8	9.13	59.4 %	377	8.07
2	35 Hz	304	47.3	6.12	304	47.3	6.12	59.4 %	305	6.51

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

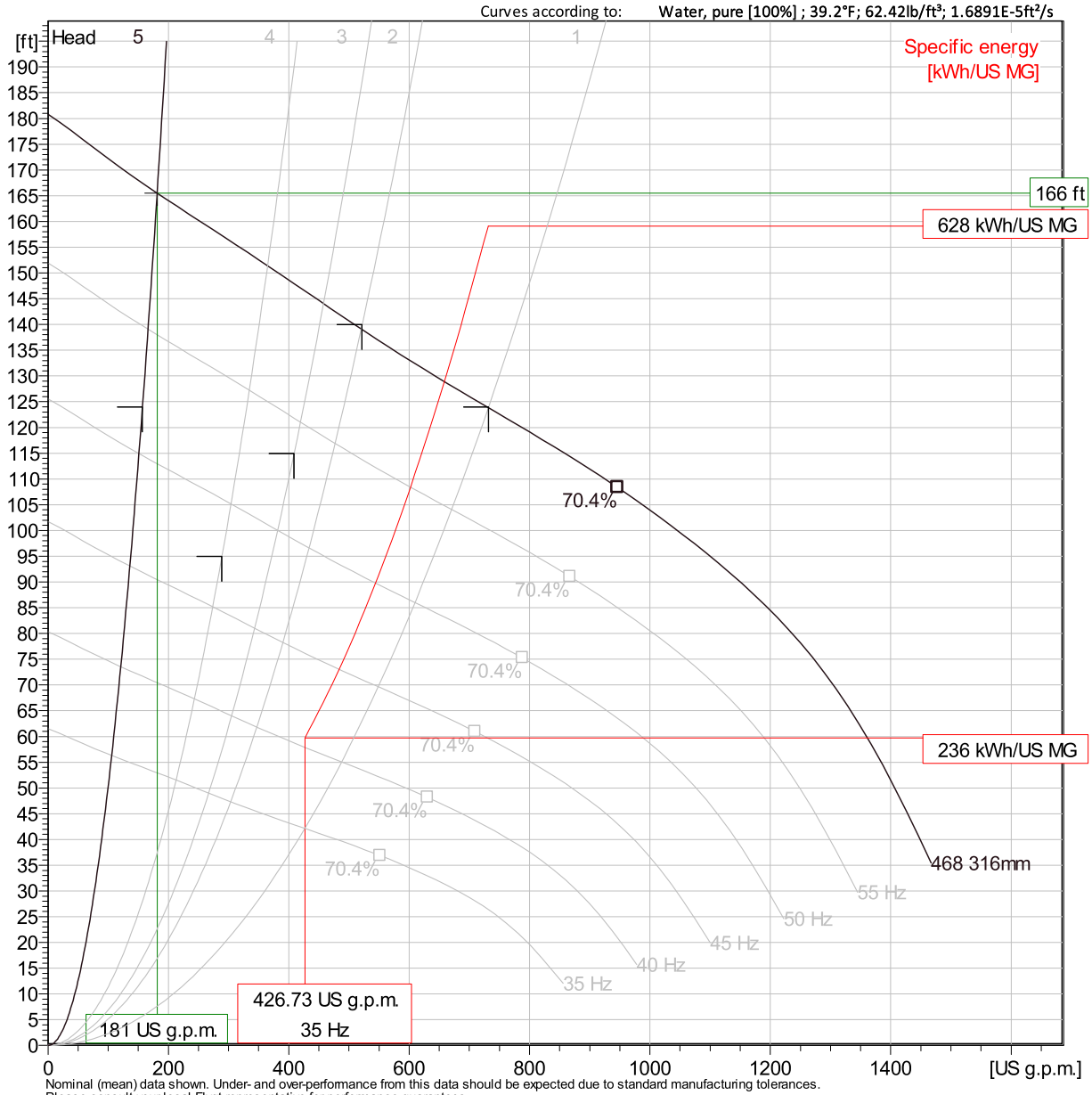
Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1	60 Hz	732	124	34	732	124	34	67.5 %	628	14.1
1	55 Hz	671	104	26.2	671	104	26.2	67.5 %	528	12.2
1	50 Hz	610	86	19.7	610	86	19.7	67.5 %	438	10.5
1	45 Hz	549	69.7	14.3	549	69.7	14.3	67.5 %	360	8.87

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

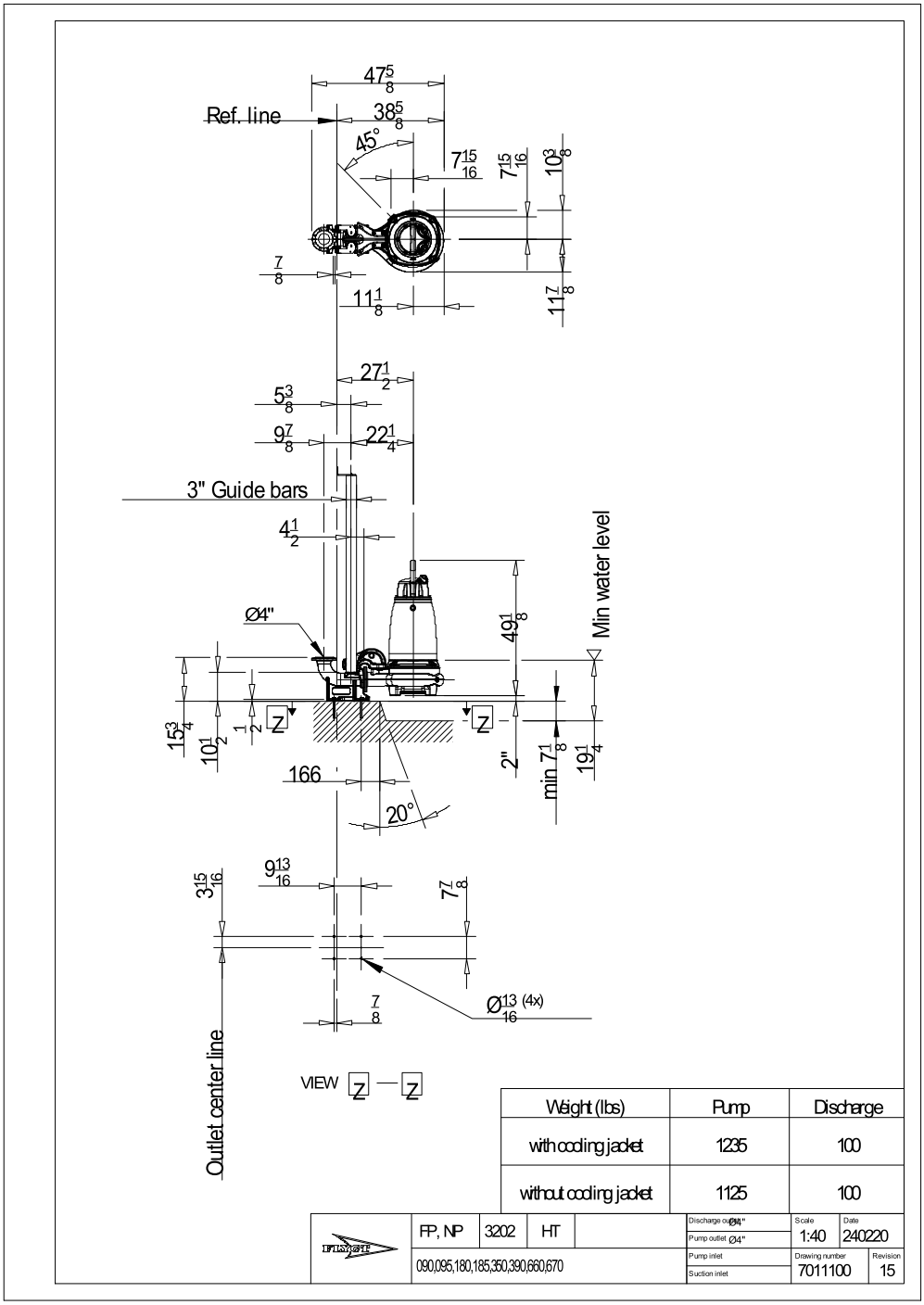
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1	40 Hz	488	55	10.1	488	55	10.1	67.5 %	293	7.34
1	35 Hz	427	42.1	6.74	427	42.1	6.74	67.5 %	236	5.93

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

NP 3202 HT 3~ 468

Dimensional drawing



Weight (lbs)	Pump	Discharge
with cooling jacket	1235	100
without cooling jacket	1125	100

FP, NP	3202	HT		Discharge outlet Ø4"	Scale 1:40	Date 240220
090,095,180,185,350,390,660,670				Pump outlet Ø4"		
				Pump inlet	Drawing number 7011100	Revision 15
				Suction inlet		

Project	Quail LS1	**Created by**	Alan Dahlqvist		
Block	0	**Created on**	6/20/2024	**Last update**	6/20/2024

APPENDIX A – LS-1 Pump Selection Options

Option 8 – Keen Grinder/Chopper Pumps and Dual 6” & 8” Force Mains

Buildout Phases
1A and 1B

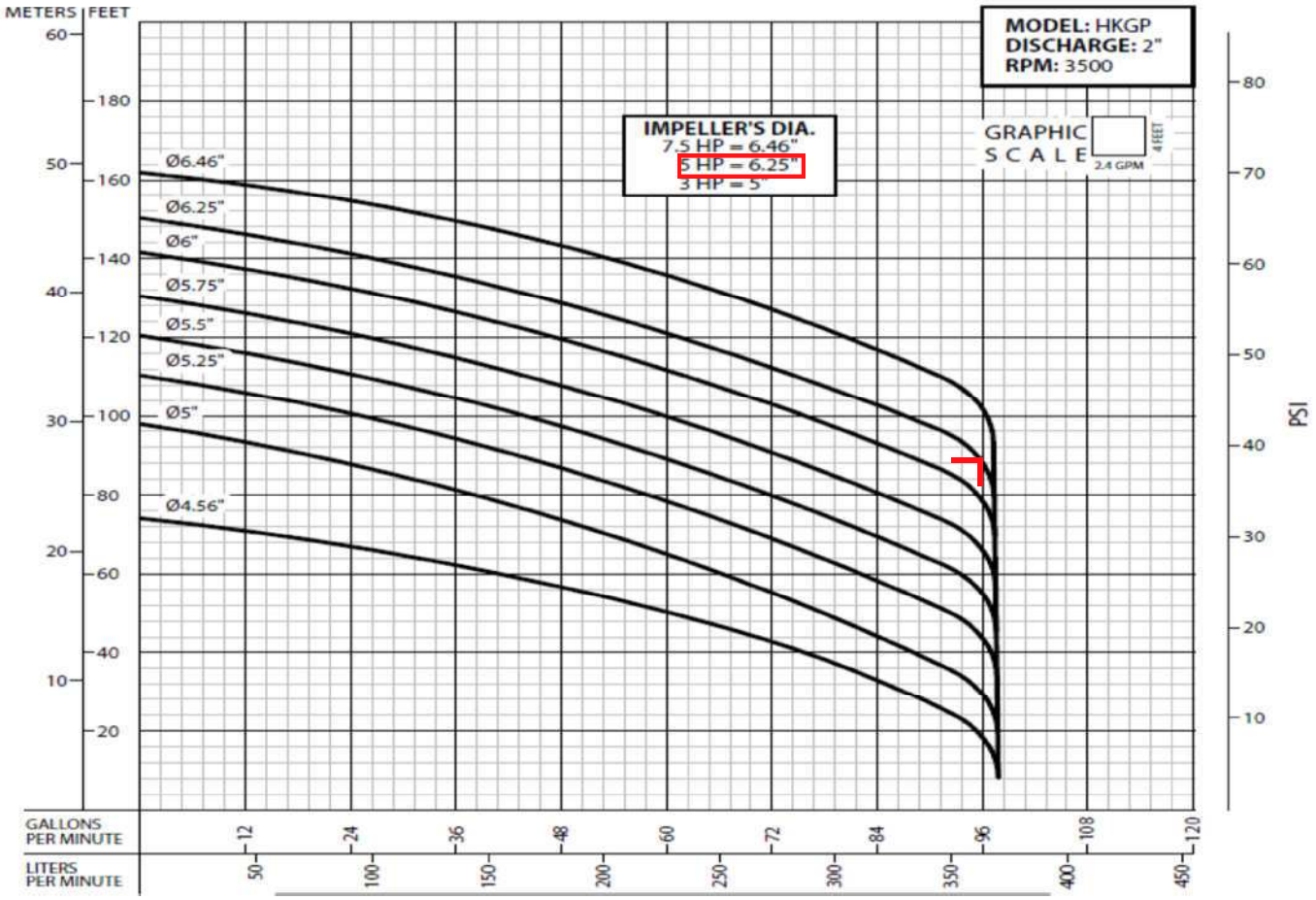
Sierra Peak
Pump Systems

HKGP – 2” Grinder

Motor Data	
HP/Power Supply	See Model Table
Rated Speed	3450 RPM
Insulation Class	F Class
Start Capacitor	External
Cooling	Oil-Filled
Mechanical Seal	Dual Silicon Carbide
Grinding Mechanism	Axial Slicer or Radial Grinder Available
Discharge	2” FPT Vertical

Model Options				
HP	Volts	Phase	Full Load Amps	Weight (lb)
3	230	1	23	188
3	230	3	13	188
3	460	3	6.5	188
5	230	1	39	199
5	230	3	20	199
5	460	3	10	199
7.5	230	3	24	203
7.5	460	3	12	203

Performance Curve

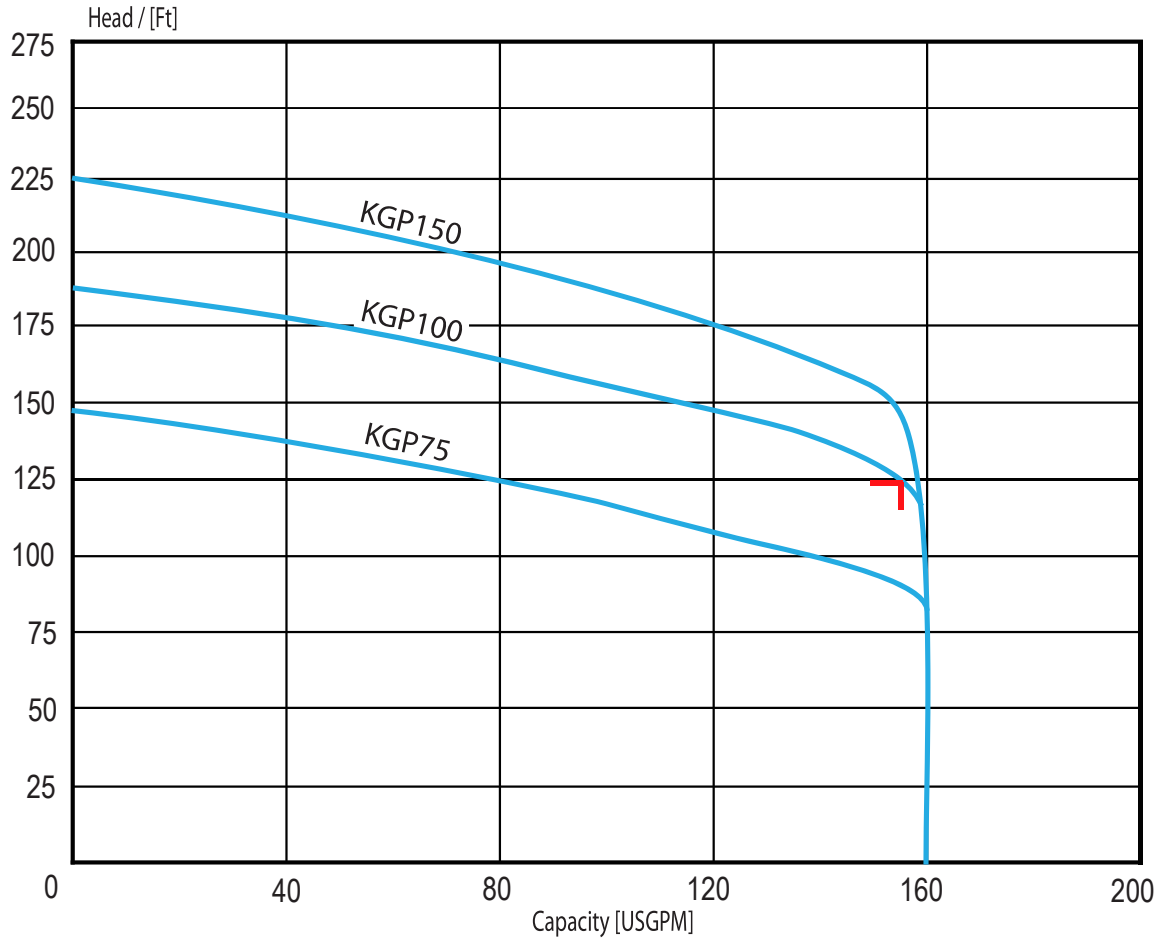


Buildout Phase 1C

KEEN PUMP

GENERAL	KGP(X)75/100/150	MOTOR DATA	
Pump Model		HP / Power Supply	7.5-15HP / 3 ϕ, 60 Hz
PUMP DATA		Poles / Rated Speed	2 P / 3450 rpm
Date	01/09/2017	Insulation Class	H Class
Discharge Flange	2-1/2 & 3" ANSI Horizontal	Full Load Amps	See Chart
Grinder Ring	Hardened SST		
Impeller Type / Std. Dia.	Recessed / As Shown		

PERFORMANCE CURVE



Models	Electrical Data			
	HP	Volts	Phase	Full Load Amps
KGP(X)75-03	7.5	208	3	39.8
KGP(X)75-23	7.5	230	3	34.5
KGP(X)75-43	7.5	460	3	17.3
KGP(X)100-03	10	208	3	55.6
KGP(X)100-23	10	230	3	48.5
KGP(X)100-43	10	460	3	24.3
KGP(X)150-03	15	208	3	68.5
KGP(X)150-23	15	230	3	59.5
KGP(X)150-43	15	460	3	29.8

* Performance with clear water and ambient temp 20°C (68°F)

Rev. 01/2017

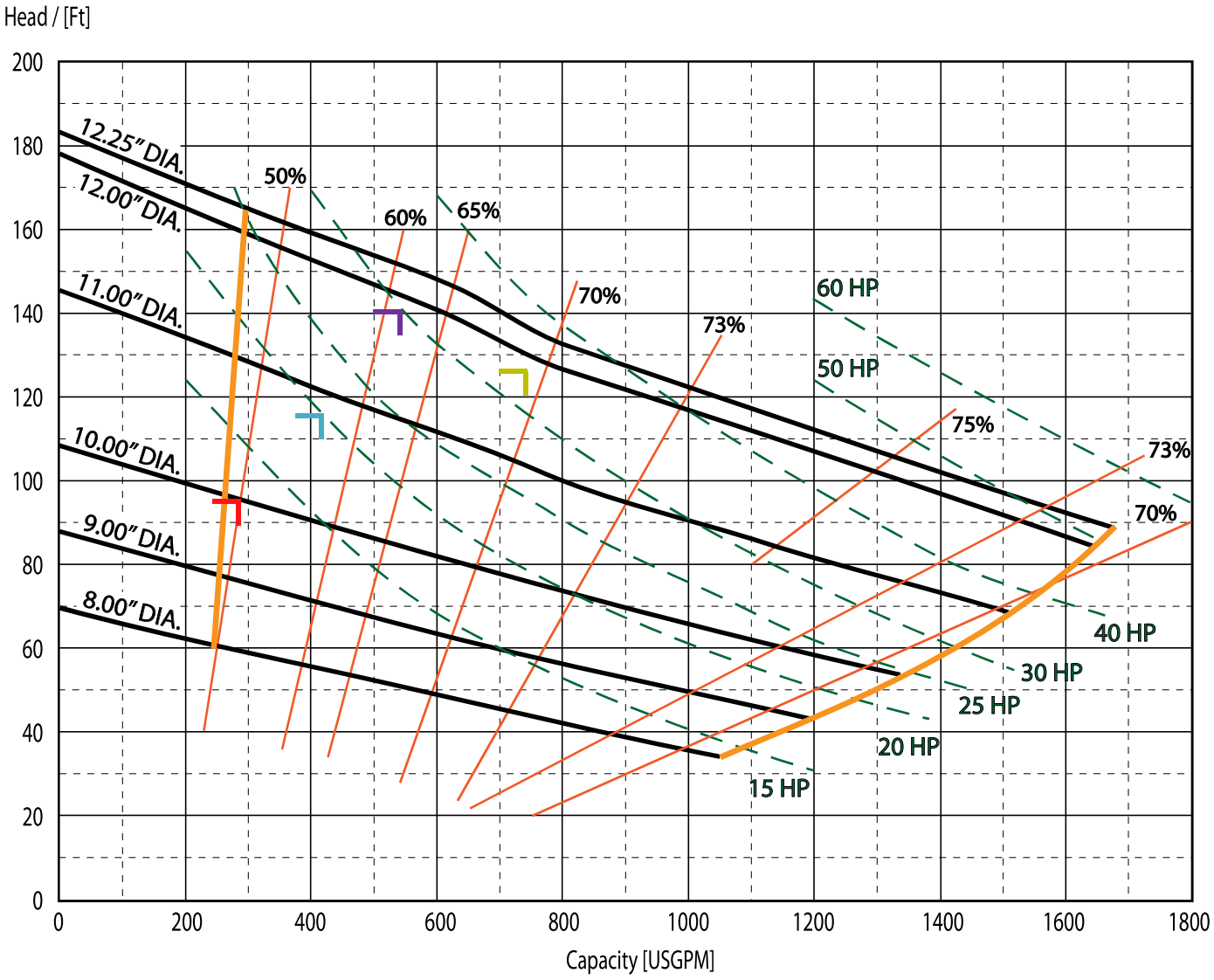
Buildout Phase 2 | Buildout Phase 4 | Buildout Phase 3 | Buildout Phase 5

KEEN PUMP

Section **ENCLOSED**
Date FEB. 2023

Pump Series	**K4VBCH**		4″ SUBMERSIBLE CHOPPER PUMPS		
Speed	**1750 RPM**	Discharge	**4″**		

GPM: _____ TDH: _____



The curves reflect maximum performance characteristics without exceeding full load.
Operation is recommended in the bounded area with operational point within the curve limit.
Performance curves are based on actual tests with clear water at 70° F and 1280 feet site elevation.

File: K4VBCH_1750

Pump Data Sheet - Keen Pump Inc.

Company: Michael Baker International
Name: WYNNETH REQUIERON
Date: 07/10/2024

Pump:

Size:	K4VB	Dimensions:	
Type:	Submersible Sewage	Suction:	---
Synch Speed:	1800 rpm	Discharge:	4 in
Dia:	10.0625 in		
Curve:	---		

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Search Criteria:

Flow:	519 US gpm	Near Miss:	---
Head:	86 ft	Static Head:	73 ft

Pump Limits:

Temperature:	---	Sphere Size:	3.19 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	30 hp
Enclosure:	TEFC	Speed:	1800 rpm
Frame:	286T		
Sizing Criteria:	Max Power on Design Curve		

Pump Selection Warnings:

None

--- Duty Point ---

Flow:	524 US gpm
Head:	86.3 ft
Eff:	65.1%
Power:	17.5 hp
NPSHr:	---
Speed:	1750 rpm

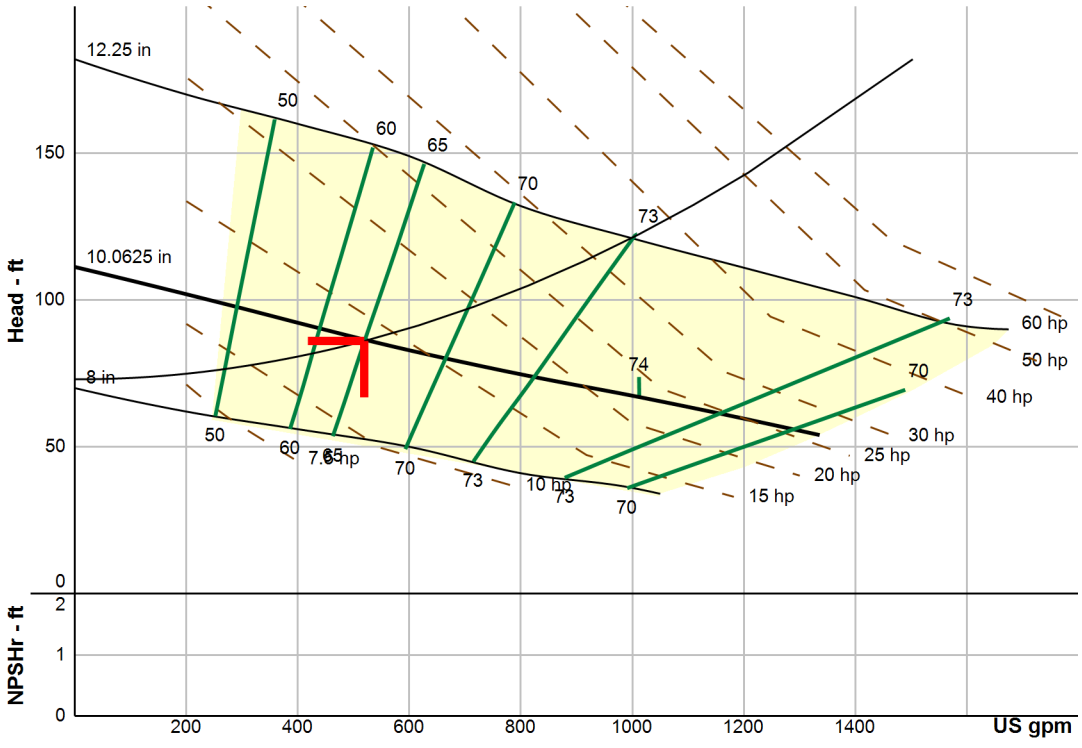
--- Design Curve ---

Shutoff Head:	111 ft
Shutoff dP:	48.2 psi
Min Flow:	--- US gpm

BEP: 74% @ 1013 US gpm
NOL Power:
26.4 hp @ 1336 US gpm

--- Max Curve ---

Max Power:
53.6 hp @ 1675 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
623	1750	81.9	68.3	18.8	---
519	1750	86.5	64.9	17.5	---
415	1750	91.5	58.4	16.3	---
311	1750	96.6	51.4	14.7	---
208	1750	102	46.3	11.5	---

Pump Data Sheet - Keen Pump Inc.

Company: Michael Baker International
Name: WYNNETH REQUIERON
Date: 09/17/2024

Pump:

Size:	K4VB	Dimensions:	
Type:	Submersible Sewage	Suction:	---
Synch Speed:	1800 rpm	Discharge:	4 in
Dia:	10.5 in		
Curve:	---		

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Search Criteria:

Flow:	599 US gpm	Near Miss:	---
Head:	95 ft	Static Head:	74 ft

Pump Limits:

Temperature:	---	Sphere Size:	3.19 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	40 hp
Enclosure:	TEFC	Speed:	1800 rpm
Frame:	324T		
Sizing Criteria:	Max Power on Design Curve		

Pump Selection Warnings:

None

--- Duty Point ---

Flow:	608 US gpm
Head:	95.6 ft
Eff:	67%
Power:	21.9 hp
NPSHr:	---
Speed:	1750 rpm

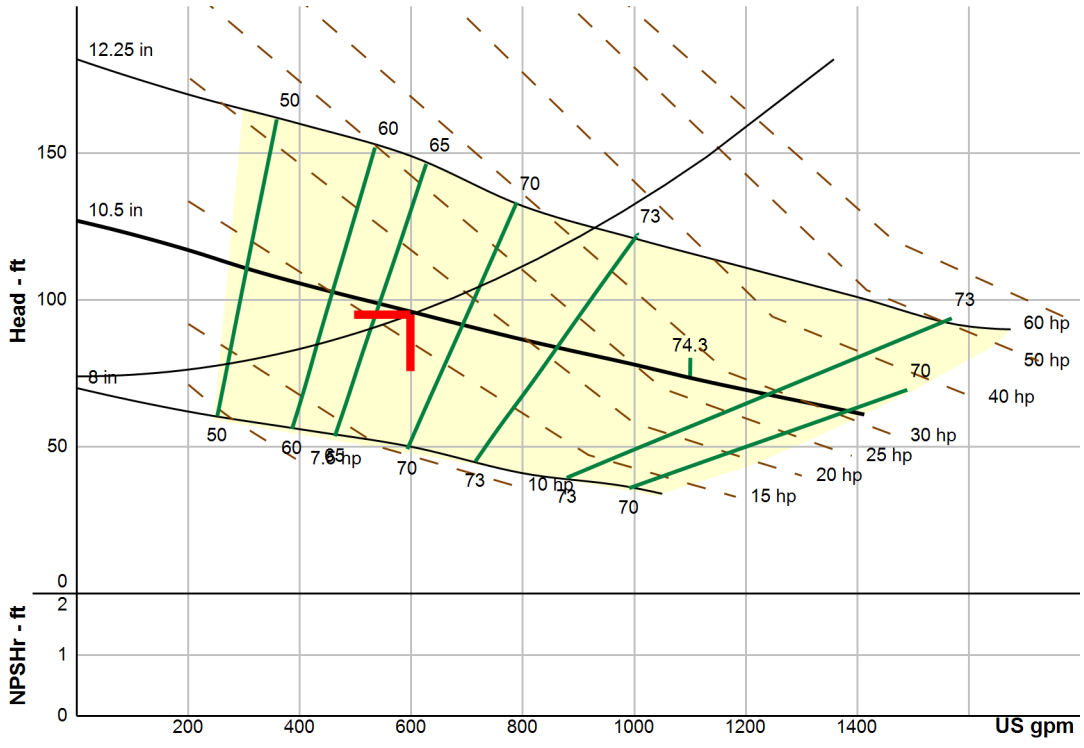
--- Design Curve ---

Shutoff Head:	127 ft
Shutoff dP:	55 psi
Min Flow:	--- US gpm

BEP: 74.3% @ 1100 US gpm
NOL Power:
31.3 hp @ 1413 US gpm

--- Max Curve ---

Max Power:
53.6 hp @ 1675 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
719	1750	90.3	70.6	23.2	---
599	1750	96	66.7	21.8	---
479	1750	102	61.2	20.1	---
359	1750	108	53.5	18	---
240	1750	115	47.5	14.5	---

Pump Data Sheet - Keen Pump Inc.

Company: Michael Baker International
Name: WYNNETH REQUIERON
Date: 09/17/2024

Pump:

Size:	K4VB	Dimensions:	
Type:	Submersible Sewage	Suction:	---
Synch Speed:	1800 rpm	Discharge:	4 in
Dia:	11 in		
Curve:	---		

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Search Criteria:

Flow:	720 US gpm	Near Miss:	---
Head:	104 ft	Static Head:	74 ft

Pump Limits:

Temperature:	---	Sphere Size:	3.19 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	40 hp
Enclosure:	TEFC	Speed:	1800 rpm
Frame:	324T		
Sizing Criteria:	Max Power on Design Curve		

Pump Selection Warnings:

None

--- Duty Point ---

Flow:	723 US gpm
Head:	104 ft
Eff:	69.4%
Power:	27.2 hp
NPSHr:	---
Speed:	1750 rpm

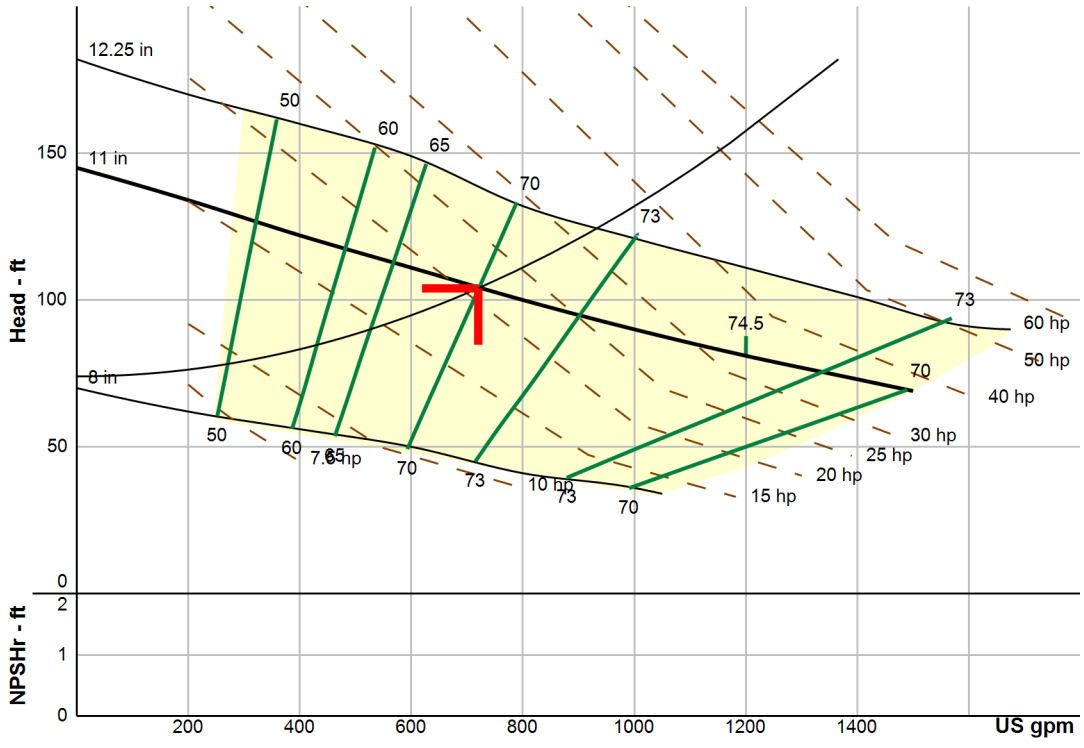
--- Design Curve ---

Shutoff Head:	145 ft
Shutoff dP:	62.8 psi
Min Flow:	--- US gpm

BEP: 74.5% @ 1200 US gpm
NOL Power:
37.3 hp @ 1500 US gpm

--- Max Curve ---

Max Power:
53.6 hp @ 1675 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
864	1750	96.8	72.3	29	---
720	1750	104	69.3	27.1	---
576	1750	112	64.7	25.1	---
432	1750	120	56.8	22.9	---
288	1750	129	49.4	18.3	---

Pump Data Sheet - Keen Pump Inc.

Company: Michael Baker International
Name: WYNNETH REQUIERON
Date: 09/17/2024

Pump:

Size:	K4VB	Dimensions:	
Type:	Submersible Sewage	Suction:	---
Synch Speed:	1800 rpm	Discharge:	4 in
Dia:	11.0625 in		
Curve:	---		

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Search Criteria:

Flow:	980 US gpm	Near Miss:	---
Head:	92 ft	Static Head:	0 ft

Pump Limits:

Temperature:	---	Sphere Size:	3.19 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	40 hp
Enclosure:	TEFC	Speed:	1800 rpm
Frame:	324T		
Sizing Criteria:	Max Power on Design Curve		

Pump Selection Warnings:

None

--- Duty Point ---

Flow:	984 US gpm
Head:	92.7 ft
Eff:	73.4%
Power:	31.1 hp
NPSHr:	---
Speed:	1750 rpm

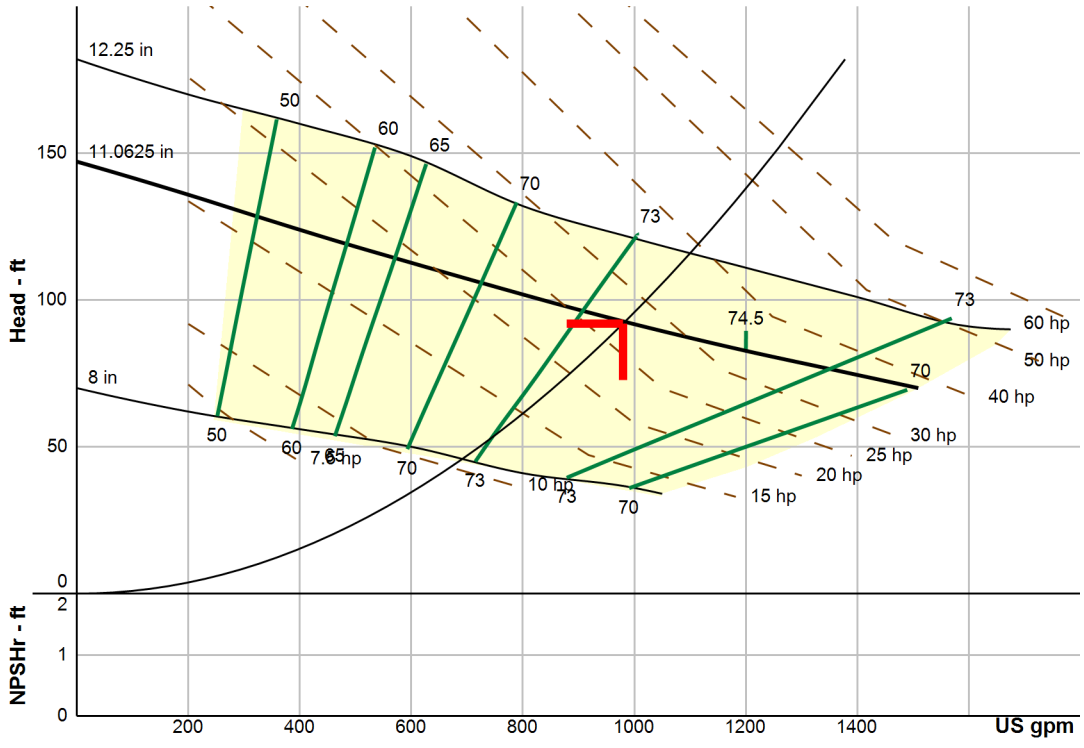
--- Design Curve ---

Shutoff Head:	147 ft
Shutoff dP:	63.7 psi
Min Flow:	--- US gpm

BEP: 74.5% @ 1200 US gpm
NOL Power:
38.1 hp @ 1509 US gpm

--- Max Curve ---

Max Power:
53.6 hp @ 1675 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
1176	1750	83.8	74.3	33.4	---
980	1750	92.9	73.4	31.1	---
784	1750	103	71	28.5	---
588	1750	113	65.6	25.6	---
392	1750	124	54.3	22.4	---

APPENDIX A – LS-1 Pump Selection Options

Option 9 – Flygt NP3102/NP3127 (4+1 configuration) and Dual 6” & 8” Force Mains

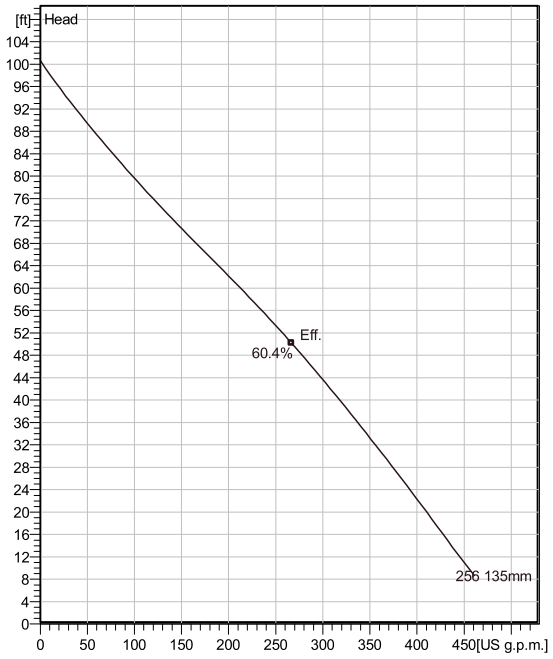
NP 3102 SH 3~ Adaptive 256

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.

Technical specification



Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6899E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N3102.760 18-10-2AL-W 6.5hp

Installation type
P - Semi permanent, Wet

Impeller diameter
135 mm

Discharge diameter
3 inch

Pump information

Impeller diameter
135 mm

Discharge diameter
3 inch

Inlet diameter
100 mm

Maximum operating speed
3440 rpm

Number of blades
2

Max. fluid temperature
40 °C

Material

Impeller
Stainless steel

Stator housing material
Grey cast iron

Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON		
Block		**Created on**	8/29/2024	**Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

Technical specification

Motor - General

Motor number N3102.760 18-10-2AL-W 6.5hp	**Phases** 3~	**Rated speed** 3440 rpm	**Rated power** 6.5 hp
ATEX approved No	**Number of poles** 2	**Rated current** 8.2 A	**Stator variant** 12
Frequency 60 Hz	**Rated voltage** 460 V	**Insulation class** H	**Type of Duty** S1
Version code 760			

Motor - Technical

Power factor - 1/1 Load 0.94	**Motor efficiency - 1/1 Load** 78.9 %	**Total moment of inertia** 0.349 lb ft²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.94	**Motor efficiency - 3/4 Load** 80.5 %	**Starting current, direct starting** 56 A	
Power factor - 1/2 Load 0.91	**Motor efficiency - 1/2 Load** 79.6 %	**Starting current, star-delta** 18.7 A	

Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON		
Block		**Created on**	8/29/2024	**Last update**	8/29/2024

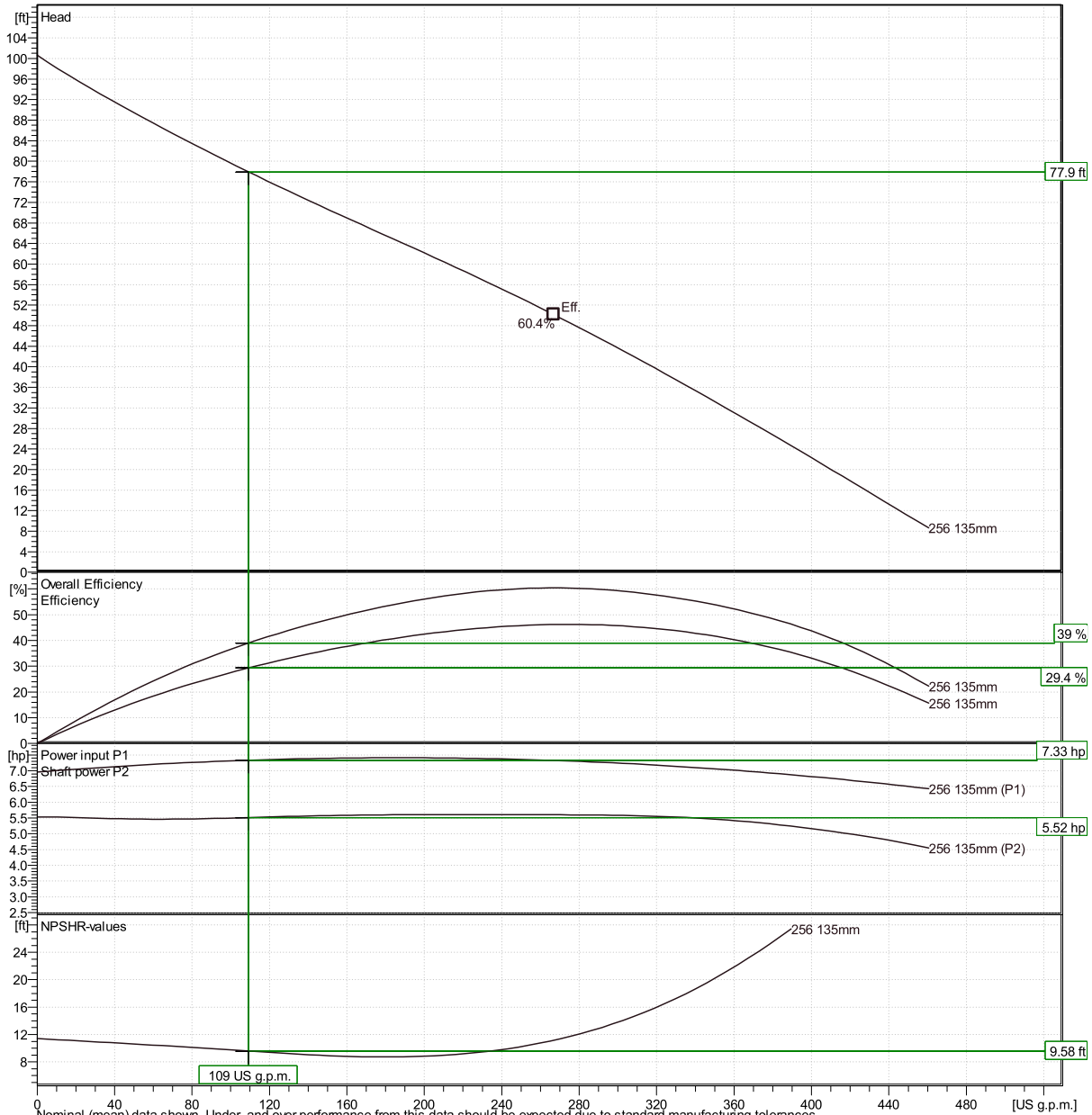
NP 3102 SH 3~ Adaptive 256

Performance curve

Duty point

Flow	Head
109 US g.p.m.	77.9 ft

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6899E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

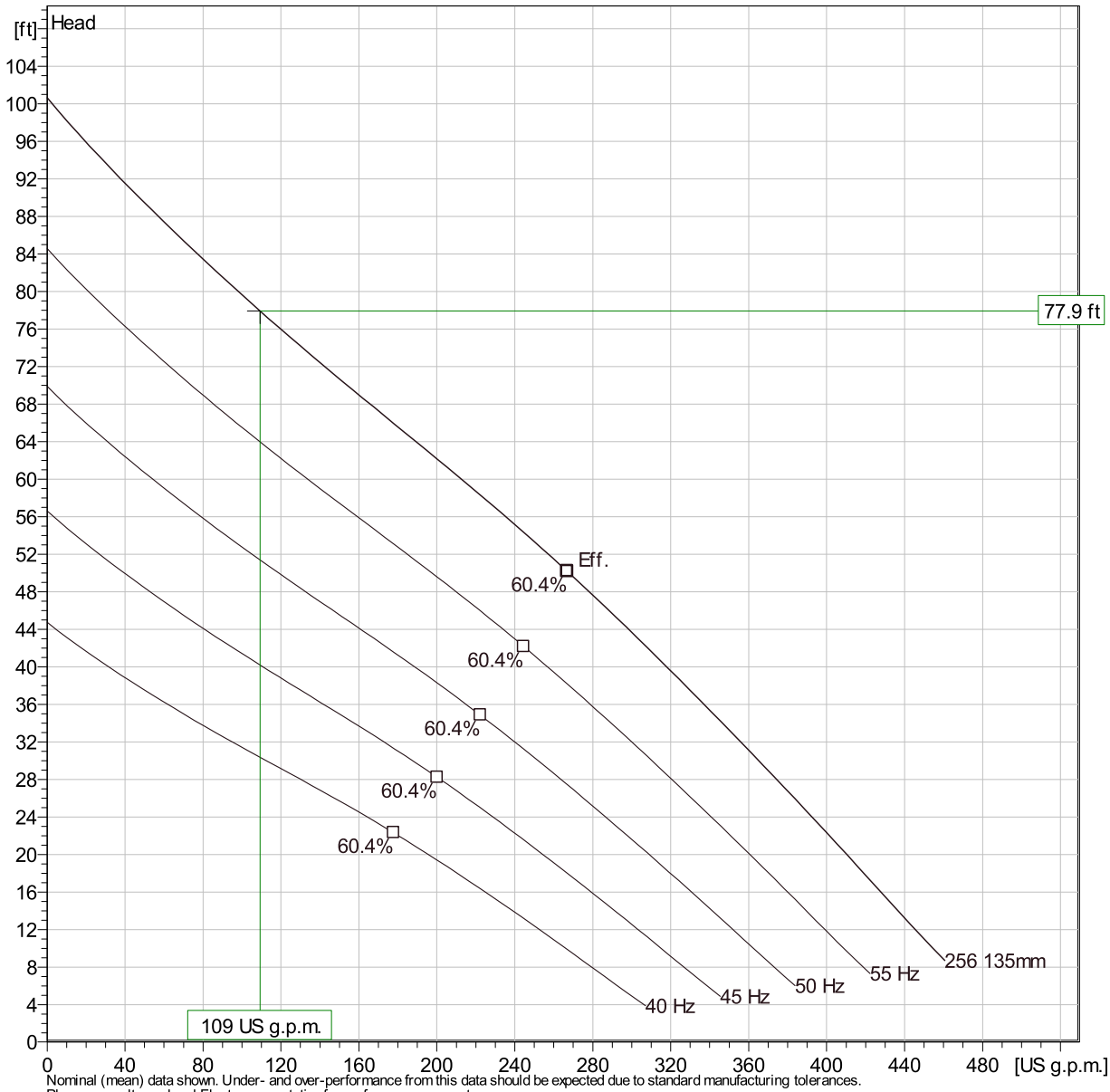
Curve: ISO 9906

Xylect-20536985		WYNNETH REQUIERON	
	Created on 8/29/2024	**Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.69E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

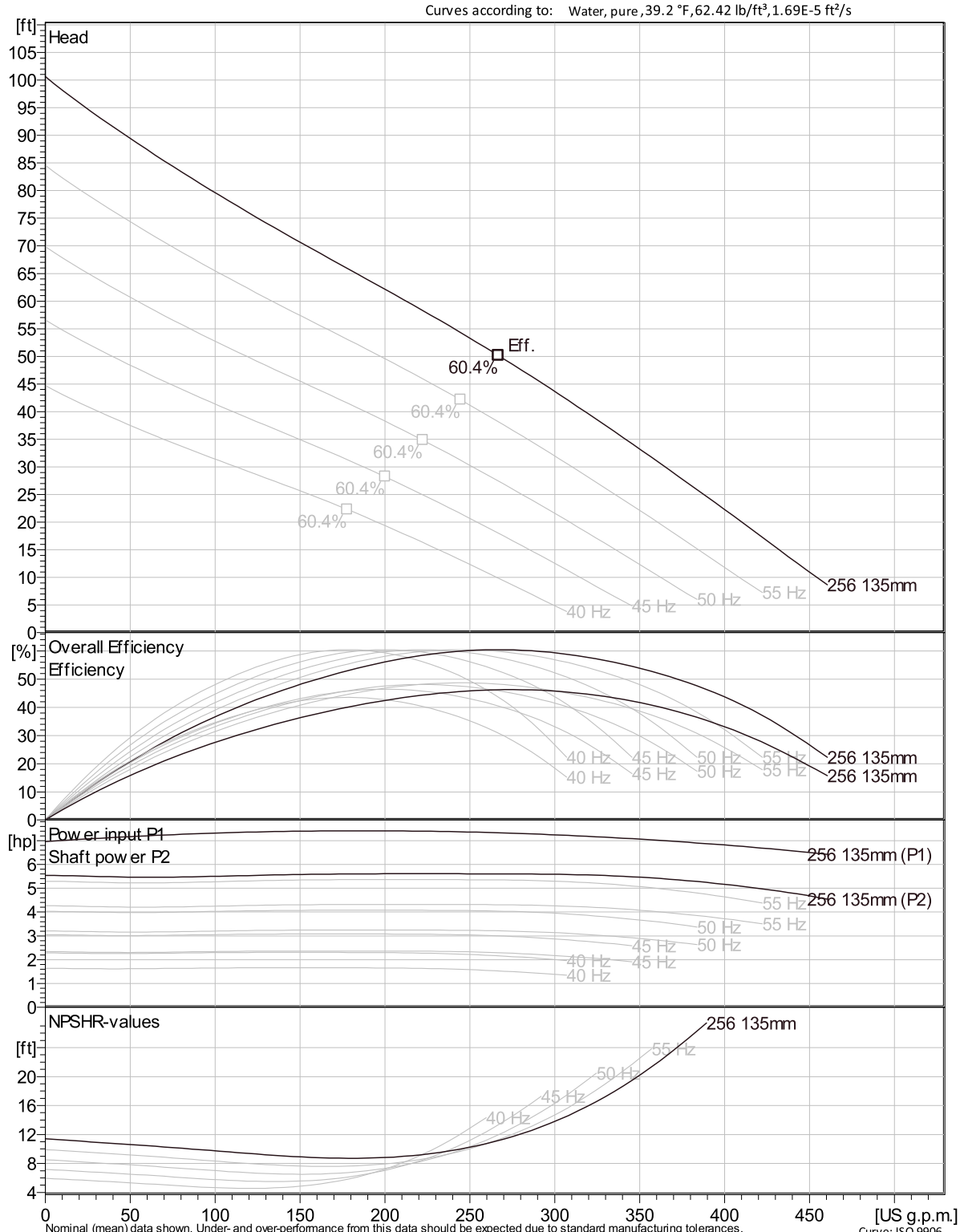
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1	109	77.9	5.52	109	77.9	5.52	39 %	834	9.58

Project		**Created by**	WYNNETH REQUIERON		
Block	Xylect-20536985	**Created on**	8/29/2024	**Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

VFD Curve

Curves according to: Water, pure ,39.2 °F,62.42 lb/ft³,1.69E-5 ft²/s



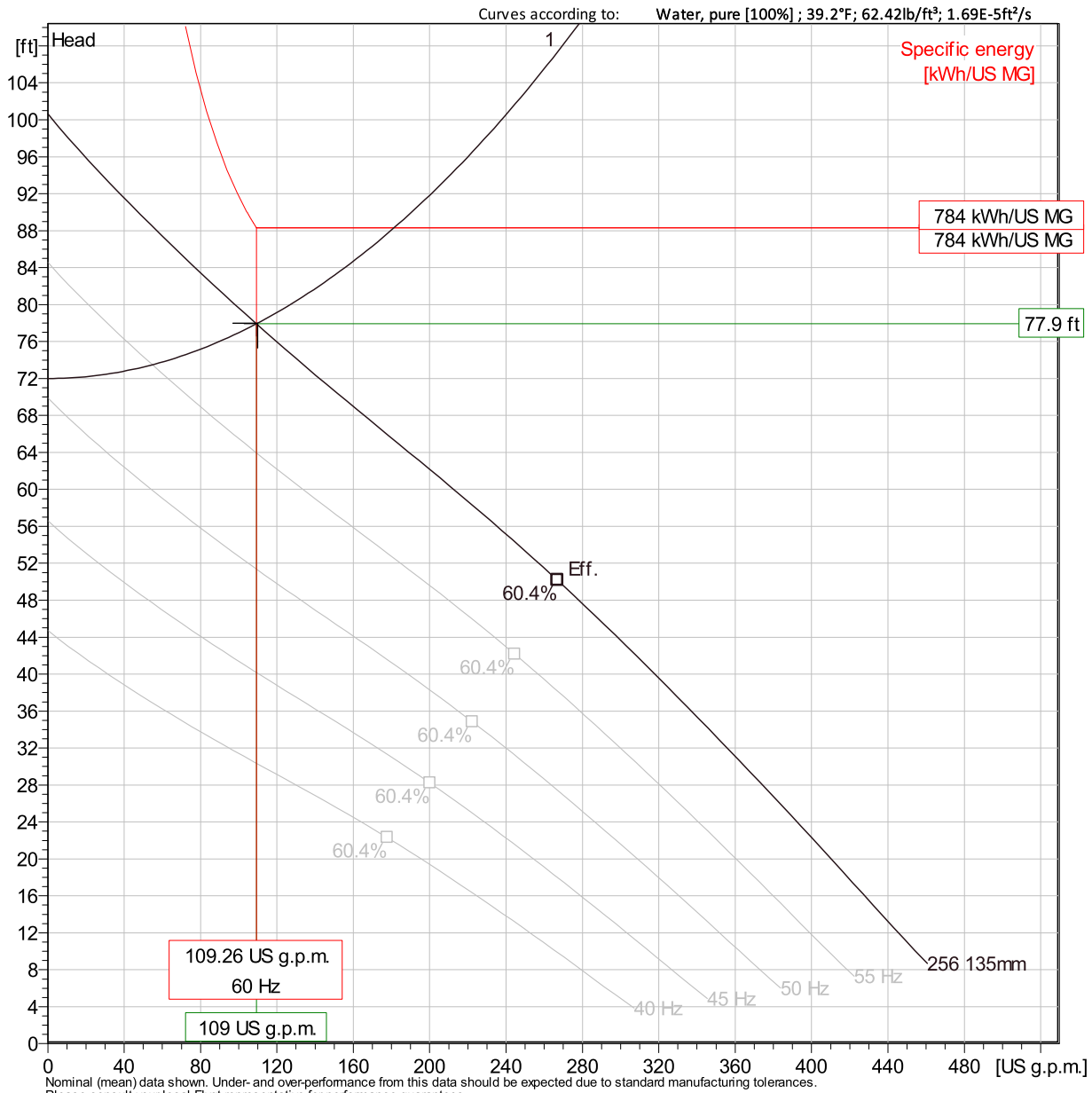
Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Curve: ISO 9906

Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON		
Block		**Created on**	8/29/2024	**Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

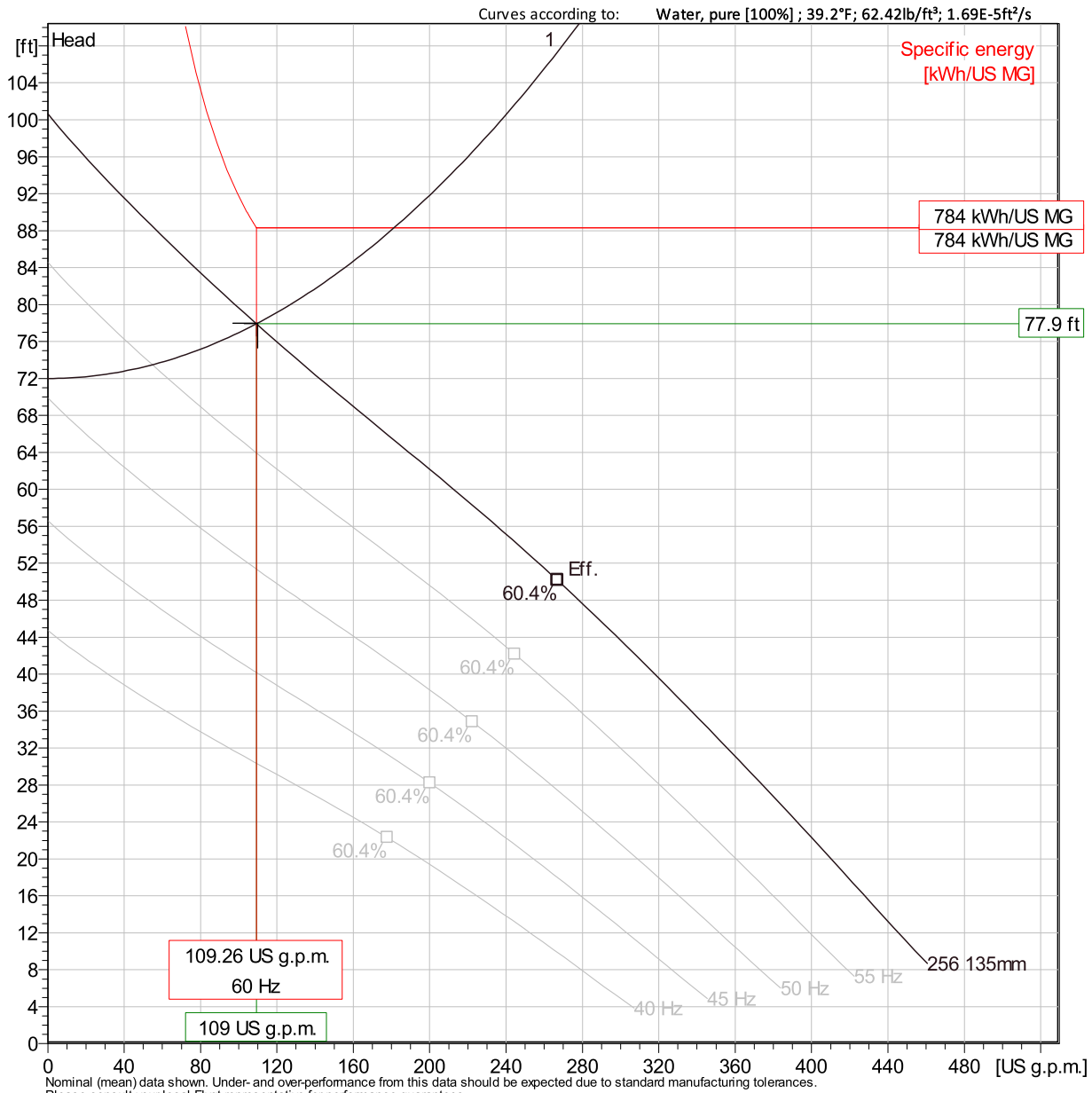
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1	60 Hz	109	77.9	5.52	109	77.9	5.52	39 %	834	9.58
1	55 Hz	54.8	73.5	4.21	54.8	73.5	4.21	24.2 %	1190	9.1
1	50 Hz									
1	45 Hz									

Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON		
Block		**Created on**	8/29/2024	**Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

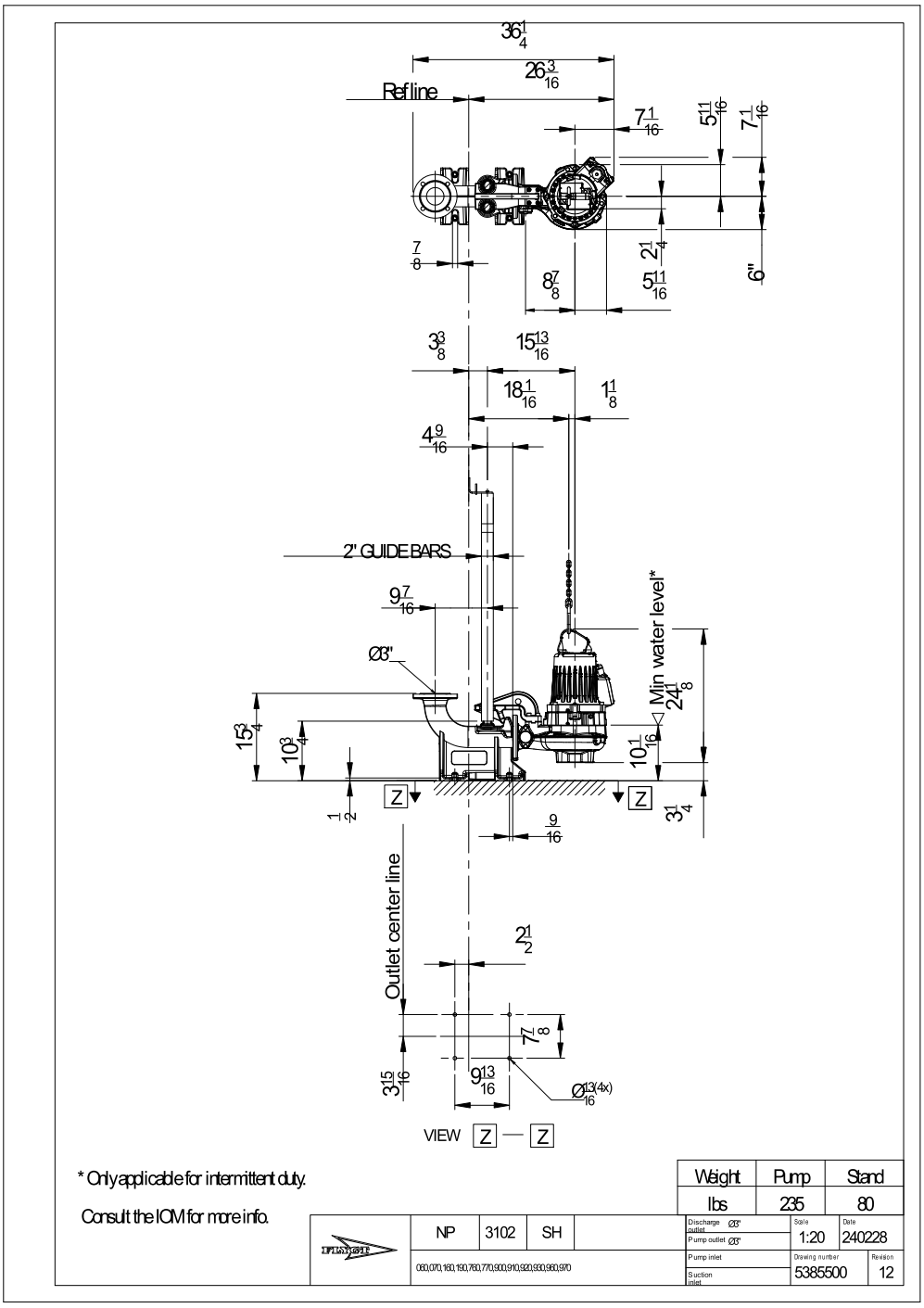
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1	40 Hz									

Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON		
Block		**Created on**	8/29/2024	**Last update**	8/29/2024

NP 3102 SH 3~ Adaptive 256

Dimensional drawing



Project	Xylect-20536985	**Created by**	WYNNETH REQUIERON
Block		**Created on**	8/29/2024 **Last update** 8/29/2024

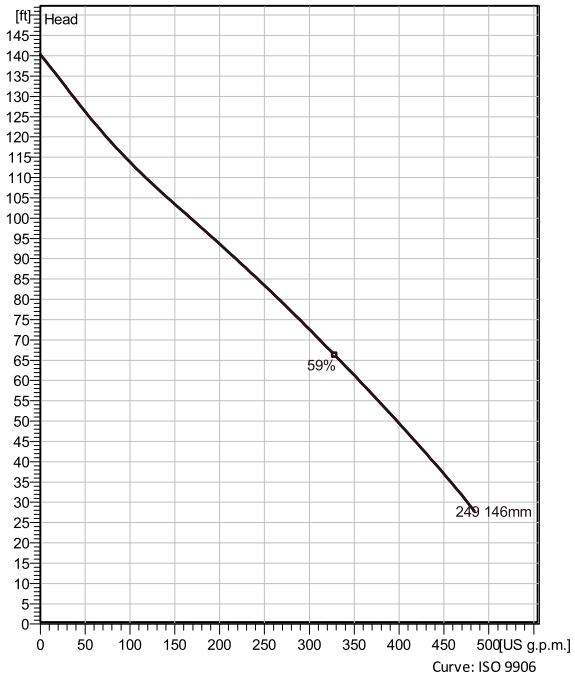
NP 3127 SH 3~ Adaptive 249

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.

Technical specification



Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N3127.930 21-11-2AS-W IE3 12hp

Installation type
P - Semi permanent, Wet

Impeller diameter
146 mm

Discharge diameter
3 inch

Pump information

Impeller diameter
146 mm

Discharge diameter
3 inch

Inlet diameter
90 mm

Maximum operating speed
3600 rpm

Number of blades
2

Max. fluid temperature
40 °C

Material

Impeller
Hard-Iron ™

Stator housing material
Grey cast iron

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Technical specification

Motor - General

Motor number N3127.930 21-11-2AS-W IE3 12hp	**Phases** 3~	**Rated speed** 3600 rpm	**Rated power** 12 hp
ATEX approved FM	**Number of poles** 2	**Rated current** 14 A	**Stator variant** 60
Frequency 60 Hz	**Rated voltage** 460 V	**Insulation class** H	**Type of Duty** S1
Version code 930			

Motor - Technical

Power factor - 1/1 Load 0.91	**Motor efficiency - 1/1 Load** 91.4 %	**Total moment of inertia** 0.482 lb ft²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.90	**Motor efficiency - 3/4 Load** 91.2 %	**Starting current, direct starting** 120 A	
Power factor - 1/2 Load 0.86	**Motor efficiency - 1/2 Load** 89.3 %	**Starting current, star-delta** 40 A	

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

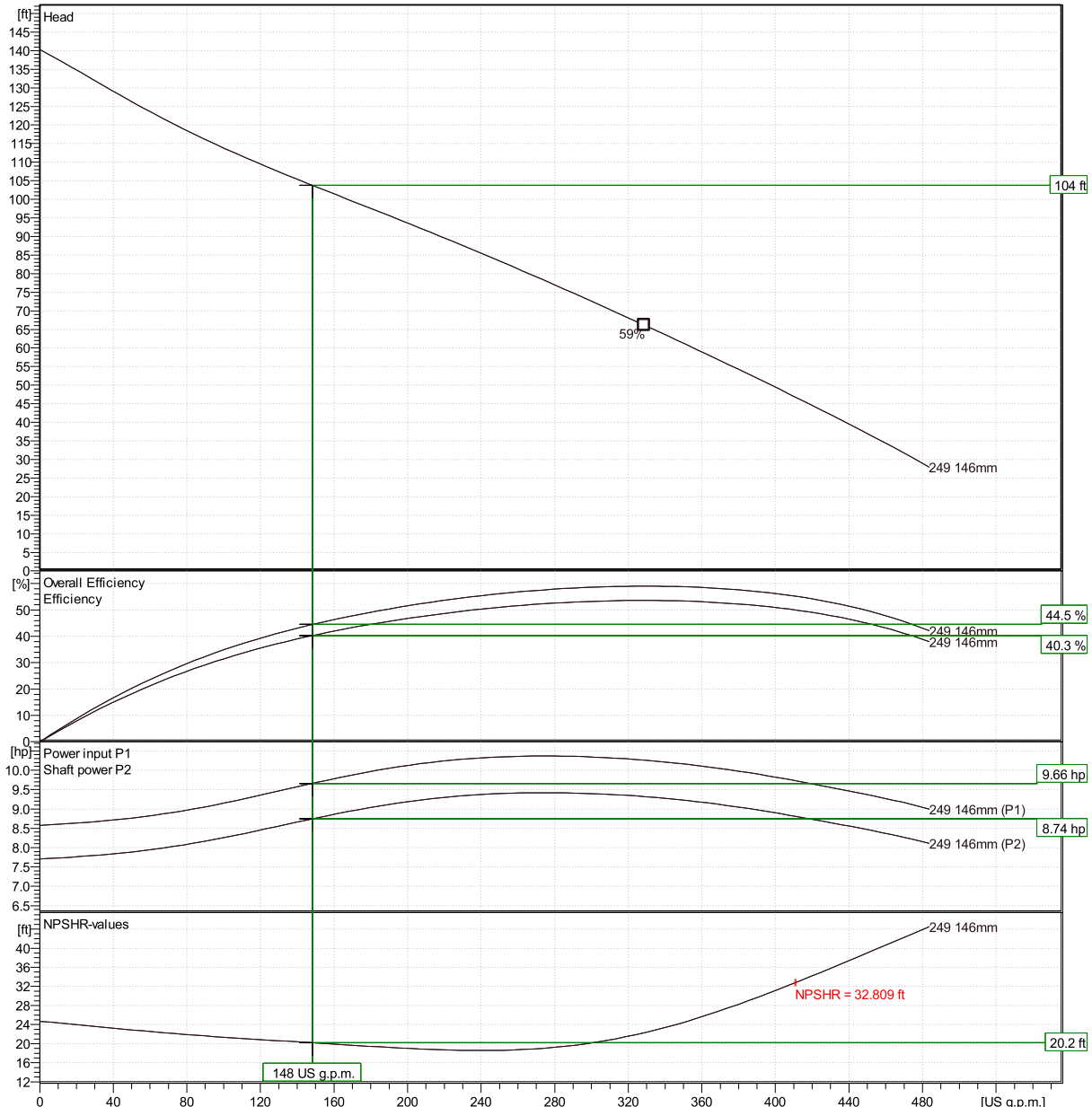
NP 3127 SH 3~ Adaptive 249

Performance curve

Duty point

Flow	Head
148 US g.p.m.	104 ft

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

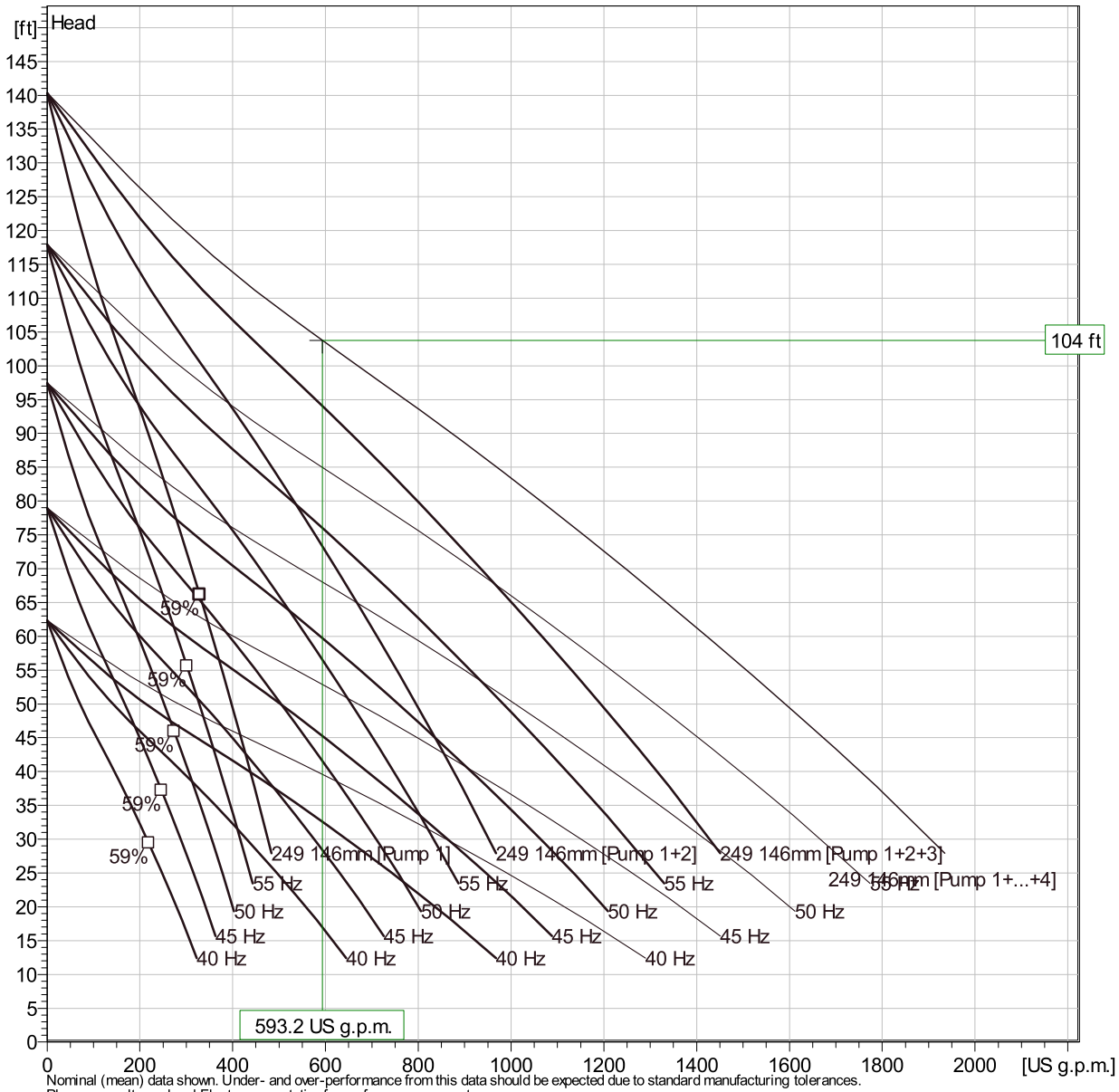
Curve: ISO 9906

Xylect-20524157		Alan Dahlqvist	
	Created on	8/28/2024 **Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

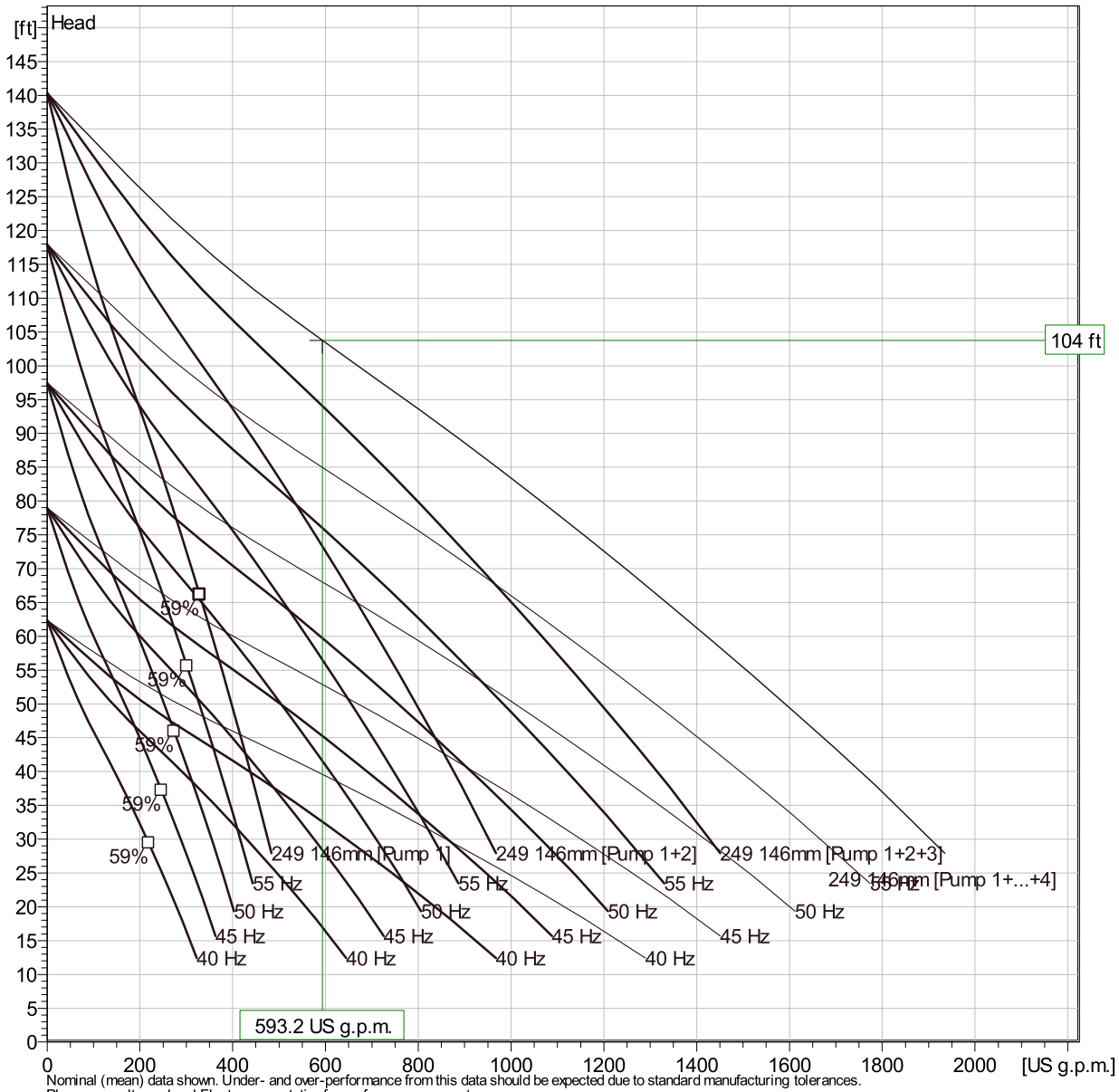
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 3	405	48.3	8.86	405	48.3	8.86	55.8 %	300	31.8
4 / 2	94.7	115	8.21	379	115	32.8	33.6 %	1190	21.5
3 / 2	123	109	8.48	368	109	25.4	39.9 %	950	20.8

Project		**Created by**	Alan Dahlqvist		
Block	Xylect-20524157	**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

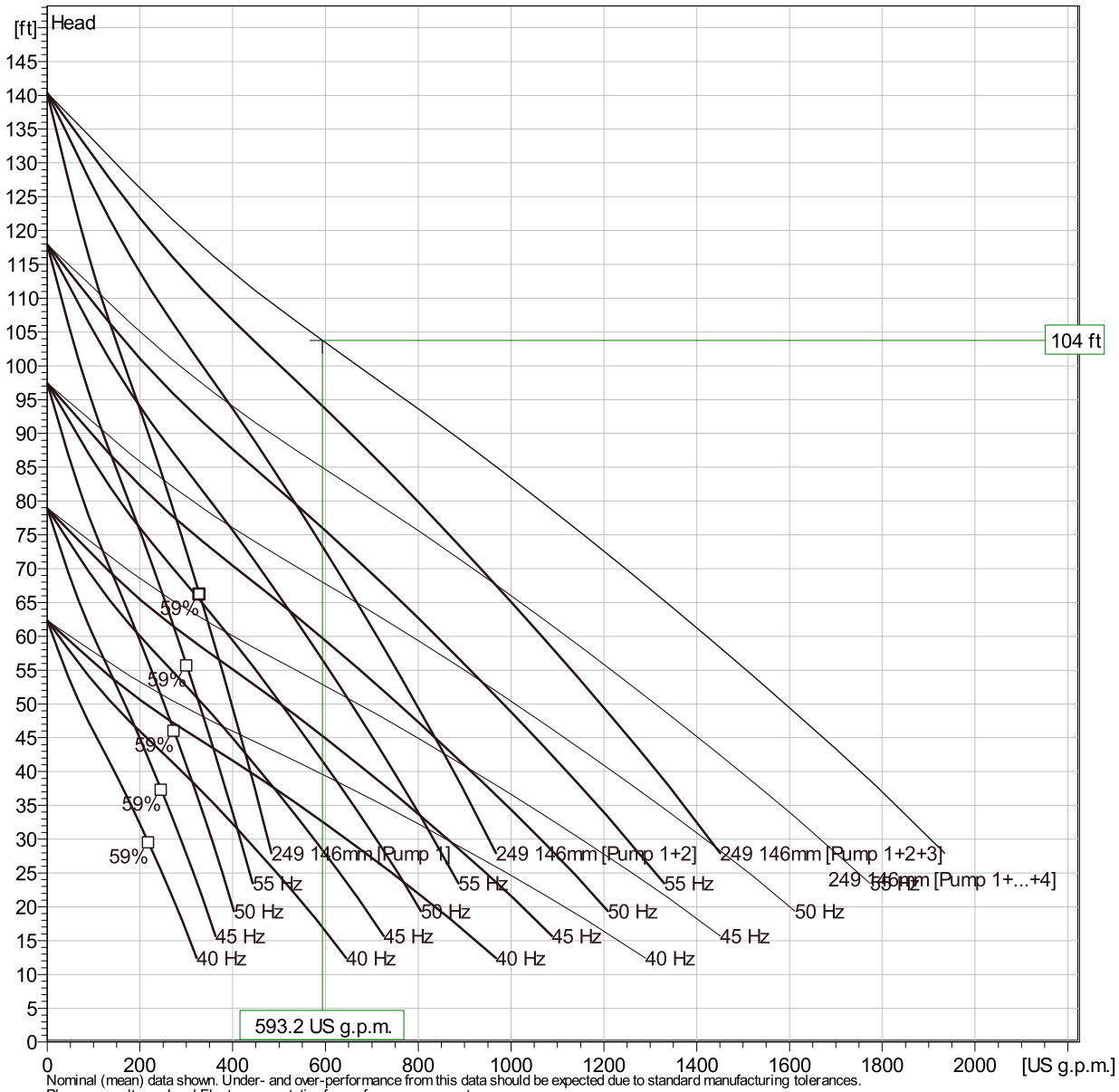
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 2	175	98.5	9	350	98.5	18	48.5 %	704	19.5
1 / 2	301	72.5	9.4	301	72.5	9.4	58.6 %	428	20.2
4 / 1	54.9	125	7.92	220	125	31.7	21.9 %	1990	22.7

Project		**Created by**	Alan Dahlqvist		
Block	Xylect-20524157	**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3 / 1	71.9	121	8.02	216	121	24.1	27.3 %	1540	22.2
2 / 1	104	113	8.3	209	113	16.6	35.9 %	1100	21.2
1 / 1	192	95.3	9.13	192	95.3	9.13	50.6 %	652	19.2

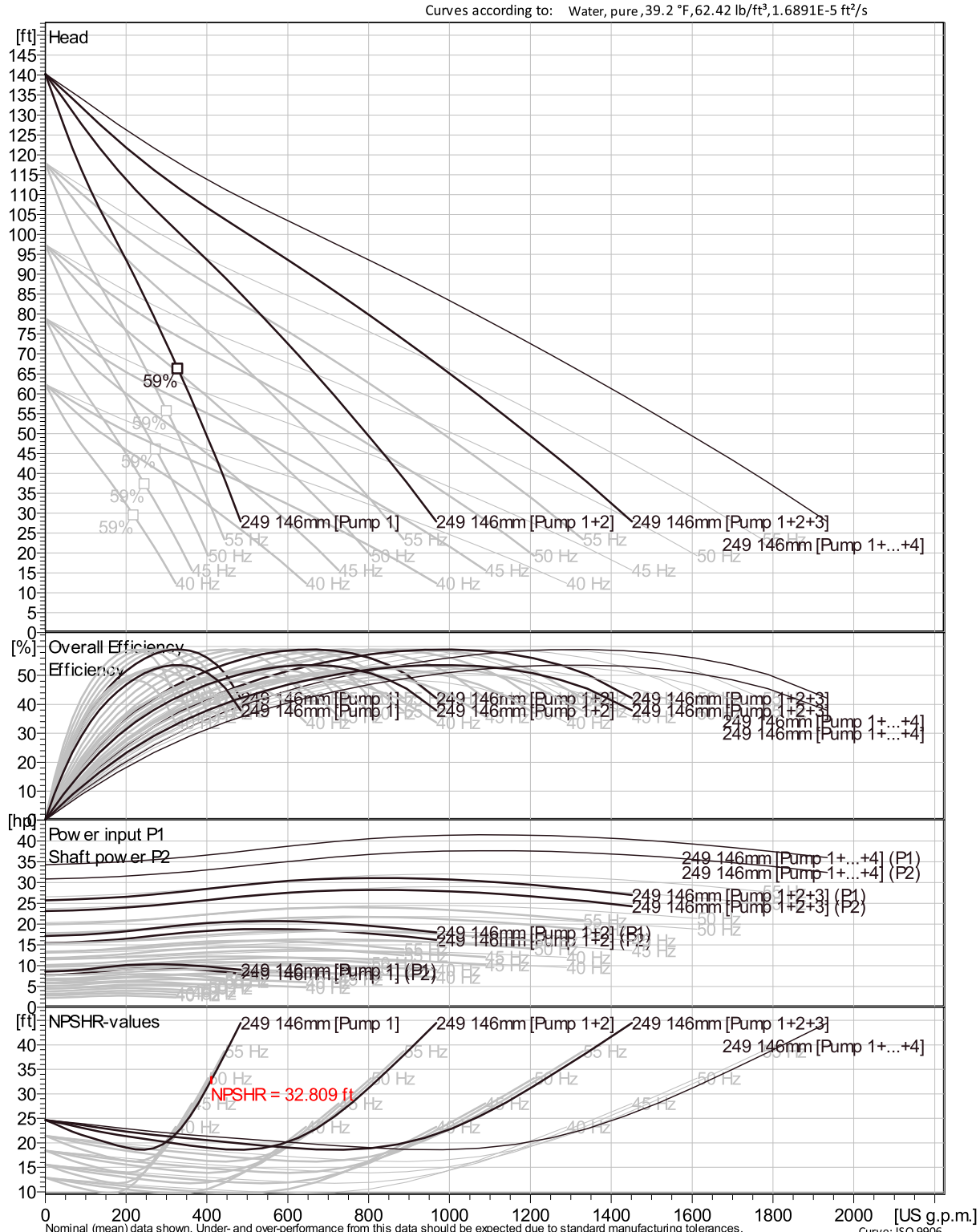
Project		**Created by**	Alan Dahlqvist		
Block	Xylect-20524157	**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Curve

FLYGT a xylem brand

Curves according to: Water, pure ,39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



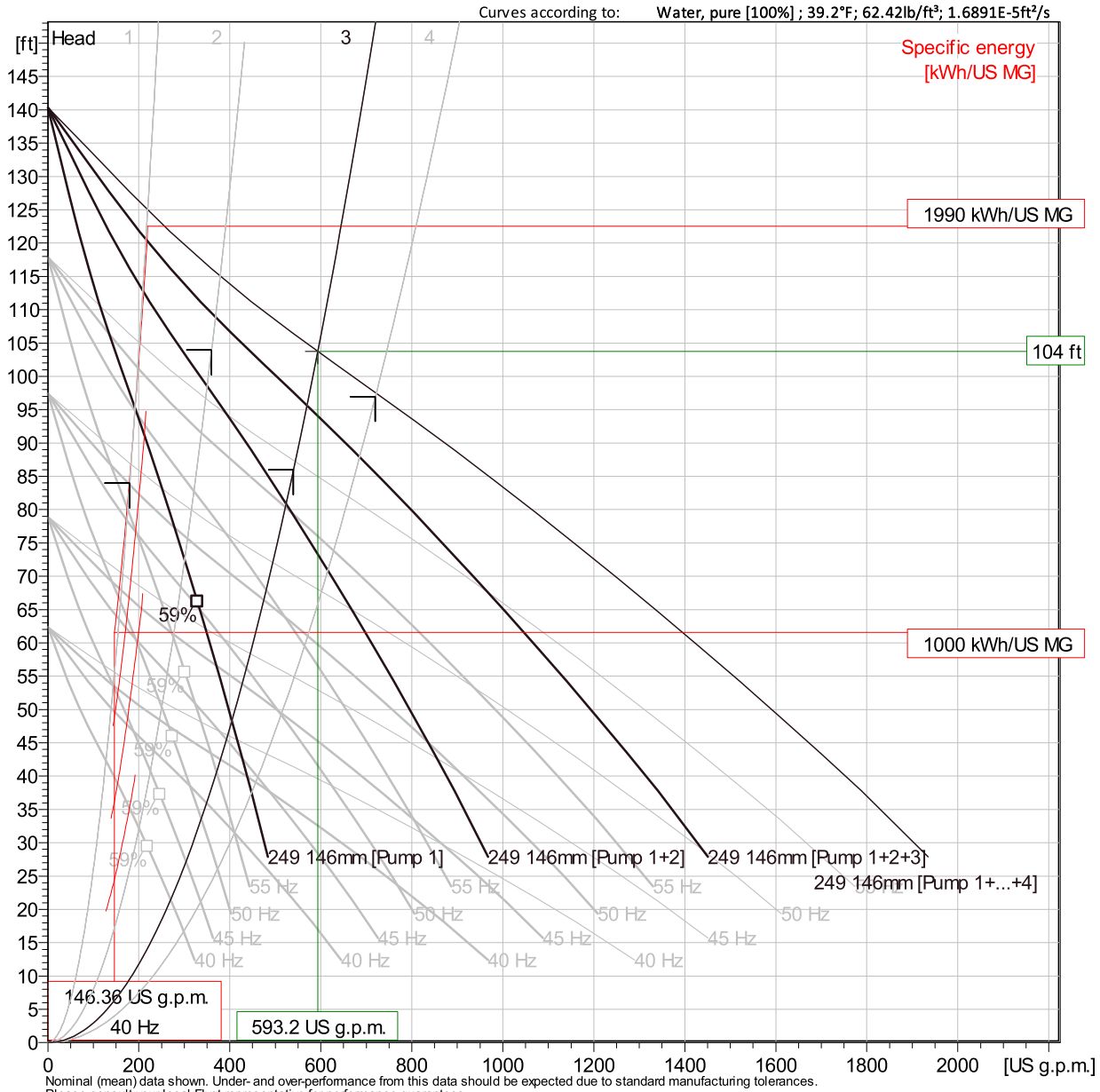
Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Curve: ISO 9906

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

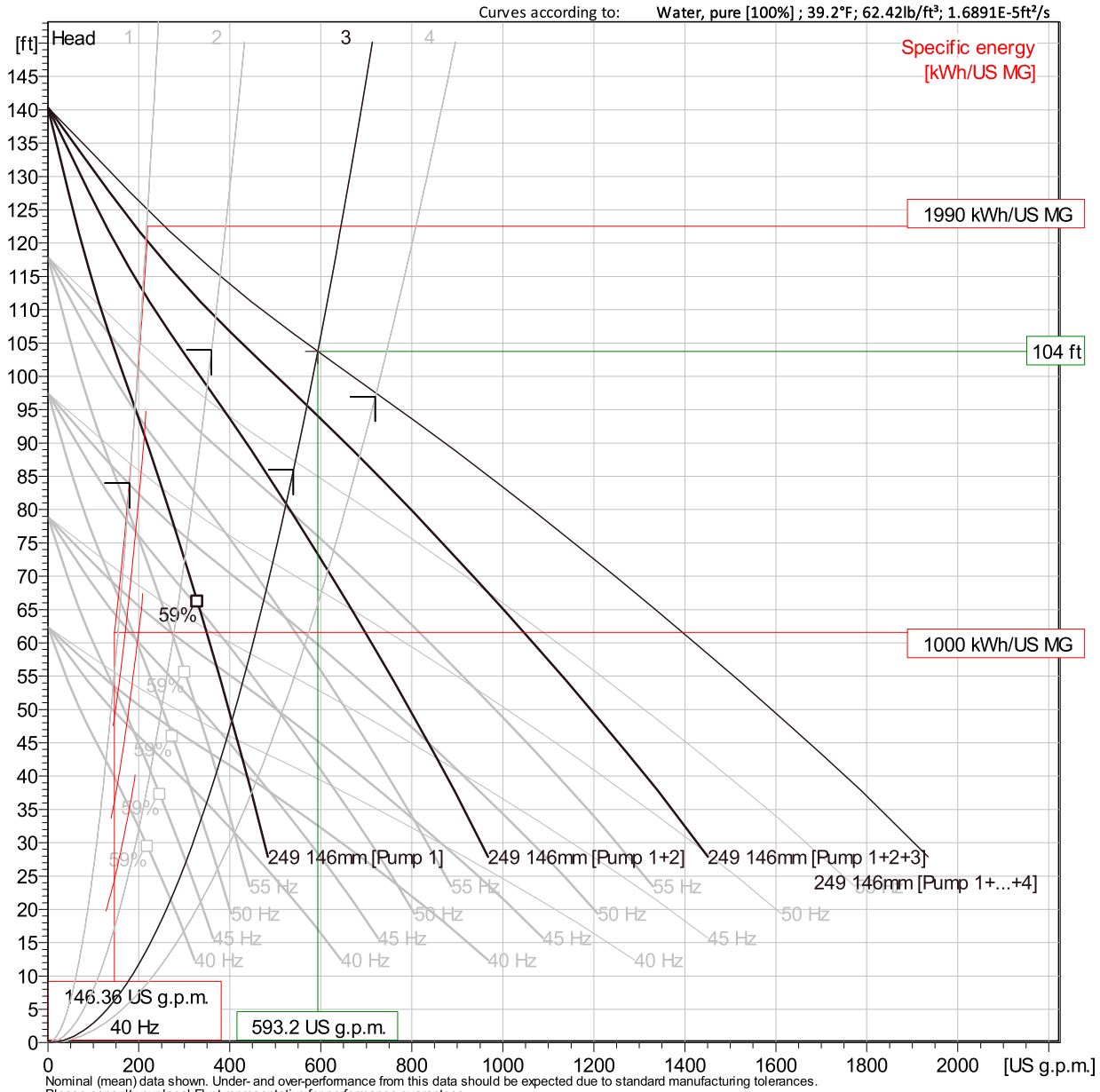
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 3	60 Hz	405	48.3	8.86	405	48.3	8.86	55.8 %	300	31.8
1 / 3	55 Hz	371	40.6	6.82	371	40.6	6.82	55.8 %	254	27.7
1 / 3	50 Hz	337	33.5	5.13	337.2623792502	33.5	5.13	55.8 %	214	23.8
1 / 3	45 Hz	304	27.2	3.74	304	27.2	3.74	55.8 %	178	20.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

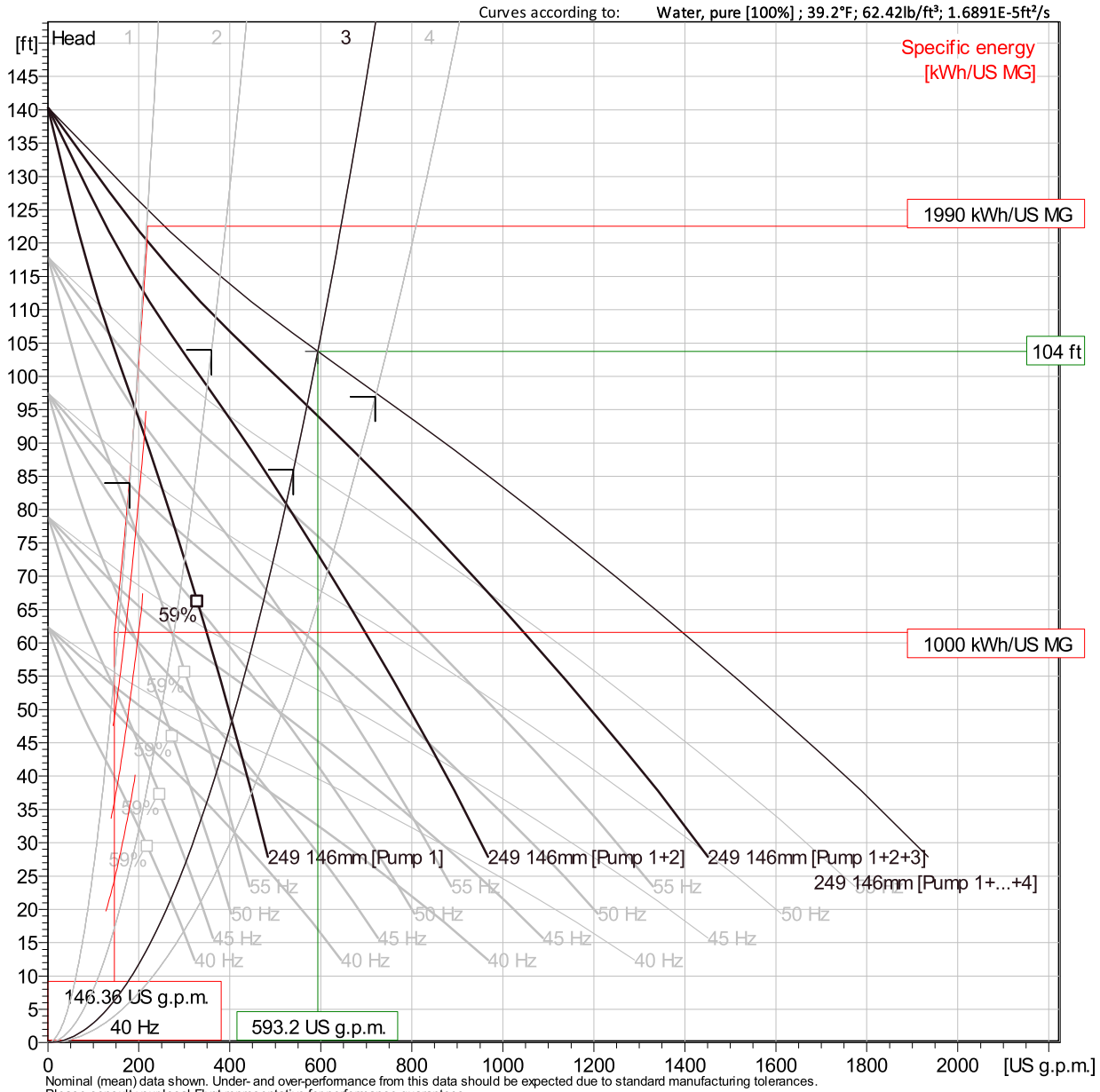
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 3	40 Hz	270	21.5	2.63	270	21.5	2.63	55.8 %	149	16.6
4 / 2	60 Hz	94.7	115	8.21	379	115	32.8	33.6 %	1190	21.5
4 / 2	55 Hz	86.8	96.7	6.32	347	96.7	25.3	33.6 %	1010	18.7
4 / 2	50 Hz	78.9	79.9	4.75	316	79.9	19	33.6 %	851	16.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

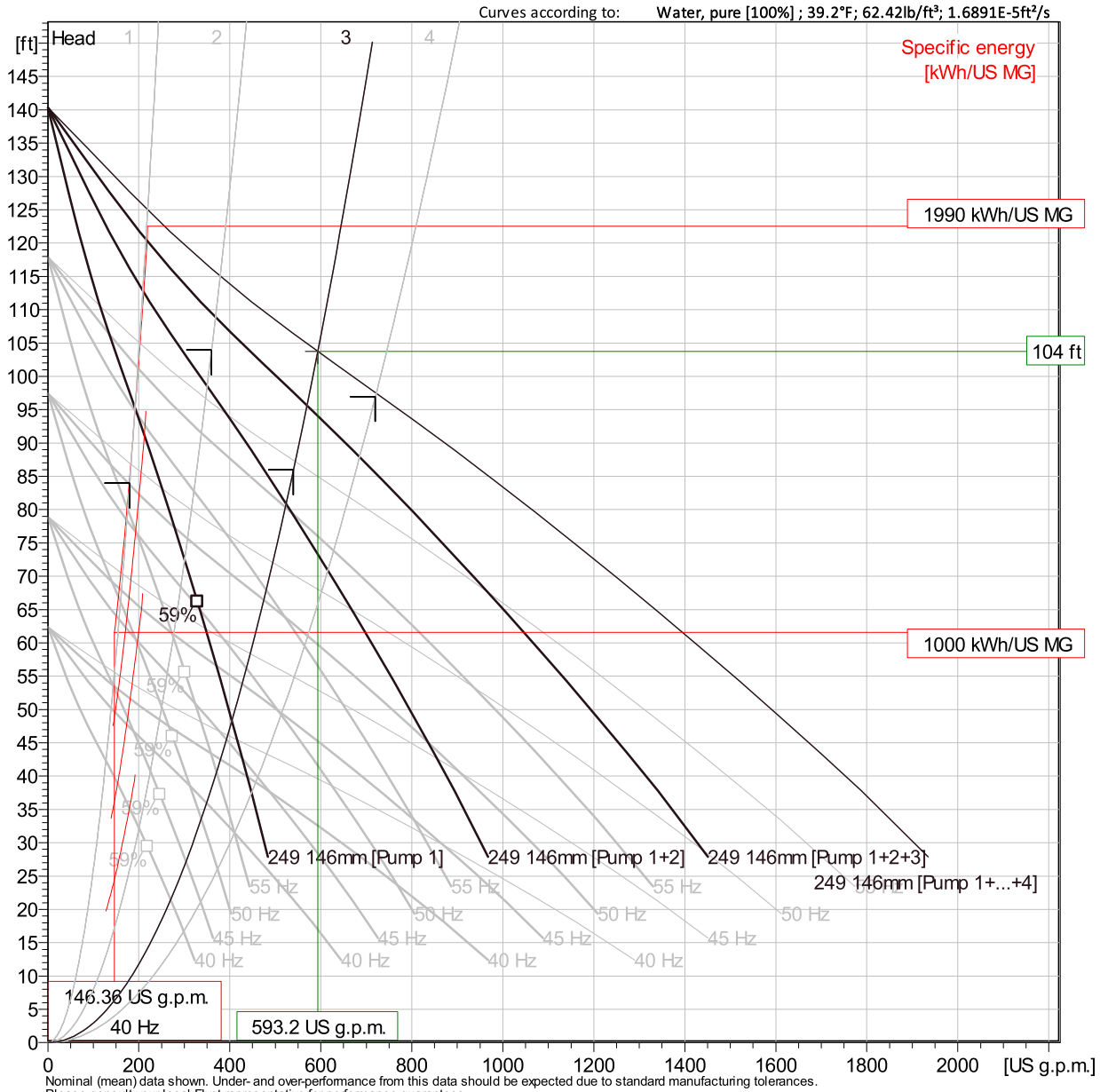
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
4 / 2	45 Hz	71	64.7	3.46	284	64.7	13.9	33.6 %	712	13.6
4 / 2	40 Hz	63.1	51.1	2.43	252	51.1	9.73	33.6 %	597	11.2
3 / 2	60 Hz	123	109	8.48	368	109	25.4	39.9 %	950	20.8
3 / 2	55 Hz	113	91.5	6.53	338	91.5	19.6	39.9 %	803	18.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

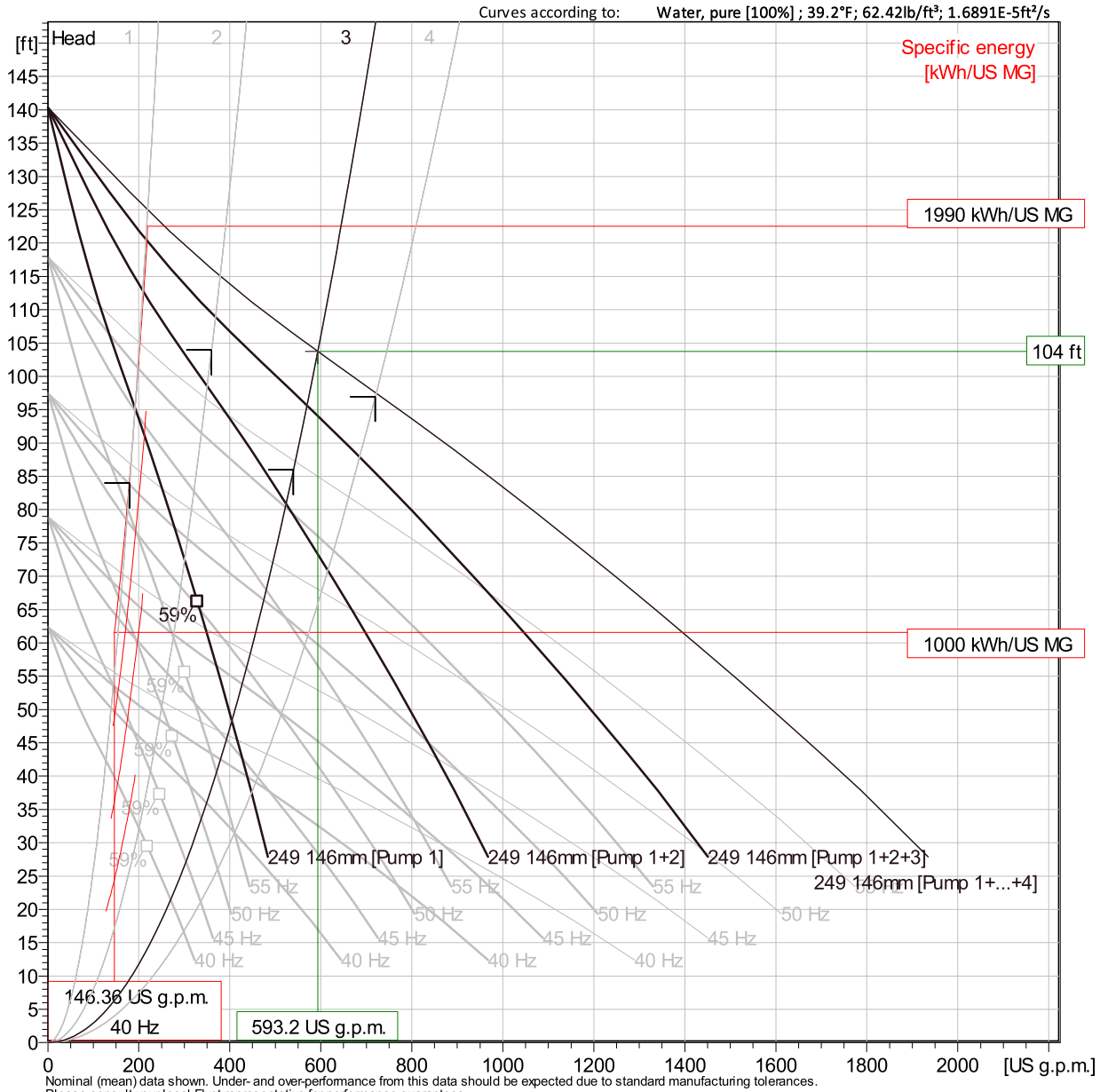
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3 / 2	50 Hz	102	75.6	4.91	307	75.6	14.7	39.9 %	676	15.5
3 / 2	45 Hz	92.1	61.3	3.58	276	61.3	10.7	39.9 %	565	13.1
3 / 2	40 Hz	81.9	48.4 ft	2.51	246	48.4	7.54	39.9 %	473	10.9
2 / 2	60 Hz	175	98.5	9	350	98.5	18	48.5 %	704	19.5

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

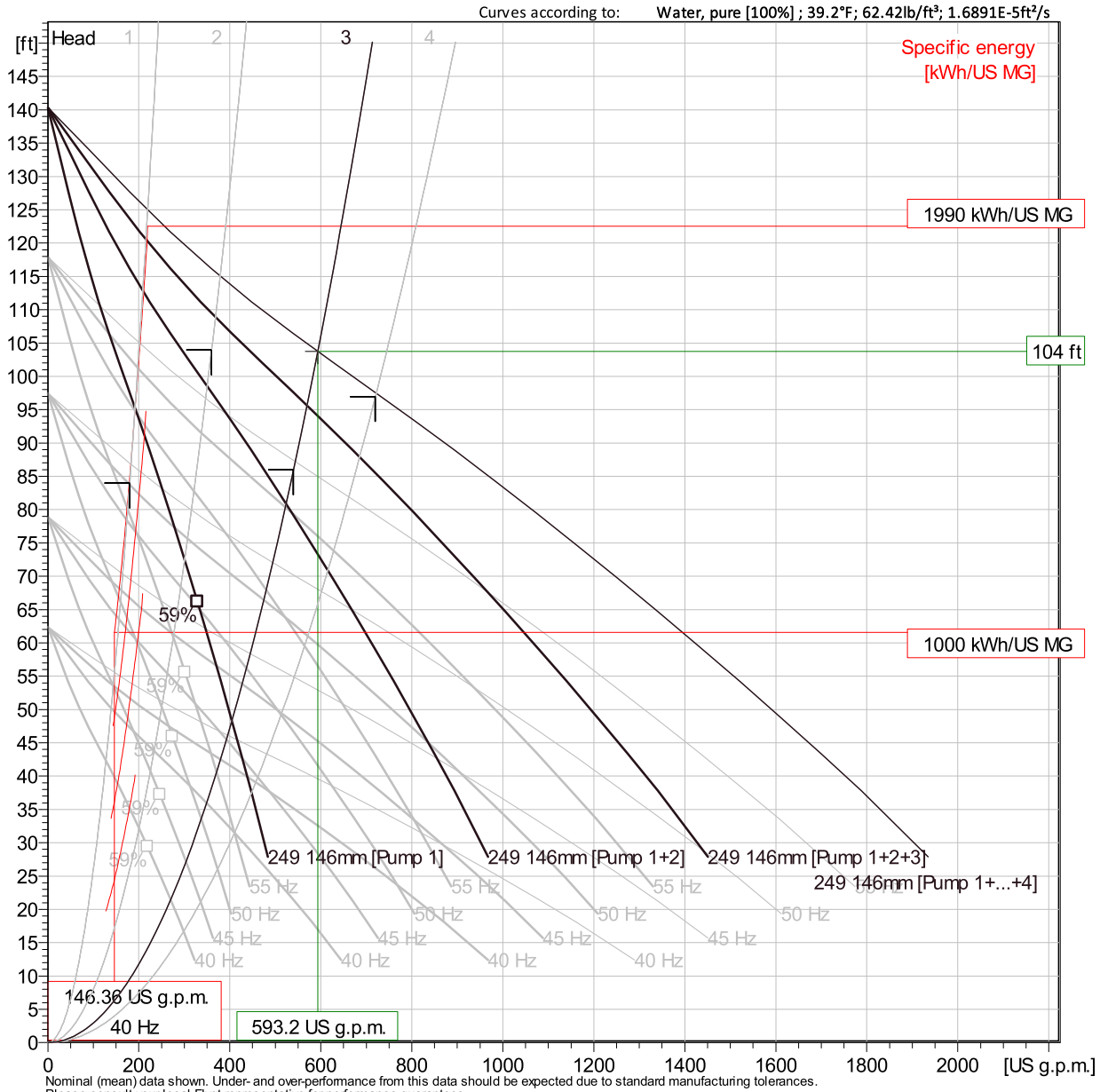
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 2	55 Hz	161	82.8	6.93	321	82.8	13.9	48.5 %	595	17
2 / 2	50 Hz	146	68.4	5.21	292	68.4	10.4	48.5 %	501	14.6
2 / 2	45 Hz	131	55.4	3.8	263	55.4	7.59	48.5 %	417	12.3
2 / 2	40 Hz	117	43.8	2.67	234	43.8	5.33	48.5 %	347	10.2

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

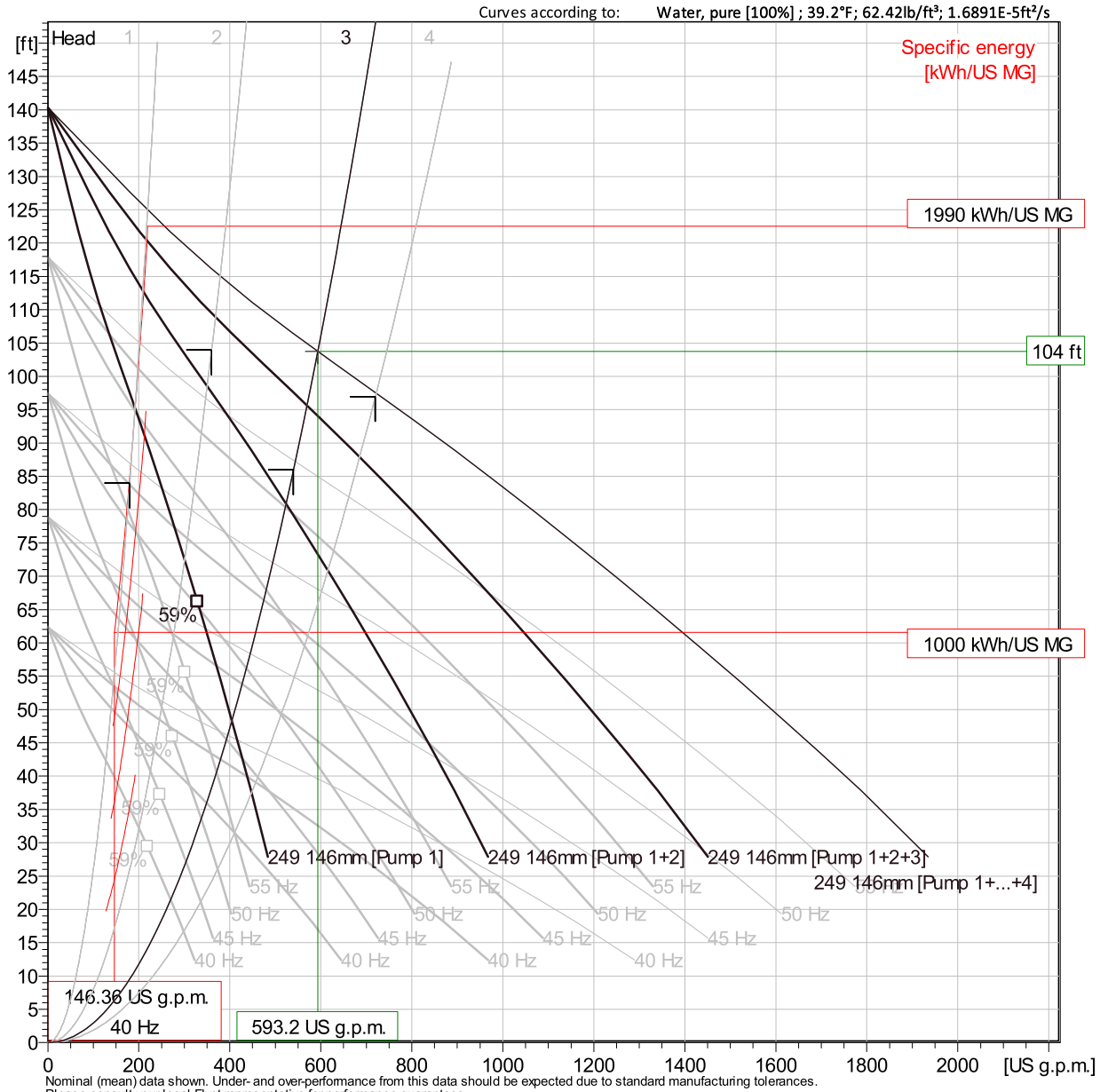
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 2	60 Hz	301	72.5	9.4	301	72.5	9.4	58.6 %	428	20.2
1 / 2	55 Hz	275	60.9	7.24	275	60.9	7.24	58.6 %	361	17.6
1 / 2	50 Hz	250	50.3	5.44	250	50.3	5.44	58.6 %	304	15.1
1 / 2	45 Hz	225	40.8	3.96	225	40.8	3.96	58.6 %	253	12.7

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

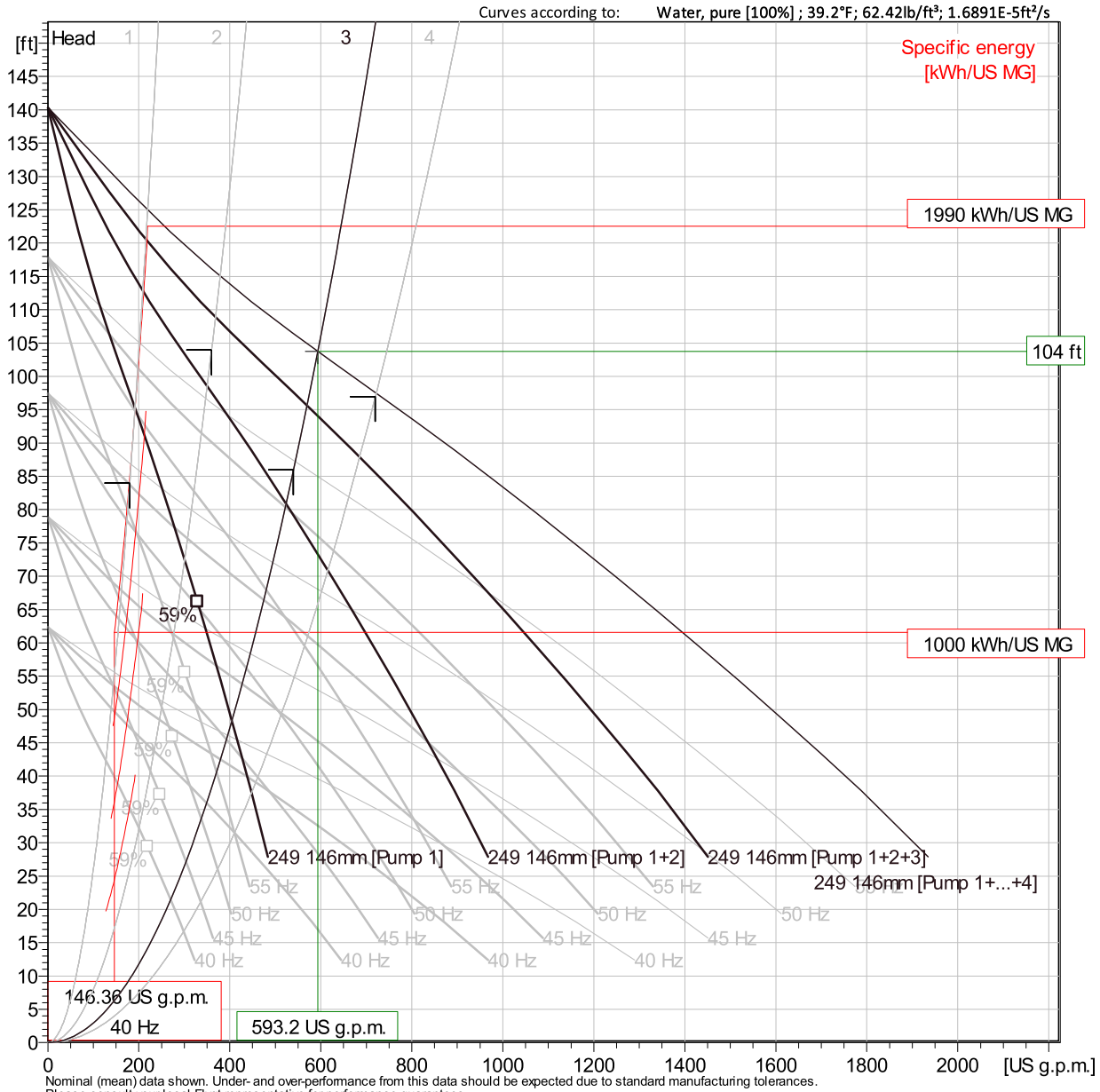
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 2	40 Hz	200	32.2	2.78	200	32.2	2.78	58.6 %	210	10.6
4 / 1	60 Hz	54.9	125	7.92	220	125	31.7	21.9 %	1990	22.7
4 / 1	55 Hz	50.3	105	6.1	201	105	24.4	21.9 %	1680	19.8
4 / 1	50 Hz	45.7	86.8	4.58	183	86.8	18.3	21.9 %	1420	17

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

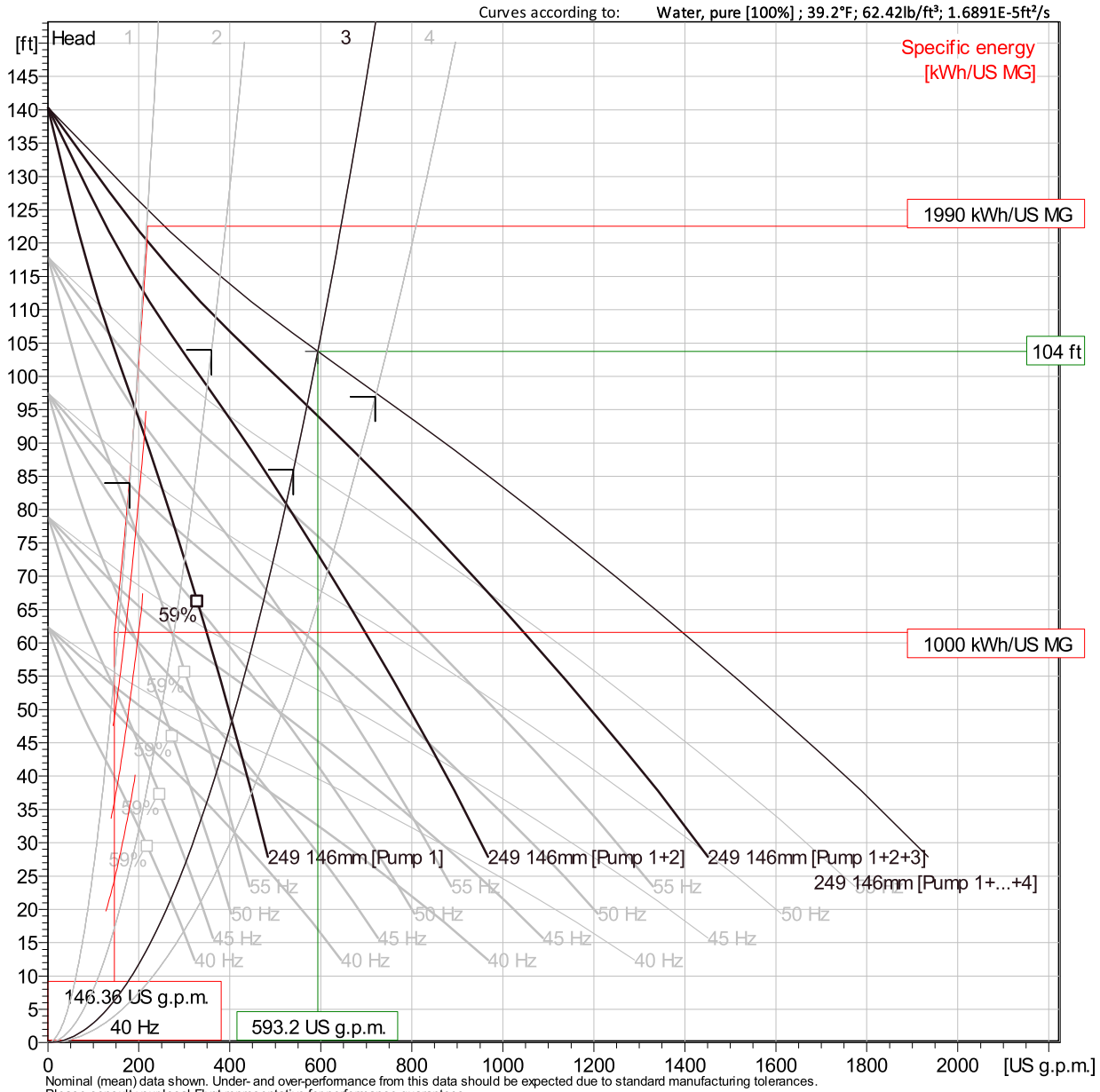
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
4 / 1	45 Hz	41.2	70.3	3.34	165	70.3	13.4	21.9 %	1190	14.3
4 / 1	40 Hz	36.6	55.5	2.35	146	55.5	9.38	21.9 %	1000	11.9
3 / 1	60 Hz	71.9	121	8.02	216	121	24.1	27.3 %	1540	22.2
3 / 1	55 Hz	65.9	101	6.18	198	101	18.5	27.3 %	1300	19.3

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

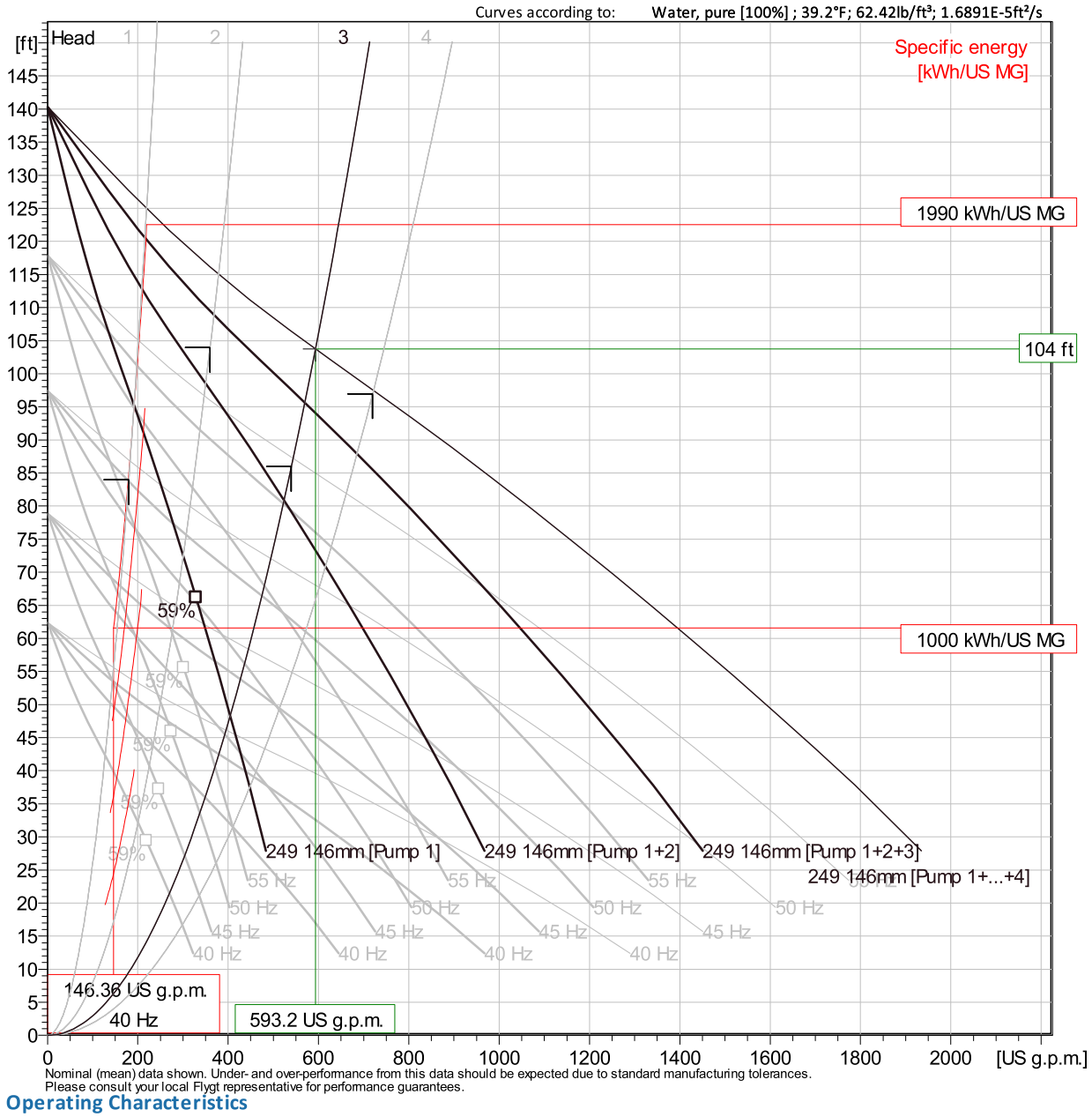
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
3 / 1	50 Hz	59.9	83.7	4.64	180	83.7	13.9	27.3 %	1100	16.5
3 / 1	45 Hz	53.9	67.8	3.39	162	67.8	10.2	27.3 %	920	14
3 / 1	40 Hz	47.9	53.6	2.38	144	53.6	7.13	27.3 %	772	11.6
2 / 1	60 Hz	104	113	8.3	209	113	16.6	35.9 %	1100	21.2

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

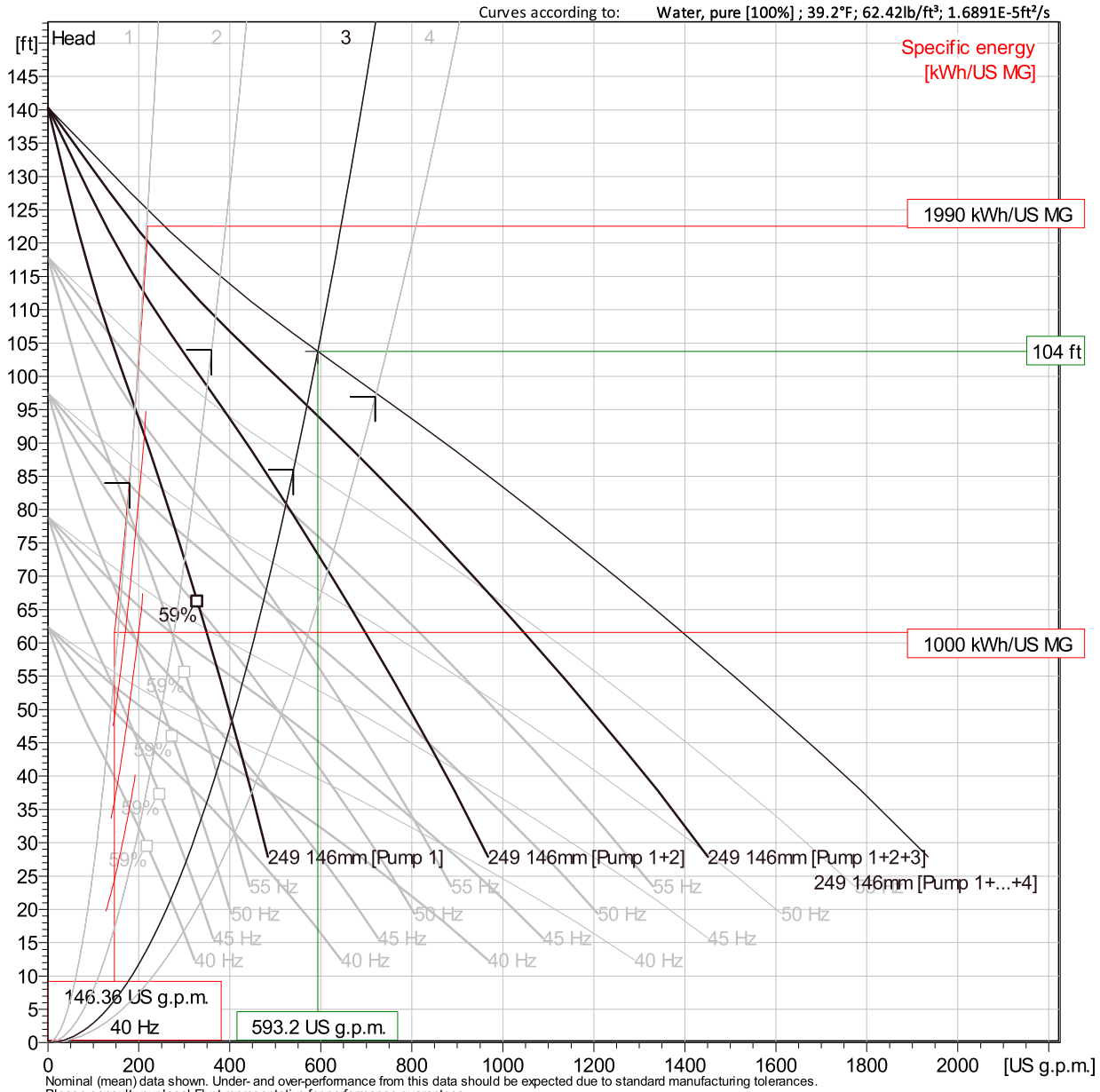
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 1	55 Hz	95.6	94.8	6.39	191	94.8	12.8	35.9 %	925	18.5
2 / 1	50 Hz	86.9	78.4	4.8	174	78.4	9.6	35.9 %	780	15.9
2 / 1	45 Hz	78.2	63.5	3.5	156	63.5	7	35.9 %	652	13.4
2 / 1	40 Hz	69.5	50.2	2.46	139	50.2	4.92	35.9 %	547	11.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

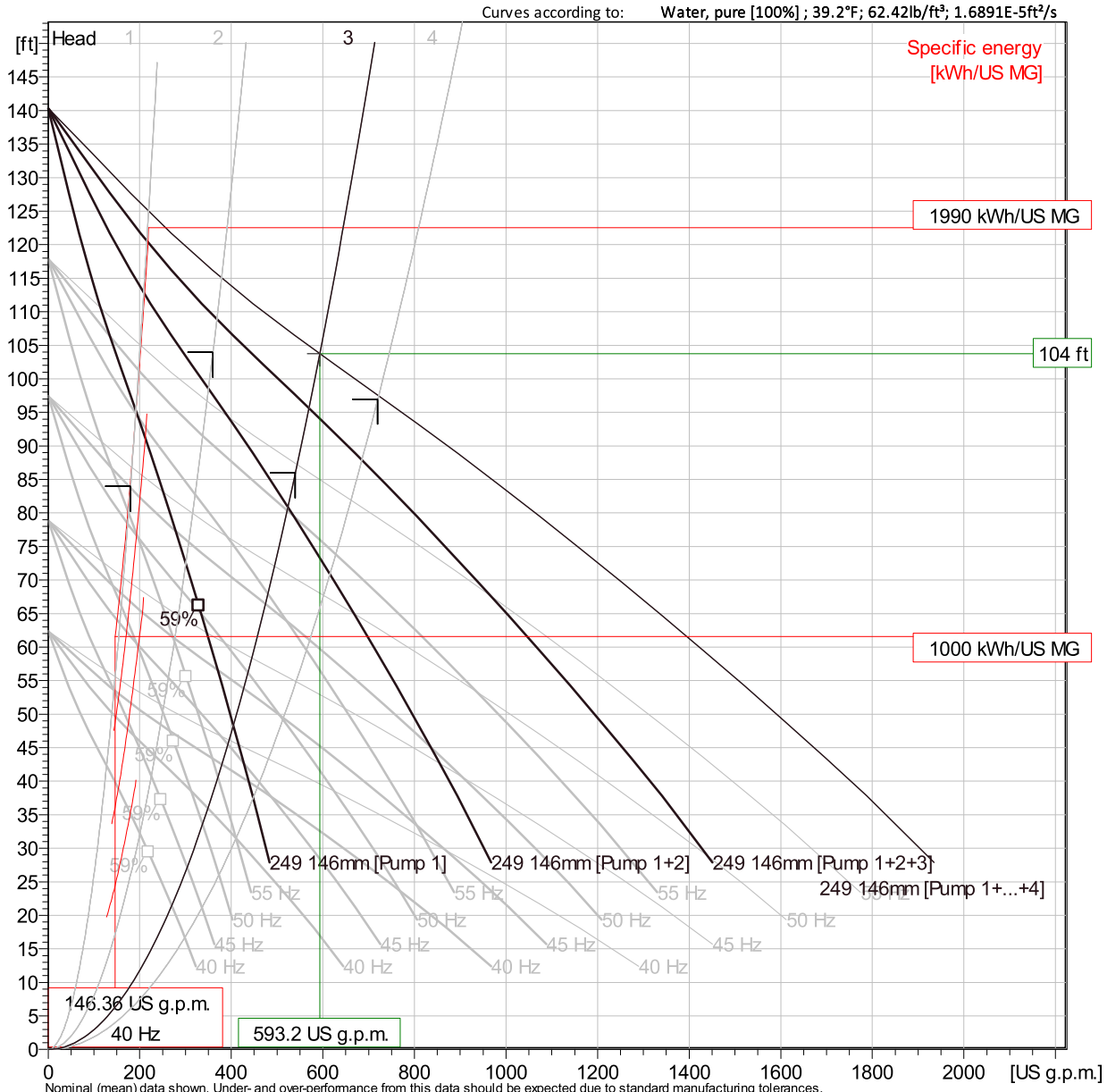
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 1	60 Hz	192	95.3	9.13	192	95.3	9.13	50.6 %	652	19.2
1 / 1	55 Hz	176	80.1	7.03	176	80.1	7.03	50.6 %	551	16.7
1 / 1	50 Hz	160	66.2	5.28	160	66.2	5.28	50.6 %	464	14.3
1 / 1	45 Hz	144	53.6	3.85	144	53.6	3.85	50.6 %	386	12.1

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

VFD Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

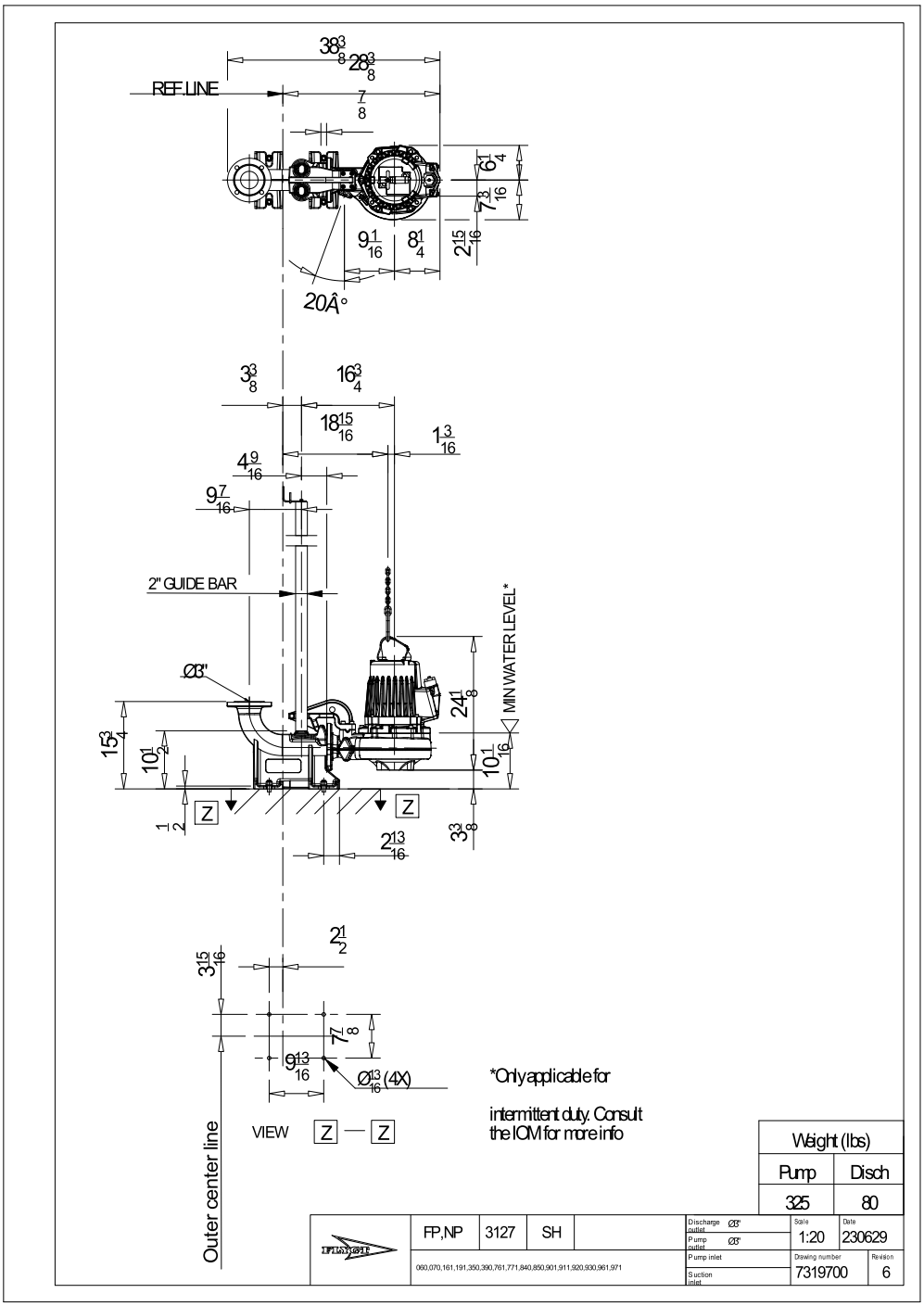
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 1	40 Hz	128	42.3	2.71	128	42.3	2.71	50.6 %	321	10

Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

NP 3127 SH 3~ Adaptive 249

Dimensional drawing



Project	Xylect-20524157	**Created by**	Alan Dahlqvist		
Block		**Created on**	8/28/2024	**Last update**	8/28/2024

APPENDIX B – LS-2 Prepackaged Lift Station Alternatives

APPENDIX B – LS-2 Prepackaged Lift Station Alternatives

Sierra Peak System

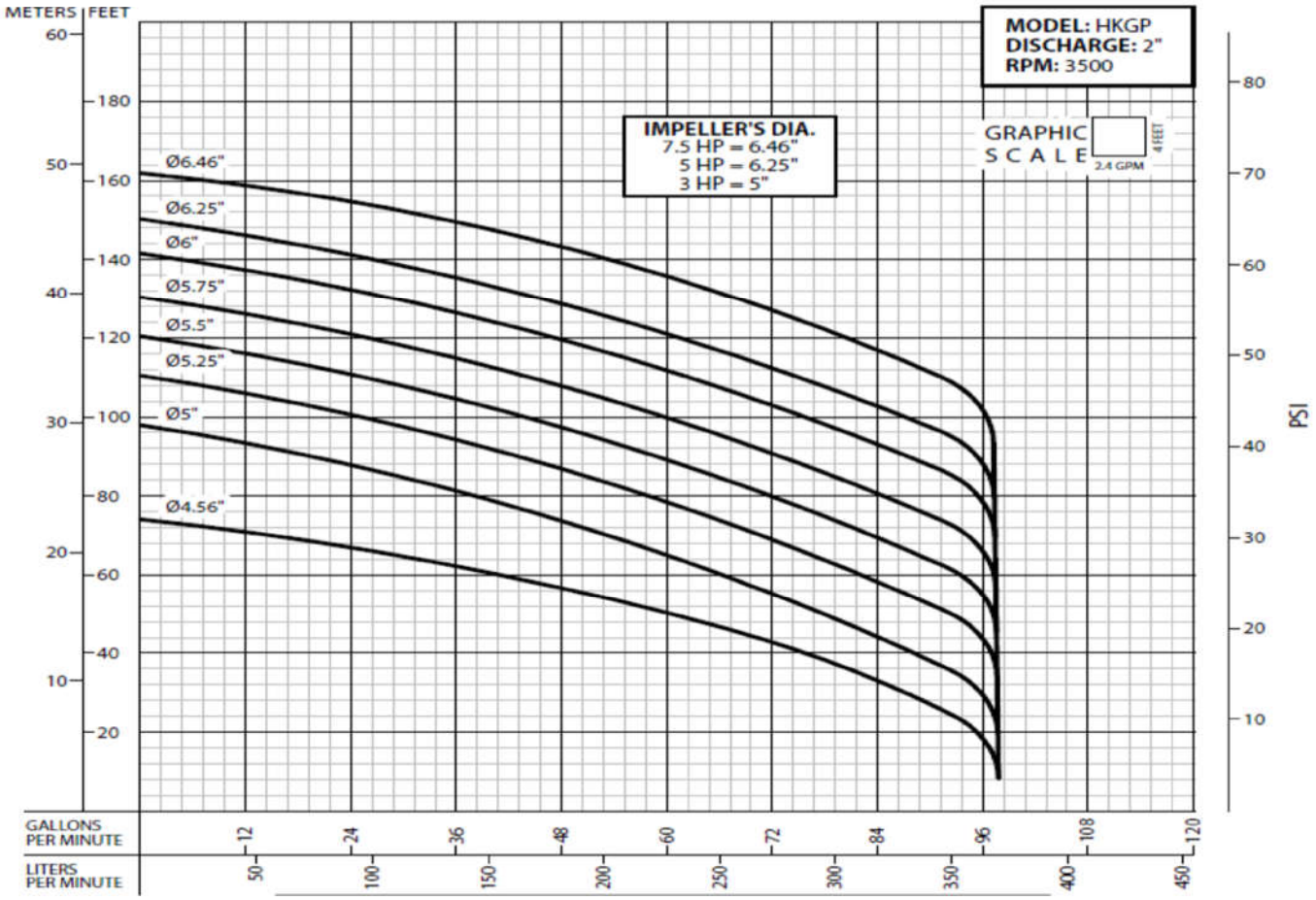
Sierra Peak Pump Systems

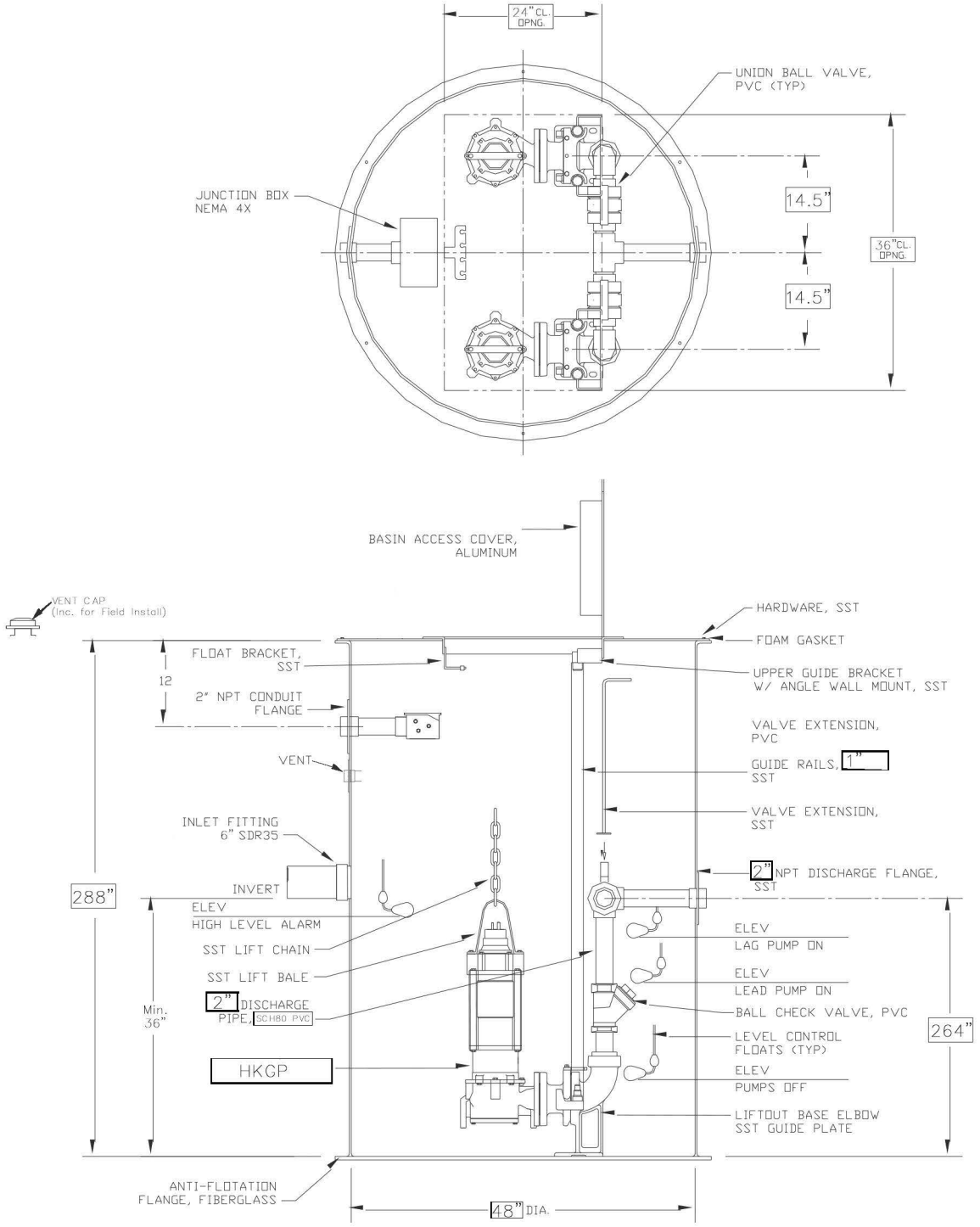
HKGP – 2” Grinder

Motor Data	
HP/Power Supply	See Model Table
Rated Speed	3450 RPM
Insulation Class	F Class
Start Capacitor	External
Cooling	Oil-Filled
Mechanical Seal	Dual Silicon Carbide
Grinding Mechanism	Axial Slicer or Radial Grinder Available
Discharge	2” FPT Vertical

Model Options				
HP	Volts	Phase	Full Load Amps	Weight (lb)
3	230	1	23	188
3	230	3	13	188
3	460	3	6.5	188
5	230	1	39	199
5	230	3	20	199
5	460	3	10	199
7.5	230	3	24	203
7.5	460	3	12	203

Performance Curve





-Pump Discharge Line outside of basin to be min. 2" SCH80

Signa MECHANICAL
"BUILDING SOLUTIONS FOR TODAY'S ENVIRONMENT"
Signa Mechanical
1615 Monrovia Ave,
Costa Mesa, CA 92627
Phone: 949-548-1125
Fax: 949-257-0587
Email: Sales@Signaco.com

EMWD Quail Valley LS-2, 3, 4
SEWER PUMP AND BASIN DETAIL

Signa MECHANICAL
"Building Solutions for Today's Environment"

Quotation

Main/Billing Office
1615 Monrovia Ave.
Costa Mesa, CA 92627
Phone # 949-548-1125
Fax # 949-257-0587

Northern CA Branch
29441 Kohoutek Way
Union City, CA 94587

Arizona Branch
2604 W. 1st Street., Ste. 46
Tempe, AZ 85281

Date	Estimate #
05/13/24	**Q240383-1**

Quotes are valid for 30 days from date listed above.

Project
EMWD Quail Valley

Name / Address
Michael Baker International - Temecula
40810 County Center Drive, Suite 200
Temecula, CA 92591

Delivery Address
Michael Baker International - Temecula
Need Shipping Address
Quail Valley, CA

FOB	Terms	Warehouse/Shop	Rep	Contact	Phone
Origin	Prepaid	Costa Mesa Branch	Natalia S Tortorello	Wynneth Requieron	951-506-2053

Description	Qty	Unit Price	Total
2 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 31,887.88	$ 0.00
3 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 41,080.68	$ 0.00
5 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 45,335.88	$ 0.00
2 HP Basin Triplex Grinder Pump Package:	0.00 ea	$ 45,165.96	$ 0.00
		Subtotal	$ 0.00
		Sales Tax	$ 0.00
		Total	$ 0.00

Budgetary Estimate for Design Options

All basins are 48" Diameter x 22' Height.

APPENDIX B – LS-2 Prepackaged Lift Station Alternatives

Jensen System

Technical Information

GRP26/1/C FM

HOMA PUMPEN MIT SYSTEM

Operating data

Flow	53 US g.p.m.
Head	50 ft
Shaft power P2	2.22 hp
Pump efficiency	42.3 %
Required pump NPSH	
Pump type	Single pump
No. of pumps	1
Fluid	Wastewater

Pump

Pump Code	GRP26/1/C FM
Impeller	Vane impeller with cutter sys.
Impeller size	$5^{7}/_{16}$"
Solid size	
Discharge port	2" M
Suction port	

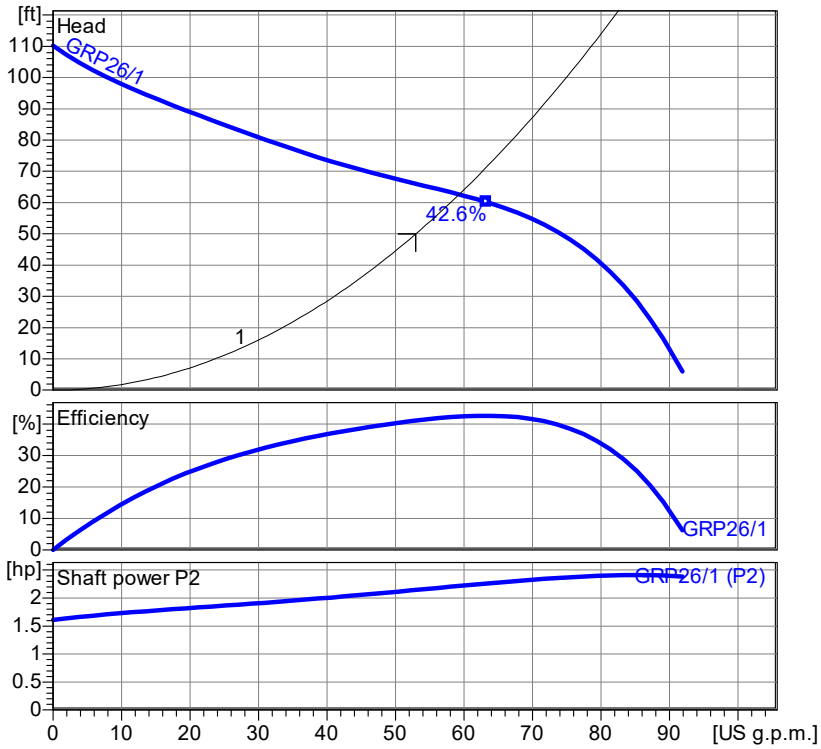
Motor

Rated voltage	230 V
Frequency	60 Hz
Rated power P2	2.4 hp
Rated speed	3450 rpm
Number of poles	2
Efficiency	70 %
Rated current	12 A
Degree of protection	IP 68

Materials

Motor housing	Cast Iron ASTM A48;Cl.40B
Pump housing	Cast Iron ASTM A48;Cl.40B
Motor bearing cover	Cast Iron ASTM A48;Cl.40B
Impeller	Cast Iron ASTM A48;Cl.40B
Cutting system	Hardened Stainless Stell HRC55
Motor shaft	AISI 430 F Stainless Steel
Bolts	AISI 304 Stainless Steel
O-Rings	Nitrile Rubber
Mechanical seal on medium side	SiC / SiC
Mechanical seal on motor side	SiC / SiC
Lower Bearing	Double row angular ball bearing
Upper Bearing	Deep Groove Ball Bearing

Testnorm: **HI Standard Sect. 11.6.5.4**



Wet well installation with coupling kit 2" with ½" Rails (GRP26)
Dimensions in mm [inch], letters see table

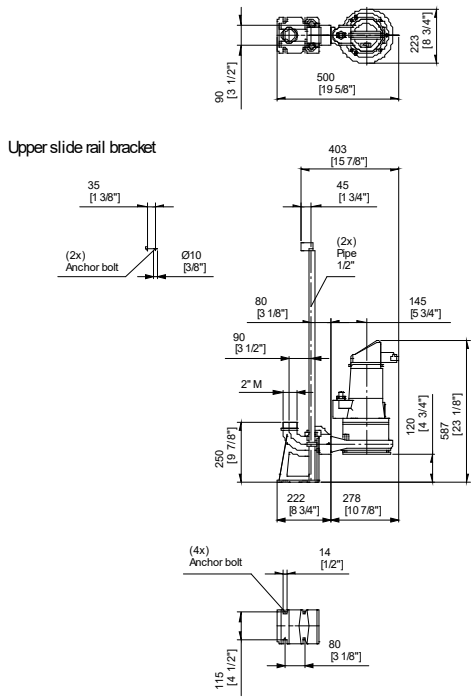


Table Dimensions (inch)

2.0.1 - 18.03.2024 (Build 147)

Project	Project no.:	Created by:	Page:	Date:
			1	4/26/2024

Performance Curve

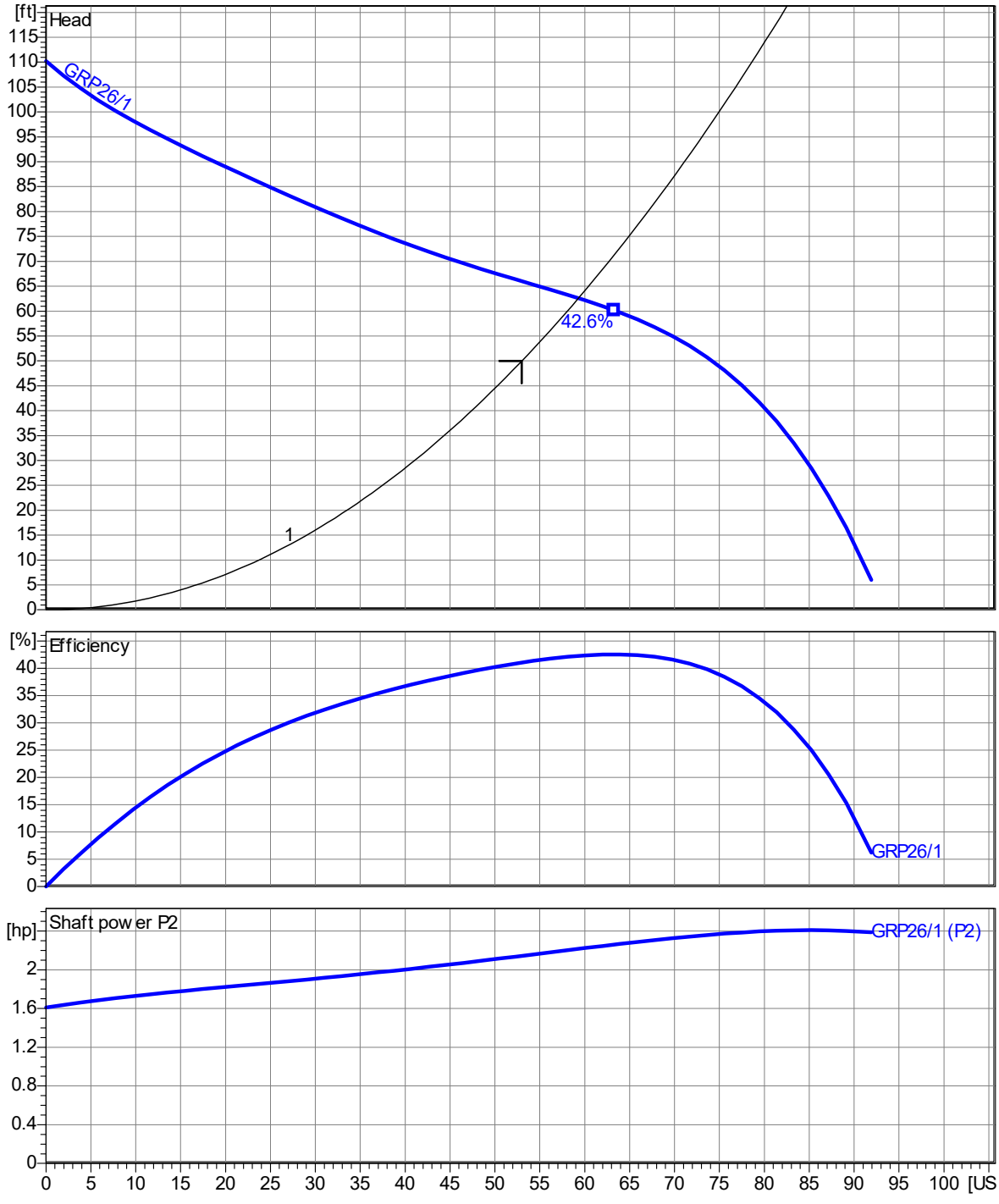
GRP26/1/C FM

Impeller					
Impeller type: Vane impeller with cutter sys.	Solid size Ø:	Max. Ø: $6^{5}/_{16}$"	Min. Ø: $6^{5}/_{16}$"	Sel. Ø: $5^{7}/_{16}$"	

Operating data				
Speed: **3450 rpm**	Frequency: **60 Hz**	Duty point: **Q = 53 US g.p.m. H = 50 ft**	Shaft power P2: **2.22 hp**	Discharge port: **2" M**

Power data referred to:
Water [100%] ; 68°F; 62.322lb/ft³; 1.0818E-5ft²/s

Testnorm: **HI Standard Sect. 11.6.5.4**



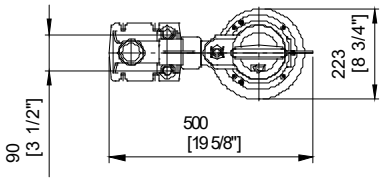
2.0.1 - 18.03.2024 (Build 147)

Project	Project no.:	Created by:	Page:	Date:
			2	**4/26/2024**

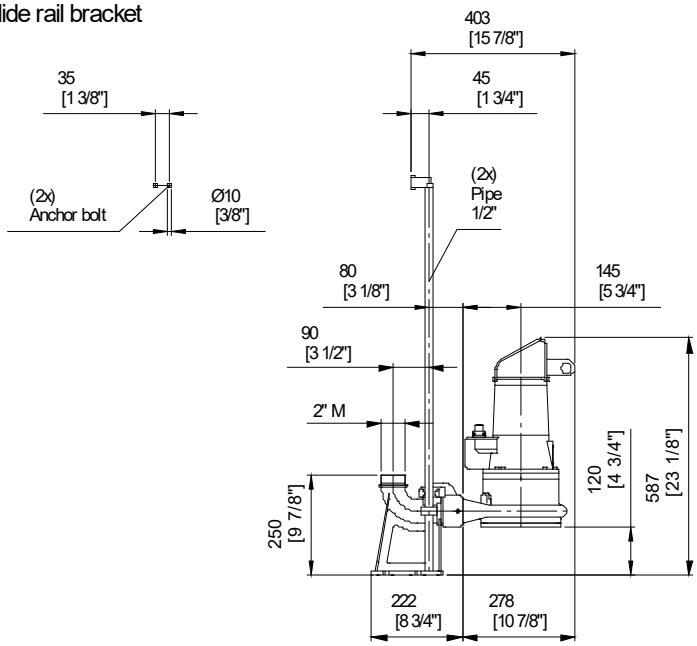
Dimensions

GRP26/1/C FM

Wet well installation with coupling kit 2" with ½" Rails (GRP26)
Dimensions in mm [inch], letters see table



Upper slide rail bracket



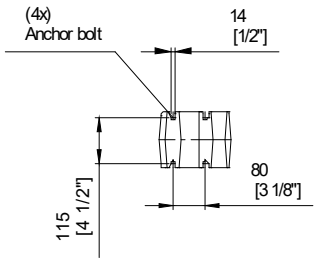


Table Dimensions (inch)

Project	Project no.:	Created by:	Page: 3	Date: 4/26/2024

Technical Data

GRP26/1/C FM

Operating data					
Flow	**53 US g.p.mUS g.p.m.**		**Head**	**50 ft**	**ft**
Shaft power P2	**2.2**	**hp**	**Static head**	**0**	**ft**
Pump efficiency	**42.3**	**%**	**Required pump NPSH**		**ft**
Pump type	Single pump		No. of pumps	1	
Fluid	Wastewater		Temperature	68	°F
Density	62.31	lb/ft³	Kin. viscosity	1.077E-5	ft²/s

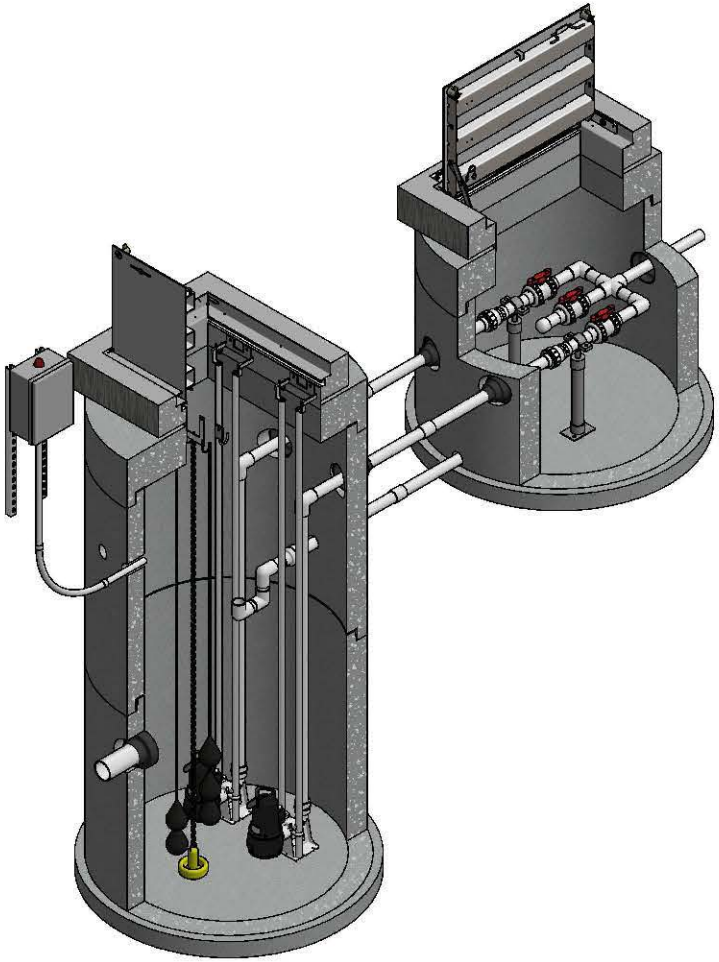
Pump					
Pump Code	GRP26/1/C FM		Speed	3450	rpm
Suction port			Head Max.	110.2	ft
Discharge port	2" M		Head Min.	6.0	ft
Impeller type	Vane impeller with cutter sys.		Flow Max.	91.9	US g.p.m.
Solid size		inch	Pump efficiency max.	42.6	%
Impeller Ø	5.43	inch	Required rated power max. P2	2.4	hp

Motor					
Motor design	Submersible motor		Insulation class	H	
Motor name	AM122.3,8/2/1		Degree of protection	IP 68	
Frequency	60	Hz	Temperature class	T4	
Rated power P2	2.4	hp	NEMA code	E	
			Explosion protection	Class I, Div. 1, Grp. C&D	
Rated speed	3450	rpm	Efficiency at % rated power 100%	70.0	%
Rated voltage	230 V | 1~		Efficiency at % rated power 75%		%
Rated current	12.0	A	Efficiency at % rated power 50%		%
Starting current, direct starting	43.2	A	cos phi at % rated power 100%	0.98	
Starting current, star-delta	14	A	cos phi at % rated power 75%		
Starting mode	Directly		cos phi at % rated power 50%		
Power cable	7X1,5 / 10G1,5		Control cable	2X1,5 / -	
Type of power cable	NSSHÖU-J / H07RN8-F PLUS		Type of control cable	ÖLFLEX-EB / -	
Cable length	32.8 ft		Service factor	1.15	
Shaft seal	Mechanical seal on medium side		SiC / SiC		
	Mechanical seal on motor side		SiC / SiC		
Bearing	Lower Bearing		Double row angular ball bearing		
	Upper Bearing		Deep Groove Ball Bearing		
Remarks	Start-/ Runcapacitor: 80µF / 40µF				

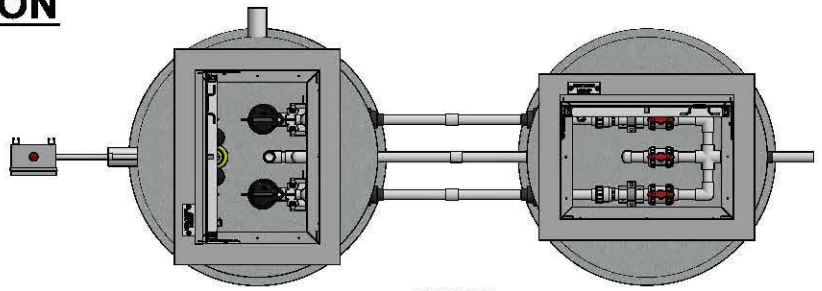
Materials / Weight			
Motor housing	Cast Iron ASTM A48;Cl.40B	Motor shaft	AISI 430 F Stainless Steel
Pump housing	Cast Iron ASTM A48;Cl.40B	Bolts	AISI 304 Stainless Steel
Motor bearing cover	Cast Iron ASTM A48;Cl.40B	O-Rings	Nitrile Rubber
Impeller	Cast Iron ASTM A48;Cl.40B		
Cutting system	Hardened Stainless Stell HRC55		
Weight aggregate	72.751 lb		

Project	Project no.:	Created by:	Page: 4	Date: 4/26/2024

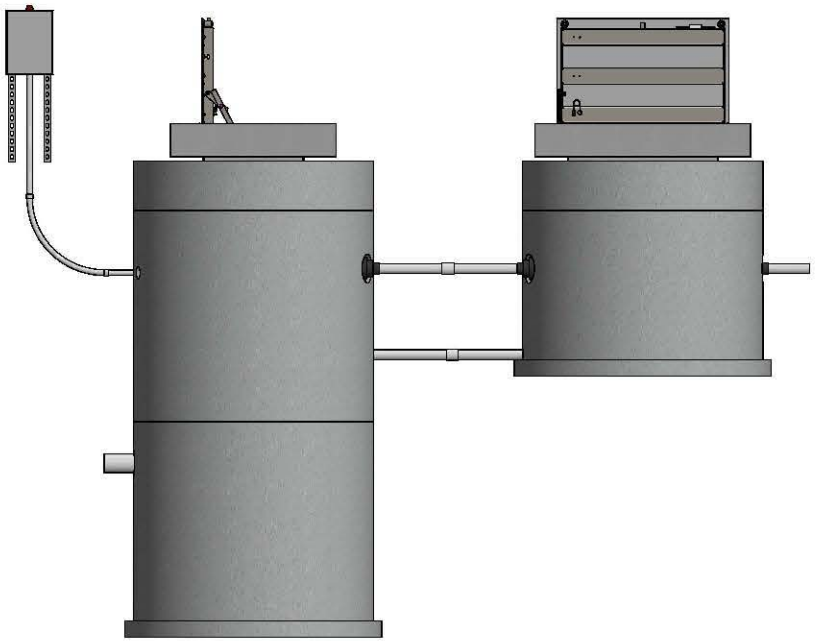
248-DV SERIES STANDARD
DUPLEX PUMP STATION



TOP LEFT ISOMETRIC VIEW w/ SECTION
NOT TO SCALE



PLAN VIEW
NOT TO SCALE



PROFILE VIEW
NOT TO SCALE

DISCLAIMERS, INCLUDING BUT NOT LIMITED TO:
1.) All elevations have been provided by others, and have not been verified by Jensen Precast. Contractor to verify all dimensions and elevations in field prior to installation.
2.) These layout drawings are intended to show overall system design only. All concrete component thicknesses, dimensions, and joint orientations may vary across Jensen Precast's manufacturing facilities. Contractor to confirm all thicknesses, dimensions, and joint orientations prior to installation.
3.) System design criteria has been provided to Jensen Precast. Others are responsible for verification that system meets intended application.
4.) Foundation, subgrade, and backfill to be designed by others.

JENSEN PUMP STATIONS
521 DUNN CIRCLE, SPARKS, NV 89431
www.jensenwaterresources.com
(855) 468-6500

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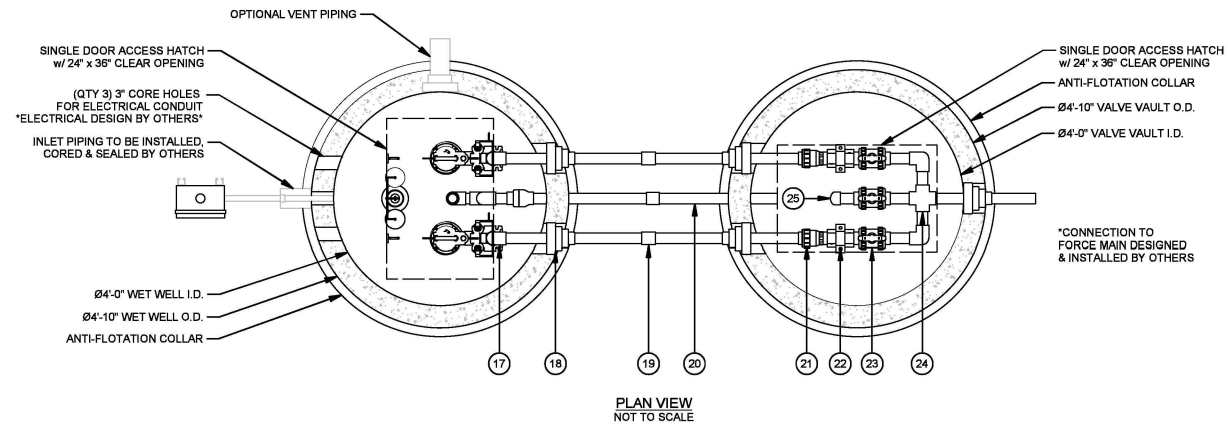
DESCRIPTION: Quail Valley - LS2

PART NUMBER:	248-DV Series Standard	DRAWN BY:	T. Tidball
CREATED:		MODIFIED:	1/26/21

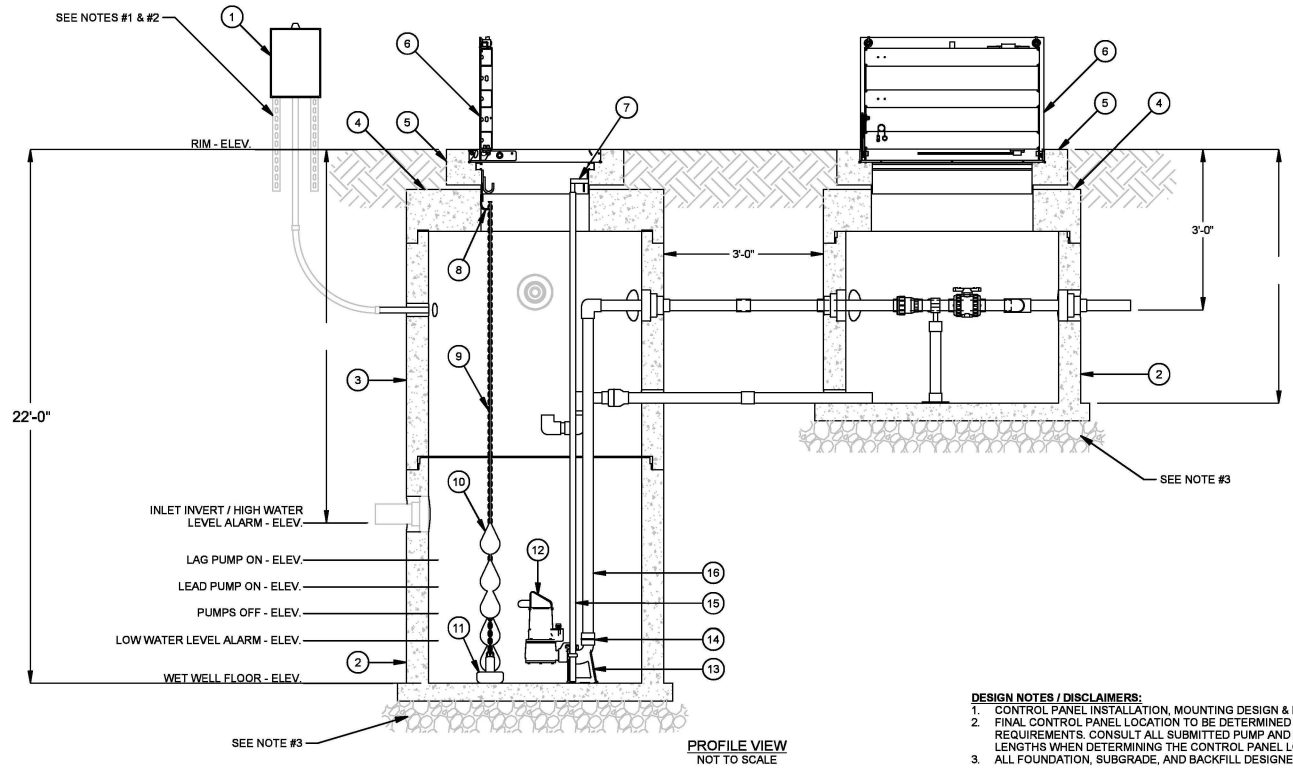
REV:

SHEET: 1 OF 2

248-DV Series Standard.dw



PLAN VIEW
NOT TO SCALE



PROFILE VIEW
NOT TO SCALE

DESIGN NOTES / DISCLAIMERS:

1. CONTROL PANEL INSTALLATION, MOUNTING DESIGN & HARDWARE BY OTHERS.
2. FINAL CONTROL PANEL LOCATION TO BE DETERMINED ACCORDING TO PROJECT REQUIREMENTS. CONSULT ALL SUBMITTED PUMP AND LEVEL CONTROL CABLE LENGTHS WHEN DETERMINING THE CONTROL PANEL LOCATION.
3. ALL FOUNDATION, SUBGRADE, AND BACKFILL DESIGNED BY OTHERS.

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION
1	1	DUPLEX ALTERNATING CONTROL PANEL
2	2	48IN DIA JENSEN PRECAST CONCRETE MANHOLE BASE *HEIGHT VARIES*
3	1	48IN DIA JENSEN PRECAST CONCRETE MANHOLE BARREL *HEIGHT VARIES *
4	2	48IN DIA JENSEN PRECAST CONCRETE MANHOLE FLAT TOP
5	2	JENSEN PRECAST CONCRETE HATCH RISER
6	2	SINGLE DOOR HATCH WITH A CLEAR OPENING OF 24IN X 36IN
7	2	UPPER GUIDE RAIL BRACKET 2IN
8	1	FLOAT BRACKET 3 HOOK TYPE 316SS
9	10 LF	LF CHAIN 1/4IN 316SS
10	5	FLOAT SWITCH w/ 100' CABLE
11	1	ANCHOR 15LB PVC COATED
12	2	2IN SUBMERSIBLE PUMP
13	2	AUTOCOUPLING ASSY 2IN STD
14	2	ADAPTER 2IN FML THRD X SLIP SCH 80 PVC
15	40 LF	LF PIPE 1IN SCH40 GUIDE RAIL 304SS
16	40 LF	LF PIPE PVC SCH 80 2IN DIA
17	4	90 DEG ELBOW 2IN SCH 80 PVC SLIP
18	5	FLEXIBLE PIPE CONNECTORS
19	2	FITTING PVC SCH 80 2IN DIA COUPLING SLIP
20	1	2IN DIA PVC SCH40 VAULT DRAIN w/ CHECK VALVE, TRAP & FITTINGS
21	2	BALL CHECK VALVE 2IN SCH 80 PVC SLIP
22	2	PIPE SUPPORTS
23	3	BALL VALVE 2IN SCH 80 PVC SLIP
24	1	CROSS 2IN SCH 80 PVC SLIP
25	1	CAP 2IN SCH 80 PVC SLIP

PROJECT SPECIFIC INFORMATION

FINISHED GRADE (Ft.)	
RIM ELEV. (Ft.)	
INLET ELEV. (Ft.)	
FORCE MAIN DISCHARGE ELEV. (Ft.)	
AVAILABLE POWER SUPPLY	120V ☐ 240V ☑ 480V ☐
AVAILABLE POWER PHASE	Single ☑ Three ☐

SYSTEM CHARACTERISTICS

APPLICATION	SEWAGE ☑ STORM WATER ☐
DESIGN FLOW (gpm)	53
TOTAL DYNAMIC HEAD (Ft.)	50
STATIC HEAD (Ft.)	
PUMP MAKE & MODEL	HOMA GRP26/1/C FM
PUMP MOTOR (Std / XP)	Standard ☐ XP/FM ☑
PUMP TYPE	Non-Clog ☐ Grinder ☑ Chopper ☐ Vortex ☐
PUMP RATED HP & CURRENT	2.4hp / 12A
ACCESS HATCH LOAD LEVEL	Pedestrian ☐ Incidental H-20 ☐ Parking Lot H-20 ☐ Full Traffic H-20 ☑

ADDITIONAL OPTIONS

OPTION	YES	NO
CONTROL PANEL SS ENCLOSURE	☐	☑
CONTROL PANEL AC UNIT	☐	☑
CONTROL PANEL REMOTE ALARM MONITORING	☐	☑
AIR RELEASE/VACUUM VALVE	☐	☑
INTERIOR LINER	☐	☑
CONCRETE WATERPROOFING	☐	☑
VENT PIPE	☐	☑
ODOR CONTROL VALVE	☐	☑
LIFTING CRANE	☐	☑
GENERATOR RECEPTACLE	☐	☑

DISCLAIMERS, INCLUDING BUT NOT LIMITED TO:

1.) All elevations have been provided by others, and have not been verified by Jensen Precast. Contractor to verify all dimensions and elevations in field prior to installation.
2.) These layout drawings are intended to show overall system design only. All concrete component thicknesses, dimensions, and joint orientations may vary across Jensen Precast's manufacturing facilities. Contractor to confirm all thicknesses, dimensions, and joint orientations prior to installation.
3.) System design criteria has been provided to Jensen Precast. Others are responsible for verification that system meets intended application.
4.) Foundation, subgrade, and backfill to be designed by others.

JENSEN PUMP STATIONS
521 DUNN CIRCLE, SPARKS, NV 89431
www.jensenwaterresources.com
(855) 468-5600

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DESCRIPTION:

Quail Valley - LS2

REV:

PART NUMBER:	248-DV Series Standard	DRAWN BY:	T. Tidball
CREATED:		MODIFIED:	4/26/24

SHEET: 2 OF 2

248-DV Series Standard.idw

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

Quoted By: DENNIS MORGAN

Document Address:
JENSEN CUSTOMER
CUSTOMER BILLING ADDRESS
. . .

Delivery Address:
JENSEN CUSTOMER

Menifee CA 92587

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS2)	Delivered FOB Truck	1	PCS	53,458.00	53,458.00

Notes: Wet Well:
• 48” Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 22’-0” Rim To Sump
• 24” X 36” Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Valve Vault:
• 48” Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6’-0” Rim To Sump
• 24” X 36” Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Pump Package:
• (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables
• Pump Lift Out/Autocoupling System
• Mounting Bracket And Hardware For Guide Rails And Base Elbows

Piping, Fittings, And Valves:
• 2” PVC SCH80 Piping And Fittings With Glue As Required
• 2” PVC SCH80 Check And Plug Valves

Controls:
• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
• Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per Project Basis.
• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
		• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply • Others Responsible For Offloading, Setting And Installation Of All Components • Delivery Includes One Hour On Site Per Delivery Truck • Additional Hours To Be Billed At $185.00 Per Hour • Suitable And Safe Access Must Be Provided For Delivery Notes: • Extremely Heavy Product – Setting And Handling Limitations Are Critical • Precast Coring For Pipe Penetrations Not Included In Jensen's Scope • Interior/Exterior Liners Not Included In Jensen's Scope					
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS3)	Delivered FOB Truck	1	PCS	53,408.00	53,408.00
		Notes: Wet Well: • 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 21'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Valve Vault: • 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Pump Package: • (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables • Pump Lift Out/Autocoupling System • Mounting Bracket And Hardware For Guide Rails And Base Elbows Piping, Fittings, And Valves: • 2" PVC SCH80 Piping And Fittings With Glue As Required • 2" PVC SCH80 Check And Plug Valves Controls: • Standard Duplex Control Panel • (5) Mechanical Float Switches W/ 50ft Cables • Mounting Bracket And Hardware For Floats Included Services: • Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per					

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
		Project Basis. • One Year Full System Warranty • Standard Jensen Water Resources O&M Documents Delivery: • Delivery To Job Site Customer To Off Load And Set • Estimated Heaviest Pick Weight At 7,000lbs • Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production • If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply • Others Responsible For Offloading, Setting And Installation Of All Components • Delivery Includes One Hour On Site Per Delivery Truck • Additional Hours To Be Billed At $185.00 Per Hour • Suitable And Safe Access Must Be Provided For Delivery Notes: • Extremely Heavy Product – Setting And Handling Limitations Are Critical • Precast Coring For Pipe Penetrations Not Included In Jensen's Scope • Interior/Exterior Liners Not Included In Jensen's Scope					
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS4)	Delivered FOB Truck	1	PCS	53,408.00	53,408.00
		Notes: Wet Well: • 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 21'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Valve Vault: • 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Pump Package: • (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables • Pump Lift Out/Autocoupling System • Mounting Bracket And Hardware For Guide Rails And Base Elbows Piping, Fittings, And Valves: • 2" PVC SCH80 Piping And Fittings With Glue As Required • 2" PVC SCH80 Check And Plug Valves Controls:					

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount

• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
• Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per Project Basis.
• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production
• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply
• Others Responsible For Offloading, Setting And Installation Of All Components
• Delivery Includes One Hour On Site Per Delivery Truck
• Additional Hours To Be Billed At $185.00 Per Hour
• Suitable And Safe Access Must Be Provided For Delivery

Notes:
• Extremely Heavy Product – Setting And Handling Limitations Are Critical
• Precast Coring For Pipe Penetrations Not Included In Jensen's Scope
• Interior/Exterior Liners Not Included In Jensen's Scope

	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS5)	Delivered FOB Truck	1	PCS	49,615.00	49,615.00

Notes: Wet Well:
• 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 22'-0" Rim To Sump
• 24" X 36" Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Valve Vault:
• 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump
• 24" X 36" Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Pump Package:
• (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount

• Pump Lift Out/Autocoupling System
• Mounting Bracket And Hardware For Guide Rails And Base Elbows

Piping, Fittings, And Valves:
• 2" PVC SCH80 Piping And Fittings With Glue As Required
• 2" PVC SCH80 Check And Plug Valves

Controls:
• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
• Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per Project Basis.
• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production
• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply
• Others Responsible For Offloading, Setting And Installation Of All Components
• Delivery Includes One Hour On Site Per Delivery Truck
• Additional Hours To Be Billed At $185.00 Per Hour
• Suitable And Safe Access Must Be Provided For Delivery

Notes:
• Extremely Heavy Product – Setting And Handling Limitations Are Critical
• Precast Coring For Pipe Penetrations Not Included In Jensen's Scope
• Interior/Exterior Liners Not Included In Jensen's Scope

Quotation Notes

FOR TECHNICAL QUESTIONS PLEASE CONTACT CHRIS PURDIE @ 775-352-6361

ITEMS INCLUDED IN THIS QUOTE ARE PER JENSEN PUMP STATION'S INTERPRETATION AND ARE LISTED AS CLOSE TO "AS EQUAL" AND "AN ALTERNATIVE" WHICH ARE SUBJECT TO FINAL APPROVAL. ANY CHANGES MIGHT REQUIRE A REQUOTE FROM JENSEN WATER RESOURCES.

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

ANY AGENCY INSPECTION REQUIREMENT FEES NOT INCLUDED.

ALL PRODUCTS ABOVE ARE SUITABLE FOR H-20 LOADING IN DRY SOIL CONDITIONS. ANY ADDITIONAL LOADING REQUIREMENTS MAY RESULT IN REVISED PRICING.

SALES TAX HAS BEEN ESTIMATED WITH THIS QUOTATION. CUSTOMER IS RESPONSIBLE TO DETERMINE AND PAY ALL ASSOCIATED SALES TAX.

ADDITIONAL FUEL SURCHARGES MAY APPLY AT TIME OF DELIVERY

JENSEN PRECAST TERMS AND CONDITIONS APPLY.

LEAD TIMES WILL BE PRESENTED AFTER JENSEN RECEIVES APPROVED SUBMITTALS. DELIVERY SCHEDULE IS SUBJECT TO CHANGE BASED ON CAPACITY, MATERIAL AVAILABILITY, AND PRECEDING CUSTOMER ORDERS. CURRENT SUPPLY CHAIN ISSUES ARE AFFECTING MANY INDUSTRIES AND MAY IMPACT LEAD TIMES.

PRIOR TO PROVIDING SUBMITTALS, JENSEN PRECAST REQUESTS A SIGNED COPY OF THIS QUOTATION, CUSTOMER PURCHASE ORDER, OR LETTER OF INTENT TO PURCHASE.

CREDIT SALES WILL BE MADE ONLY AFTER RECEIPT OF A SIGNED JENSEN PRECAST CREDIT APPLICATION AND WRITTEN CREDIT APPROVAL BY JENSEN PRECAST'S CREDIT MANAGER.

ITEMS INCLUDED IN THIS QUOTATION ARE CUSTOM PRODUCTS. JENSEN PRECAST MAY REQUIRE PARTIAL OR FULL PAYMENT PRIOR TO PROCUREMENT, MANUFACTURING, OR SHIPMENT OF ANY ITEMS.

THIS OFFER TO SELL IS BASED ON CUSTOMER BUYING THIS COMPLETE BILL OF MATERIALS. PRICES MAY BE SUBJECT TO CHANGE IF INDIVIDUAL LINE ITEMS ARE PURCHASED SEPARATELY.

FOR FURTHER INFORMATION CONCERNING JENSEN ENGINEERED SYSTEMS, PLEASE VISIT OUR WEBSITE @ HTTPS://WWW.JENSENPRECAST.COM/WATER-RESOURCES

THANK YOU FOR ALLOWING US TO PROVIDE YOU WITH THIS QUOTATION. WE LOOK FORWARD TO WORKING WITH YOU ON THIS PROJECT.

Net Total:	**209,889.00**
Estimated Tax:	**18,365.29**
Gross Total	**228,254.29**

All orders are subject to credit acceptance by seller.
A 3% credit card service fee may be added for all credit card payments.
Delivery trips, setting time, or materials not noted above will be billed accordingly.
Offer to sell subject to Jensen Precast's company policies, terms and conditions.
Please refer to https://www.jensenprecast.com/terms-of-service/ for complete terms and conditions which are hereby incorporated by reference.
All specialized product may be subject to a deposit prior to submittals and/or fabrication.
Quotation is valid for 30 days.
Thank you for choosing Jensen Precast!

JENSEN CUSTOMER Signature **Date**

JENSEN CUSTOMER PO

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

TERMS AND CONDITIONS

ORDERING INSTRUCTIONS

Please refer to the quotation number and date on all orders. Indicate desired delivery dates, quantities and item priority if applicable. Please contact our office for delivery schedules. Delivery lead-time will be estimated upon receipt of order, and is based on actual demand at that time. Any dates discussed prior to order are non-binding estimates. Orders for non-standard products should be accompanied by specifications, and blue prints or scale drawings. Notify us as soon as possible to insure prompt delivery.

COMPANY POLICIES TERMS AND CONDITIONS

THE POLICY TERMS AND CONDITIONS, DELINEATED HEREIN SHALL APPLY TO ALL QUOTATIONS, OR OFFERS TO SELL

1. Goods to Be Provided: Jensen Enterprises, Inc. dba Jensen Precast ("Jensen Precast") agrees to sell to Customer, on the terms and conditions stated herein, the materials and related items (the "goods") identified in Jensen Precast's quotation to Customer. Customer is solely responsible for determining whether the goods listed are the correct types and/or sufficient in number to meet Customer's needs and/or requirements. Jensen Precast's offer to sell is based on customer approval of Jensen Precast standard product drawings or submittals, and not in accordance with any plans and specifications, unless agreed to in writing by a duly authorized representative of Jensen Precast.
2. No Additional Terms of Sale: Customer's acceptance of Jensen Precast's quotation is limited to these Terms and Conditions of Sale. Any new or different terms or conditions stated or proposed by Customer in its acceptance of Jensen Precast's quotation or in any accompanying or related purchase order or other document are hereby rejected by Jensen Precast and shall not be binding upon Jensen Precast. The entire contract is embodied in this writing. This writing constitutes the final expression of the parties' agreement, and it is a complete and exclusive statement of the terms of that agreement.
3. Payment Terms: Jensen Precast may require payment in full prior to manufacture or shipment of any goods. If Jensen Precast agrees to provide materials on a "Cash on Delivery" basis, payment in full is due upon arrival of Jensen Precast's equipment, prior to setting of product or unloading of trucks. Credit sales will be made only after receipt of a signed Jensen Precast credit application and written credit approval by Jensen Precast's credit manager. On all credit sales, payment in full is due within 30 days after Customer's receipt of materials or services. Customer agrees to pay a service charge of 1.5% per month on all invoices not paid when due. At its option, Jensen Precast may decline to make delivery or shipment to Customer if any invoice remains past due. Customer waives and releases any claim against Jensen Precast for loss or damage allegedly sustained by Customer as a result of Jensen Precast's refusal to make delivery or shipment under such circumstances. All payments shall be made in U.S. dollars and, unless otherwise designated by Jensen Precast in writing, shall be sent to Jensen Precast's Corporate Office, 9895 Double R Blvd, Reno, NV 89521.
4. Price: The price(s) stated in Jensen Precast's quotation to Customer are firm for 30 days. The prices stated in Jensen Precast's quotation are subject to sales and use tax. Customer shall reimburse Jensen Precast for all sales and use taxes imposed upon: (a) the sale of the goods; and/or, (b) the use of any materials consumed by Jensen Precast; and/or, (c) the sale of any fixtures or equipment incident to this contract. Prices are subject to delivery charges unless quoted as delivered (see shipping code definitions on quotation). Jensen Precast reserves the right to increase the cost of delivery or shipment if Customer increases mileage or number of trucks specified in the original quotation. Prices quoted are based on quantities indicated, and on customer acceptance of the entire quote. Jensen Precast reserves the right to accept or reject partial orders.
5. Time for Performance: Jensen Precast will endeavor to meet any reasonable shipping date(s) requested by Customer. However, Jensen Precast does not guarantee that the goods will be furnished by any particular date. All shipping dates stated or indicated are estimates only and are based upon conditions known at the time the dates were stated or indicated. Jensen Precast shall not in any event be liable for any loss or damage sustained by Customer on account of failure to meet any delivery or shipping date.
6. Delivery: Customer or its designated representative shall be prepared to unload, receive, and accept the goods at the time specified on the order. Customer shall provide assistance in delivering the goods, including but not limited to assisting in backing and directing Jensen Precast's truck at the delivery site, providing access to the delivery site that is acceptable to Jensen Precast, and providing a setting location for the truck, crane or other delivery equipment that is acceptable to Jensen Precast. Jensen Precast shall not be liable for any property damage arising from or related to delivery of the goods, including without limitation damage to sidewalks, curbs, fences, valves, conduit, pipes, concrete, asphalt, lawns, trees, or landscaping. All excessive unloading or stand-by time, resetting or re-delivery will be charged for at the current hourly or mileage rates of the equipment involved. If for any reason Jensen Precast cannot set the goods at the time of delivery, Customer shall be responsible for setting the goods by other means, at no cost to Jensen Precast.
7. Customer Responsibilities: The Customer or its designated representative shall be solely responsible for accomplishing the following:
a. Finish grade, leveling and position of the goods.
b. Grouting and/or sealing of vault sections, grade rings, risers, frames, covers, pipes or similar structures, unless a duly authorized representative of Jensen Precast has stated in writing that Jensen Precast will perform installation and sealing of the goods.
c. Excavation, bedding, shoring, backfilling, compacting and grading.
d. Water and/or flotation control.
e. Setting and adjusting ladders, racking, grates or other hardware.
f. Providing a one- or two-person ground crew to assist the Jensen Precast crane operator.
g. All other site work not specified above.
8. Returns: The goods shall not be returned for credit without prior written authorization and approval by a duly authorized representative of Jensen Precast. A minimum handling charge of 15% plus actual shipping or delivery costs shall be made on all goods returned to compensate for costs of accounting, reconditioning, restocking and delivery, except when due to fault or error of Jensen Precast. No credits shall be allowed on used, damaged, custom, specially ordered or specially manufactured goods. Customer shall bear the cost of any labor, damage or transportation associated with return of the goods.
9. Equipment: Unless otherwise agreed to in a writing signed by a duly authorized representative of Jensen Precast, equipment belonging to Jensen Precast cannot be left at any job site for the purpose of unloading or setting by others.
10. Project Information: Customer agrees to furnish to Jensen Precast promptly upon request all project information necessary for Jensen Precast to perfect or provide notice of its mechanic's lien, stop notice, and/or payment bond rights.
11. Buy America(n) Requirements. Purchaser must clearly and affirmatively notify Jensen Precast of the applicability of any order, law, regulation or other requirement that the Products be produced, manufactured, or substantially transformed in the United States, or consist wholly or partly of materials or components produced, manufactured, or substantially transformed in the United States, or that the raw material comprising the Products be of domestic origin. If Purchaser fails to notify Jensen Precast of any such requirements, Purchaser must accept delivery and pay for the Products, regardless of any such requirements, and Purchaser agrees to fully indemnify and hole Jensen Precast harmless from and against any liability, costs and expenses, including reasonable attorney fees, incurred by Jensen Precast in connection with Purchaser's omission.
12. Force Majeure: Jensen Precast will not be liable for any delay or for failure to perform its obligations hereunder resulting from any cause beyond Jensen Precast's reasonable control including, but not limited to: Customer's failure to timely supply Jensen Precast with necessary data or specifications; any changes in such data or specifications at Customer's request; fires; explosions; floods; acts of God; epidemics; quarantine; embargoes; strikes; work stoppages or slowdowns or other industrial disputes; accidents; riots or civil disturbances; acts of civil or military authorities; inability to obtain any license or consent necessary in respect of any the goods; inability to obtain equipment, materials, labor, fuel or supplies; and delay by suppliers or material shortages.
13. Limited Warranty: For a period of one year from the date of shipment or delivery to Customer, Jensen Precast warrants all of the goods which it has manufactured to be free of material defects. If any such goods are found to be materially defective during the warranty period, Jensen Precast agrees to, in its sole discretion, repair or replace the defective goods without charge to Customer. Customer's remedy with respect to such goods is limited to repair or replacement. For goods not manufactured by Jensen Precast, Customer agrees to accept as its sole remedy the warranty, if any, offered by the manufacturer or manufacturers of such goods.

AS TO ALL GOODS SOLD BY JENSEN PRECAST TO CUSTOMER, THE WARRANTY DESCRIBED IN THIS PARAGRAPH SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

JENSEN PRECAST SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR LIQUIDATED DAMAGES OF ANY KIND, WHETHER THE CUSTOMER'S CLAIM IS BASED UPON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

14. Indemnity: Customer is solely responsible for the selection, installation, and use of the goods. Therefore, to the fullest extent permitted by law, Customer agrees to defend and indemnify Jensen Precast from and against any claim for loss or damage, including attorneys' fees and experts' or consultants' fees, arising from or relating to such selection, installation, and use. This indemnity applies regardless of any active and/or passive negligent act or omission on the part of Jensen Precast or its employees; provided, however, Customer shall not be obligated to indemnify Jensen Precast for the sole negligence or willful misconduct of Jensen Precast or its employees.
15. Risk of Loss: The risk of loss shall pass to Customer based on the applicable shipping code:
a. "Delivered and Set": Risk of loss shall pass to Customer when Jensen Precast's delivery truck has unloaded the product.
b. "Delivered - F.O.B. Truck": Risk of loss shall pass to Customer when Jensen Precast's delivery truck arrives at Customer's jobsite.
c. "Delivered and offloaded": Risk of loss shall pass to Customer when Jensen Precast's delivery truck arrives at Customer's jobsite.
d. "F.O.B. Jensen Precast Yard": Risk of loss shall pass upon tender of delivery of the goods to a common carrier or Customer's truck. Buyer shall procure and maintain insurance on the goods sufficient to protect its interests.
16. Dispute Resolution: All disputes arising from or relating to these Terms and Conditions of Sale and/or the furnishing of any goods by Jensen Precast to Customer shall be heard and decided exclusively in the state or federal court where the delivery or pick up of the Product(s) is located. The construction, interpretation and performance of this order and all transactions hereunder shall be governed by the laws of the state where delivery or pick up the Products is located, without regard to its choice of law principles. These Terms and Conditions of Sale (the "Terms") apply to all quotations and sales by Jensen Precast's (including its Water Resources, Metal Tech and other branded products) products, materials, services, components, accessories, and panels (collectively, "Products"). No terms or conditions other than those stated in these Terms, and no agreement or understanding, oral or written, purporting to modify these Terms, whether contained in a purchaser's purchase forms or elsewhere, will be binding on Jensen Precast unless signed by an authorized executive manager of Jensen Precast. Customer consents to these Terms for all Products. In any legal proceedings, the prevailing party shall be entitled to recover its reasonable attorneys' fees and costs.
17. Submittals and Tests: Jensen Precast reserves the right to charge customers for the cost of submittals, engineering or tests that are in addition to those customarily provided.
18. Custom Products: Jensen Precast will charge customer for any work completed at the time of cancellation of a custom or special order. All custom orders will be invoiced to customer if not released for delivery within 30 days past estimated date of delivery.
19. Storage Fees: For every month beyond the requested manufacture date that the product remains in Jensen Precast's possession, a fee of 3% per month of total sale price of product will be added to the invoice total due upon final delivery/pick up.
20. Invoice Date: Customer will be invoiced for product at either, date of delivery or 60 days past date of originally requested delivery/pick up date.

SHIPPING POLICY

1. The customer will be prepared to receive products at the specified delivery time. Excessive unloading or stand-by time, resetting or re-delivery not caused by Jensen Precast will be charged at the hourly rate for the equipment involved.
2. The customer will be solely responsible for the following:
a. Finish grade, leveling, and position of product.
b. Grouting, and/or sealing of vault sections, grade rings, risers, frames and covers, pipes, etc.
c. Excavation, bedding, shoring, backfilling, compacting and grading.
d. Water and/or flotation control.
e. Setting and adjusting ladders, racking, grates or other hardware.
f. All other site work not specifically referred to.
3. Equipment belonging to the company cannot be left at any jobsite for the purpose of unloading or setting by others unless previously agreed to in writing between Jensen Precast and the customer.
4. Carriers are responsible for goods lost or damaged in transit. Damages or shortages should be indicated on the carrier's delivery receipt and any claims should be made in writing directly to the carrier.
5. All products are to be delivered in the number of trips specified. Charges will be added for additional trips.

SHIPPING CODE DEFINITIONS

Code #1 - DELIVERED AND SET

Quoted prices include product delivery and setting with our boom truck subject to the following provisions:
a. Jensen Precast will provide driver/crane operator services only using Jensen Precast's boom truck, unless otherwise specified.
b. Customer will be solely responsible for all other site work associated with setting and installing this product unless specifically referred to in writing.
c. Most products require assistance from the customer in setting (generally one or two laborers). Contact Jensen Precast for the specific requirements of each product.
d. The customer will provide a properly prepared, sized and graded, excavation. Access and setting location for our boom truck must be acceptable to our driver or representative.
e. Since site conditions, products, and delivery equipment vary, the logistics must be considered to determine the best approach for setting the product.
Attention must be given to the variables of the set, including:
a. Capacity of the Jensen Precast boom truck and truck crane to be used.
b. The maximum product weight relative to the setting distance from the center of the crane to the center of the excavation cannot exceed the boom truck rated capacity.
c. The route to the setting location must be accessible for the boom truck without towing or pushing.
d. The type of terrain, site slope, and ground conditions for outrigger footings, at the setting location.
e. Overhead restrictions and other physical constraints.
f. Any or all of the above could prevent Jensen Precast from setting the product. In cases where Jensen Precast cannot set the product, we will off load the product in accordance with shipping code definition #3 herein.
NOTE: If for any reason Jensen Precast cannot set the product, Jensen Precast will not be responsible, or charged, for setting by any other means.

Code #2 - DELIVERED - F.O.B. TRUCK:

Quoted prices include product delivery to the job site only; "Free On Board" the truck. Generally, this would be a flatbed truck without a crane or other unloading equipment subject to the following provisions:
a. The company will provide driver services only and the customer will supply means of unloading and setting products at time of delivery. 1 hour of off-load time is allotted per truck from time of arrival at delivery location or entry point. Additional standby time not caused by Jensen Precast will be charged at the hourly rate for the equipment involved.

Code #3 - DELIVERED AND OFFLOADED:

Quoted prices include product delivery to the job site and unloaded from our truck subject to the following provisions:
a. Jensen Precast will provide driver services and a means of unloading products.

b. The customer will provide an acceptable location for unloading and storing products, and the means for setting the product in the permanent location.

Code #4 - F.O.B. - JENSEN PRECAST YARD:

Quoted prices include product loading on customer or common carrier trucks in the yard subject to the following provisions:
a. Customer will be responsible for any additional charges, including charges for freight, shipping, delivery and setting.
b. Customer or common carrier will be responsible for tie down, dunnage, pallets, etc., unless specifically referred to.
c. Yard location will be addressed in section one of the quotation.

Code #5 - OTHER AS SPECIFIED:

If not specified in section one of this quotation, please consult our office for more specific information or written clarification.

APPENDIX B – LS-2 Prepackaged Lift Station Alternatives

Flygt System

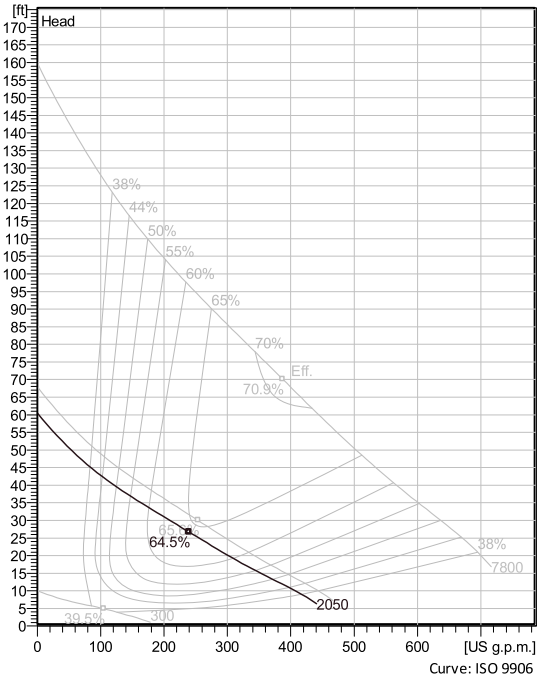
Concertor DP N80-2050

A process-controlled wastewater pumping system suitable for customers who utilize specially designed process control algorithms and want to benefit from lower capital costs, smaller control cabinets and higher pump system efficiencies. Concertor DP is also suitable as a reliable and energy efficient on/off controlled wastewater pumping system for customers who want to benefit from easily adjustable pump performance, soft start/soft stop, constant power and motor protection. This system is scalable to as many pumps as required by your application, with one gateway per pump.

Technical specification



Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N6020.091 18-08-1AZ-W 3hp

Installation type
P - Semi permanent, Wet

Impeller diameter
170 mm

Discharge diameter
3 inch

Pump information

Impeller diameter
170 mm

Discharge diameter
3 inch

Inlet diameter
110 mm

Maximum operating speed
800-2094.6 rpm

Number of blades
2

Max. fluid temperature
40 °C

Materials

Impeller
Hard-Iron ™

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-2050

Technical specification

Motor - General

Motor number
N6020.091 18-08-1AZ-W 3hp

Phases
3~

Rated speed
800-2095 rpm

Rated power
3 hp

ATEX approved
FM

Insulation class
H

Rated current
3.6 A

Type of Duty
S1

Frequency
60 Hz

Rated voltage
460 V

Motor efficiency class
IE4 according to IEC/TS 60034-30-2 Ed. 1

Motor - Technical

Power factor - 1/1 Load
0.95

Motor efficiency - 1/1 Load
90.0 %

Nominal speed - 1/1 Load
2300 rpm

Power factor - 3/4 Load
0.95

Motor efficiency - 3/4 Load
91.0 %

Nominal speed - 3/4 Load
2070 rpm

Power factor - 1/2 Load
0.95

Motor efficiency - 1/2 Load
91.0 %

Nominal speed - 1/2 Load
1840 rpm

Starting current
3.6 A

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-2050

Monitoring and Control equipment

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

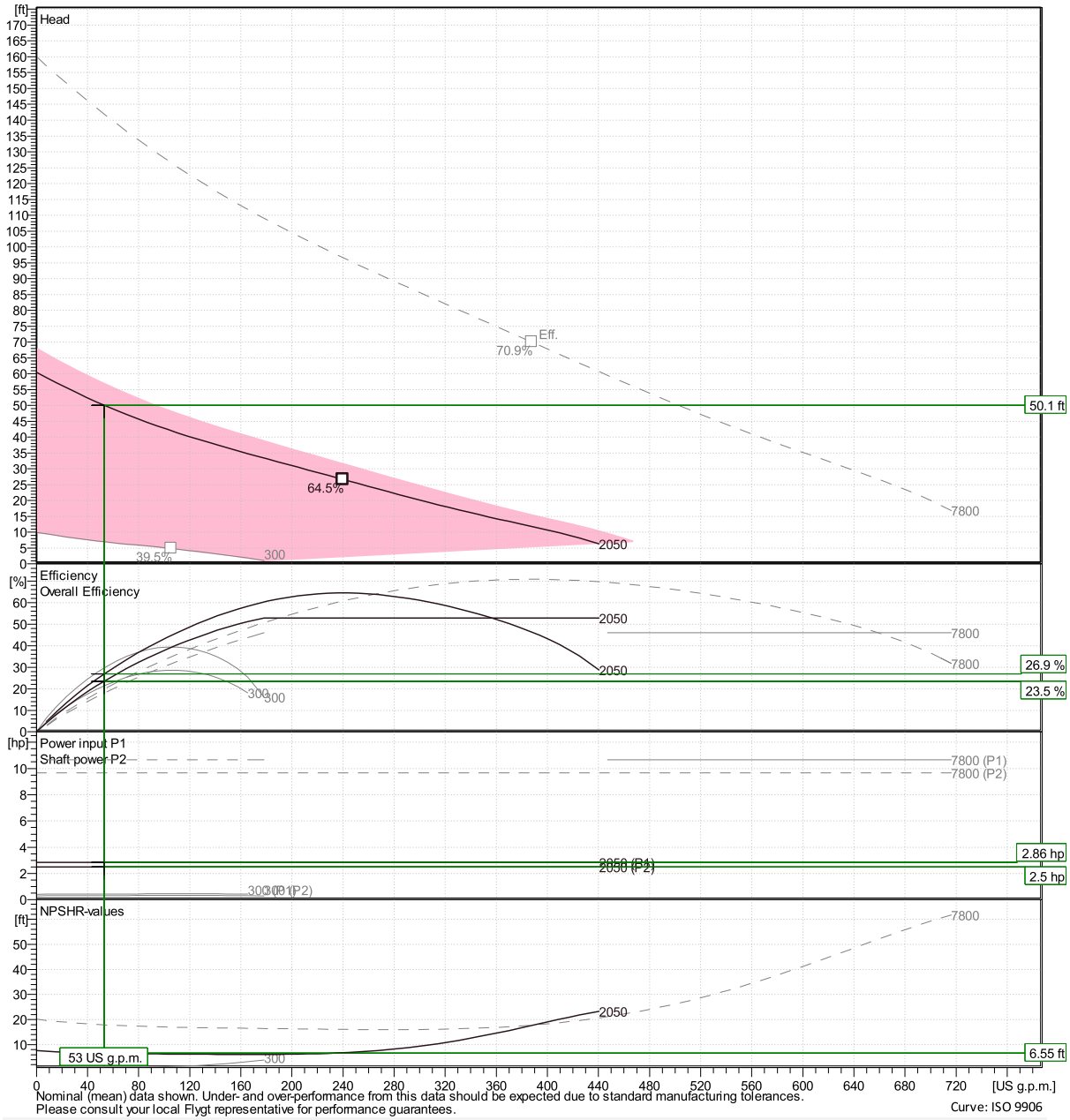
Concertor DP N80-2050

Performance curve

Duty point

Flow	Head
53 US g.p.m.	50.1 ft

Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

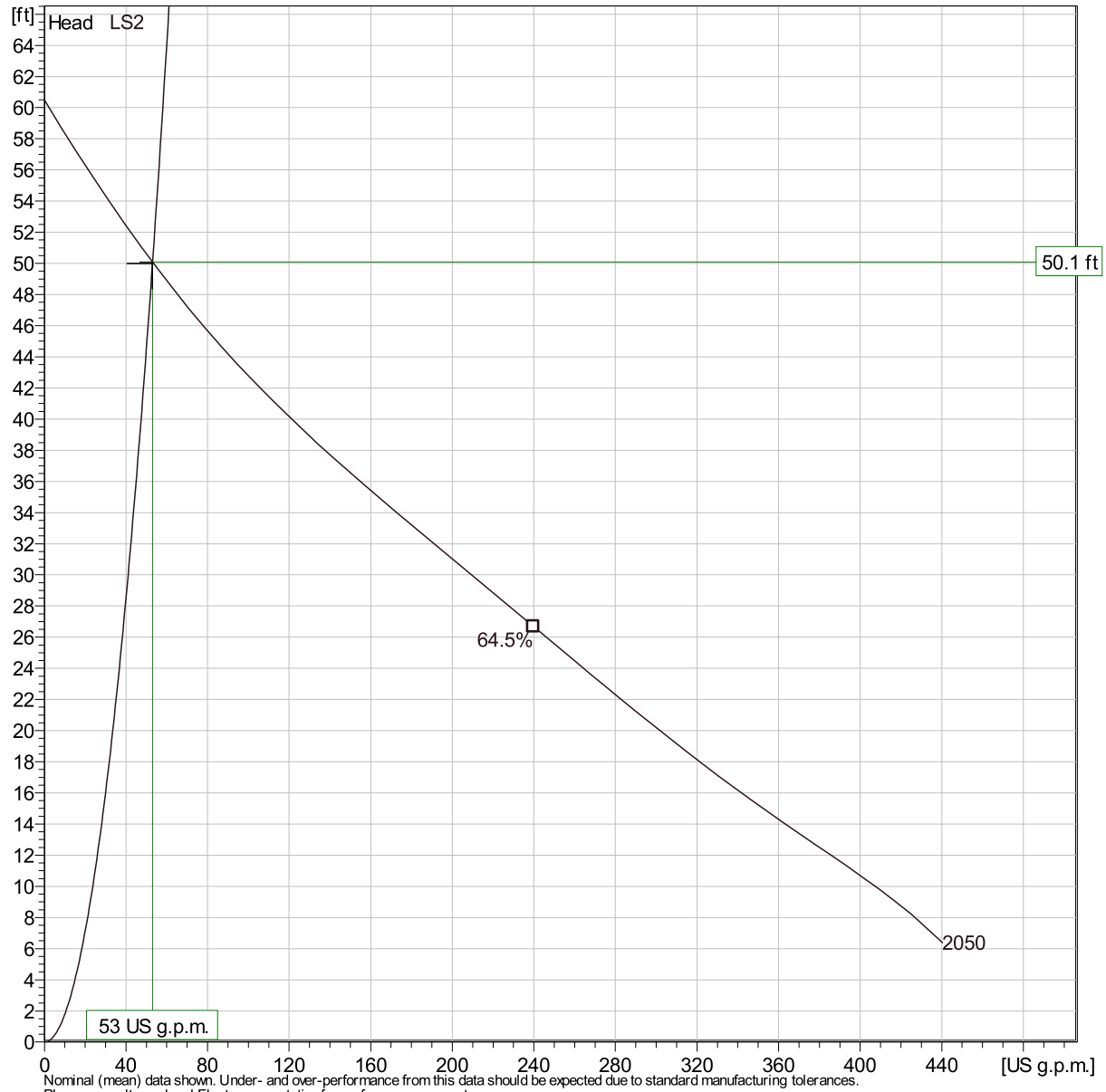
Curve: ISO 9906

Project	Xylect-22161321	**Created by**	Alan Dahlqvist	**Last update**	4/17/2024
Block		**Created on**	4/17/2024		

Concertor DP N80-2050

Duty Analysis

Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

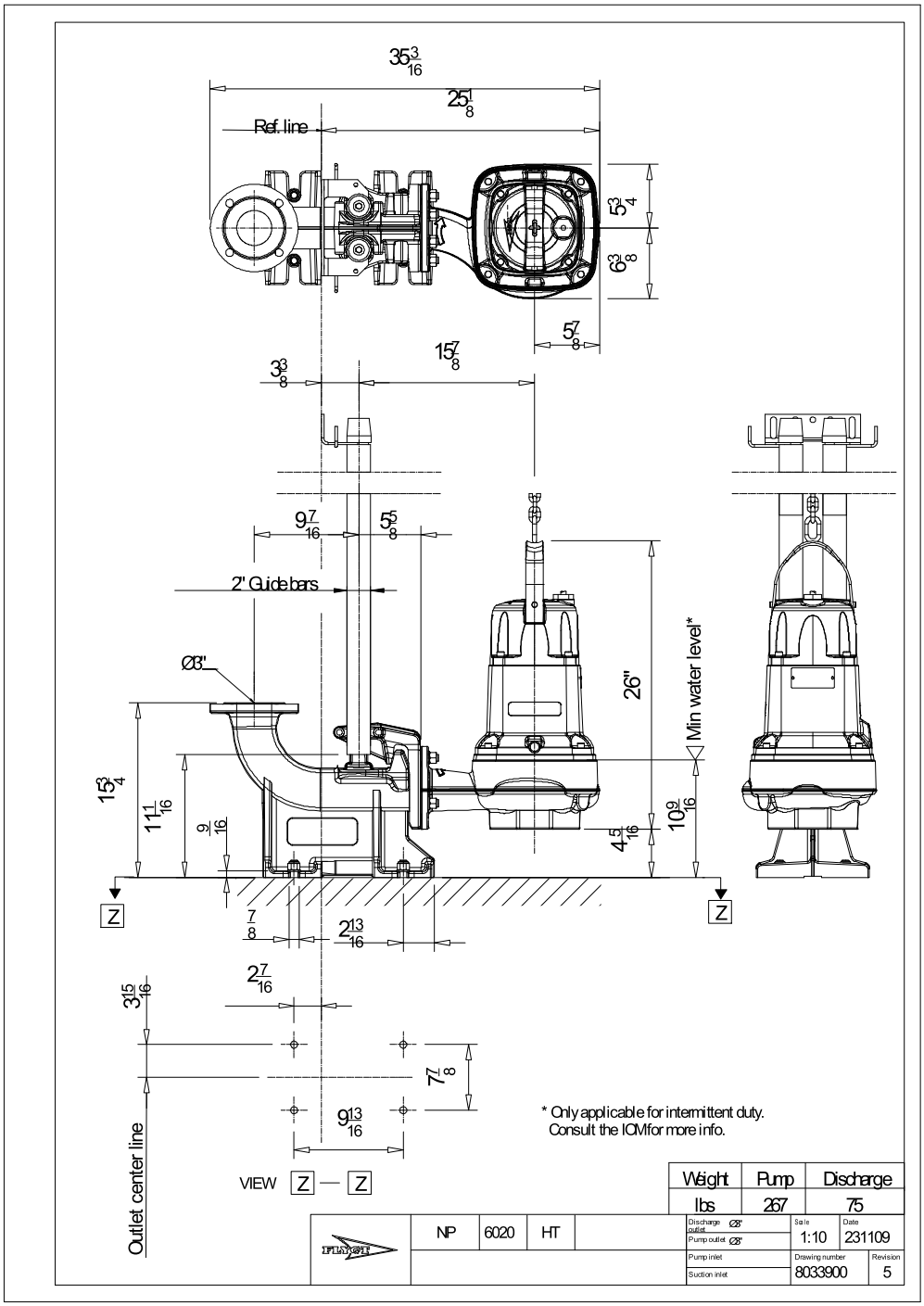
Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
LS2	53	50.1	2.5	53	50.1	2.5	26.9 %	669	6.55

Project		**Created by**	Alan Dahlqvist		
Block	Xylect-22161321	**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-2050

Dimensional drawing



Project	Xylect-22161321	**Created by**	Alan Dahlqvist
Block		**Created on**	4/17/2024 **Last update** 4/17/2024

FLYGT
a xylem brand



Flygt Concertor®

THE WORLD'S FIRST WASTEWATER PUMPING SYSTEM WITH INTEGRATED INTELLIGENCE

xylem
Let's Solve Water

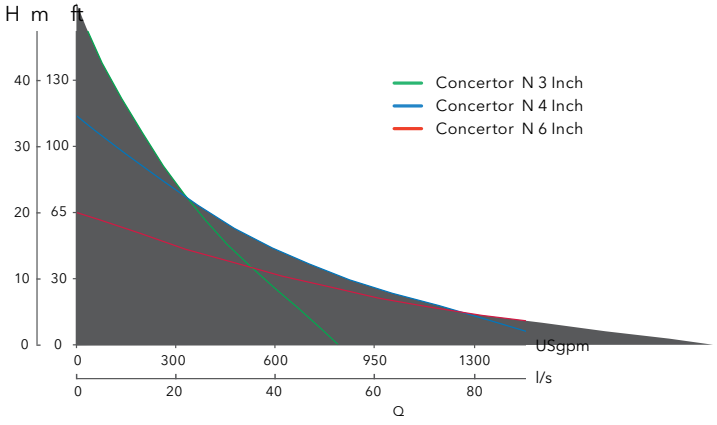
Flygt Concertor®
Intelligent Pumping System (iPS)

A new level of technology with unlimited possibilities

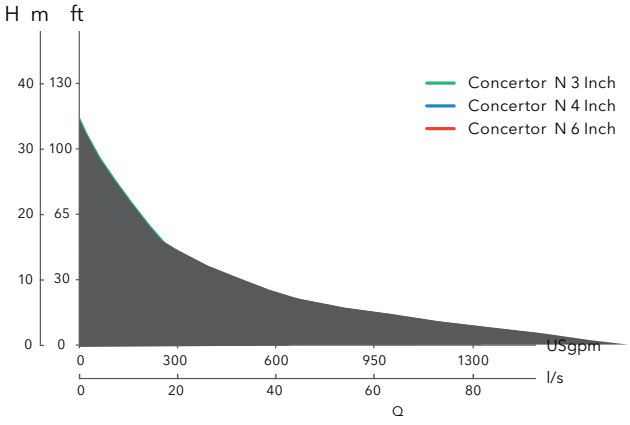
Xylem is proud to introduce the world's first wastewater pumping system with integrated intelligence. A real breakthrough innovation, Flygt Concertor® is capable of sensing the operating conditions of its environment, adapting its performance in real time and providing feedback to pumping station operators. With this new system, Xylem is now bringing smart and interconnected solutions to the world of wastewater pumping.

A new way of thinking
Concertor combines a fully integrated control system with our patented Adaptive N-hydraulics and intelligent functionality. The control system automatically adapts to the changing pumping environment, growing with your needs and delivering the optimal level of performance at the lowest cost of ownership. The built-in intelligence also makes it easier to set up and operate, as well as allowing for a significantly smaller footprint.

10HP / 380-480V / 3 phase



5.5HP / 200-240V / 3 phase



Trouble-free Pumping SAFER SYSTEM

NEW PANEL
FLYGT CONCERTOR iPS





INTELLIGENT CONTROL PANEL



SYSTEM THAT CAN BE LOCALLY ADJUSTED

INTELLIGENT CONTROL PANEL
RETROFIT KIT (INC. PRE-ENGINEERING)



* Retrofit kit includes MultiSmart controller, DP gateways, surge protector, modem kit with antenna, power supply and battery

- Clog free guarantee 24 months
- Improved operator safety – built in pump cleaning function
- Easily retrofitted into existing systems
- No more nuisance service calls due to clogging
- End to manual station cleaning – integrated sump and pipe cleaning
- Reduced odor and grease build-up
- Easy installation – impossible to wire the pump backwards
- Quick start-up – pre-engineered solution with simple set-up wizard
- Includes intelligent pump station manager
- Adjustable flow rate – automatically adjusts to optimal speed
- No VFD trips on hot days / no need for HVAC or cleaning fan filters
- Don't have time to check your stations in person? Flygt Cloud ready for remote monitoring and diagnostics
- Quick ROI – energy savings average 46% for installed systems
- Extended system warranty - 7 years

Basic Retrofit



CONCERTOR DP RETROFIT

** Basic retrofit kit includes DP gateway, surge protector and HMI

FB273 • Flygt Concertor Sales • 5/2018 • NACT

- Clog free guarantee 12 months
- Improved operator safety – built in pump cleaning function
- No more nuisance service calls due to clogging
- Easy installation – impossible to wire the pump backwards
- Quick start-up – pre-engineered solution with simple set-up wizard
- No VFD trips on hot days / no need for HVAC or cleaning fan filters
- Adjustable flow rate – remotely or on site
- Compatible with 3rd party controllers – accepts 4-20mA signal
- Quick ROI – energy savings at least 25%
- System warranty - 5 years

ONE PUMP TAKES CARE OF IT ALL

SIMPLE - Eliminates complex installation, programming and operation.

SMART - Cleans the station, auto-reverses upon blockage, and automatically runs at reduced speed as required.

SAFE - Keeps operators safe. Station cleaning and clogged pumps at 2:00 am just became obsolete.

SAVINGS - Provides true value. Taking energy, maintenance, & operations savings to a whole new level never seen before.

One powerful solution. Unlimited possibilities.

xylem
Let's Solve Water

Xylem, Inc.
14125 South Bridge Circle
Charlotte, NC 28273
Tel 704.409.9700
Fax 704.295.9080
855-XYL-H2O1 (855-995-4261)

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services, and agricultural settings. With its October 2016 acquisition of Sensus, Xylem added smart metering, network technologies and advanced data analytics for water, gas and electric utilities to its portfolio of solutions. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to **www.flygt.com**

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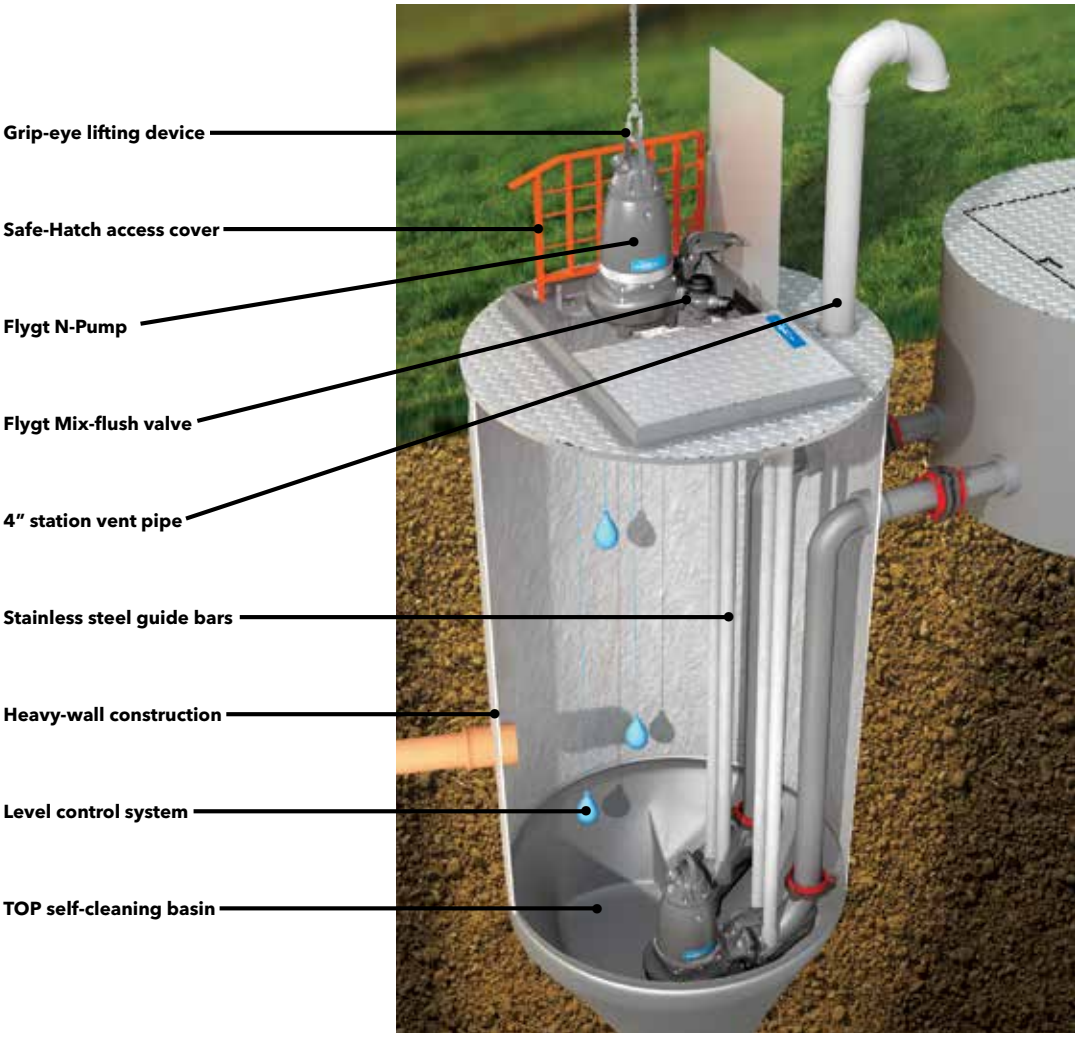
TOP Pre-Engineered Fiberglass Pump Station

THE OPTIMUM PUMP STATION

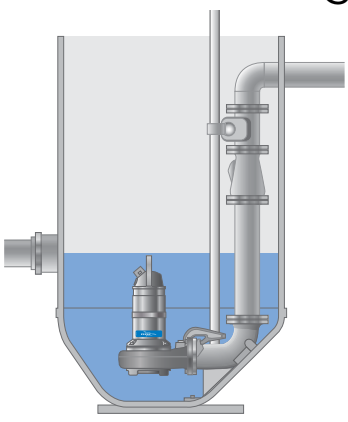
FLYGT

a xylem brand

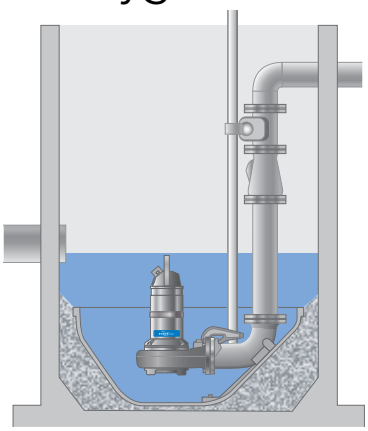
Flygt TOP Pre-Engineered Pump Station



The self-cleaning team: Flygt TOP Sump and N-Pump



TURNKEY PUMP STATIONS
Install a prepackaged pump station with Flygt TOP self cleaning design in corrosion resistant fiberglass construction.



RETROFIT EXISTING SUMPS
Install the prefabricated Flygt TOP sump floor and fill the gap between the old floor and the new with concrete. Wait a few hours until dry, then put your pump station back online. No additional excavation is required.



N IMPELLER & WEAR PLATE
N-Impeller with back swept vanes and guide pin with relief groove provide sustained efficiency while pumping modern trash such as flushable wipes.

Continuously removes suspended solids

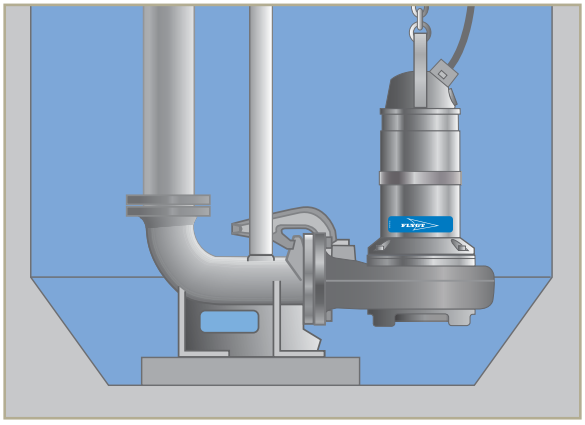
The Flygt TOP station delivers outstanding self-cleaning performance both in laboratory tests and under real-life operating conditions.

Flygt conducted a laboratory test comparing the Flygt TOP sump to a traditional sump. The test sumps were each filled with 105 US gallons (400 liters) of water and 108 lbs. (49 kg) of sand. The water was pumped back and forth 10 times from one sump to the other.

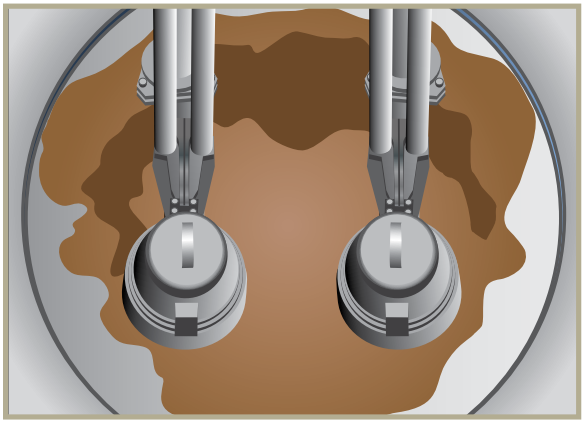
At the end of the test 207 lbs. (94 kg) of solids accumulated in the conventional sump, while only 9 lbs. (4 kg) of solids remained in the TOP sump.

These lab test results are replicated on a daily basis in thousands of Flygt TOP stations operating around the world. The results are definitive: Flygt TOP stations with self cleaning hopper shaped bottom reduce settled solids in turn reducing maintenance and downtime.

Conventional pump sump

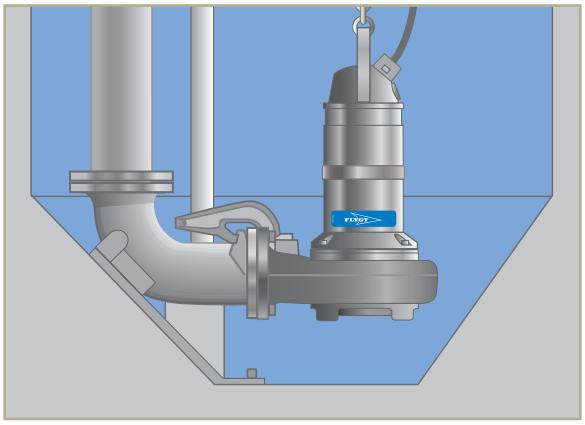


Conventional large flat sump floor encourages buildup of sludge and solids.

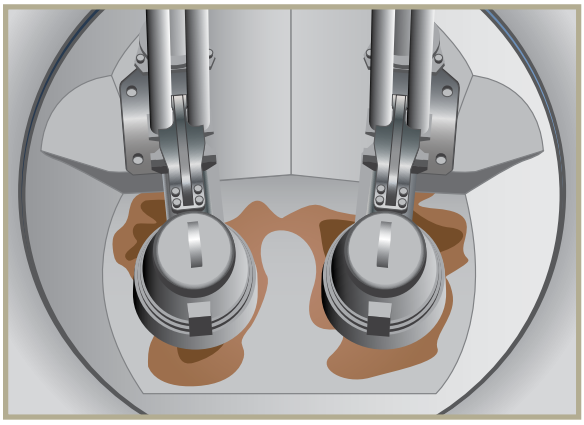


The further away the sumps walls are from the pumps, the greater the sedimentation.

Flygt TOP sump



Minimal floor area and optimized geometries ensure high velocity, which efficiently suspends settled solids in wastewater.

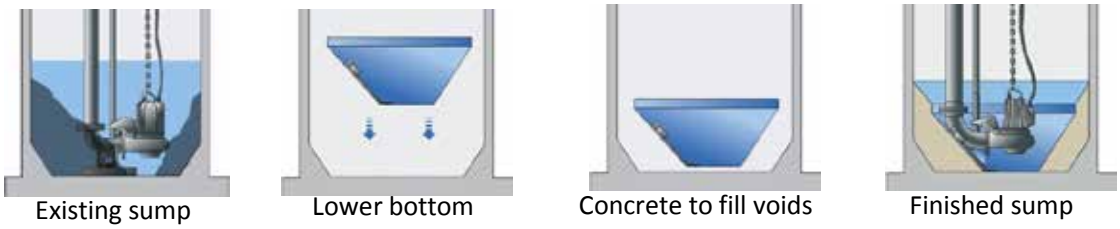


Optimized geometry draws any solids remaining in the sump closer to the pumps, where pump suction is the strongest. This eliminates the risk of solids buildup.

Retrofits easier and turnkey solutions possible

Top Stations are available as turnkey fully assembled pump stations, with rails, valves, and all discharge piping fully assembled. The other option is to retrofit the exsiting station with a TOP self-cleaning bottom. Just lower the insert into the station, fill the gap between the old floor and the new with concrete.

Retrofit Solution install process



TOP Sizes	TOP 4	TOP 5	TOP 6	TOP 100 Retrofit Liner	TOP 150 Retrofit Liner
Station Diameter	4 ft.	5 ft.	6 ft.	4 ft.	5 ft.
Discharge Sizes	2, 3, 4"		2, 3, 4, 6"	2, 3, 4, 6"	
Pipe Material	316 Stainless Steel /PVC			Determined by Engineer	

Depths up to 25 ft. standard. Designs over 25 ft. possible please consult factory

FB012 • Flygt TOP Pre-engineered Fiberglass Pump Station Brochure • 1/2017 • NACT

xylem
Let's Solve Water

Flygt is a brand of Xylem, whose 12,000 employees are addressing the most complex issues in the global water market.

www.xyleminc.com

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14125 South Bridge Circle
Charlotte, NC 28273
Tel 704.409.9700
Fax 704.295.9080
855-XYL-H2O1 (855-995-4261)
www.xyleminc.com

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Focardi, Dana

From: Dahlqvist, Alan - Xylem <Alan.Dahlqvist@xylem.com>
Sent: Friday, May 31, 2024 3:18 PM
To: Requieron, Wynneth
Subject: RE: EXTERNAL: RE: Inquiry on Pre-packaged Lift Stations for Quail Valley
Attachments: LS5 NP3085MT463 2.2HP.pdf; LS2 NP3085SH256 4HP.pdf; LS3 NP3069SH275 2.7HP.pdf; LS4 NP3085SH255 4HP.pdf

Hi Wynneth
Here are some conservative budgetary prices for the equipment with standard pumps

List station
4'Dia x22'Deep FRP wet well 3" SS discharge piping NO Valve vault (no valves supplied) - $46,400

2- LS5 pumps with installation accessories - $19,600
2- LS4 pumps with installation accessories - $23,000
2- LS3 pumps with installation accessories - $13,800
2- LS2 pumps with installation accessories - $23,000

Not applicable. Using Concertor Pumps.

Control Panel for this size pump $20-30k for a typical design with NEMA3R SS enclosure, depending on components required, VFD's etc

Please let me know if you have any questions

Best regards
Alan

Alan Dahlqvist
Flygt – Pumps, Repairs, Controls
San Diego, Riverside, San Bernardino, Imperial and Orange County
Engineered Projects
Cell: 951-553-1493
Alan.Dahlqvist@xylem.com

Direct Sales Representative
11161 Harrel Street, Suite B
Mira Loma, CA 91752
www.flygtus.com/

O: 951.332.3668 F: 951.332.3679

Focardi, Dana

From: Dahlqvist, Alan - Xylem <Alan.Dahlqvist@xylem.com>
Sent: Monday, May 6, 2024 9:53 AM
To: Requieron, Wynneth
Subject: RE: EXTERNAL: RE: Inquiry on Pre-packaged Lift Stations for Quail Valley

Hi Wynneth
Here are some conservative budgetary prices for the equipment

Not applicable.
Using 4' Dia.

List station
6'Dia x22'Deep FRP wet well 3" SS discharge piping with 6' Dia x 6' deep Valve vault - $90,000

2- Concertor pumps with installation accessories - $26,000

Control Panel for this size pump $30k for a typical design with NEMA3R SS enclosure

Please let me know if you have any questions

Best regards
Alan

Alan Dahlqvist
Flygt – Pumps, Repairs, Controls
San Diego, Riverside, San Bernardino, Imperial and Orange County
Engineered Projects
Cell: 951-553-1493
Alan.Dahlqvist@xylem.com

Direct Sales Representative
11161 Harrel Street, Suite B
Mira Loma, CA 91752
www.flygtus.com/

O: 951.332.3668 F: 951.332.3679

APPENDIX C – LS-3 Prepackaged Lift Station Alternatives

APPENDIX C – LS-3 Prepackaged Lift Station Alternatives

Sierra Peak System

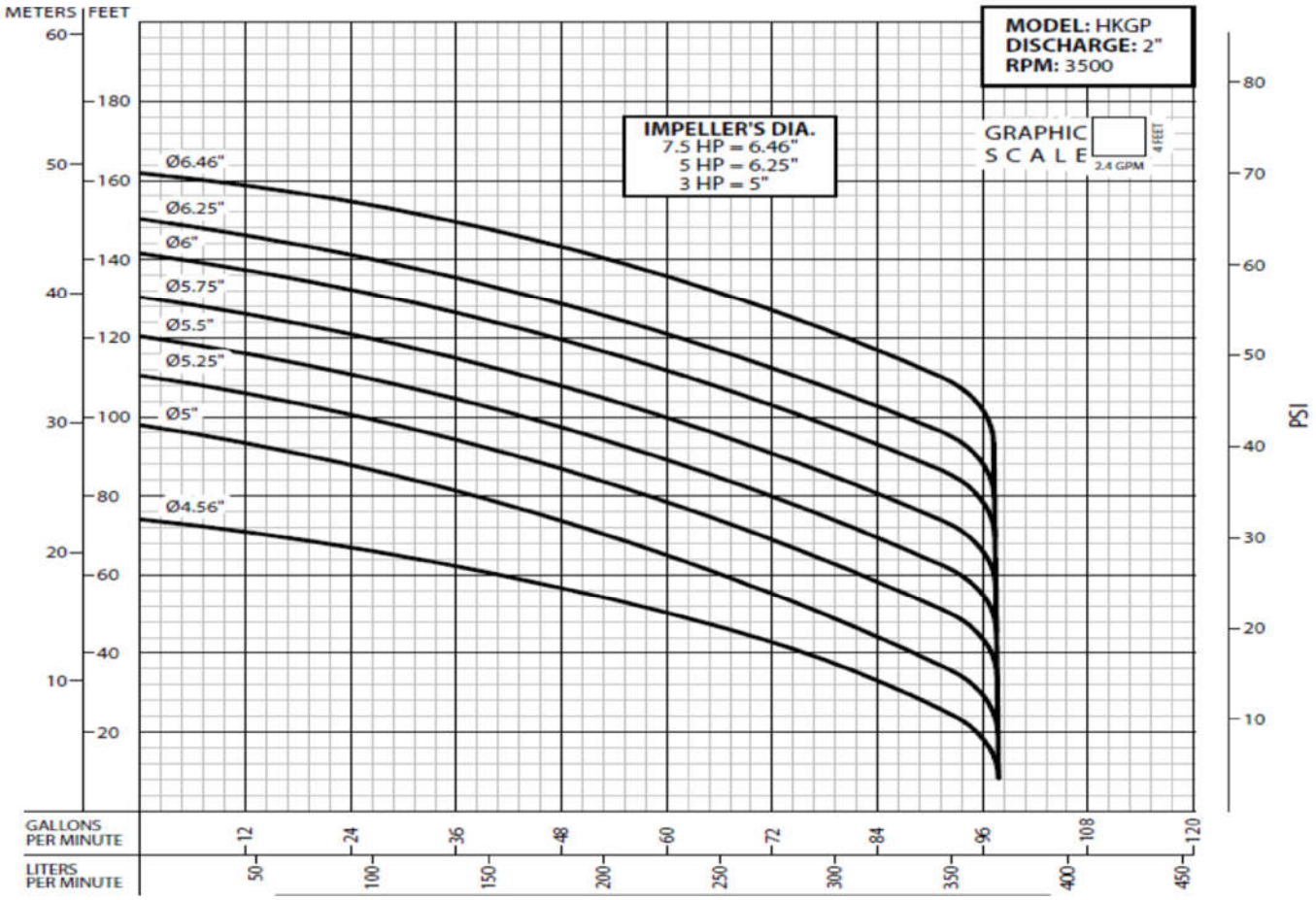
Sierra Peak Pump Systems

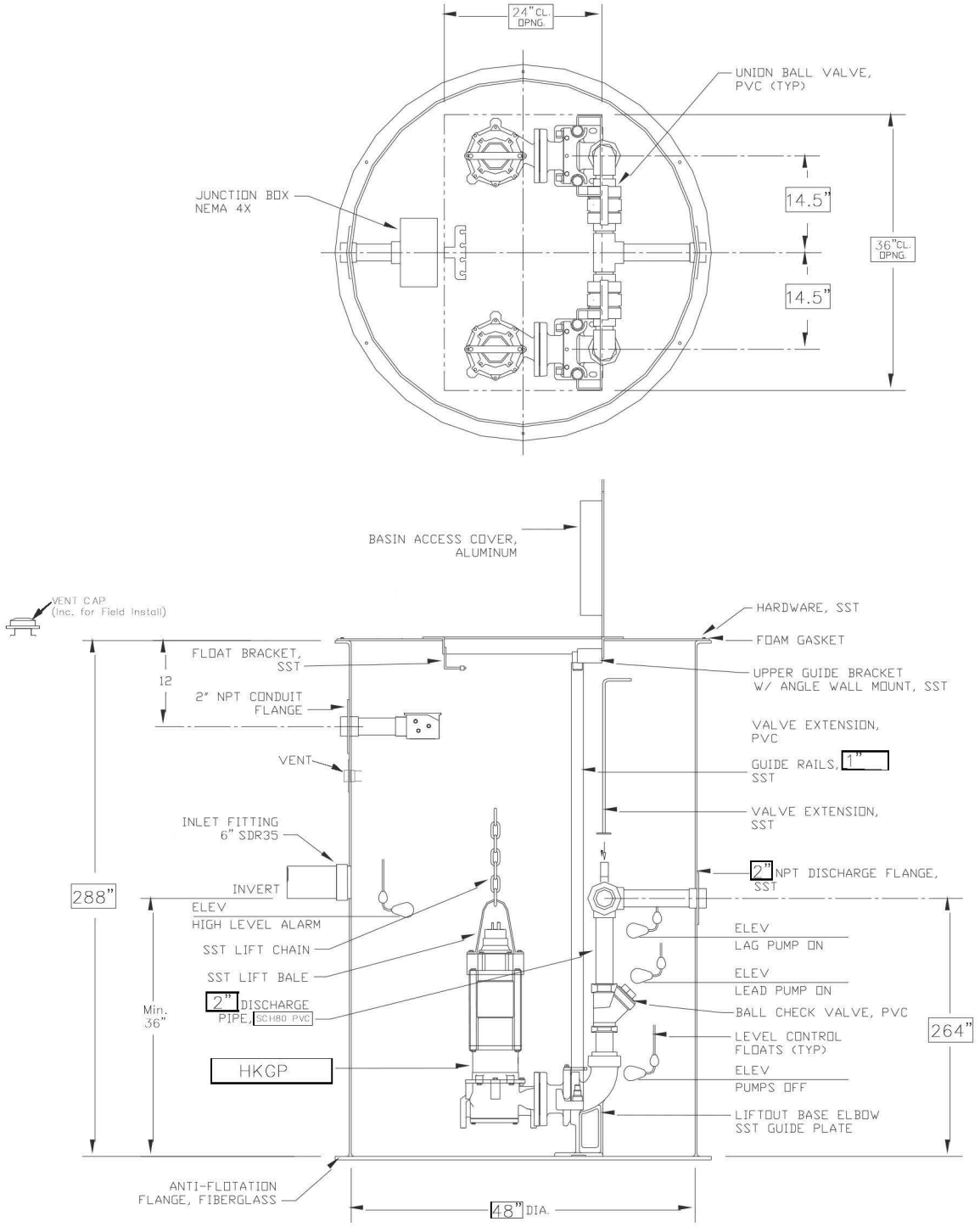
HKGP – 2” Grinder

Motor Data	
HP/Power Supply	See Model Table
Rated Speed	3450 RPM
Insulation Class	F Class
Start Capacitor	External
Cooling	Oil-Filled
Mechanical Seal	Dual Silicon Carbide
Grinding Mechanism	Axial Slicer or Radial Grinder Available
Discharge	2” FPT Vertical

Model Options				
HP	Volts	Phase	Full Load Amps	Weight (lb)
3	230	1	23	188
3	230	3	13	188
3	460	3	6.5	188
5	230	1	39	199
5	230	3	20	199
5	460	3	10	199
7.5	230	3	24	203
7.5	460	3	12	203

Performance Curve





-Pump Discharge Line outside of basin to be min. 2" SCH80

Signa MECHANICAL
"BUILDING SOLUTIONS FOR TODAY'S ENVIRONMENT"
Signa Mechanical
1615 Monrovia Ave,
Costa Mesa, CA 92627
Phone: 949-548-1125
Fax: 949-257-0587
Email: Sales@Signaco.com

EMWD Quail Valley LS-2, 3, 4
SEWER PUMP AND BASIN DETAIL

Signa MECHANICAL
"Building Solutions for Today's Environment"

Quotation

Main/Billing Office
1615 Monrovia Ave.
Costa Mesa, CA 92627
Phone # 949-548-1125
Fax # 949-257-0587

Northern CA Branch
29441 Kohoutek Way
Union City, CA 94587

Arizona Branch
2604 W. 1st Street., Ste. 46
Tempe, AZ 85281

Date	Estimate #
05/13/24	**Q240383-1**

Quotes are valid for 30 days from date listed above.

Project
EMWD Quail Valley

Name / Address
Michael Baker International - Temecula 40810 County Center Drive, Suite 200 Temecula, CA 92591

Delivery Address
Michael Baker International - Temecula Need Shipping Address Quail Valley, CA

FOB	Terms	Warehouse/Shop	Rep	Contact	Phone
Origin	Prepaid	Costa Mesa Branch	Natalia S Tortorello	Wynneth Requieron	951-506-2053

Description	Qty	Unit Price	Total
2 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 31,887.88	$ 0.00
3 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 41,080.68	$ 0.00
5 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 45,335.88	$ 0.00
2 HP Basin Triplex Grinder Pump Package:	0.00 ea	$ 45,165.96	$ 0.00
		Subtotal	$ 0.00
		Sales Tax	$ 0.00
		Total	$ 0.00

Budgetary Estimate for Design Options

All basins are 48" Diameter x 22' Height.

APPENDIX C – LS-3 Prepackaged Lift Station Alternatives

Jensen System

Technical Information

GRP26/1/C FM

HOMA PUMPEN MIT SYSTEM

Operating data

Flow	49 US g.p.m.
Head	31.1 ft
Shaft power P2	2.3 hp
Pump efficiency	42.3 %
Required pump NPSH	
Pump type	Single pump
No. of pumps	1
Fluid	Wastewater

Pump

Pump Code	GRP26/1/C FM
Impeller	Vane impeller with cutter sys.
Impeller size	$5^{7}/_{16}$"
Solid size	
Discharge port	2" M
Suction port	

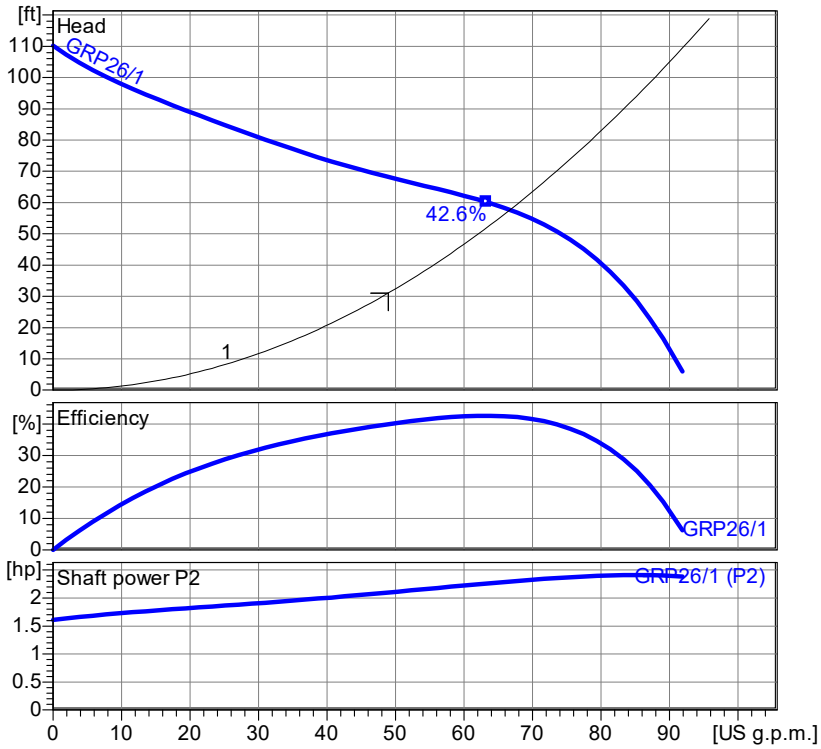
Motor

Rated voltage	230 V
Frequency	60 Hz
Rated power P2	2.4 hp
Rated speed	3450 rpm
Number of poles	2
Efficiency	70 %
Rated current	12 A
Degree of protection	IP 68

Materials

Motor housing	Cast Iron ASTM A48;Cl.40B
Pump housing	Cast Iron ASTM A48;Cl.40B
Motor bearing cover	Cast Iron ASTM A48;Cl.40B
Impeller	Cast Iron ASTM A48;Cl.40B
Cutting system	Hardened Stainless Stell HRC55
Motor shaft	AISI 430 F Stainless Steel
Bolts	AISI 304 Stainless Steel
O-Rings	Nitrile Rubber
Mechanical seal on medium side	SiC / SiC
Mechanical seal on motor side	SiC / SiC
Lower Bearing	Double row angular ball bearing
Upper Bearing	Deep Groove Ball Bearing

Testnorm: **HI Standard Sect. 11.6.5.4**



Wet well installation with coupling kit 2" with ½" Rails (GRP26)
Dimensions in mm [inch], letters see table

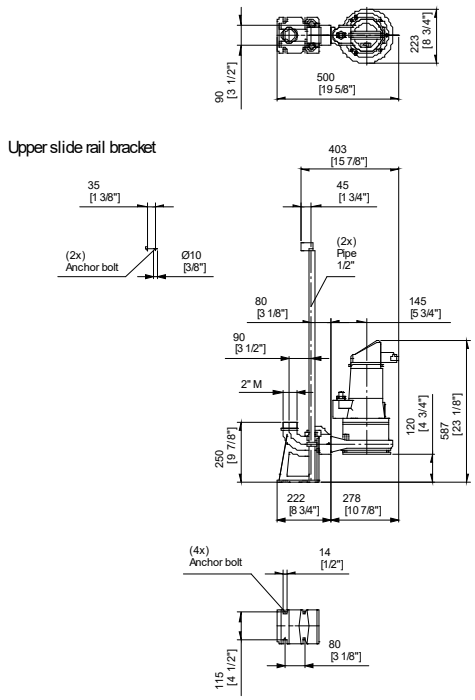


Table Dimensions (inch)

Project	Project no.:	Created by:	Page:	Date:
			1	4/26/2024

Performance Curve

GRP26/1/C FM

HOMA PUMPEN MIT SYSTEM

Impeller

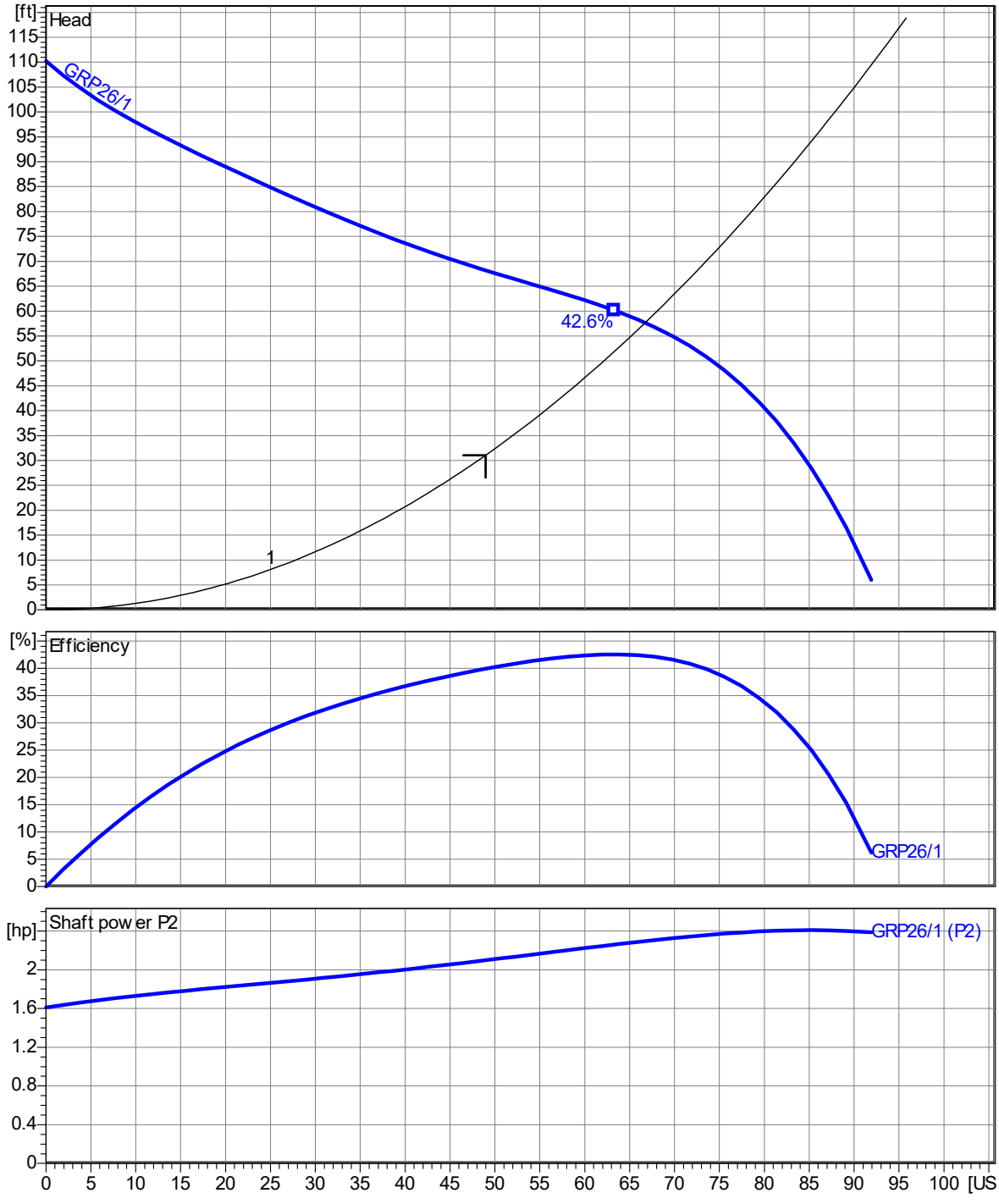
Impeller type:	Solid size Ø:	Max. Ø:	Min. Ø:	Sel. Ø:	
Vane impeller with cutter sys.		$6^{5}/_{16}$"	$6^{5}/_{16}$"	$5^{7}/_{16}$"	

Operating data

Speed:	Frequency:	Duty point:	Shaft power P2:	Discharge port:
3450 rpm	**60 Hz**	**Q =49 US g.p.m. H =31.1 ft**	**2.3 hp**	**2" M**

Power data referred to:
Water [100%] ; 68°F; 62.322lb/ft³; 1.0818E-5ft²/s

Testnorm: **HI Standard Sect. 11.6.5.4**



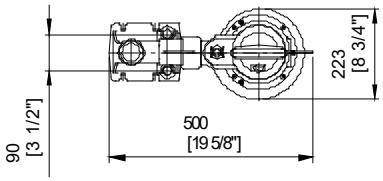
2.0.1 - 18.03.2024 (Build 147)

Project	Project no.:	Created by:	Page:	Date:
			2	**4/26/2024**

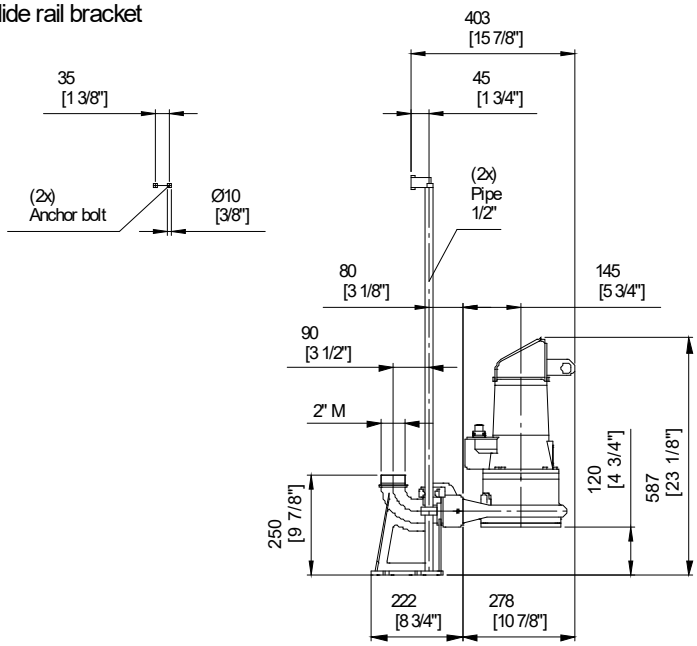
Dimensions

GRP26/1/C FM

Wet well installation with coupling kit 2" with ½" Rails (GRP26)
Dimensions in mm [inch], letters see table



Upper slide rail bracket



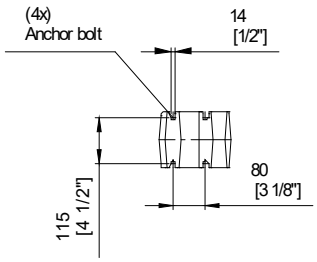


Table Dimensions (inch)

Project	Project no.:	Created by:	Page: 3	Date: 4/26/2024

Technical Data

GRP26/1/C FM

HOMA PUMPEN MIT SYSTEM

Operating data					
Flow	**49 US g.p.mUS g.p.m.**		**Head**	**31.1 ft**	**ft**
Shaft power P2	**2.3**	**hp**	**Static head**	**0**	**ft**
Pump efficiency	**42.3**	**%**	**Required pump NPSH**		**ft**
Pump type	Single pump		No. of pumps	1	
Fluid	Wastewater		Temperature	68	°F
Density	62.31	lb/ft³	Kin. viscosity	1.077E-5	ft²/s

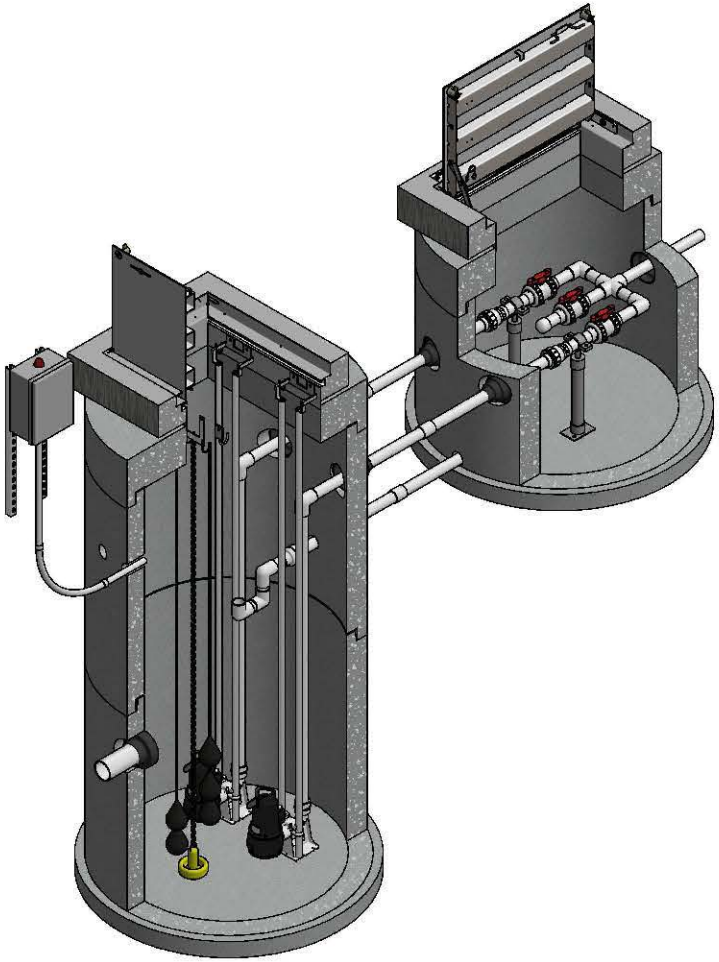
Pump					
Pump Code	GRP26/1/C FM		Speed	3450	rpm
Suction port			Head Max.	110.2	ft
Discharge port	2" M		Head Min.	6.0	ft
Impeller type	Vane impeller with cutter sys.		Flow Max.	91.9	US g.p.m.
Solid size		inch	Pump efficiency max.	42.6	%
Impeller Ø	5.43	inch	Required rated power max. P2	2.4	hp

Motor					
Motor design	Submersible motor		Insulation class	H	
Motor name	AM122.3,8/2/1		Degree of protection	IP 68	
Frequency	60	Hz	Temperature class	T4	
Rated power P2	2.4	hp	NEMA code	E	
			Explosion protection	Class I, Div. 1, Grp. C&D	
Rated speed	3450	rpm	Efficiency at % rated power 100%	70.0	%
Rated voltage	230 V | 1~		Efficiency at % rated power 75%		%
Rated current	12.0	A	Efficiency at % rated power 50%		%
Starting current, direct starting	43.2	A	cos phi at % rated power 100%	0.98	
Starting current, star-delta	14	A	cos phi at % rated power 75%		
Starting mode	Directly		cos phi at % rated power 50%		
Power cable	7X1,5 / 10G1,5		Control cable	2X1,5 / -	
Type of power cable	NSSHÖU-J / H07RN8-F PLUS		Type of control cable	ÖLFLEX-EB / -	
Cable length	32.8 ft		Service factor	1.15	
Shaft seal	Mechanical seal on medium side		SiC / SiC		
	Mechanical seal on motor side		SiC / SiC		
Bearing	Lower Bearing		Double row angular ball bearing		
	Upper Bearing		Deep Groove Ball Bearing		
Remarks	Start-/ Runcapacitor: 80µF / 40µF				

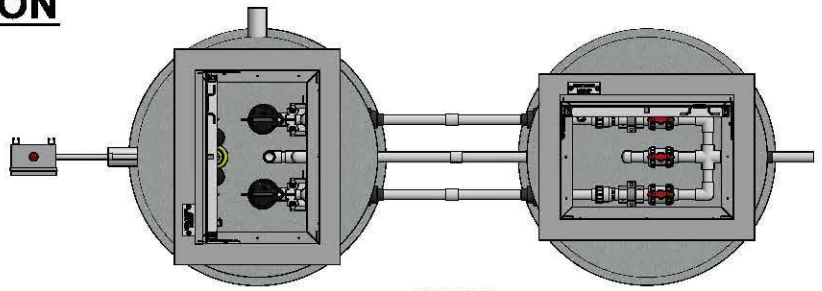
Materials / Weight			
Motor housing	Cast Iron ASTM A48;Cl.40B	Motor shaft	AISI 430 F Stainless Steel
Pump housing	Cast Iron ASTM A48;Cl.40B	Bolts	AISI 304 Stainless Steel
Motor bearing cover	Cast Iron ASTM A48;Cl.40B	O-Rings	Nitrile Rubber
Impeller	Cast Iron ASTM A48;Cl.40B		
Cutting system	Hardened Stainless Stell HRC55		
Weight aggregate	72.751 lb		

Project	Project no.:	Created by:	Page: 4	Date: 4/26/2024

248-DV SERIES STANDARD
DUPLEX PUMP STATION



TOP LEFT ISOMETRIC VIEW w/ SECTION
NOT TO SCALE



PLAN VIEW
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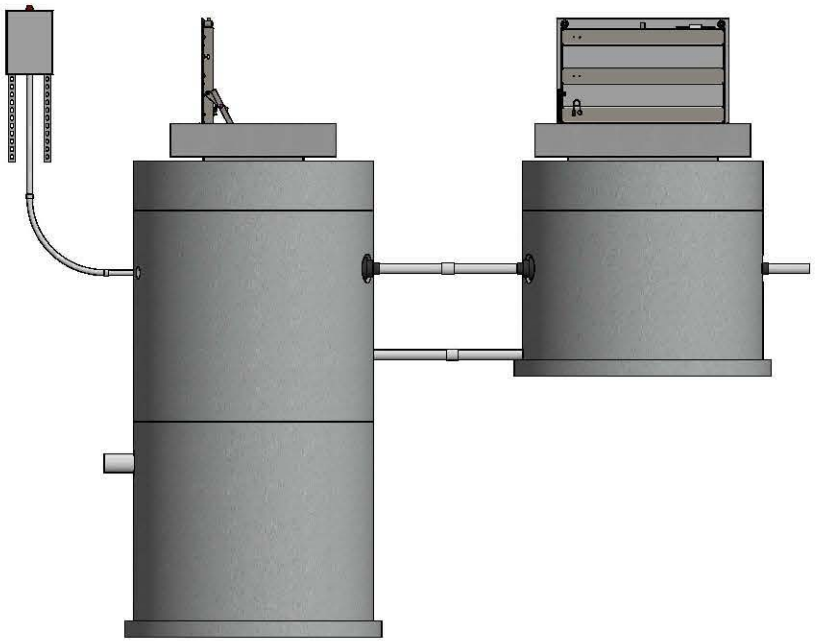

PROFILE VIEW
NOT TO SCALE

DISCLAIMERS, INCLUDING BUT NOT LIMITED TO:
1.) All elevations have been provided by others, and have not been verified by Jensen Precast. Contractor to verify all dimensions and elevations in field prior to installation.
2.) These layout drawings are intended to show overall system design only. All concrete component thicknesses, dimensions, and joint orientations may vary across Jensen Precast's manufacturing facilities. Contractor to confirm all thicknesses, dimensions, and joint orientations prior to installation.
3.) System design criteria has been provided to Jensen Precast. Others are responsible for verification that system meets intended application.
4.) Foundation, subgrade, and backfill to be designed by others.

JENSEN PUMP STATIONS
521 DUNN CIRCLE, SPARKS, NV 89431
www.jensenwaterresources.com
(855) 468-6500

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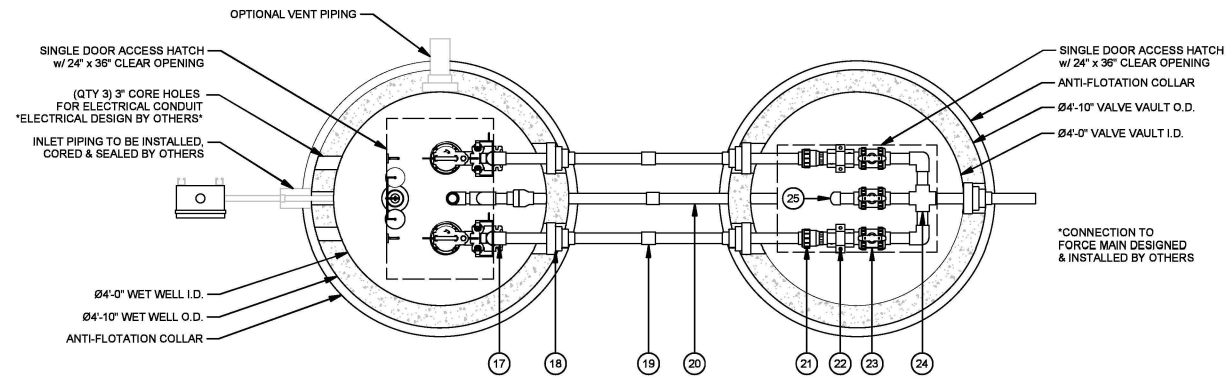
DESCRIPTION: Quail Valley - LS3

PART NUMBER:	248-DV Series Standard	DRAWN BY:	T. Tidball
CREATED:		MODIFIED:	1/26/21

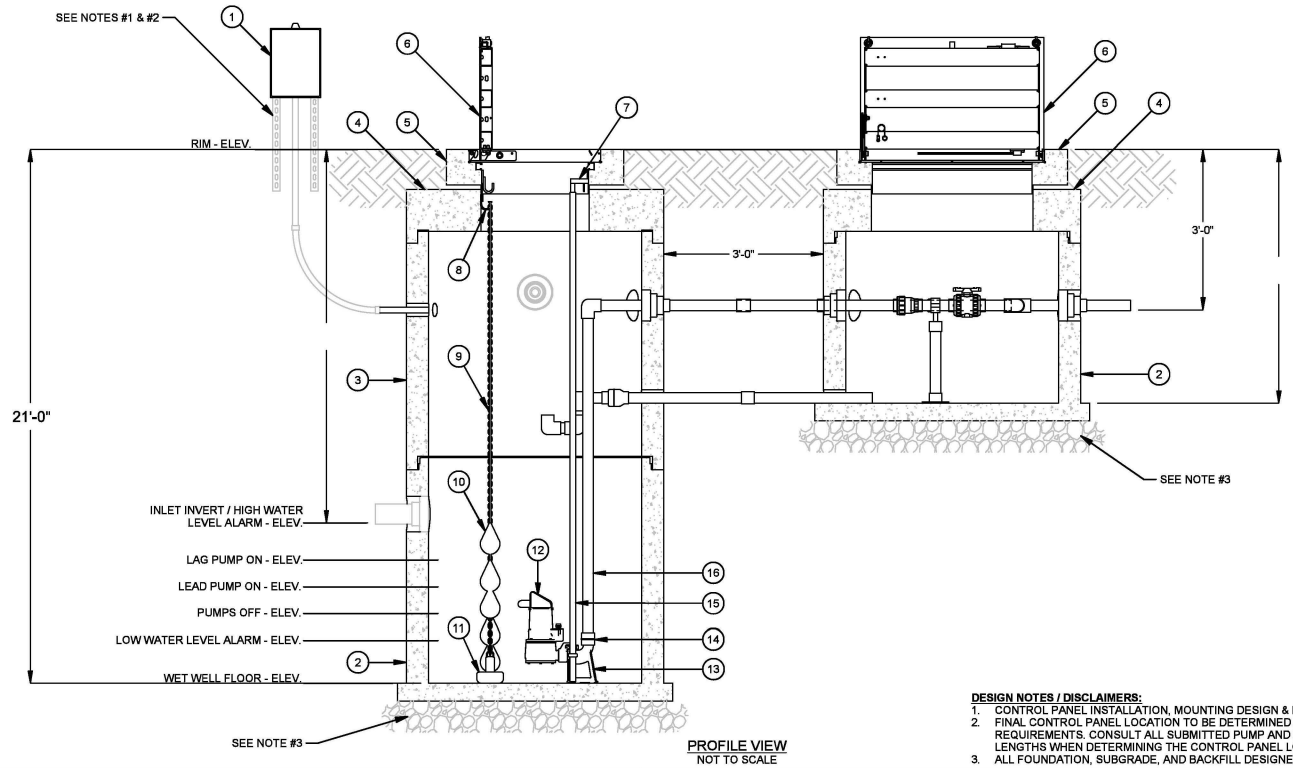
REV:

SHEET: 1 OF 2

248-DV Series Standard.dw



PLAN VIEW
NOT TO SCALE



PROFILE VIEW
NOT TO SCALE

DESIGN NOTES / DISCLAIMERS:

1. CONTROL PANEL INSTALLATION, MOUNTING DESIGN & HARDWARE BY OTHERS.
2. FINAL CONTROL PANEL LOCATION TO BE DETERMINED ACCORDING TO PROJECT REQUIREMENTS. CONSULT ALL SUBMITTED PUMP AND LEVEL CONTROL CABLE LENGTHS WHEN DETERMINING THE CONTROL PANEL LOCATION.
3. ALL FOUNDATION, SUBGRADE, AND BACKFILL DESIGNED BY OTHERS.

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION
1	1	DUPLEX ALTERNATING CONTROL PANEL
2	2	48IN DIA JENSEN PRECAST CONCRETE MANHOLE BASE *HEIGHT VARIES*
3	1	48IN DIA JENSEN PRECAST CONCRETE MANHOLE BARREL *HEIGHT VARIES *
4	2	48IN DIA JENSEN PRECAST CONCRETE MANHOLE FLAT TOP
5	2	JENSEN PRECAST CONCRETE HATCH RISER
6	2	SINGLE DOOR HATCH WITH A CLEAR OPENING OF 24IN X 36IN
7	2	UPPER GUIDE RAIL BRACKET 2IN
8	1	FLOAT BRACKET 3 HOOK TYPE 316SS
9	10 LF	LF CHAIN 1/4IN 316SS
10	5	FLOAT SWITCH w/ 100' CABLE
11	1	ANCHOR 15LB PVC COATED
12	2	2IN SUBMERSIBLE PUMP
13	2	AUTOCOUPLING ASSY 2IN STD
14	2	ADAPTER 2IN FML THRD X SLIP SCH 80 PVC
15	40 LF	LF PIPE 1IN SCH40 GUIDE RAIL 304SS
16	40 LF	LF PIPE PVC SCH 80 2IN DIA
17	4	90 DEG ELBOW 2IN SCH 80 PVC SLIP
18	5	FLEXIBLE PIPE CONNECTORS
19	2	FITTING PVC SCH 80 2IN DIA COUPLING SLIP
20	1	2IN DIA PVC SCH40 VAULT DRAIN w/ CHECK VALVE, TRAP & FITTINGS
21	2	BALL CHECK VALVE 2IN SCH 80 PVC SLIP
22	2	PIPE SUPPORTS
23	3	BALL VALVE 2IN SCH 80 PVC SLIP
24	1	CROSS 2IN SCH 80 PVC SLIP
25	1	CAP 2IN SCH 80 PVC SLIP

PROJECT SPECIFIC INFORMATION

FINISHED GRADE (Ft.)	
RIM ELEV. (Ft.)	
INLET ELEV. (Ft.)	
FORCE MAIN DISCHARGE ELEV. (Ft.)	
AVAILABLE POWER SUPPLY	120V ☐ 240V ☑ 480V ☐
AVAILABLE POWER PHASE	Single ☑ Three ☐

SYSTEM CHARACTERISTICS

APPLICATION	SEWAGE ☑ STORM WATER ☐
DESIGN FLOW (gpm)	49
TOTAL DYNAMIC HEAD (Ft.)	31.1
STATIC HEAD (Ft.)	
PUMP MAKE & MODEL	HOMA GRP26/1/C FM
PUMP MOTOR (Std / XP)	Standard ☐ XP/FM ☑
PUMP TYPE	Non-Clog ☐ Grinder ☑ Chopper ☐ Vortex ☐
PUMP RATED HP & CURRENT	2.4hp / 12A
ACCESS HATCH LOAD LEVEL	Pedestrian ☐ Incidental H-20 ☐ Parking Lot H-20 ☐ Full Traffic H-20 ☑

ADDITIONAL OPTIONS

OPTION	YES	NO
CONTROL PANEL SS ENCLOSURE	☐	☑
CONTROL PANEL AC UNIT	☐	☑
CONTROL PANEL REMOTE ALARM MONITORING	☐	☑
AIR RELEASE/VACUUM VALVE	☐	☑
INTERIOR LINER	☐	☑
CONCRETE WATERPROOFING	☐	☑
VENT PIPE	☐	☑
ODOR CONTROL VALVE	☐	☑
LIFTING CRANE	☐	☑
GENERATOR RECEPTACLE	☐	☑

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DESCRIPTION:

Quail Valley - LS3

REV:

PART NUMBER:	248-DV Series Standard	DRAWN BY:	T. Tidball
CREATED:		MODIFIED:	4/26/24

SHEET: 2 OF 2

248-DV Series Standard.idw

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

Quoted By: DENNIS MORGAN

Document Address:
JENSEN CUSTOMER
CUSTOMER BILLING ADDRESS
. . .

Delivery Address:
JENSEN CUSTOMER

Menifee CA 92587

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS2)	Delivered FOB Truck	1	PCS	53,458.00	53,458.00

Notes: Wet Well:
• 48” Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 22’-0” Rim To Sump
• 24” X 36” Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Valve Vault:
• 48” Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6’-0” Rim To Sump
• 24” X 36” Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Pump Package:
• (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables
• Pump Lift Out/Autocoupling System
• Mounting Bracket And Hardware For Guide Rails And Base Elbows

Piping, Fittings, And Valves:
• 2” PVC SCH80 Piping And Fittings With Glue As Required
• 2” PVC SCH80 Check And Plug Valves

Controls:
• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
• Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per Project Basis.
• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
		• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply • Others Responsible For Offloading, Setting And Installation Of All Components • Delivery Includes One Hour On Site Per Delivery Truck • Additional Hours To Be Billed At $185.00 Per Hour • Suitable And Safe Access Must Be Provided For Delivery Notes: • Extremely Heavy Product – Setting And Handling Limitations Are Critical • Precast Coring For Pipe Penetrations Not Included In Jensen's Scope • Interior/Exterior Liners Not Included In Jensen's Scope					
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS3)	Delivered FOB Truck	1	PCS	53,408.00	53,408.00
		Notes: Wet Well: • 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 21'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Valve Vault: • 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Pump Package: • (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables • Pump Lift Out/Autocoupling System • Mounting Bracket And Hardware For Guide Rails And Base Elbows Piping, Fittings, And Valves: • 2" PVC SCH80 Piping And Fittings With Glue As Required • 2" PVC SCH80 Check And Plug Valves Controls: • Standard Duplex Control Panel • (5) Mechanical Float Switches W/ 50ft Cables • Mounting Bracket And Hardware For Floats Included Services: • Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per					

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
		Project Basis. • One Year Full System Warranty • Standard Jensen Water Resources O&M Documents Delivery: • Delivery To Job Site Customer To Off Load And Set • Estimated Heaviest Pick Weight At 7,000lbs • Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production • If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply • Others Responsible For Offloading, Setting And Installation Of All Components • Delivery Includes One Hour On Site Per Delivery Truck • Additional Hours To Be Billed At $185.00 Per Hour • Suitable And Safe Access Must Be Provided For Delivery Notes: • Extremely Heavy Product – Setting And Handling Limitations Are Critical • Precast Coring For Pipe Penetrations Not Included In Jensen's Scope • Interior/Exterior Liners Not Included In Jensen's Scope					
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS4)	Delivered FOB Truck	1	PCS	53,408.00	53,408.00
		Notes: Wet Well: • 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 21'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Valve Vault: • 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Pump Package: • (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables • Pump Lift Out/Autocoupling System • Mounting Bracket And Hardware For Guide Rails And Base Elbows Piping, Fittings, And Valves: • 2" PVC SCH80 Piping And Fittings With Glue As Required • 2" PVC SCH80 Check And Plug Valves Controls:					

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount

• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
• Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per Project Basis.
• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production
• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply
• Others Responsible For Offloading, Setting And Installation Of All Components
• Delivery Includes One Hour On Site Per Delivery Truck
• Additional Hours To Be Billed At $185.00 Per Hour
• Suitable And Safe Access Must Be Provided For Delivery

Notes:
• Extremely Heavy Product – Setting And Handling Limitations Are Critical
• Precast Coring For Pipe Penetrations Not Included In Jensen's Scope
• Interior/Exterior Liners Not Included In Jensen's Scope

	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS5)	Delivered FOB Truck	1	PCS	49,615.00	49,615.00

Notes: Wet Well:
• 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 22'-0" Rim To Sump
• 24" X 36" Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Valve Vault:
• 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump
• 24" X 36" Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Pump Package:
• (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount

• Pump Lift Out/Autocoupling System
• Mounting Bracket And Hardware For Guide Rails And Base Elbows

Piping, Fittings, And Valves:
• 2" PVC SCH80 Piping And Fittings With Glue As Required
• 2" PVC SCH80 Check And Plug Valves

Controls:
• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
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• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production
• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply
• Others Responsible For Offloading, Setting And Installation Of All Components
• Delivery Includes One Hour On Site Per Delivery Truck
• Additional Hours To Be Billed At $185.00 Per Hour
• Suitable And Safe Access Must Be Provided For Delivery

Notes:
• Extremely Heavy Product – Setting And Handling Limitations Are Critical
• Precast Coring For Pipe Penetrations Not Included In Jensen's Scope
• Interior/Exterior Liners Not Included In Jensen's Scope

Quotation Notes

FOR TECHNICAL QUESTIONS PLEASE CONTACT CHRIS PURDIE @ 775-352-6361

ITEMS INCLUDED IN THIS QUOTE ARE PER JENSEN PUMP STATION'S INTERPRETATION AND ARE LISTED AS CLOSE TO "AS EQUAL" AND "AN ALTERNATIVE" WHICH ARE SUBJECT TO FINAL APPROVAL. ANY CHANGES MIGHT REQUIRE A REQUOTE FROM JENSEN WATER RESOURCES.

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

ANY AGENCY INSPECTION REQUIREMENT FEES NOT INCLUDED.

ALL PRODUCTS ABOVE ARE SUITABLE FOR H-20 LOADING IN DRY SOIL CONDITIONS. ANY ADDITIONAL LOADING REQUIREMENTS MAY RESULT IN REVISED PRICING.

SALES TAX HAS BEEN ESTIMATED WITH THIS QUOTATION. CUSTOMER IS RESPONSIBLE TO DETERMINE AND PAY ALL ASSOCIATED SALES TAX.

ADDITIONAL FUEL SURCHARGES MAY APPLY AT TIME OF DELIVERY

JENSEN PRECAST TERMS AND CONDITIONS APPLY.

LEAD TIMES WILL BE PRESENTED AFTER JENSEN RECEIVES APPROVED SUBMITTALS. DELIVERY SCHEDULE IS SUBJECT TO CHANGE BASED ON CAPACITY, MATERIAL AVAILABILITY, AND PRECEDING CUSTOMER ORDERS. CURRENT SUPPLY CHAIN ISSUES ARE AFFECTING MANY INDUSTRIES AND MAY IMPACT LEAD TIMES.

PRIOR TO PROVIDING SUBMITTALS, JENSEN PRECAST REQUESTS A SIGNED COPY OF THIS QUOTATION, CUSTOMER PURCHASE ORDER, OR LETTER OF INTENT TO PURCHASE.

CREDIT SALES WILL BE MADE ONLY AFTER RECEIPT OF A SIGNED JENSEN PRECAST CREDIT APPLICATION AND WRITTEN CREDIT APPROVAL BY JENSEN PRECAST'S CREDIT MANAGER.

ITEMS INCLUDED IN THIS QUOTATION ARE CUSTOM PRODUCTS. JENSEN PRECAST MAY REQUIRE PARTIAL OR FULL PAYMENT PRIOR TO PROCUREMENT, MANUFACTURING, OR SHIPMENT OF ANY ITEMS.

THIS OFFER TO SELL IS BASED ON CUSTOMER BUYING THIS COMPLETE BILL OF MATERIALS. PRICES MAY BE SUBJECT TO CHANGE IF INDIVIDUAL LINE ITEMS ARE PURCHASED SEPARATELY.

FOR FURTHER INFORMATION CONCERNING JENSEN ENGINEERED SYSTEMS, PLEASE VISIT OUR WEBSITE @ HTTPS://WWW.JENSENPRECAST.COM/WATER-RESOURCES

THANK YOU FOR ALLOWING US TO PROVIDE YOU WITH THIS QUOTATION. WE LOOK FORWARD TO WORKING WITH YOU ON THIS PROJECT.

Net Total:	**209,889.00**
Estimated Tax:	**18,365.29**
Gross Total	**228,254.29**

All orders are subject to credit acceptance by seller.
A 3% credit card service fee may be added for all credit card payments.
Delivery trips, setting time, or materials not noted above will be billed accordingly.
Offer to sell subject to Jensen Precast's company policies, terms and conditions.
Please refer to https://www.jensenprecast.com/terms-of-service/ for complete terms and conditions which are hereby incorporated by reference.
All specialized product may be subject to a deposit prior to submittals and/or fabrication.
Quotation is valid for 30 days.
Thank you for choosing Jensen Precast!

JENSEN CUSTOMER Signature **Date**

JENSEN CUSTOMER PO

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

TERMS AND CONDITIONS

ORDERING INSTRUCTIONS

Please refer to the quotation number and date on all orders. Indicate desired delivery dates, quantities and item priority if applicable. Please contact our office for delivery schedules. Delivery lead-time will be estimated upon receipt of order, and is based on actual demand at that time. Any dates discussed prior to order are non-binding estimates. Orders for non-standard products should be accompanied by specifications, and blue prints or scale drawings. Notify us as soon as possible to insure prompt delivery.

COMPANY POLICIES TERMS AND CONDITIONS

THE POLICY TERMS AND CONDITIONS, DELINEATED HEREIN SHALL APPLY TO ALL QUOTATIONS, OR OFFERS TO SELL

1. Goods to Be Provided: Jensen Enterprises, Inc. dba Jensen Precast ("Jensen Precast") agrees to sell to Customer, on the terms and conditions stated herein, the materials and related items (the "goods") identified in Jensen Precast's quotation to Customer. Customer is solely responsible for determining whether the goods listed are the correct types and/or sufficient in number to meet Customer's needs and/or requirements. Jensen Precast's offer to sell is based on customer approval of Jensen Precast standard product drawings or submittals, and not in accordance with any plans and specifications, unless agreed to in writing by a duly authorized representative of Jensen Precast.
2. No Additional Terms of Sale: Customer's acceptance of Jensen Precast's quotation is limited to these Terms and Conditions of Sale. Any new or different terms or conditions stated or proposed by Customer in its acceptance of Jensen Precast's quotation or in any accompanying or related purchase order or other document are hereby rejected by Jensen Precast and shall not be binding upon Jensen Precast. The entire contract is embodied in this writing. This writing constitutes the final expression of the parties' agreement, and it is a complete and exclusive statement of the terms of that agreement.
3. Payment Terms: Jensen Precast may require payment in full prior to manufacture or shipment of any goods. If Jensen Precast agrees to provide materials on a "Cash on Delivery" basis, payment in full is due upon arrival of Jensen Precast's equipment, prior to setting of product or unloading of trucks. Credit sales will be made only after receipt of a signed Jensen Precast credit application and written credit approval by Jensen Precast's credit manager. On all credit sales, payment in full is due within 30 days after Customer's receipt of materials or services. Customer agrees to pay a service charge of 1.5% per month on all invoices not paid when due. At its option, Jensen Precast may decline to make delivery or shipment to Customer if any invoice remains past due. Customer waives and releases any claim against Jensen Precast for loss or damage allegedly sustained by Customer as a result of Jensen Precast's refusal to make delivery or shipment under such circumstances. All payments shall be made in U.S. dollars and, unless otherwise designated by Jensen Precast in writing, shall be sent to Jensen Precast's Corporate Office, 9895 Double R Blvd, Reno, NV 89521.
4. Price: The price(s) stated in Jensen Precast's quotation to Customer are firm for 30 days. The prices stated in Jensen Precast's quotation are subject to sales and use tax. Customer shall reimburse Jensen Precast for all sales and use taxes imposed upon: (a) the sale of the goods; and/or, (b) the use of any materials consumed by Jensen Precast; and/or, (c) the sale of any fixtures or equipment incident to this contract. Prices are subject to delivery charges unless quoted as delivered (see shipping code definitions on quotation). Jensen Precast reserves the right to increase the cost of delivery or shipment if Customer increases mileage or number of trucks specified in the original quotation. Prices quoted are based on quantities indicated, and on customer acceptance of the entire quote. Jensen Precast reserves the right to accept or reject partial orders.
5. Time for Performance: Jensen Precast will endeavor to meet any reasonable shipping date(s) requested by Customer. However, Jensen Precast does not guarantee that the goods will be furnished by any particular date. All shipping dates stated or indicated are estimates only and are based upon conditions known at the time the dates were stated or indicated. Jensen Precast shall not in any event be liable for any loss or damage sustained by Customer on account of failure to meet any delivery or shipping date.
6. Delivery: Customer or its designated representative shall be prepared to unload, receive, and accept the goods at the time specified on the order. Customer shall provide assistance in delivering the goods, including but not limited to assisting in backing and directing Jensen Precast's truck at the delivery site, providing access to the delivery site that is acceptable to Jensen Precast, and providing a setting location for the truck, crane or other delivery equipment that is acceptable to Jensen Precast. Jensen Precast shall not be liable for any property damage arising from or related to delivery of the goods, including without limitation damage to sidewalks, curbs, fences, valves, conduit, pipes, concrete, asphalt, lawns, trees, or landscaping. All excessive unloading or stand-by time, resetting or re-delivery will be charged for at the current hourly or mileage rates of the equipment involved. If for any reason Jensen Precast cannot set the goods at the time of delivery, Customer shall be responsible for setting the goods by other means, at no cost to Jensen Precast.
7. Customer Responsibilities: The Customer or its designated representative shall be solely responsible for accomplishing the following:
a. Finish grade, leveling and position of the goods.
b. Grouting and/or sealing of vault sections, grade rings, risers, frames, covers, pipes or similar structures, unless a duly authorized representative of Jensen Precast has stated in writing that Jensen Precast will perform installation and sealing of the goods.
c. Excavation, bedding, shoring, backfilling, compacting and grading.
d. Water and/or flotation control.
e. Setting and adjusting ladders, racking, grates or other hardware.
f. Providing a one- or two-person ground crew to assist the Jensen Precast crane operator.
g. All other site work not specified above.
8. Returns: The goods shall not be returned for credit without prior written authorization and approval by a duly authorized representative of Jensen Precast. A minimum handling charge of 15% plus actual shipping or delivery costs shall be made on all goods returned to compensate for costs of accounting, reconditioning, restocking and delivery, except when due to fault or error of Jensen Precast. No credits shall be allowed on used, damaged, custom, specially ordered or specially manufactured goods. Customer shall bear the cost of any labor, damage or transportation associated with return of the goods.
9. Equipment: Unless otherwise agreed to in a writing signed by a duly authorized representative of Jensen Precast, equipment belonging to Jensen Precast cannot be left at any job site for the purpose of unloading or setting by others.
10. Project Information: Customer agrees to furnish to Jensen Precast promptly upon request all project information necessary for Jensen Precast to perfect or provide notice of its mechanic's lien, stop notice, and/or payment bond rights.
11. Buy America(n) Requirements. Purchaser must clearly and affirmatively notify Jensen Precast of the applicability of any order, law, regulation or other requirement that the Products be produced, manufactured, or substantially transformed in the United States, or consist wholly or partly of materials or components produced, manufactured, or substantially transformed in the United States, or that the raw material comprising the Products be of domestic origin. If Purchaser fails to notify Jensen Precast of any such requirements, Purchaser must accept delivery and pay for the Products, regardless of any such requirements, and Purchaser agrees to fully indemnify and hole Jensen Precast harmless from and against any liability, costs and expenses, including reasonable attorney fees, incurred by Jensen Precast in connection with Purchaser's omission.
12. Force Majeure: Jensen Precast will not be liable for any delay or for failure to perform its obligations hereunder resulting from any cause beyond Jensen Precast's reasonable control including, but not limited to: Customer's failure to timely supply Jensen Precast with necessary data or specifications; any changes in such data or specifications at Customer's request; fires; explosions; floods; acts of God; epidemics; quarantine; embargoes; strikes; work stoppages or slowdowns or other industrial disputes; accidents; riots or civil disturbances; acts of civil or military authorities; inability to obtain any license or consent necessary in respect of any the goods; inability to obtain equipment, materials, labor, fuel or supplies; and delay by suppliers or material shortages.
13. Limited Warranty: For a period of one year from the date of shipment or delivery to Customer, Jensen Precast warrants all of the goods which it has manufactured to be free of material defects. If any such goods are found to be materially defective during the warranty period, Jensen Precast agrees to, in its sole discretion, repair or replace the defective goods without charge to Customer. Customer's remedy with respect to such goods is limited to repair or replacement. For goods not manufactured by Jensen Precast, Customer agrees to accept as its sole remedy the warranty, if any, offered by the manufacturer or manufacturers of such goods.

AS TO ALL GOODS SOLD BY JENSEN PRECAST TO CUSTOMER, THE WARRANTY DESCRIBED IN THIS PARAGRAPH SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

JENSEN PRECAST SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR LIQUIDATED DAMAGES OF ANY KIND, WHETHER THE CUSTOMER'S CLAIM IS BASED UPON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

14. Indemnity: Customer is solely responsible for the selection, installation, and use of the goods. Therefore, to the fullest extent permitted by law, Customer agrees to defend and indemnify Jensen Precast from and against any claim for loss or damage, including attorneys' fees and experts' or consultants' fees, arising from or relating to such selection, installation, and use. This indemnity applies regardless of any active and/or passive negligent act or omission on the part of Jensen Precast or its employees; provided, however, Customer shall not be obligated to indemnify Jensen Precast for the sole negligence or willful misconduct of Jensen Precast or its employees.
15. Risk of Loss: The risk of loss shall pass to Customer based on the applicable shipping code:
a. "Delivered and Set": Risk of loss shall pass to Customer when Jensen Precast's delivery truck has unloaded the product.
b. "Delivered - F.O.B. Truck": Risk of loss shall pass to Customer when Jensen Precast's delivery truck arrives at Customer's jobsite.
c. "Delivered and offloaded": Risk of loss shall pass to Customer when Jensen Precast's delivery truck arrives at Customer's jobsite.
d. "F.O.B. Jensen Precast Yard": Risk of loss shall pass upon tender of delivery of the goods to a common carrier or Customer's truck. Buyer shall procure and maintain insurance on the goods sufficient to protect its interests.
16. Dispute Resolution: All disputes arising from or relating to these Terms and Conditions of Sale and/or the furnishing of any goods by Jensen Precast to Customer shall be heard and decided exclusively in the state or federal court where the delivery or pick up of the Product(s) is located. The construction, interpretation and performance of this order and all transactions hereunder shall be governed by the laws of the state where delivery or pick up the Products is located, without regard to its choice of law principles. These Terms and Conditions of Sale (the "Terms") apply to all quotations and sales by Jensen Precast's (including its Water Resources, Metal Tech and other branded products) products, materials, services, components, accessories, and panels (collectively, "Products"). No terms or conditions other than those stated in these Terms, and no agreement or understanding, oral or written, purporting to modify these Terms, whether contained in a purchaser's purchase forms or elsewhere, will be binding on Jensen Precast unless signed by an authorized executive manager of Jensen Precast. Customer consents to these Terms for all Products. In any legal proceedings, the prevailing party shall be entitled to recover its reasonable attorneys' fees and costs.
17. Submittals and Tests: Jensen Precast reserves the right to charge customers for the cost of submittals, engineering or tests that are in addition to those customarily provided.
18. Custom Products: Jensen Precast will charge customer for any work completed at the time of cancellation of a custom or special order. All custom orders will be invoiced to customer if not released for delivery within 30 days past estimated date of delivery.
19. Storage Fees: For every month beyond the requested manufacture date that the product remains in Jensen Precast's possession, a fee of 3% per month of total sale price of product will be added to the invoice total due upon final delivery/pick up.
20. Invoice Date: Customer will be invoiced for product at either, date of delivery or 60 days past date of originally requested delivery/pick up date.

SHIPPING POLICY

1. The customer will be prepared to receive products at the specified delivery time. Excessive unloading or stand-by time, resetting or re-delivery not caused by Jensen Precast will be charged at the hourly rate for the equipment involved.
2. The customer will be solely responsible for the following:
a. Finish grade, leveling, and position of product.
b. Grouting, and/or sealing of vault sections, grade rings, risers, frames and covers, pipes, etc.
c. Excavation, bedding, shoring, backfilling, compacting and grading.
d. Water and/or flotation control.
e. Setting and adjusting ladders, racking, grates or other hardware.
f. All other site work not specifically referred to.
3. Equipment belonging to the company cannot be left at any jobsite for the purpose of unloading or setting by others unless previously agreed to in writing between Jensen Precast and the customer.
4. Carriers are responsible for goods lost or damaged in transit. Damages or shortages should be indicated on the carrier's delivery receipt and any claims should be made in writing directly to the carrier.
5. All products are to be delivered in the number of trips specified. Charges will be added for additional trips.

SHIPPING CODE DEFINITIONS

Code #1 - DELIVERED AND SET

Quoted prices include product delivery and setting with our boom truck subject to the following provisions:
a. Jensen Precast will provide driver/crane operator services only using Jensen Precast's boom truck, unless otherwise specified.
b. Customer will be solely responsible for all other site work associated with setting and installing this product unless specifically referred to in writing.
c. Most products require assistance from the customer in setting (generally one or two laborers). Contact Jensen Precast for the specific requirements of each product.
d. The customer will provide a properly prepared, sized and graded, excavation. Access and setting location for our boom truck must be acceptable to our driver or representative.
e. Since site conditions, products, and delivery equipment vary, the logistics must be considered to determine the best approach for setting the product.
Attention must be given to the variables of the set, including:
a. Capacity of the Jensen Precast boom truck and truck crane to be used.
b. The maximum product weight relative to the setting distance from the center of the crane to the center of the excavation cannot exceed the boom truck rated capacity.
c. The route to the setting location must be accessible for the boom truck without towing or pushing.
d. The type of terrain, site slope, and ground conditions for outrigger footings, at the setting location.
e. Overhead restrictions and other physical constraints.
f. Any or all of the above could prevent Jensen Precast from setting the product. In cases where Jensen Precast cannot set the product, we will off load the product in accordance with shipping code definition #3 herein.
NOTE: If for any reason Jensen Precast cannot set the product, Jensen Precast will not be responsible, or charged, for setting by any other means.

Code #2 - DELIVERED - F.O.B. TRUCK:

Quoted prices include product delivery to the job site only; "Free On Board" the truck. Generally, this would be a flatbed truck without a crane or other unloading equipment subject to the following provisions:
a. The company will provide driver services only and the customer will supply means of unloading and setting products at time of delivery. 1 hour of off-load time is allotted per truck from time of arrival at delivery location or entry point. Additional standby time not caused by Jensen Precast will be charged at the hourly rate for the equipment involved.

Code #3 - DELIVERED AND OFFLOADED:

Quoted prices include product delivery to the job site and unloaded from our truck subject to the following provisions:
a. Jensen Precast will provide driver services and a means of unloading products.

b. The customer will provide an acceptable location for unloading and storing products, and the means for setting the product in the permanent location.

Code #4 - F.O.B. - JENSEN PRECAST YARD:

Quoted prices include product loading on customer or common carrier trucks in the yard subject to the following provisions:
a. Customer will be responsible for any additional charges, including charges for freight, shipping, delivery and setting.
b. Customer or common carrier will be responsible for tie down, dunnage, pallets, etc., unless specifically referred to.
c. Yard location will be addressed in section one of the quotation.

Code #5 - OTHER AS SPECIFIED:

If not specified in section one of this quotation, please consult our office for more specific information or written clarification.

APPENDIX C – LS-3 Prepackaged Lift Station Alternatives

Flygt System

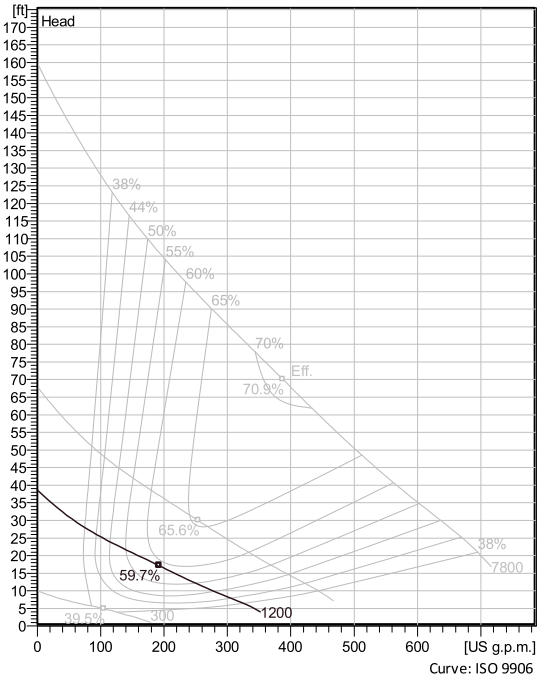
Concertor DP N80-1200

A process-controlled wastewater pumping system suitable for customers who utilize specially designed process control algorithms and want to benefit from lower capital costs, smaller control cabinets and higher pump system efficiencies. Concertor DP is also suitable as a reliable and energy efficient on/off controlled wastewater pumping system for customers who want to benefit from easily adjustable pump performance, soft start/soft stop, constant power and motor protection. This system is scalable to as many pumps as required by your application, with one gateway per pump.

Technical specification



Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N6020.091 18-08-1AZ-W 3hp

Installation type
P - Semi permanent, Wet

Impeller diameter
170 mm

Discharge diameter
3 inch

Pump information

Impeller diameter
170 mm

Discharge diameter
3 inch

Inlet diameter
110 mm

Maximum operating speed
800-2094.6 rpm

Number of blades
2

Max. fluid temperature
40 °C

Materials

Impeller
Hard-Iron ™

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-1200

Technical specification

Motor - General

Motor number N6020.091 18-08-1AZ-W 3hp	**Phases** 3~	**Rated speed** 800-2095 rpm	**Rated power** 3 hp
ATEX approved FM	**Insulation class** H	**Rated current** 3.6 A	**Type of Duty** S1
Frequency 60 Hz	**Rated voltage** 460 V	**Motor efficiency class** IE4 according to IEC/TS 60034-30-2 Ed. 1	

Motor - Technical

Power factor - 1/1 Load 0.95	**Motor efficiency - 1/1 Load** 90.0 %	**Nominal speed - 1/1 Load** 2300 rpm
Power factor - 3/4 Load 0.95	**Motor efficiency - 3/4 Load** 91.0 %	**Nominal speed - 3/4 Load** 2070 rpm
Power factor - 1/2 Load 0.95	**Motor efficiency - 1/2 Load** 91.0 %	**Nominal speed - 1/2 Load** 1840 rpm

Starting current
3.6 A

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-1200

Monitoring and Control equipment

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

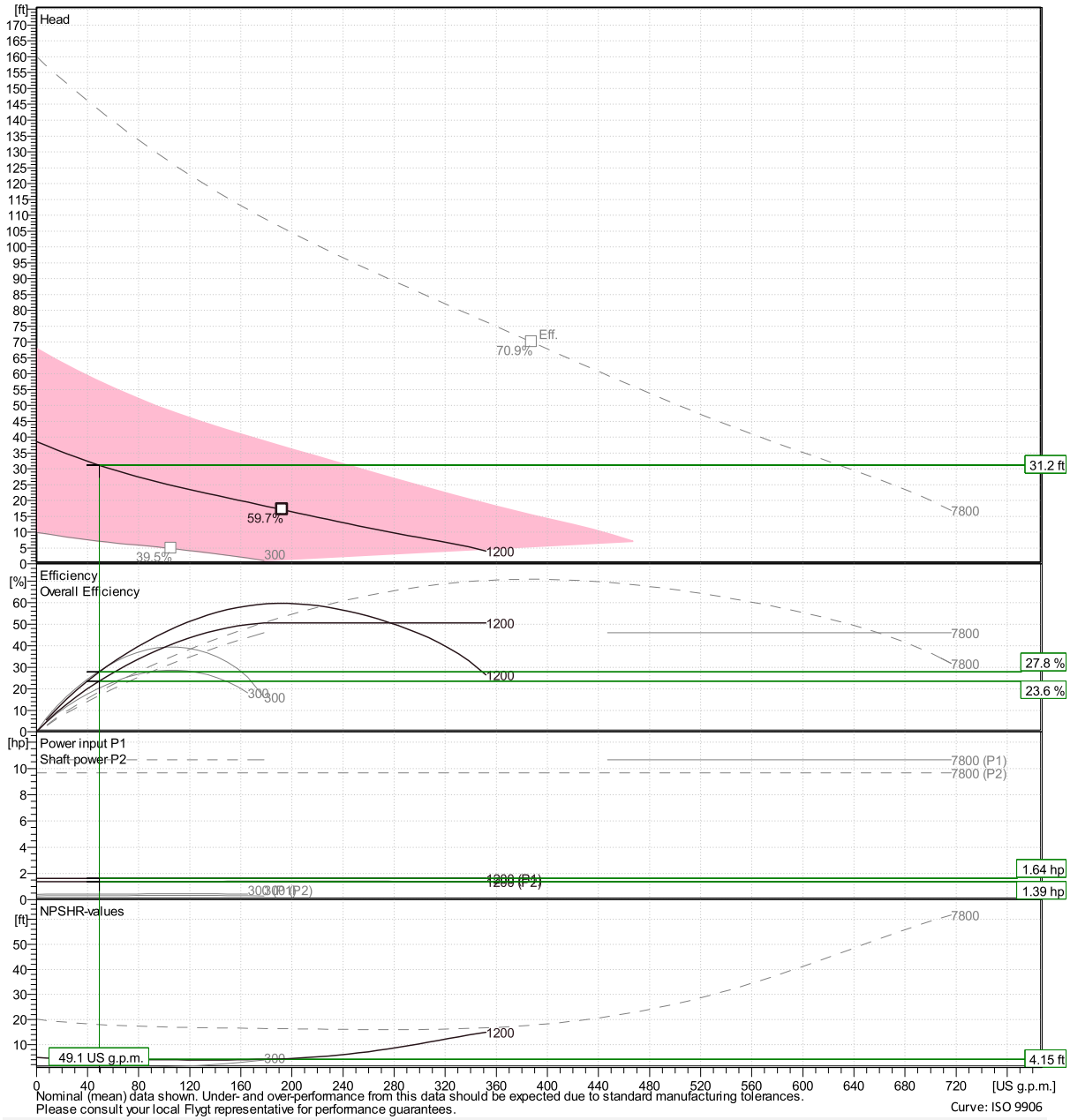
Concertor DP N80-1200

Performance curve

Duty point

Flow	Head
49.1 US g.p.m.	31.2 ft

Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

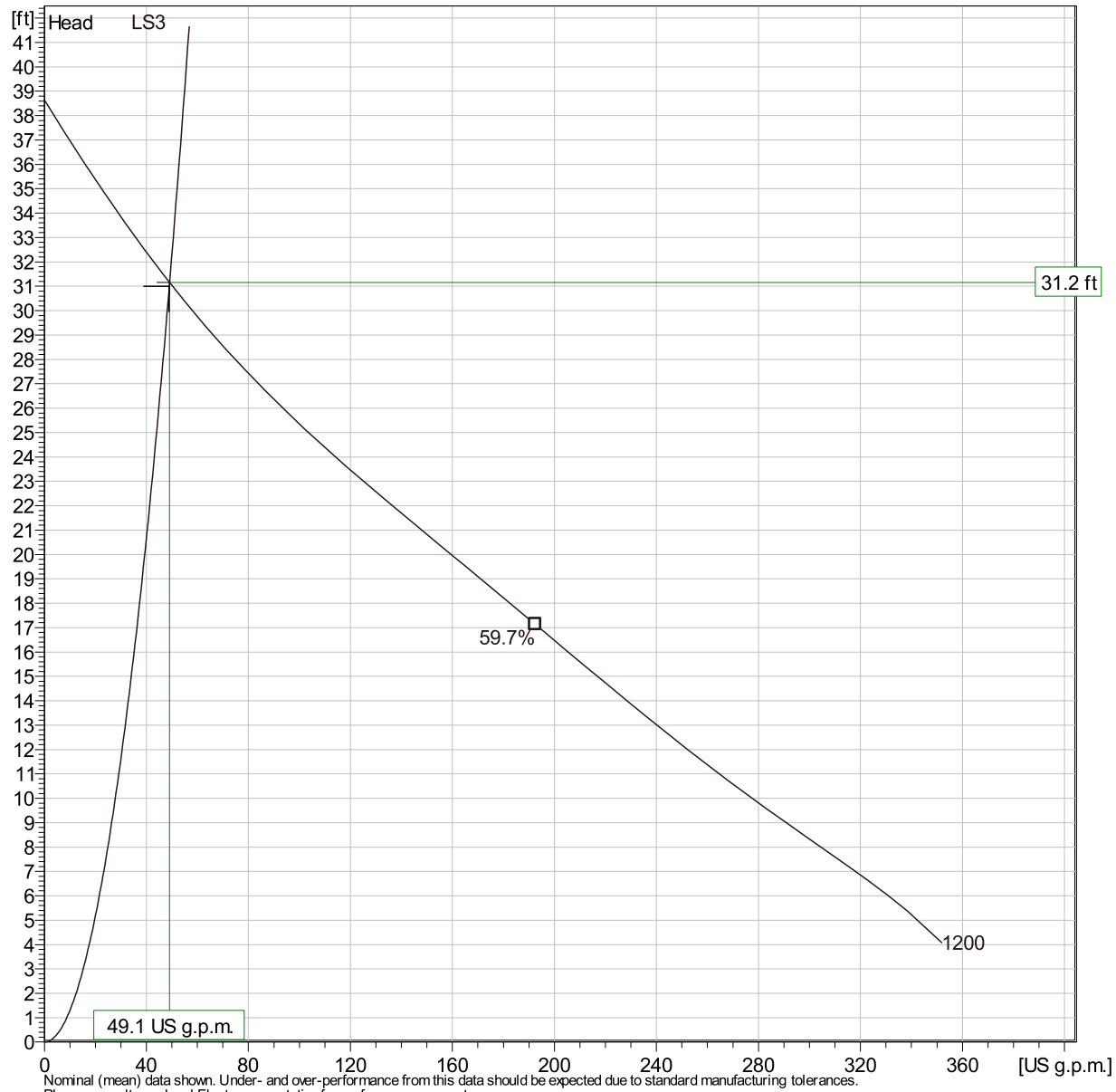
Curve: ISO 9906

Project	Xylect-22161321	**Created by**	Alan Dahlqvist	**Last update**	4/17/2024
Block		**Created on**	4/17/2024		

Concertor DP N80-1200

Duty Analysis

Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

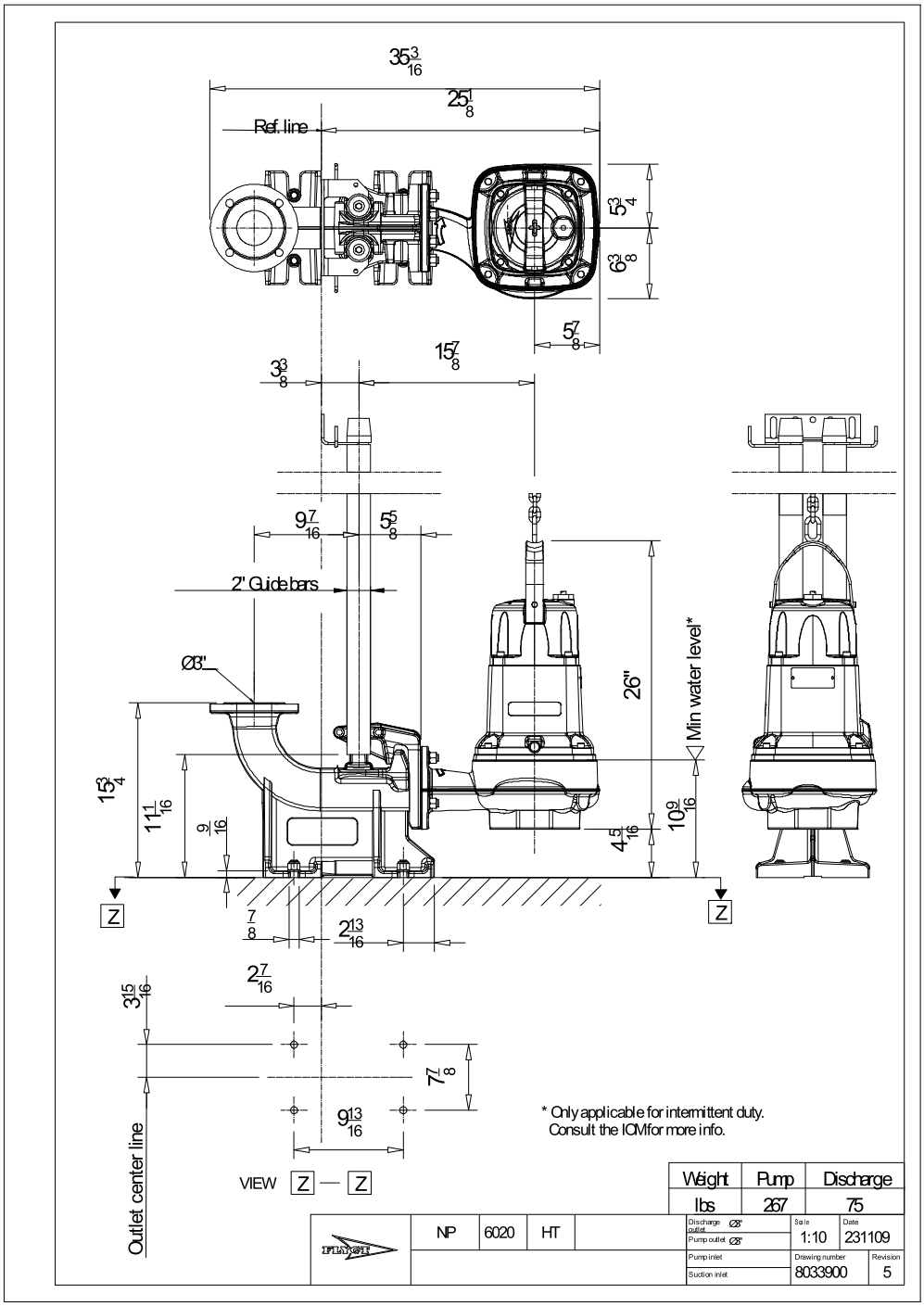
Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
LS3	49.1	31.2	1.39	49.1	31.2	1.39	27.8 %	414	4.15

Project		**Created by**	Alan Dahlqvist		
Block	Xylect-22161321	**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-1200

Dimensional drawing



Project	Xylect-22161321	**Created by**	Alan Dahlqvist
Block		**Created on**	4/17/2024 **Last update** 4/17/2024

FLYGT
a xylem brand



Flygt Concertor®

THE WORLD'S FIRST WASTEWATER PUMPING SYSTEM WITH INTEGRATED INTELLIGENCE

xylem
Let's Solve Water

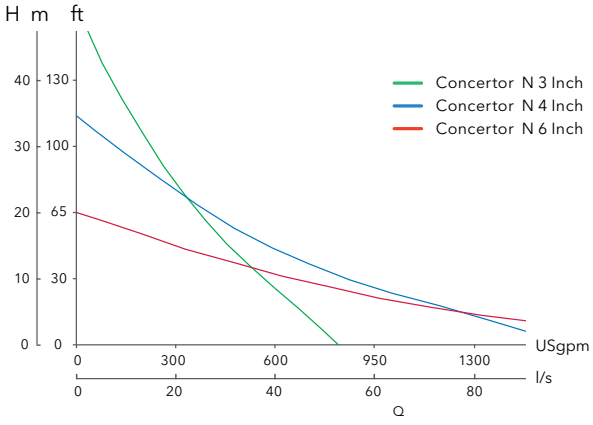
Flygt Concertor®
Intelligent Pumping System (iPS)

A new level of technology with unlimited possibilities

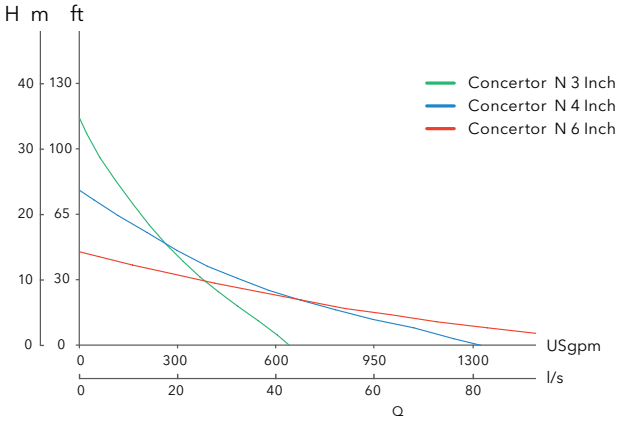
Xylem is proud to introduce the world's first wastewater pumping system with integrated intelligence. A real breakthrough innovation, Flygt Concertor® is capable of sensing the operating conditions of its environment, adapting its performance in real time and providing feedback to pumping station operators. With this new system, Xylem is now bringing smart and interconnected solutions to the world of wastewater pumping.

A new way of thinking
Concertor combines a fully integrated control system with our patented Adaptive N-hydraulics and intelligent functionality. The control system automatically adapts to the changing pumping environment, growing with your needs and delivering the optimal level of performance at the lowest cost of ownership. The built-in intelligence also makes it easier to set up and operate, as well as allowing for a significantly smaller footprint.

10HP / 380-480V / 3 phase



5.5HP / 200-240V / 3 phase



Trouble-free Pumping SAFER SYSTEM

NEW PANEL
FLYGT CONCERTOR iPS





INTELLIGENT CONTROL PANEL



SYSTEM THAT CAN BE LOCALLY ADJUSTED

INTELLIGENT CONTROL PANEL
RETROFIT KIT (INC. PRE-ENGINEERING)



* Retrofit kit includes MultiSmart controller, DP gateways, surge protector, modem kit with antenna, power supply and battery

- Clog free guarantee 24 months
- Improved operator safety – built in pump cleaning function
- Easily retrofitted into existing systems
- No more nuisance service calls due to clogging
- End to manual station cleaning – integrated sump and pipe cleaning
- Reduced odor and grease build-up
- Easy installation – impossible to wire the pump backwards
- Quick start-up – pre-engineered solution with simple set-up wizard
- Includes intelligent pump station manager
- Adjustable flow rate – automatically adjusts to optimal speed
- No VFD trips on hot days / no need for HVAC or cleaning fan filters
- Don't have time to check your stations in person? Flygt Cloud ready for remote monitoring and diagnostics
- Quick ROI – energy savings average 46% for installed systems
- Extended system warranty - 7 years

Basic Retrofit



CONCERTOR DP RETROFIT

** Basic retrofit kit includes DP gateway, surge protector and HMI

FB273 • Flygt Concertor Sales • 5/2018 • NACT

- Clog free guarantee 12 months
- Improved operator safety – built in pump cleaning function
- No more nuisance service calls due to clogging
- Easy installation – impossible to wire the pump backwards
- Quick start-up – pre-engineered solution with simple set-up wizard
- No VFD trips on hot days / no need for HVAC or cleaning fan filters
- Adjustable flow rate – remotely or on site
- Compatible with 3rd party controllers – accepts 4-20mA signal
- Quick ROI – energy savings at least 25%
- System warranty - 5 years

ONE PUMP TAKES CARE OF IT ALL

SIMPLE - Eliminates complex installation, programming and operation.

SMART - Cleans the station, auto-reverses upon blockage, and automatically runs at reduced speed as required.

SAFE - Keeps operators safe. Station cleaning and clogged pumps at 2:00 am just became obsolete.

SAVINGS - Provides true value. Taking energy, maintenance, & operations savings to a whole new level never seen before.

One powerful solution. Unlimited possibilities.

xylem
Let's Solve Water

Xylem, Inc.
14125 South Bridge Circle
Charlotte, NC 28273
Tel 704.409.9700
Fax 704.295.9080
855-XYL-H2O1 (855-995-4261)

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services, and agricultural settings. With its October 2016 acquisition of Sensus, Xylem added smart metering, network technologies and advanced data analytics for water, gas and electric utilities to its portfolio of solutions. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to **www.flygt.com**

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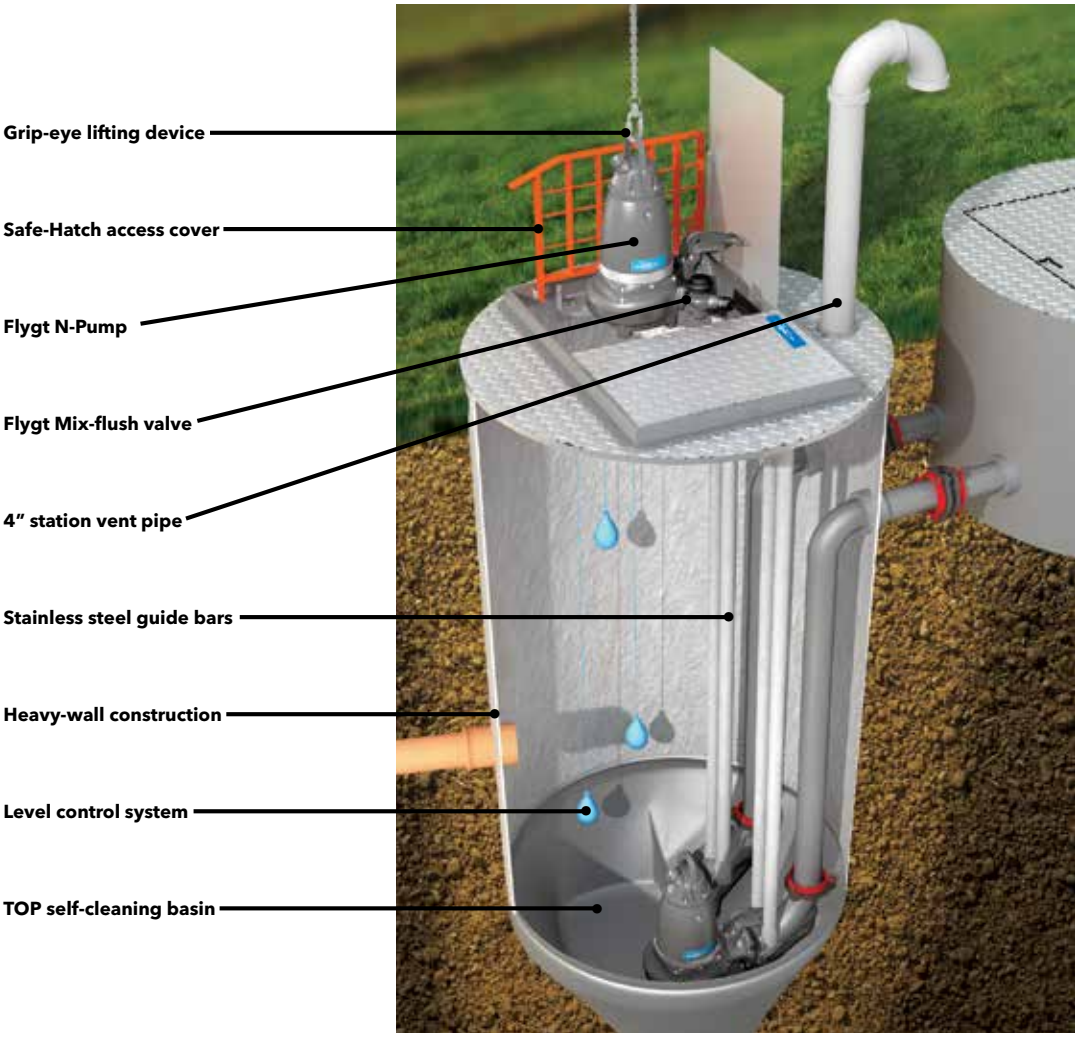
TOP Pre-Engineered Fiberglass Pump Station

THE OPTIMUM PUMP STATION

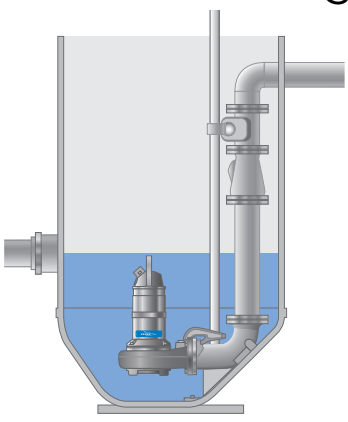
FLYGT

a xylem brand

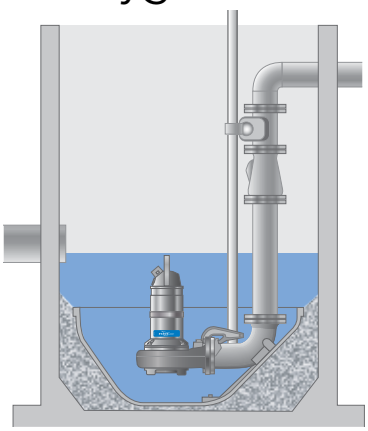
Flygt TOP Pre-Engineered Pump Station



The self-cleaning team: Flygt TOP Sump and N-Pump



TURNKEY PUMP STATIONS
Install a prepackaged pump station with Flygt TOP self cleaning design in corrosion resistant fiberglass construction.



RETROFIT EXISTING SUMPS
Install the prefabricated Flygt TOP sump floor and fill the gap between the old floor and the new with concrete. Wait a few hours until dry, then put your pump station back online. No additional excavation is required.



N IMPELLER & WEAR PLATE
N-Impeller with back swept vanes and guide pin with relief groove provide sustained efficiency while pumping modern trash such as flushable wipes.

Continuously removes suspended solids

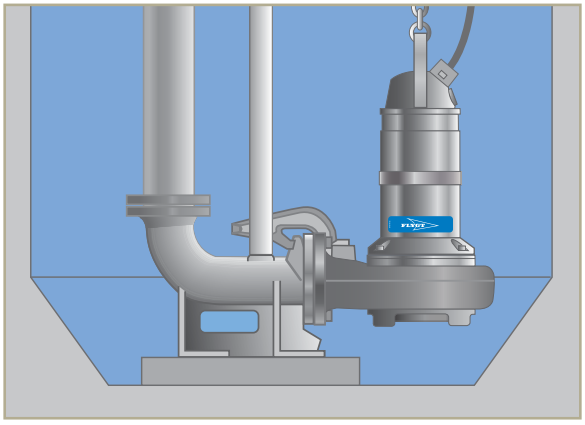
The Flygt TOP station delivers outstanding self-cleaning performance both in laboratory tests and under real-life operating conditions.

Flygt conducted a laboratory test comparing the Flygt TOP sump to a traditional sump. The test sumps were each filled with 105 US gallons (400 liters) of water and 108 lbs. (49 kg) of sand. The water was pumped back and forth 10 times from one sump to the other.

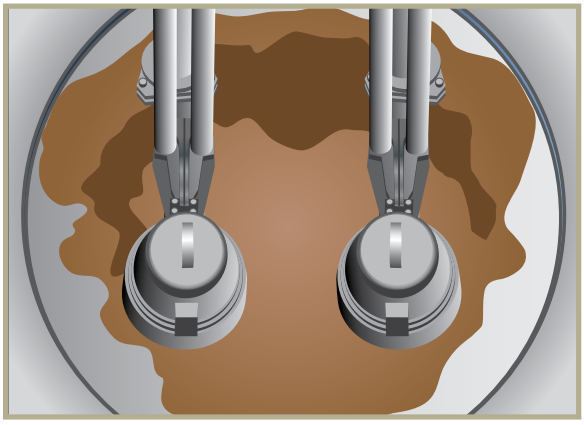
At the end of the test 207 lbs. (94 kg) of solids accumulated in the conventional sump, while only 9 lbs. (4 kg) of solids remained in the TOP sump.

These lab test results are replicated on a daily basis in thousands of Flygt TOP stations operating around the world. The results are definitive: Flygt TOP stations with self cleaning hopper shaped bottom reduce settled solids in turn reducing maintenance and downtime.

Conventional pump sump

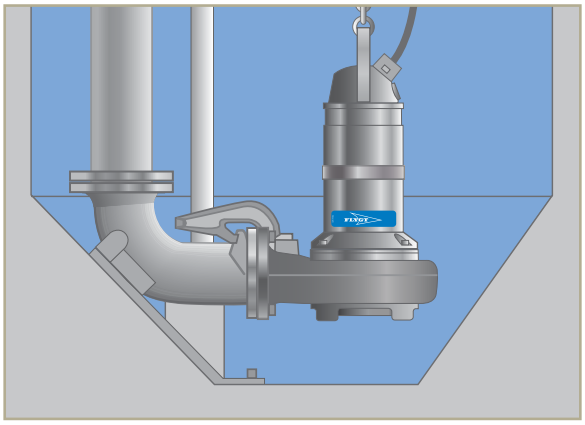


Conventional large flat sump floor encourages buildup of sludge and solids.

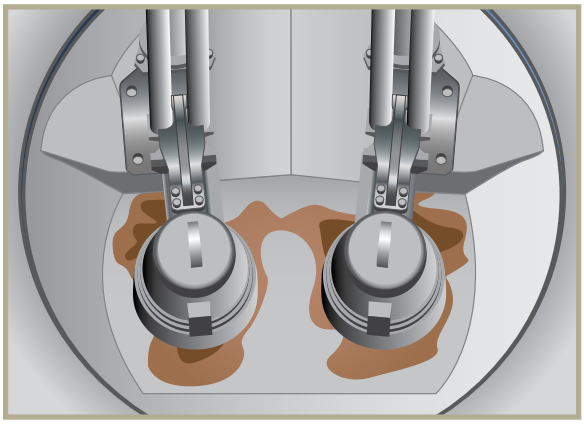


The further away the sumps walls are from the pumps, the greater the sedimentation.

Flygt TOP sump



Minimal floor area and optimized geometries ensure high velocity, which efficiently suspends settled solids in wastewater.

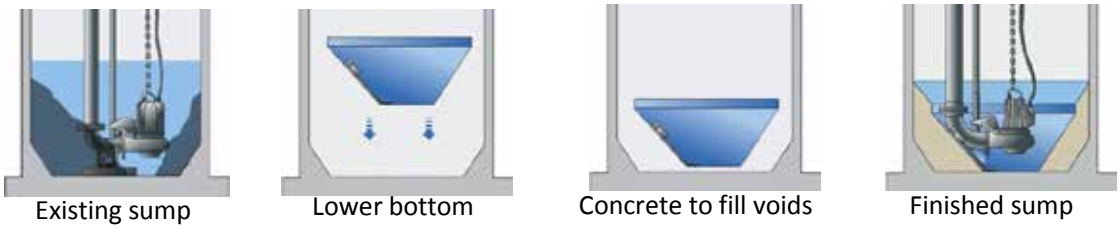


Optimized geometry draws any solids remaining in the sump closer to the pumps, where pump suction is the strongest. This eliminates the risk of solids buildup.

Retrofits easier and turnkey solutions possible

Top Stations are available as turnkey fully assembled pump stations, with rails, valves, and all discharge piping fully assembled. The other option is to retrofit the exsiting station with a TOP self-cleaning bottom. Just lower the insert into the station, fill the gap between the old floor and the new with concrete.

Retrofit Solution install process



TOP Sizes	TOP 4	TOP 5	TOP 6	TOP 100 Retrofit Liner	TOP 150 Retrofit Liner
Station Diameter	4 ft.	5 ft.	6 ft.	4 ft.	5 ft.
Discharge Sizes	2, 3, 4"		2, 3, 4, 6"	2, 3, 4, 6"	
Pipe Material	316 Stainless Steel /PVC			Determined by Engineer	

Depths up to 25 ft. standard. Designs over 25 ft. possible please consult factory

FB012 • Flygt TOP Pre-engineered Fiberglass Pump Station Brochure • 1/2017 • NACT

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Let's Solve Water

Flygt is a brand of Xylem, whose 12,000 employees are addressing the most complex issues in the global water market.

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Charlotte, NC 28273
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www.xyleminc.com

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Focardi, Dana

From: Dahlqvist, Alan - Xylem <Alan.Dahlqvist@xylem.com>
Sent: Friday, May 31, 2024 3:18 PM
To: Requieron, Wynneth
Subject: RE: EXTERNAL: RE: Inquiry on Pre-packaged Lift Stations for Quail Valley
Attachments: LS5 NP3085MT463 2.2HP.pdf; LS2 NP3085SH256 4HP.pdf; LS3 NP3069SH275 2.7HP.pdf; LS4 NP3085SH255 4HP.pdf

Hi Wynneth
Here are some conservative budgetary prices for the equipment with standard pumps

List station
4'Dia x22'Deep FRP wet well 3" SS discharge piping NO Valve vault (no valves supplied) - $46,400

2- LS5 pumps with installation accessories - $19,600
2- LS4 pumps with installation accessories - $23,000
2- LS3 pumps with installation accessories - $13,800
2- LS2 pumps with installation accessories - $23,000

Not applicable. Using Concertor Pumps.

Control Panel for this size pump $20-30k for a typical design with NEMA3R SS enclosure, depending on components required, VFD's etc

Please let me know if you have any questions

Best regards
Alan

Alan Dahlqvist
Flygt – Pumps, Repairs, Controls
San Diego, Riverside, San Bernardino, Imperial and Orange County
Engineered Projects
Cell: 951-553-1493
Alan.Dahlqvist@xylem.com

Direct Sales Representative
11161 Harrel Street, Suite B
Mira Loma, CA 91752
www.flygtus.com/

O: 951.332.3668 F: 951.332.3679

Focardi, Dana

From: Dahlqvist, Alan - Xylem <Alan.Dahlqvist@xylem.com>
Sent: Monday, May 6, 2024 9:53 AM
To: Requieron, Wynneth
Subject: RE: EXTERNAL: RE: Inquiry on Pre-packaged Lift Stations for Quail Valley

Hi Wynneth
Here are some conservative budgetary prices for the equipment

Not applicable. Using 4' Dia.

List station
6'Dia x22'Deep FRP wet well 3" SS discharge piping with 6' Dia x 6' deep Valve vault - $90,000

2- Concertor pumps with installation accessories - $26,000

Control Panel for this size pump $30k for a typical design with NEMA3R SS enclosure

Please let me know if you have any questions

Best regards
Alan

Alan Dahlqvist
Flygt – Pumps, Repairs, Controls
San Diego, Riverside, San Bernardino, Imperial and Orange County
Engineered Projects
Cell: 951-553-1493
Alan.Dahlqvist@xylem.com

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11161 Harrel Street, Suite B
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APPENDIX D – LS-4 Prepackaged Lift Station Alternatives

APPENDIX D – LS-4 Prepackaged Lift Station Alternatives

Sierra Peak System

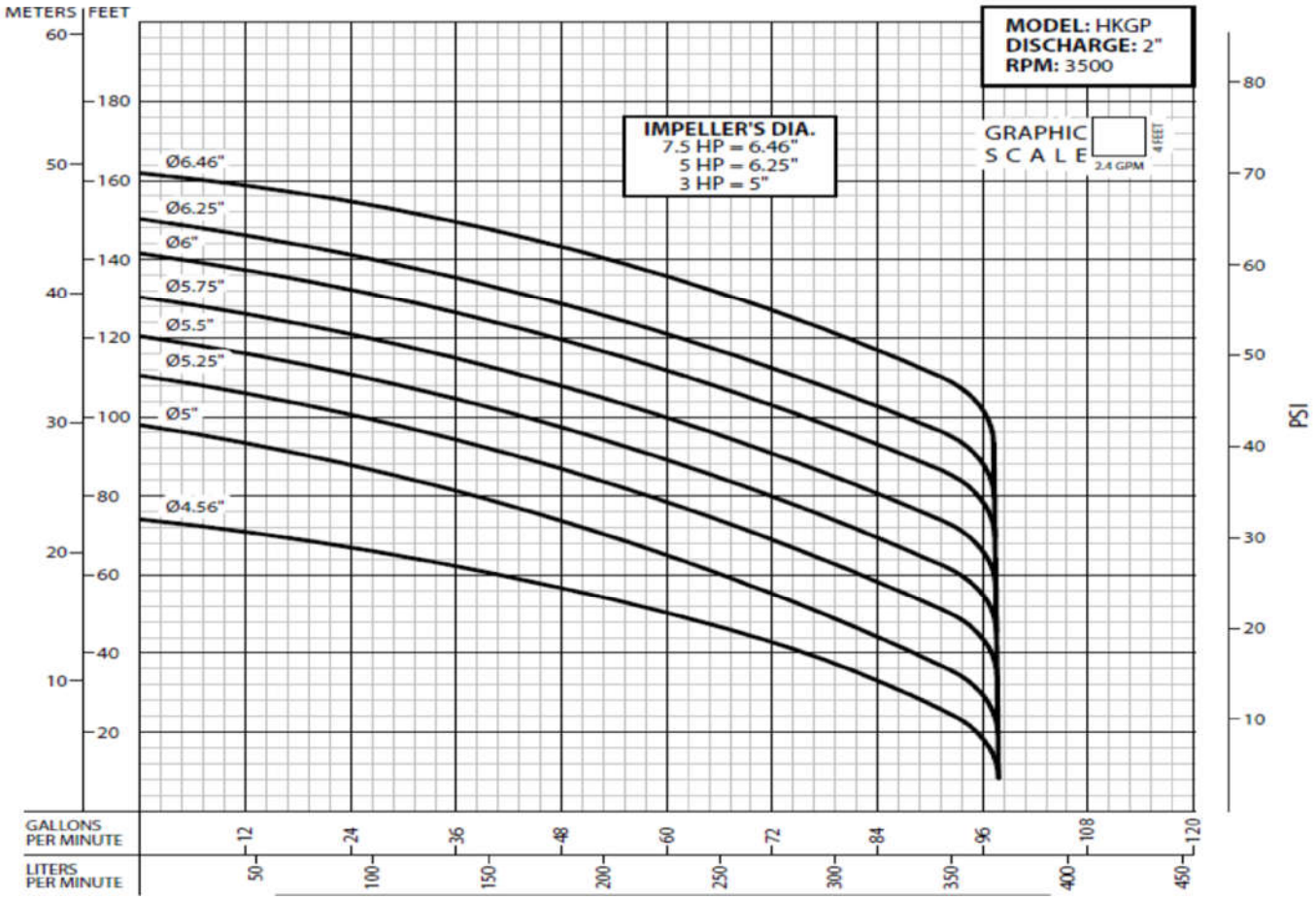
Sierra Peak Pump Systems

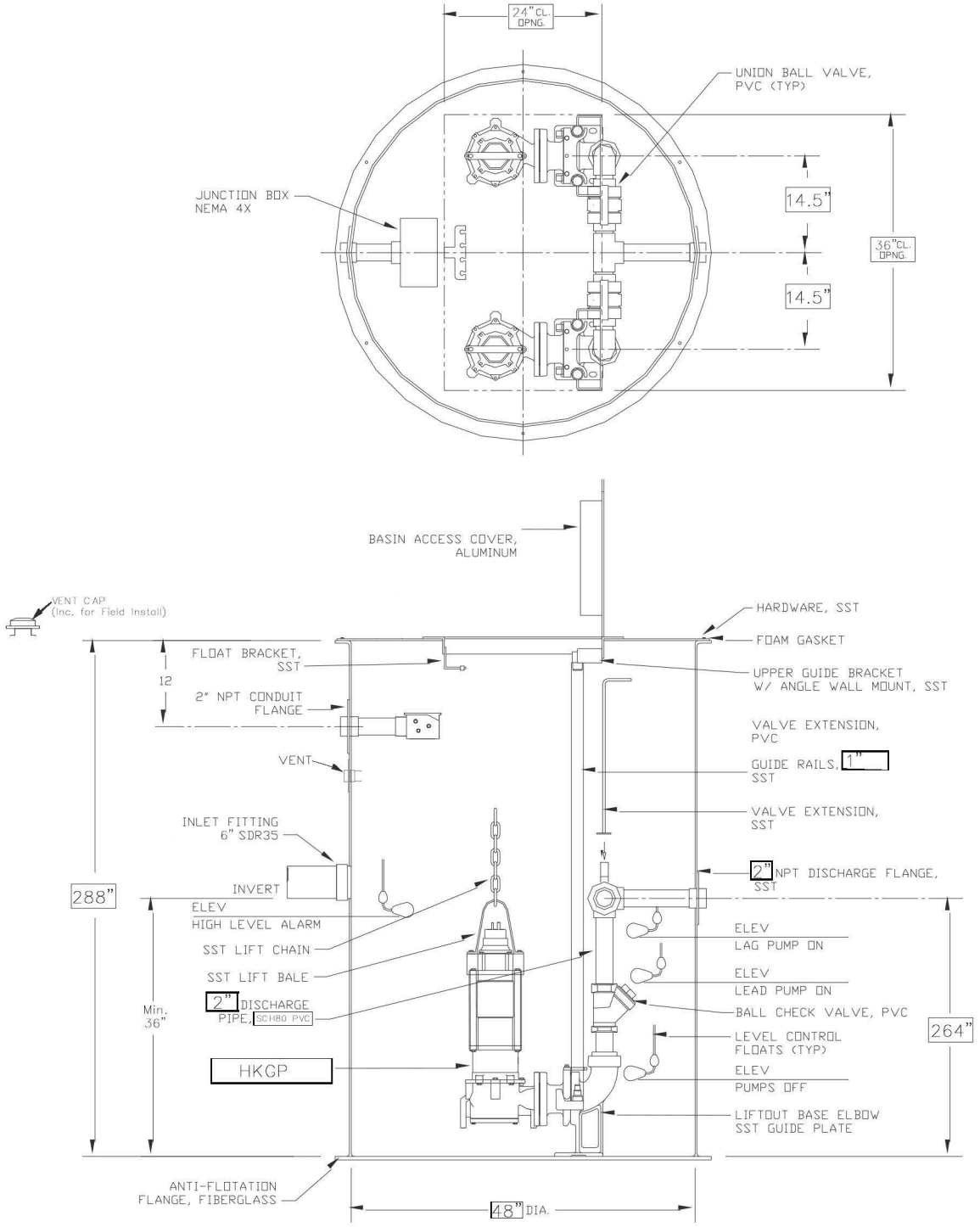
HKGP – 2” Grinder

Motor Data	
HP/Power Supply	See Model Table
Rated Speed	3450 RPM
Insulation Class	F Class
Start Capacitor	External
Cooling	Oil-Filled
Mechanical Seal	Dual Silicon Carbide
Grinding Mechanism	Axial Slicer or Radial Grinder Available
Discharge	2” FPT Vertical

Model Options				
HP	Volts	Phase	Full Load Amps	Weight (lb)
3	230	1	23	188
3	230	3	13	188
3	460	3	6.5	188
5	230	1	39	199
5	230	3	20	199
5	460	3	10	199
7.5	230	3	24	203
7.5	460	3	12	203

Performance Curve





-Pump Discharge Line outside of basin to be min. 2" SCH80

Signa MECHANICAL
"BUILDING SOLUTIONS FOR TODAY'S ENVIRONMENT"
Signa Mechanical
1615 Monrovia Ave,
Costa Mesa, CA 92627
Phone: 949-548-1125
Fax: 949-257-0587
Email: Sales@Signaco.com

EMWD Quail Valley LS-2, 3, 4
SEWER PUMP AND BASIN DETAIL

Signa MECHANICAL
"Building Solutions for Today's Environment"

Quotation

Main/Billing Office
1615 Monrovia Ave.
Costa Mesa, CA 92627
Phone # 949-548-1125
Fax # 949-257-0587

Northern CA Branch
29441 Kohoutek Way
Union City, CA 94587

Arizona Branch
2604 W. 1st Street., Ste. 46
Tempe, AZ 85281

Date	Estimate #
05/13/24	**Q240383-1**

Quotes are valid for 30 days from date listed above.

Project
EMWD Quail Valley

Name / Address
Michael Baker International - Temecula 40810 County Center Drive, Suite 200 Temecula, CA 92591

Delivery Address
Michael Baker International - Temecula Need Shipping Address Quail Valley, CA

FOB	Terms	Warehouse/Shop	Rep	Contact	Phone
Origin	Prepaid	Costa Mesa Branch	Natalia S Tortorello	Wynneth Requieron	951-506-2053

Description	Qty	Unit Price	Total
2 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 31,887.88	$ 0.00
3 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 41,080.68	$ 0.00
5 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 45,335.88	$ 0.00
2 HP Basin Triplex Grinder Pump Package:	0.00 ea	$ 45,165.96	$ 0.00
		Subtotal	$ 0.00
		Sales Tax	$ 0.00
		Total	$ 0.00

Budgetary Estimate for Design Options

All basins are 48" Diameter x 22' Height.

APPENDIX D – LS-4 Prepackaged Lift Station Alternatives

Jensen System

Technical Information

GRP26/1/C FM

HOMA PUMPEN MIT SYSTEM

Operating data

Flow	70 US g.p.m.
Head	50 ft
Shaft power P2	2.34 hp
Pump efficiency	40.8 %
Required pump NPSH	
Pump type	Single pump
No. of pumps	1
Fluid	Wastewater

Pump

Pump Code	GRP26/1/C FM
Impeller	Vane impeller with cutter sys.
Impeller size	$5^{7}/_{16}$"
Solid size	
Discharge port	2" M
Suction port	

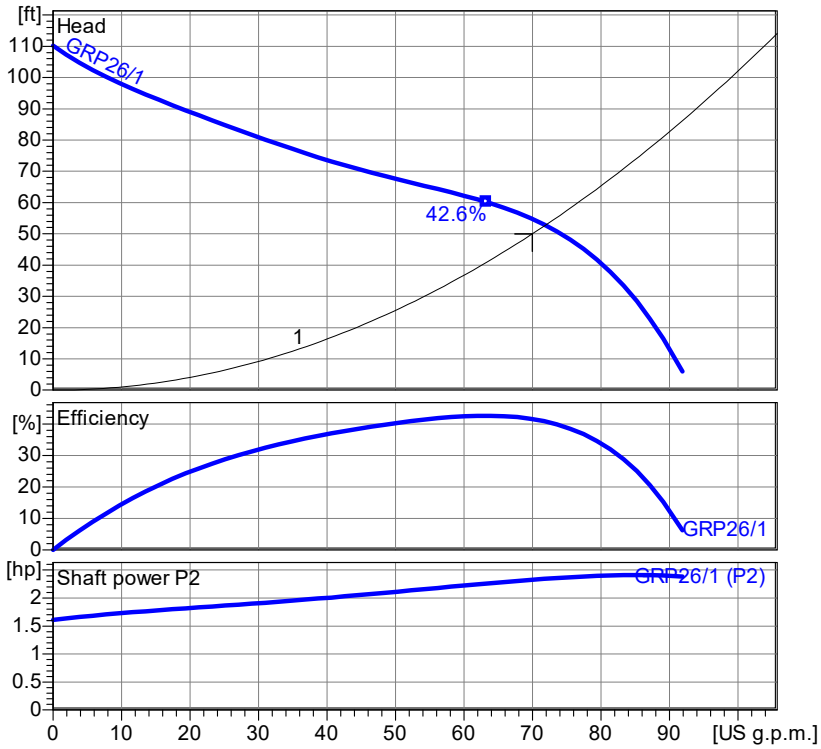
Motor

Rated voltage	230 V
Frequency	60 Hz
Rated power P2	2.4 hp
Rated speed	3450 rpm
Number of poles	2
Efficiency	70 %
Rated current	12 A
Degree of protection	IP 68

Materials

Motor housing	Cast Iron ASTM A48;Cl.40B
Pump housing	Cast Iron ASTM A48;Cl.40B
Motor bearing cover	Cast Iron ASTM A48;Cl.40B
Impeller	Cast Iron ASTM A48;Cl.40B
Cutting system	Hardened Stainless Stell HRC55
Motor shaft	AISI 430 F Stainless Steel
Bolts	AISI 304 Stainless Steel
O-Rings	Nitrile Rubber
Mechanical seal on medium side	SiC / SiC
Mechanical seal on motor side	SiC / SiC
Lower Bearing	Double row angular ball bearing
Upper Bearing	Deep Groove Ball Bearing

Testnorm: **HI Standard Sect. 11.6.5.4**



Wet well installation with coupling kit 2" with ½" Rails (GRP26)
Dimensions in mm [inch], letters see table

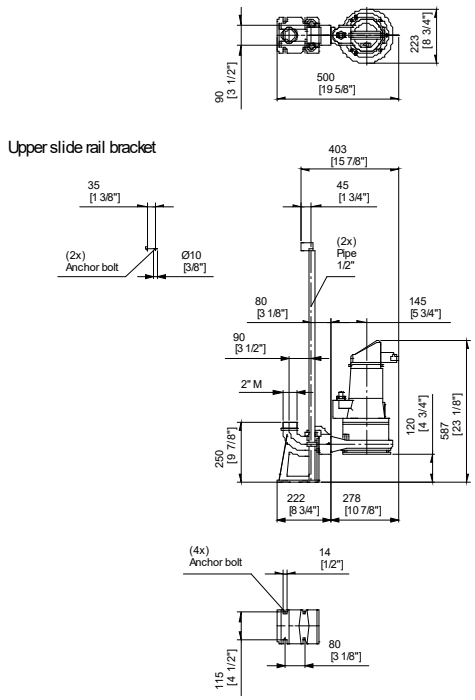


Table Dimensions (inch)

Project	Project no.:	Created by:	Page:	Date:
			1	4/26/2024

Performance Curve

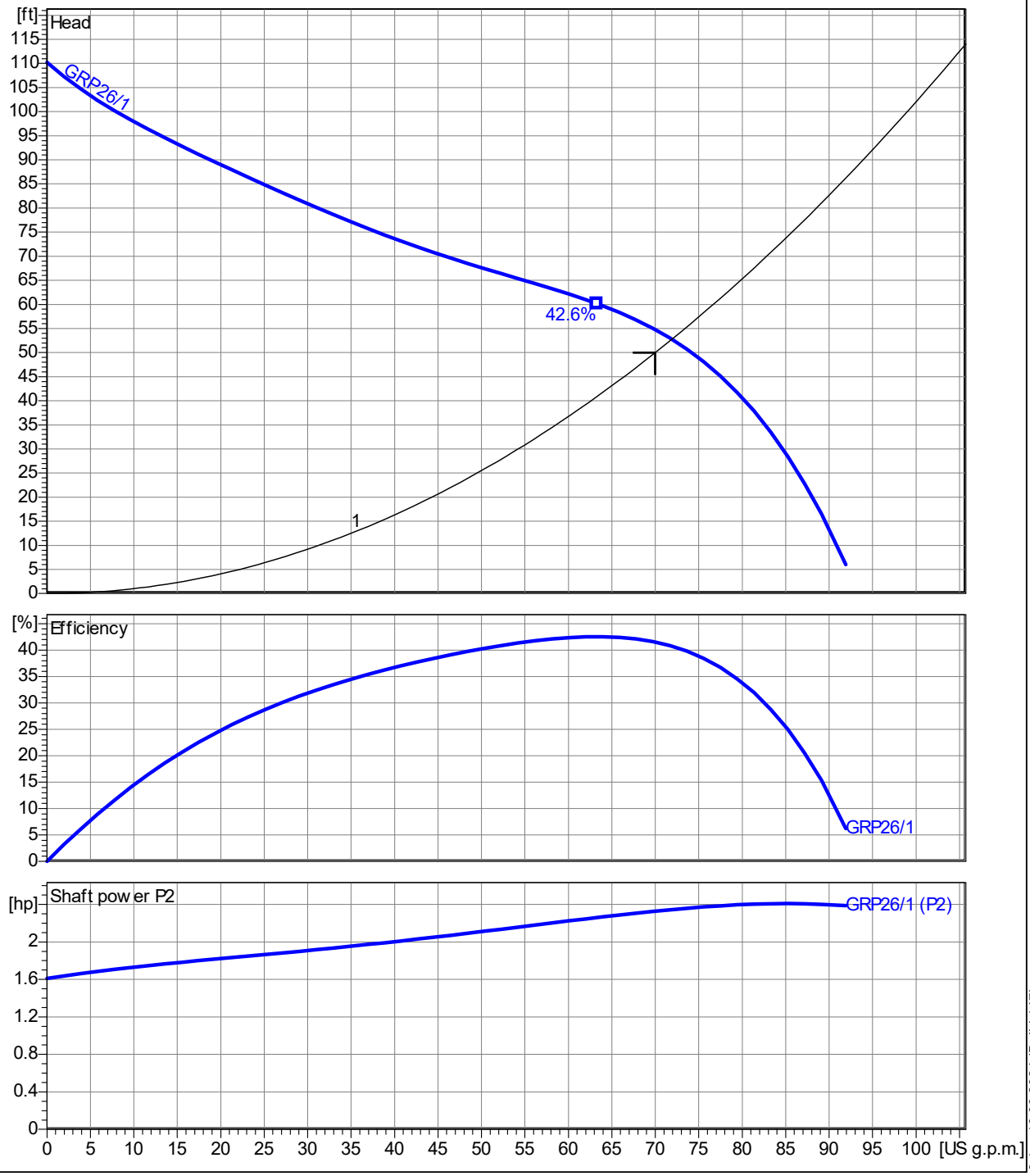
GRP26/1/C FM

Impeller					
Impeller type: Vane impeller with cutter sys.	Solid size Ø:	Max. Ø: $6^{5}/_{16}$"	Min. Ø: $6^{5}/_{16}$"	Sel. Ø: $5^{7}/_{16}$"	

Operating data				
Speed: **3450 rpm**	Frequency: **60 Hz**	Duty point: **Q =70 US g.p.m. H = 50 ft**	Shaft power P2: **2.34 hp**	Discharge port: **2" M**

Power data referred to:
Water [100%] ; 68°F; 62.322lb/ft³; 1.0818E-5ft²/s

Testnorm: **HI Standard Sect. 11.6.5.4**



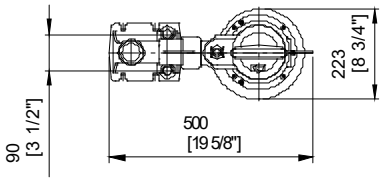
2.0.1 - 18.03.2024 (Build 147)

Project	Project no.:	Created by:	Page:	Date:
			2	**4/26/2024**

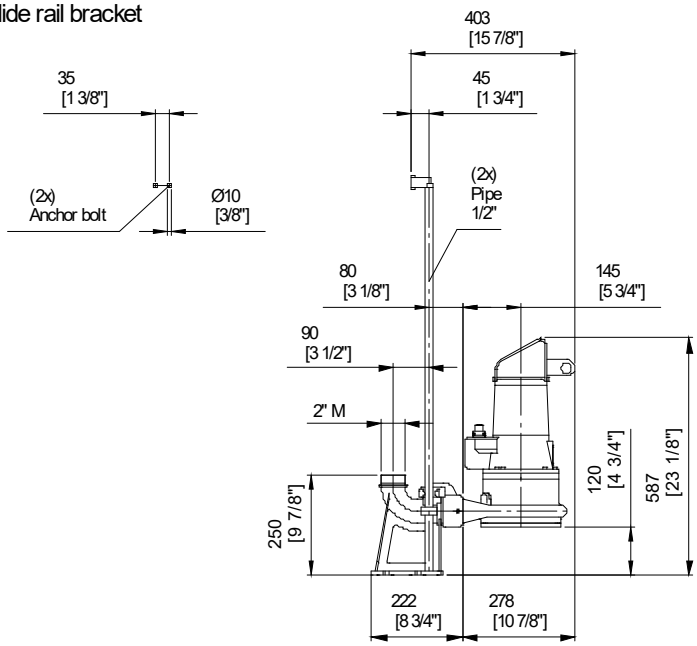
Dimensions

GRP26/1/C FM

Wet well installation with coupling kit 2" with ½" Rails (GRP26)
Dimensions in mm [inch], letters see table



Upper slide rail bracket



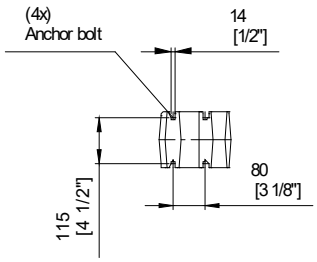


Table Dimensions (inch)

Project	Project no.:	Created by:	Page: 3	Date: 4/26/2024

Technical Data

GRP26/1/C FM

Operating data					
Flow	**70 US g.p.mUS g.p.m.**		**Head**	**50 ft**	**ft**
Shaft power P2	**2.3**	**hp**	**Static head**	**0**	**ft**
Pump efficiency	**40.8**	**%**	**Required pump NPSH**		**ft**
Pump type	Single pump		No. of pumps	1	
Fluid	Wastewater		Temperature	68	°F
Density	62.31	lb/ft³	Kin. viscosity	1.077E-5	ft²/s

Pump					
Pump Code	GRP26/1/C FM		Speed	3450	rpm
Suction port			Head Max.	110.2	ft
Discharge port	2" M		Head Min.	6.0	ft
Impeller type	Vane impeller with cutter sys.		Flow Max.	91.9	US g.p.m.
Solid size		inch	Pump efficiency max.	42.6	%
Impeller Ø	5.43	inch	Required rated power max. P2	2.4	hp

Motor					
Motor design	Submersible motor		Insulation class	H	
Motor name	AM122.3,8/2/1		Degree of protection	IP 68	
Frequency	60	Hz	Temperature class	T4	
Rated power P2	2.4	hp	NEMA code	E	
			Explosion protection	Class I, Div. 1, Grp. C&D	
Rated speed	3450	rpm	Efficiency at % rated power 100%	70.0	%
Rated voltage	230 V | 1~		Efficiency at % rated power 75%		%
Rated current	12.0	A	Efficiency at % rated power 50%		%
Starting current, direct starting	43.2	A	cos phi at % rated power 100%	0.98	
Starting current, star-delta	14	A	cos phi at % rated power 75%		
Starting mode	Directly		cos phi at % rated power 50%		
Power cable	7X1,5 / 10G1,5		Control cable	2X1,5 / -	
Type of power cable	NSSHÖU-J / H07RN8-F PLUS		Type of control cable	ÖLFLEX-EB / -	
Cable length	32.8 ft		Service factor	1.15	
Shaft seal	Mechanical seal on medium side		SiC / SiC		
	Mechanical seal on motor side		SiC / SiC		
Bearing	Lower Bearing		Double row angular ball bearing		
	Upper Bearing		Deep Groove Ball Bearing		
Remarks	Start-/ Runcapacitor: 80µF / 40µF				

Materials / Weight			
Motor housing	Cast Iron ASTM A48;Cl.40B	Motor shaft	AISI 430 F Stainless Steel
Pump housing	Cast Iron ASTM A48;Cl.40B	Bolts	AISI 304 Stainless Steel
Motor bearing cover	Cast Iron ASTM A48;Cl.40B	O-Rings	Nitrile Rubber
Impeller	Cast Iron ASTM A48;Cl.40B		
Cutting system	Hardened Stainless Stell HRC55		
Weight aggregate	72.751 lb		

Project	Project no.:	Created by:	Page: 4	Date: 4/26/2024

Technical Information

GRP34/1/C

Operating data

Flow	80 US g.p.m.
Head	60 ft
Shaft power P2	3.09 hp
Pump efficiency	44 %
Required pump NPSH	
Pump type	Single pump
No. of pumps	1
Fluid	Wastewater

Pump

Pump Code	GRP34/1/C
Impeller	Vane impeller with cutter sys.
Impeller size	$4^{13}/_{16}$"
Solid size	
Discharge port	2" M
Suction port	

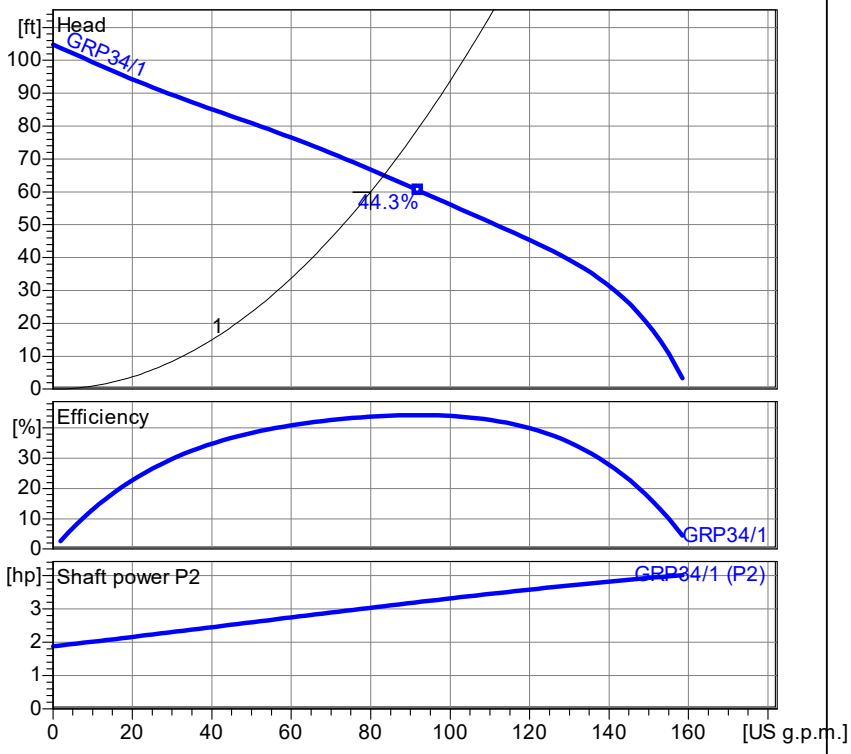
Motor

Rated voltage	230 V
Frequency	60 Hz
Rated power P2	4.0 hp
Rated speed	3450 rpm
Number of poles	2
Efficiency	80 %
Rated current	16.2 A
Degree of protection	IP 68

Materials

Motor housing	Cast Iron ASTM A48;Cl.40B
Pump housing	Cast Iron ASTM A48;Cl.40B
Motor bearing cover	Cast Iron ASTM A48;Cl.40B
Impeller	Cast Iron ASTM A48;Cl.40B
Cutting system	Hardened Stainless Stell HRC55
Motor shaft	AISI 430 F Stainless Steel
Bolts	AISI 304 Stainless Steel
O-Rings	Nitrile Rubber
Mechanical seal on medium side	SiC / SiC
Mechanical seal on motor side	SiC / SiC
Lower Bearing	Double row angular ball bearing
Upper Bearing	Deep Groove Ball Bearing

Testnorm: **HI Standard Sect. 11.6.5.4**



Wet well installation with coupling kit 2" with ½" Rails (GRP36...41)
Dimensions in mm [inch], letters see table

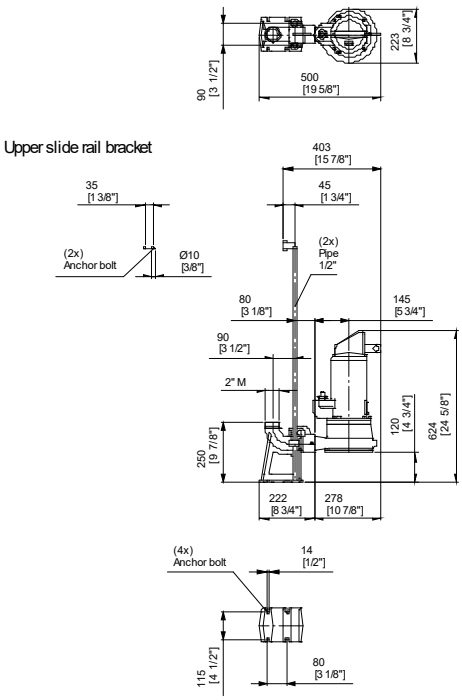


Table Dimensions (inch)

2.0.1 - 18.03.2024 (Build 147)

Project	Project no.:	Created by:	Page:	Date:
			1	2024-05-21

Performance Curve

GRP34/1/C

HOMA PUMPEN MIT SYSTEM

Impeller

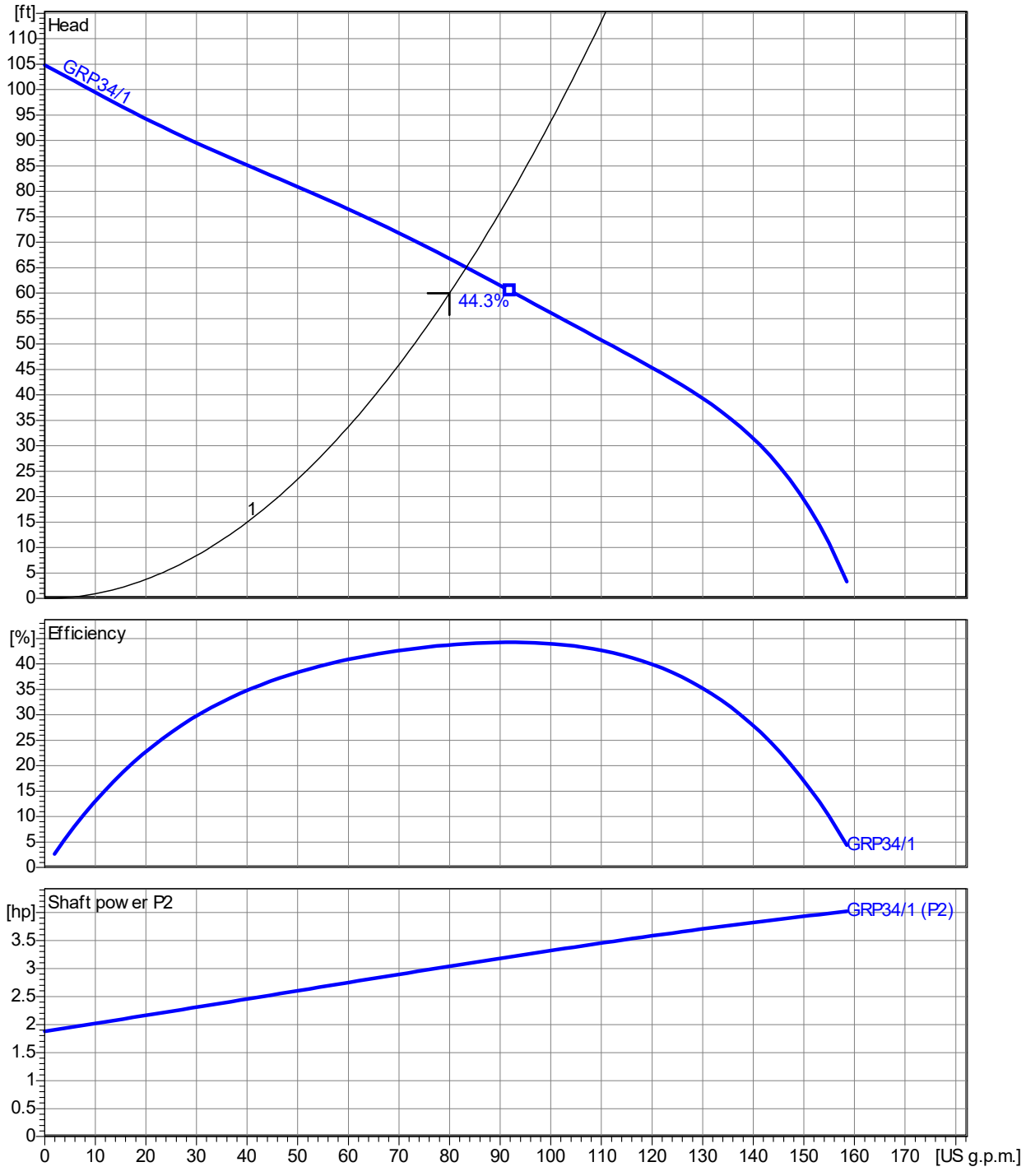
Impeller type:	Solid size Ø:	Max. Ø:	Min. Ø:	Sel. Ø:	
Vane impeller with cutter sys.		$6^{5}/_{16}$"	$6^{5}/_{16}$"	$4^{13}/_{16}$"	

Operating data

Speed:	Frequency:	Duty point:	Shaft power P2:	Discharge port:
3450 rpm	**60 Hz**	**Q =80 US g.p.m. H =60 ft**	**3.09 hp**	**2" M**

Power data referred to:
Water [100%] ; 68°F; 62.322lb/ft³; 1.0818E-5ft²/s

Testnorm: **HI Standard Sect. 11.6.5.4**



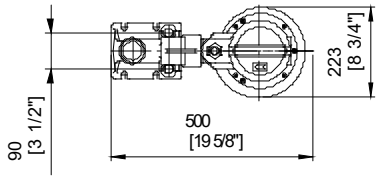
2.0.1 - 18.03.2024 (Build 147)

Project	Project no.:	Created by:	Page:	Date:
			2	**2024-05-21**

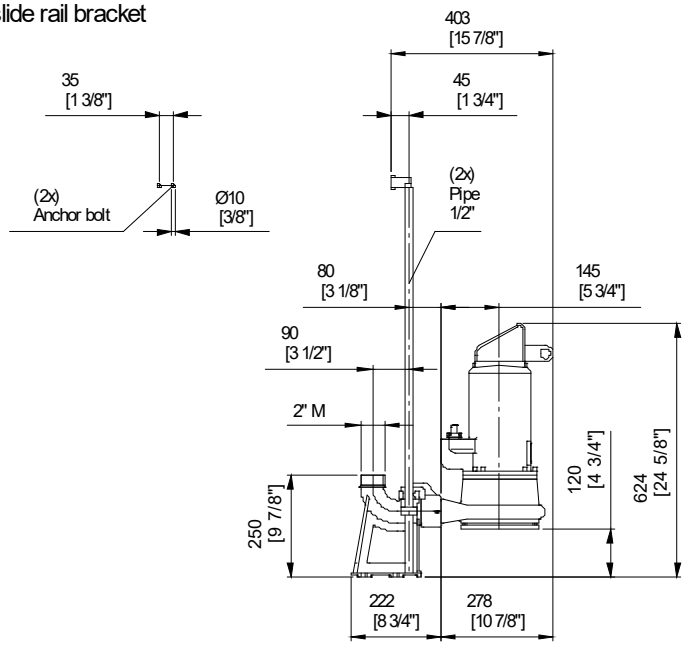
Dimensions

GRP34/1/C

Wet well installation with coupling kit 2" with ½" Rails (GRP36...41)
Dimensions in mm [inch], letters see table



Upper slide rail bracket



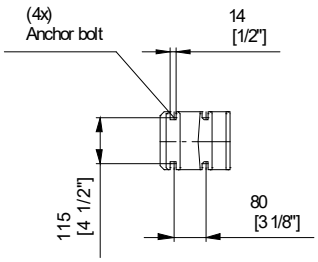


Table Dimensions (inch)

Project	Project no.:	Created by:	Page:	Date:
			3	2024-05-21

Technical Data

GRP34/1/C

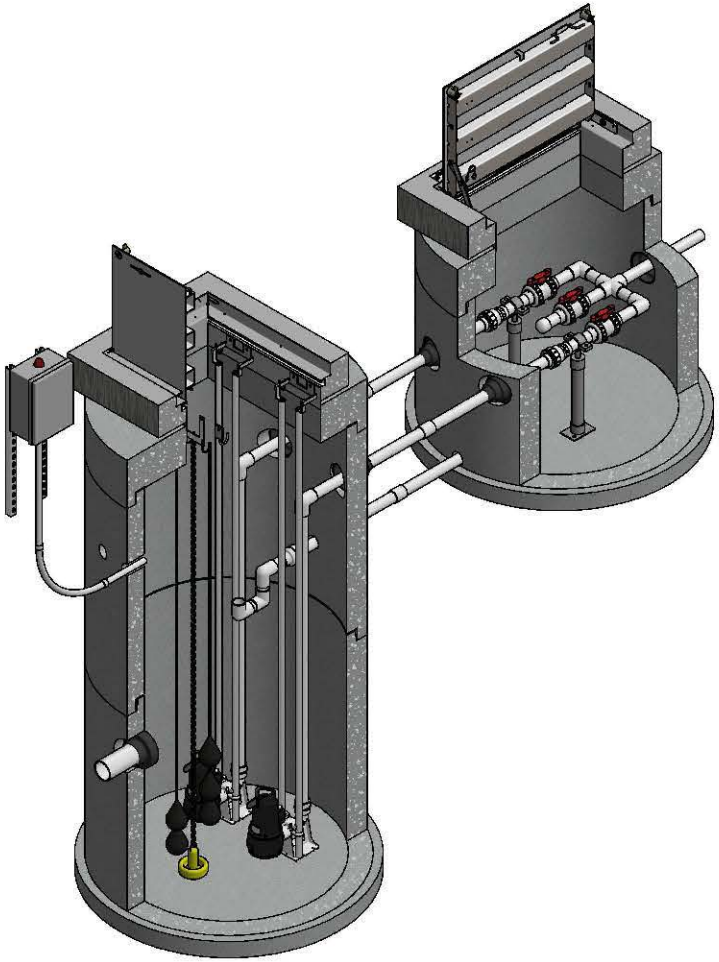
Operating data					
Flow	**80 US g.p.mUS g.p.m.**		**Head**	**60 ft**	**ft**
Shaft power P2	**3.1**	**hp**	**Static head**	**0**	**ft**
Pump efficiency	**44.0**	**%**	**Required pump NPSH**		**ft**
Pump type	Single pump		No. of pumps	1	
Fluid	Wastewater		Temperature	68	°F
Density	62.31	lb/ft³	Kin. viscosity	1.077E-5	ft²/s

Pump					
Pump Code	GRP34/1/C		Speed	3450	rpm
Suction port			Head Max.	104.8	ft
Discharge port	2" M		Head Min.	3.3	ft
Impeller type	Vane impeller with cutter sys.		Flow Max.	158.5	US g.p.m.
Solid size		inch	Pump efficiency max.	44.3	%
Impeller Ø	4.84	inch	Required rated power max. P2	4.0	hp

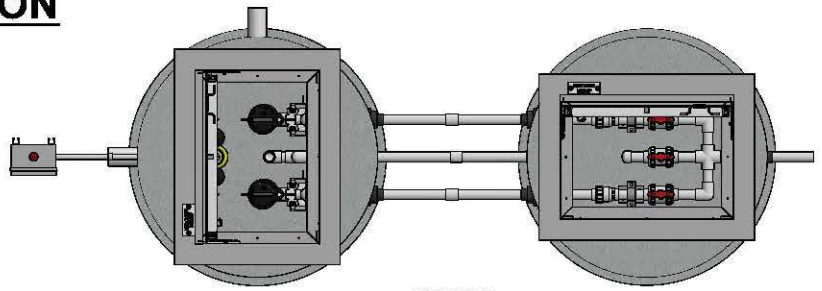
Motor					
Motor design	Submersible motor		Insulation class	H	
Motor name	AM136.5,0/2/1		Degree of protection	IP 68	
Frequency	60	Hz	Temperature class	T4	
Rated power P2	4.0	hp	NEMA code	F	
			Explosion protection		
Rated speed	3450	rpm	Efficiency at % rated power 100%	80.0	%
Rated voltage	230 V 1~		Efficiency at % rated power 75%	79.0	%
Rated current	16.2	A	Efficiency at % rated power 50%	78.0	%
Starting current, direct starting	83.8	A	cos phi at % rated power 100%	0.99	
Starting current, star-delta	27	A	cos phi at % rated power 75%	0.99	
Starting mode	Directly		cos phi at % rated power 50%	0.99	
Power cable	10G1,5 / 14AWG-4+14AWG-4		Control cable		
Type of power cable	H07RN8-F PLUS / RHW-2		Type of control cable		
Cable length	32.8 ft		Service factor	1.15	
Shaft seal	Mechanical seal on medium side		SiC / SiC		
	Mechanical seal on motor side		SiC / SiC		
Bearing	Lower Bearing		Double row angular ball bearing		
	Upper Bearing		Deep Groove Ball Bearing		
Remarks	Start-/ Runcapacitor: 150µF / 50µF				

Materials / Weight			
Motor housing	Cast Iron ASTM A48;Cl.40B	Motor shaft	AISI 430 F Stainless Steel
Pump housing	Cast Iron ASTM A48;Cl.40B	Bolts	AISI 304 Stainless Steel
Motor bearing cover	Cast Iron ASTM A48;Cl.40B	O-Rings	Nitrile Rubber
Impeller	Cast Iron ASTM A48;Cl.40B		
Cutting system	Hardened Stainless Stell HRC55		
Weight aggregate	97.002 lb		

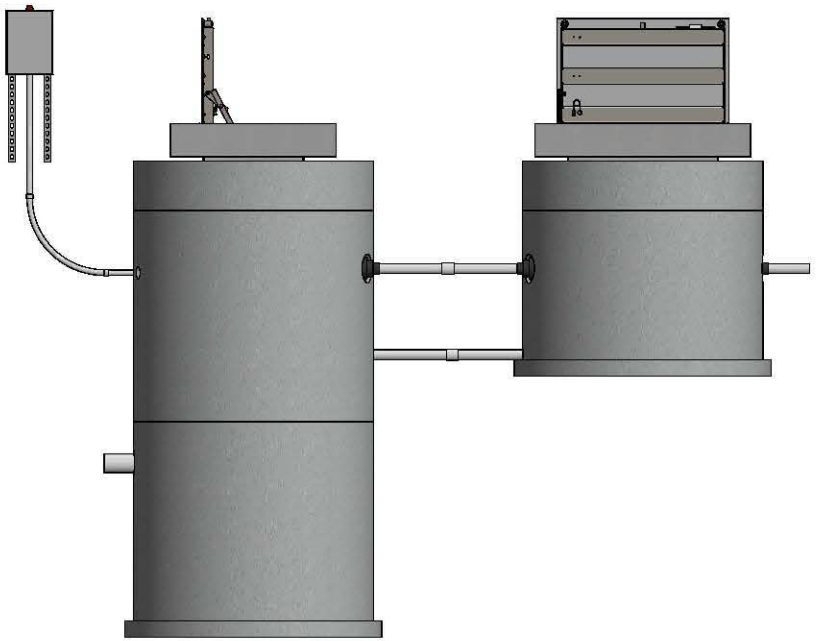
248-DV SERIES STANDARD
DUPLEX PUMP STATION



TOP LEFT ISOMETRIC VIEW w/ SECTION
NOT TO SCALE



PLAN VIEW
NOT TO SCALE



PROFILE VIEW
NOT TO SCALE

DISCLAIMERS, INCLUDING BUT NOT LIMITED TO:
1.) All elevations have been provided by others, and have not been verified by Jensen Precast. Contractor to verify all dimensions and elevations in field prior to installation.
2.) These layout drawings are intended to show overall system design only. All concrete component thicknesses, dimensions, and joint orientations may vary across Jensen Precast's manufacturing facilities. Contractor to confirm all thicknesses, dimensions, and joint orientations prior to installation.
3.) System design criteria has been provided to Jensen Precast. Others are responsible for verification that system meets intended application.
4.) Foundation, subgrade, and backfill to be designed by others.

JENSEN PUMP STATIONS
521 DUNN CIRCLE, SPARKS, NV 89431
www.jensenwaterresources.com
(855) 468-6500

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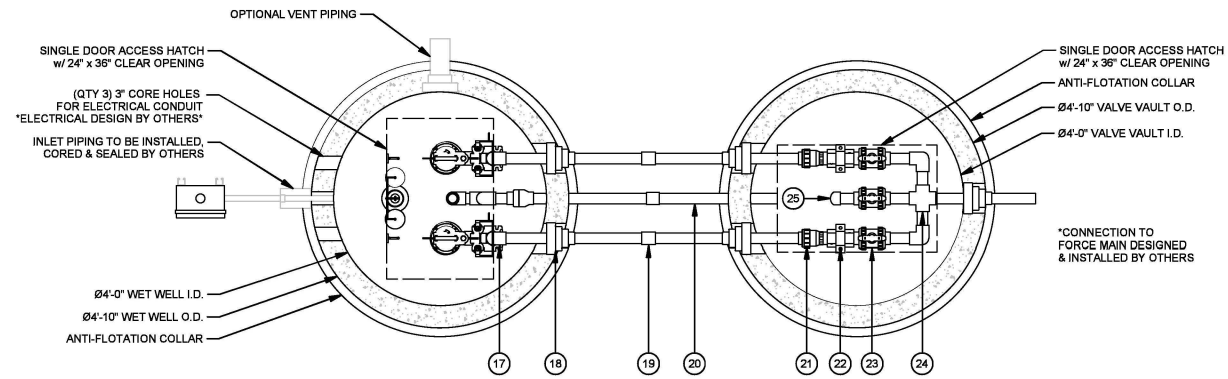
DESCRIPTION: Quail Valley - LS4

PART NUMBER:	248-DV Series Standard	DRAWN BY:	T. Tidball
CREATED:		MODIFIED:	1/26/21

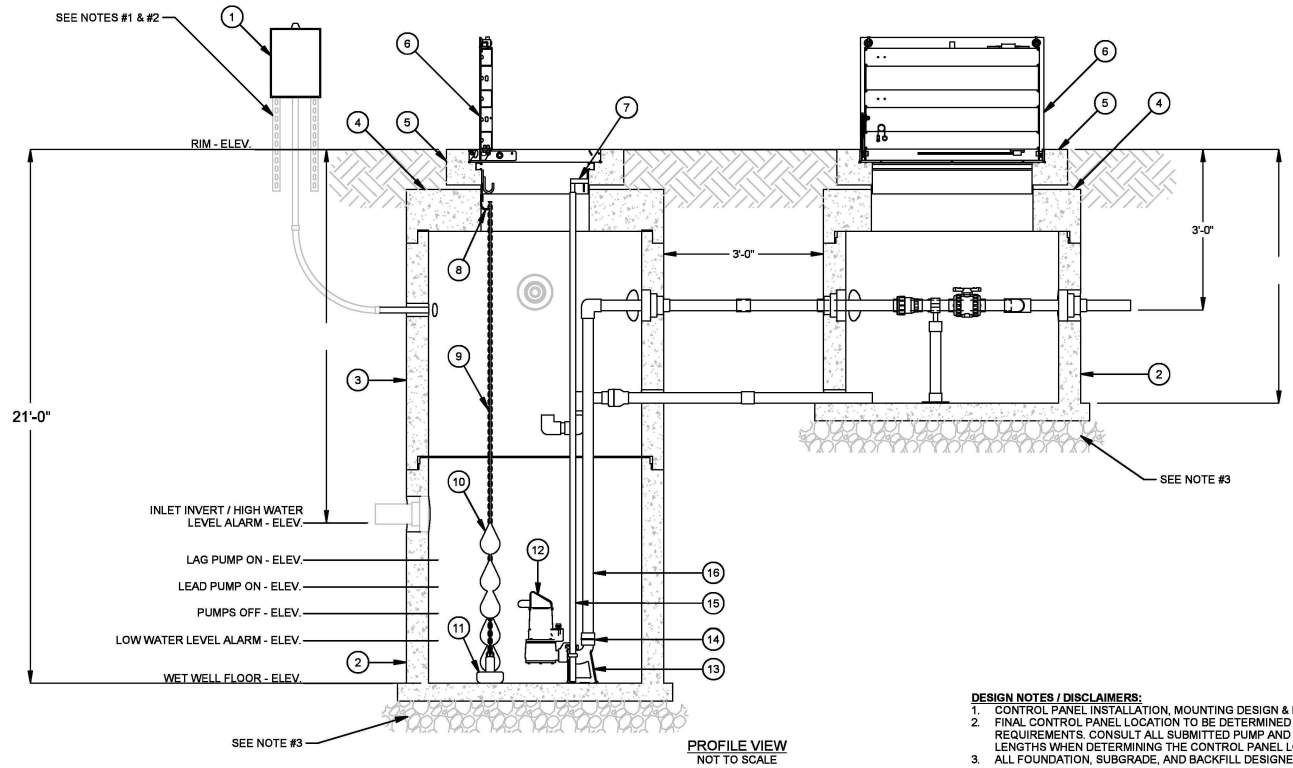
REV:

SHEET: 1 OF 2

248-DV Series Standard.dw



PLAN VIEW
NOT TO SCALE



PROFILE VIEW
NOT TO SCALE

DESIGN NOTES / DISCLAIMERS:

1. CONTROL PANEL INSTALLATION, MOUNTING DESIGN & HARDWARE BY OTHERS.
2. FINAL CONTROL PANEL LOCATION TO BE DETERMINED ACCORDING TO PROJECT REQUIREMENTS. CONSULT ALL SUBMITTED PUMP AND LEVEL CONTROL CABLE LENGTHS WHEN DETERMINING THE CONTROL PANEL LOCATION.
3. ALL FOUNDATION, SUBGRADE, AND BACKFILL DESIGNED BY OTHERS.

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION
1	1	DUPLEX ALTERNATING CONTROL PANEL
2	2	48IN DIA JENSEN PRECAST CONCRETE MANHOLE BASE *HEIGHT VARIES*
3	1	48IN DIA JENSEN PRECAST CONCRETE MANHOLE BARREL *HEIGHT VARIES *
4	2	48IN DIA JENSEN PRECAST CONCRETE MANHOLE FLAT TOP
5	2	JENSEN PRECAST CONCRETE HATCH RISER
6	2	SINGLE DOOR HATCH WITH A CLEAR OPENING OF 24IN X 36IN
7	2	UPPER GUIDE RAIL BRACKET 2IN
8	1	FLOAT BRACKET 3 HOOK TYPE 316SS
9	10 LF	LF CHAIN 1/4IN 316SS
10	5	FLOAT SWITCH w/ 100' CABLE
11	1	ANCHOR 15LB PVC COATED
12	2	2IN SUBMERSIBLE PUMP
13	2	AUTOCOUPLING ASSY 2IN STD
14	2	ADAPTER 2IN FML THRD X SLIP SCH 80 PVC
15	40 LF	LF PIPE 1IN SCH40 GUIDE RAIL 304SS
16	40 LF	LF PIPE PVC SCH 80 2IN DIA
17	4	90 DEG ELBOW 2IN SCH 80 PVC SLIP
18	5	FLEXIBLE PIPE CONNECTORS
19	2	FITTING PVC SCH 80 2IN DIA COUPLING SLIP
20	1	2IN DIA PVC SCH40 VAULT DRAIN w/ CHECK VALVE, TRAP & FITTINGS
21	2	BALL CHECK VALVE 2IN SCH 80 PVC SLIP
22	2	PIPE SUPPORTS
23	3	BALL VALVE 2IN SCH 80 PVC SLIP
24	1	CROSS 2IN SCH 80 PVC SLIP
25	1	CAP 2IN SCH 80 PVC SLIP

PROJECT SPECIFIC INFORMATION

FINISHED GRADE (Ft.)	
RIM ELEV. (Ft.)	
INLET ELEV. (Ft.)	
FORCE MAIN DISCHARGE ELEV. (Ft.)	
AVAILABLE POWER SUPPLY	120V ☐ 240V ☑ 480V ☐
AVAILABLE POWER PHASE	Single ☑ Three ☐

SYSTEM CHARACTERISTICS

APPLICATION	SEWAGE ☑ STORM WATER ☐
DESIGN FLOW (gpm)	70
TOTAL DYNAMIC HEAD (Ft.)	50
STATIC HEAD (Ft.)	
PUMP MAKE & MODEL	HOMA GRP26/1/C FM
PUMP MOTOR (Std / XP)	Standard ☐ XP/FM ☑
PUMP TYPE	Non-Clog ☐ Grinder ☑ Chopper ☐ Vortex ☐
PUMP RATED HP & CURRENT	2.4hp / 12A
ACCESS HATCH LOAD LEVEL	Pedestrian ☐ Incidental H-20 ☐ Parking Lot H-20 ☐ Full Traffic H-20 ☑

ADDITIONAL OPTIONS

OPTION	YES	NO
CONTROL PANEL SS ENCLOSURE	☐	☑
CONTROL PANEL AC UNIT	☐	☑
CONTROL PANEL REMOTE ALARM MONITORING	☐	☑
AIR RELEASE/VACUUM VALVE	☐	☑
INTERIOR LINER	☐	☑
CONCRETE WATERPROOFING	☐	☑
VENT PIPE	☐	☑
ODOR CONTROL VALVE	☐	☑
LIFTING CRANE	☐	☑
GENERATOR RECEPTACLE	☐	☑

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2.) These layout drawings are intended to show overall system design only. All concrete component thicknesses, dimensions, and joint orientations may vary across Jensen Precast's manufacturing facilities. Contractor to confirm all thicknesses, dimensions, and joint orientations prior to installation.
3.) System design criteria has been provided to Jensen Precast. Others are responsible for verification that system meets intended application.
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DESCRIPTION:

Quail Valley - LS4

REV:

PART NUMBER:	248-DV Series Standard	DRAWN BY:	T. Tidball
CREATED:		MODIFIED:	4/26/24

SHEET: 2 OF 2

248-DV Series Standard.idw

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

Quoted By: DENNIS MORGAN

Document Address:
JENSEN CUSTOMER
CUSTOMER BILLING ADDRESS
. . .

Delivery Address:
JENSEN CUSTOMER

Menifee CA 92587

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS2)	Delivered FOB Truck	1	PCS	53,458.00	53,458.00

Notes: Wet Well:
• 48” Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 22’-0” Rim To Sump
• 24” X 36” Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Valve Vault:
• 48” Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6’-0” Rim To Sump
• 24” X 36” Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Pump Package:
• (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables
• Pump Lift Out/Autocoupling System
• Mounting Bracket And Hardware For Guide Rails And Base Elbows

Piping, Fittings, And Valves:
• 2” PVC SCH80 Piping And Fittings With Glue As Required
• 2” PVC SCH80 Check And Plug Valves

Controls:
• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
• Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per Project Basis.
• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
		• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply • Others Responsible For Offloading, Setting And Installation Of All Components • Delivery Includes One Hour On Site Per Delivery Truck • Additional Hours To Be Billed At $185.00 Per Hour • Suitable And Safe Access Must Be Provided For Delivery Notes: • Extremely Heavy Product – Setting And Handling Limitations Are Critical • Precast Coring For Pipe Penetrations Not Included In Jensen's Scope • Interior/Exterior Liners Not Included In Jensen's Scope					
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS3)	Delivered FOB Truck	1	PCS	53,408.00	53,408.00
		Notes: Wet Well: • 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 21'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Valve Vault: • 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Pump Package: • (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables • Pump Lift Out/Autocoupling System • Mounting Bracket And Hardware For Guide Rails And Base Elbows Piping, Fittings, And Valves: • 2" PVC SCH80 Piping And Fittings With Glue As Required • 2" PVC SCH80 Check And Plug Valves Controls: • Standard Duplex Control Panel • (5) Mechanical Float Switches W/ 50ft Cables • Mounting Bracket And Hardware For Floats Included Services: • Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per					

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
		Project Basis. • One Year Full System Warranty • Standard Jensen Water Resources O&M Documents Delivery: • Delivery To Job Site Customer To Off Load And Set • Estimated Heaviest Pick Weight At 7,000lbs • Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production • If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply • Others Responsible For Offloading, Setting And Installation Of All Components • Delivery Includes One Hour On Site Per Delivery Truck • Additional Hours To Be Billed At $185.00 Per Hour • Suitable And Safe Access Must Be Provided For Delivery Notes: • Extremely Heavy Product – Setting And Handling Limitations Are Critical • Precast Coring For Pipe Penetrations Not Included In Jensen's Scope • Interior/Exterior Liners Not Included In Jensen's Scope					
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS4)	Delivered FOB Truck	1	PCS	53,408.00	53,408.00
		Notes: Wet Well: • 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 21'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Valve Vault: • 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Pump Package: • (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables • Pump Lift Out/Autocoupling System • Mounting Bracket And Hardware For Guide Rails And Base Elbows Piping, Fittings, And Valves: • 2" PVC SCH80 Piping And Fittings With Glue As Required • 2" PVC SCH80 Check And Plug Valves Controls:					

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount

• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
• Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per Project Basis.
• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production
• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply
• Others Responsible For Offloading, Setting And Installation Of All Components
• Delivery Includes One Hour On Site Per Delivery Truck
• Additional Hours To Be Billed At $185.00 Per Hour
• Suitable And Safe Access Must Be Provided For Delivery

Notes:
• Extremely Heavy Product – Setting And Handling Limitations Are Critical
• Precast Coring For Pipe Penetrations Not Included In Jensen's Scope
• Interior/Exterior Liners Not Included In Jensen's Scope

	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS5)	Delivered FOB Truck	1	PCS	49,615.00	49,615.00

Notes: Wet Well:
• 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 22'-0" Rim To Sump
• 24" X 36" Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Valve Vault:
• 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump
• 24" X 36" Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Pump Package:
• (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount

• Pump Lift Out/Autocoupling System
• Mounting Bracket And Hardware For Guide Rails And Base Elbows

Piping, Fittings, And Valves:
• 2" PVC SCH80 Piping And Fittings With Glue As Required
• 2" PVC SCH80 Check And Plug Valves

Controls:
• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
• Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per Project Basis.
• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production
• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply
• Others Responsible For Offloading, Setting And Installation Of All Components
• Delivery Includes One Hour On Site Per Delivery Truck
• Additional Hours To Be Billed At $185.00 Per Hour
• Suitable And Safe Access Must Be Provided For Delivery

Notes:
• Extremely Heavy Product – Setting And Handling Limitations Are Critical
• Precast Coring For Pipe Penetrations Not Included In Jensen's Scope
• Interior/Exterior Liners Not Included In Jensen's Scope

Quotation Notes

FOR TECHNICAL QUESTIONS PLEASE CONTACT CHRIS PURDIE @ 775-352-6361

ITEMS INCLUDED IN THIS QUOTE ARE PER JENSEN PUMP STATION'S INTERPRETATION AND ARE LISTED AS CLOSE TO "AS EQUAL" AND "AN ALTERNATIVE" WHICH ARE SUBJECT TO FINAL APPROVAL. ANY CHANGES MIGHT REQUIRE A REQUOTE FROM JENSEN WATER RESOURCES.

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

ANY AGENCY INSPECTION REQUIREMENT FEES NOT INCLUDED.

ALL PRODUCTS ABOVE ARE SUITABLE FOR H-20 LOADING IN DRY SOIL CONDITIONS. ANY ADDITIONAL LOADING REQUIREMENTS MAY RESULT IN REVISED PRICING.

SALES TAX HAS BEEN ESTIMATED WITH THIS QUOTATION. CUSTOMER IS RESPONSIBLE TO DETERMINE AND PAY ALL ASSOCIATED SALES TAX.

ADDITIONAL FUEL SURCHARGES MAY APPLY AT TIME OF DELIVERY

JENSEN PRECAST TERMS AND CONDITIONS APPLY.

LEAD TIMES WILL BE PRESENTED AFTER JENSEN RECEIVES APPROVED SUBMITTALS. DELIVERY SCHEDULE IS SUBJECT TO CHANGE BASED ON CAPACITY, MATERIAL AVAILABILITY, AND PRECEDING CUSTOMER ORDERS. CURRENT SUPPLY CHAIN ISSUES ARE AFFECTING MANY INDUSTRIES AND MAY IMPACT LEAD TIMES.

PRIOR TO PROVIDING SUBMITTALS, JENSEN PRECAST REQUESTS A SIGNED COPY OF THIS QUOTATION, CUSTOMER PURCHASE ORDER, OR LETTER OF INTENT TO PURCHASE.

CREDIT SALES WILL BE MADE ONLY AFTER RECEIPT OF A SIGNED JENSEN PRECAST CREDIT APPLICATION AND WRITTEN CREDIT APPROVAL BY JENSEN PRECAST'S CREDIT MANAGER.

ITEMS INCLUDED IN THIS QUOTATION ARE CUSTOM PRODUCTS. JENSEN PRECAST MAY REQUIRE PARTIAL OR FULL PAYMENT PRIOR TO PROCUREMENT, MANUFACTURING, OR SHIPMENT OF ANY ITEMS.

THIS OFFER TO SELL IS BASED ON CUSTOMER BUYING THIS COMPLETE BILL OF MATERIALS. PRICES MAY BE SUBJECT TO CHANGE IF INDIVIDUAL LINE ITEMS ARE PURCHASED SEPARATELY.

FOR FURTHER INFORMATION CONCERNING JENSEN ENGINEERED SYSTEMS, PLEASE VISIT OUR WEBSITE @ HTTPS://WWW.JENSENPRECAST.COM/WATER-RESOURCES

THANK YOU FOR ALLOWING US TO PROVIDE YOU WITH THIS QUOTATION. WE LOOK FORWARD TO WORKING WITH YOU ON THIS PROJECT.

Net Total:	**209,889.00**
Estimated Tax:	**18,365.29**
Gross Total	**228,254.29**

All orders are subject to credit acceptance by seller.
A 3% credit card service fee may be added for all credit card payments.
Delivery trips, setting time, or materials not noted above will be billed accordingly.
Offer to sell subject to Jensen Precast's company policies, terms and conditions.
Please refer to https://www.jensenprecast.com/terms-of-service/ for complete terms and conditions which are hereby incorporated by reference.
All specialized product may be subject to a deposit prior to submittals and/or fabrication.
Quotation is valid for 30 days.
Thank you for choosing Jensen Precast!

JENSEN CUSTOMER Signature **Date**

JENSEN CUSTOMER PO

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

TERMS AND CONDITIONS

ORDERING INSTRUCTIONS

Please refer to the quotation number and date on all orders. Indicate desired delivery dates, quantities and item priority if applicable. Please contact our office for delivery schedules. Delivery lead-time will be estimated upon receipt of order, and is based on actual demand at that time. Any dates discussed prior to order are non-binding estimates. Orders for non-standard products should be accompanied by specifications, and blue prints or scale drawings. Notify us as soon as possible to insure prompt delivery.

COMPANY POLICIES TERMS AND CONDITIONS

THE POLICY TERMS AND CONDITIONS, DELINEATED HEREIN SHALL APPLY TO ALL QUOTATIONS, OR OFFERS TO SELL

1. Goods to Be Provided: Jensen Enterprises, Inc. dba Jensen Precast ("Jensen Precast") agrees to sell to Customer, on the terms and conditions stated herein, the materials and related items (the "goods") identified in Jensen Precast's quotation to Customer. Customer is solely responsible for determining whether the goods listed are the correct types and/or sufficient in number to meet Customer's needs and/or requirements. Jensen Precast's offer to sell is based on customer approval of Jensen Precast standard product drawings or submittals, and not in accordance with any plans and specifications, unless agreed to in writing by a duly authorized representative of Jensen Precast.
2. No Additional Terms of Sale: Customer's acceptance of Jensen Precast's quotation is limited to these Terms and Conditions of Sale. Any new or different terms or conditions stated or proposed by Customer in its acceptance of Jensen Precast's quotation or in any accompanying or related purchase order or other document are hereby rejected by Jensen Precast and shall not be binding upon Jensen Precast. The entire contract is embodied in this writing. This writing constitutes the final expression of the parties' agreement, and it is a complete and exclusive statement of the terms of that agreement.
3. Payment Terms: Jensen Precast may require payment in full prior to manufacture or shipment of any goods. If Jensen Precast agrees to provide materials on a "Cash on Delivery" basis, payment in full is due upon arrival of Jensen Precast's equipment, prior to setting of product or unloading of trucks. Credit sales will be made only after receipt of a signed Jensen Precast credit application and written credit approval by Jensen Precast's credit manager. On all credit sales, payment in full is due within 30 days after Customer's receipt of materials or services. Customer agrees to pay a service charge of 1.5% per month on all invoices not paid when due. At its option, Jensen Precast may decline to make delivery or shipment to Customer if any invoice remains past due. Customer waives and releases any claim against Jensen Precast for loss or damage allegedly sustained by Customer as a result of Jensen Precast's refusal to make delivery or shipment under such circumstances. All payments shall be made in U.S. dollars and, unless otherwise designated by Jensen Precast in writing, shall be sent to Jensen Precast's Corporate Office, 9895 Double R Blvd, Reno, NV 89521.
4. Price: The price(s) stated in Jensen Precast's quotation to Customer are firm for 30 days. The prices stated in Jensen Precast's quotation are subject to sales and use tax. Customer shall reimburse Jensen Precast for all sales and use taxes imposed upon: (a) the sale of the goods; and/or, (b) the use of any materials consumed by Jensen Precast; and/or, (c) the sale of any fixtures or equipment incident to this contract. Prices are subject to delivery charges unless quoted as delivered (see shipping code definitions on quotation). Jensen Precast reserves the right to increase the cost of delivery or shipment if Customer increases mileage or number of trucks specified in the original quotation. Prices quoted are based on quantities indicated, and on customer acceptance of the entire quote. Jensen Precast reserves the right to accept or reject partial orders.
5. Time for Performance: Jensen Precast will endeavor to meet any reasonable shipping date(s) requested by Customer. However, Jensen Precast does not guarantee that the goods will be furnished by any particular date. All shipping dates stated or indicated are estimates only and are based upon conditions known at the time the dates were stated or indicated. Jensen Precast shall not in any event be liable for any loss or damage sustained by Customer on account of failure to meet any delivery or shipping date.
6. Delivery: Customer or its designated representative shall be prepared to unload, receive, and accept the goods at the time specified on the order. Customer shall provide assistance in delivering the goods, including but not limited to assisting in backing and directing Jensen Precast's truck at the delivery site, providing access to the delivery site that is acceptable to Jensen Precast, and providing a setting location for the truck, crane or other delivery equipment that is acceptable to Jensen Precast. Jensen Precast shall not be liable for any property damage arising from or related to delivery of the goods, including without limitation damage to sidewalks, curbs, fences, valves, conduit, pipes, concrete, asphalt, lawns, trees, or landscaping. All excessive unloading or stand-by time, resetting or re-delivery will be charged for at the current hourly or mileage rates of the equipment involved. If for any reason Jensen Precast cannot set the goods at the time of delivery, Customer shall be responsible for setting the goods by other means, at no cost to Jensen Precast.
7. Customer Responsibilities: The Customer or its designated representative shall be solely responsible for accomplishing the following:
a. Finish grade, leveling and position of the goods.
b. Grouting and/or sealing of vault sections, grade rings, risers, frames, covers, pipes or similar structures, unless a duly authorized representative of Jensen Precast has stated in writing that Jensen Precast will perform installation and sealing of the goods.
c. Excavation, bedding, shoring, backfilling, compacting and grading.
d. Water and/or flotation control.
e. Setting and adjusting ladders, racking, grates or other hardware.
f. Providing a one- or two-person ground crew to assist the Jensen Precast crane operator.
g. All other site work not specified above.
8. Returns: The goods shall not be returned for credit without prior written authorization and approval by a duly authorized representative of Jensen Precast. A minimum handling charge of 15% plus actual shipping or delivery costs shall be made on all goods returned to compensate for costs of accounting, reconditioning, restocking and delivery, except when due to fault or error of Jensen Precast. No credits shall be allowed on used, damaged, custom, specially ordered or specially manufactured goods. Customer shall bear the cost of any labor, damage or transportation associated with return of the goods.
9. Equipment: Unless otherwise agreed to in a writing signed by a duly authorized representative of Jensen Precast, equipment belonging to Jensen Precast cannot be left at any job site for the purpose of unloading or setting by others.
10. Project Information: Customer agrees to furnish to Jensen Precast promptly upon request all project information necessary for Jensen Precast to perfect or provide notice of its mechanic's lien, stop notice, and/or payment bond rights.
11. Buy America(n) Requirements. Purchaser must clearly and affirmatively notify Jensen Precast of the applicability of any order, law, regulation or other requirement that the Products be produced, manufactured, or substantially transformed in the United States, or consist wholly or partly of materials or components produced, manufactured, or substantially transformed in the United States, or that the raw material comprising the Products be of domestic origin. If Purchaser fails to notify Jensen Precast of any such requirements, Purchaser must accept delivery and pay for the Products, regardless of any such requirements, and Purchaser agrees to fully indemnify and hole Jensen Precast harmless from and against any liability, costs and expenses, including reasonable attorney fees, incurred by Jensen Precast in connection with Purchaser's omission.
12. Force Majeure: Jensen Precast will not be liable for any delay or for failure to perform its obligations hereunder resulting from any cause beyond Jensen Precast's reasonable control including, but not limited to: Customer's failure to timely supply Jensen Precast with necessary data or specifications; any changes in such data or specifications at Customer's request; fires; explosions; floods; acts of God; epidemics; quarantine; embargoes; strikes; work stoppages or slowdowns or other industrial disputes; accidents; riots or civil disturbances; acts of civil or military authorities; inability to obtain any license or consent necessary in respect of any the goods; inability to obtain equipment, materials, labor, fuel or supplies; and delay by suppliers or material shortages.
13. Limited Warranty: For a period of one year from the date of shipment or delivery to Customer, Jensen Precast warrants all of the goods which it has manufactured to be free of material defects. If any such goods are found to be materially defective during the warranty period, Jensen Precast agrees to, in its sole discretion, repair or replace the defective goods without charge to Customer. Customer's remedy with respect to such goods is limited to repair or replacement. For goods not manufactured by Jensen Precast, Customer agrees to accept as its sole remedy the warranty, if any, offered by the manufacturer or manufacturers of such goods.

AS TO ALL GOODS SOLD BY JENSEN PRECAST TO CUSTOMER, THE WARRANTY DESCRIBED IN THIS PARAGRAPH SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

JENSEN PRECAST SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR LIQUIDATED DAMAGES OF ANY KIND, WHETHER THE CUSTOMER'S CLAIM IS BASED UPON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

14. Indemnity: Customer is solely responsible for the selection, installation, and use of the goods. Therefore, to the fullest extent permitted by law, Customer agrees to defend and indemnify Jensen Precast from and against any claim for loss or damage, including attorneys' fees and experts' or consultants' fees, arising from or relating to such selection, installation, and use. This indemnity applies regardless of any active and/or passive negligent act or omission on the part of Jensen Precast or its employees; provided, however, Customer shall not be obligated to indemnify Jensen Precast for the sole negligence or willful misconduct of Jensen Precast or its employees.
15. Risk of Loss: The risk of loss shall pass to Customer based on the applicable shipping code:
a. "Delivered and Set": Risk of loss shall pass to Customer when Jensen Precast's delivery truck has unloaded the product.
b. "Delivered - F.O.B. Truck": Risk of loss shall pass to Customer when Jensen Precast's delivery truck arrives at Customer's jobsite.
c. "Delivered and offloaded": Risk of loss shall pass to Customer when Jensen Precast's delivery truck arrives at Customer's jobsite.
d. "F.O.B. Jensen Precast Yard": Risk of loss shall pass upon tender of delivery of the goods to a common carrier or Customer's truck. Buyer shall procure and maintain insurance on the goods sufficient to protect its interests.
16. Dispute Resolution: All disputes arising from or relating to these Terms and Conditions of Sale and/or the furnishing of any goods by Jensen Precast to Customer shall be heard and decided exclusively in the state or federal court where the delivery or pick up of the Product(s) is located. The construction, interpretation and performance of this order and all transactions hereunder shall be governed by the laws of the state where delivery or pick up the Products is located, without regard to its choice of law principles. These Terms and Conditions of Sale (the "Terms") apply to all quotations and sales by Jensen Precast's (including its Water Resources, Metal Tech and other branded products) products, materials, services, components, accessories, and panels (collectively, "Products"). No terms or conditions other than those stated in these Terms, and no agreement or understanding, oral or written, purporting to modify these Terms, whether contained in a purchaser's purchase forms or elsewhere, will be binding on Jensen Precast unless signed by an authorized executive manager of Jensen Precast. Customer consents to these Terms for all Products. In any legal proceedings, the prevailing party shall be entitled to recover its reasonable attorneys' fees and costs.
17. Submittals and Tests: Jensen Precast reserves the right to charge customers for the cost of submittals, engineering or tests that are in addition to those customarily provided.
18. Custom Products: Jensen Precast will charge customer for any work completed at the time of cancellation of a custom or special order. All custom orders will be invoiced to customer if not released for delivery within 30 days past estimated date of delivery.
19. Storage Fees: For every month beyond the requested manufacture date that the product remains in Jensen Precast's possession, a fee of 3% per month of total sale price of product will be added to the invoice total due upon final delivery/pick up.
20. Invoice Date: Customer will be invoiced for product at either, date of delivery or 60 days past date of originally requested delivery/pick up date.

SHIPPING POLICY

1. The customer will be prepared to receive products at the specified delivery time. Excessive unloading or stand-by time, resetting or re-delivery not caused by Jensen Precast will be charged at the hourly rate for the equipment involved.
2. The customer will be solely responsible for the following:
a. Finish grade, leveling, and position of product.
b. Grouting, and/or sealing of vault sections, grade rings, risers, frames and covers, pipes, etc.
c. Excavation, bedding, shoring, backfilling, compacting and grading.
d. Water and/or flotation control.
e. Setting and adjusting ladders, racking, grates or other hardware.
f. All other site work not specifically referred to.
3. Equipment belonging to the company cannot be left at any jobsite for the purpose of unloading or setting by others unless previously agreed to in writing between Jensen Precast and the customer.
4. Carriers are responsible for goods lost or damaged in transit. Damages or shortages should be indicated on the carrier's delivery receipt and any claims should be made in writing directly to the carrier.
5. All products are to be delivered in the number of trips specified. Charges will be added for additional trips.

SHIPPING CODE DEFINITIONS

Code #1 - DELIVERED AND SET

Quoted prices include product delivery and setting with our boom truck subject to the following provisions:
a. Jensen Precast will provide driver/crane operator services only using Jensen Precast's boom truck, unless otherwise specified.
b. Customer will be solely responsible for all other site work associated with setting and installing this product unless specifically referred to in writing.
c. Most products require assistance from the customer in setting (generally one or two laborers). Contact Jensen Precast for the specific requirements of each product.
d. The customer will provide a properly prepared, sized and graded, excavation. Access and setting location for our boom truck must be acceptable to our driver or representative.
e. Since site conditions, products, and delivery equipment vary, the logistics must be considered to determine the best approach for setting the product.
Attention must be given to the variables of the set, including:
a. Capacity of the Jensen Precast boom truck and truck crane to be used.
b. The maximum product weight relative to the setting distance from the center of the crane to the center of the excavation cannot exceed the boom truck rated capacity.
c. The route to the setting location must be accessible for the boom truck without towing or pushing.
d. The type of terrain, site slope, and ground conditions for outrigger footings, at the setting location.
e. Overhead restrictions and other physical constraints.
f. Any or all of the above could prevent Jensen Precast from setting the product. In cases where Jensen Precast cannot set the product, we will off load the product in accordance with shipping code definition #3 herein.
NOTE: If for any reason Jensen Precast cannot set the product, Jensen Precast will not be responsible, or charged, for setting by any other means.

Code #2 - DELIVERED - F.O.B. TRUCK:

Quoted prices include product delivery to the job site only; "Free On Board" the truck. Generally, this would be a flatbed truck without a crane or other unloading equipment subject to the following provisions:
a. The company will provide driver services only and the customer will supply means of unloading and setting products at time of delivery. 1 hour of off-load time is allotted per truck from time of arrival at delivery location or entry point. Additional standby time not caused by Jensen Precast will be charged at the hourly rate for the equipment involved.

Code #3 - DELIVERED AND OFFLOADED:

Quoted prices include product delivery to the job site and unloaded from our truck subject to the following provisions:
a. Jensen Precast will provide driver services and a means of unloading products.

b. The customer will provide an acceptable location for unloading and storing products, and the means for setting the product in the permanent location.

Code #4 - F.O.B. - JENSEN PRECAST YARD:

Quoted prices include product loading on customer or common carrier trucks in the yard subject to the following provisions:
a. Customer will be responsible for any additional charges, including charges for freight, shipping, delivery and setting.
b. Customer or common carrier will be responsible for tie down, dunnage, pallets, etc., unless specifically referred to.
c. Yard location will be addressed in section one of the quotation.

Code #5 - OTHER AS SPECIFIED:

If not specified in section one of this quotation, please consult our office for more specific information or written clarification.

APPENDIX D – LS-4 Prepackaged Lift Station Alternatives

Flygt System

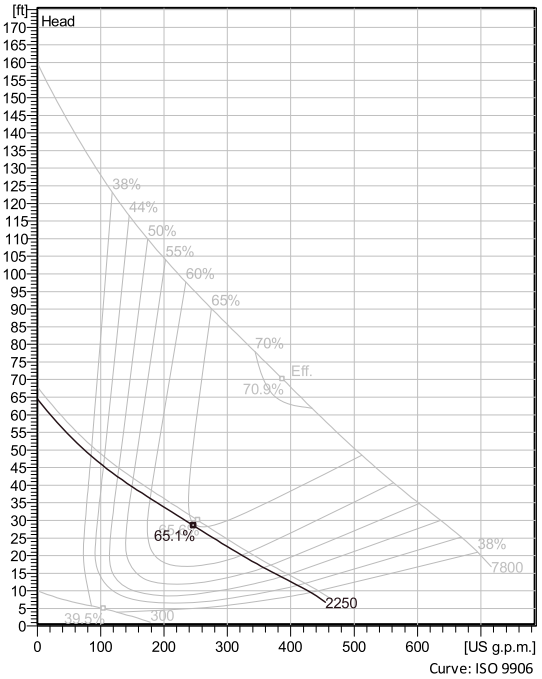
Concertor DP N80-2250

A process-controlled wastewater pumping system suitable for customers who utilize specially designed process control algorithms and want to benefit from lower capital costs, smaller control cabinets and higher pump system efficiencies. Concertor DP is also suitable as a reliable and energy efficient on/off controlled wastewater pumping system for customers who want to benefit from easily adjustable pump performance, soft start/soft stop, constant power and motor protection. This system is scalable to as many pumps as required by your application, with one gateway per pump.

Technical specification



Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N6020.091 18-08-1AZ-W 3hp

Installation type
P - Semi permanent, Wet

Impeller diameter
170 mm

Discharge diameter
3 inch

Pump information

Impeller diameter
170 mm

Discharge diameter
3 inch

Inlet diameter
110 mm

Maximum operating speed
800-2094.6 rpm

Number of blades
2

Max. fluid temperature
40 °C

Materials

Impeller
Hard-Iron ™

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-2250

Technical specification

Motor - General

Motor number N6020.091 18-08-1AZ-W 3hp	**Phases** 3~	**Rated speed** 800-2095 rpm	**Rated power** 3 hp
ATEX approved FM	**Insulation class** H	**Rated current** 3.6 A	**Type of Duty** S1
Frequency 60 Hz	**Rated voltage** 460 V	**Motor efficiency class** IE4 according to IEC/TS 60034-30-2 Ed. 1	

Motor - Technical

Power factor - 1/1 Load 0.95	**Motor efficiency - 1/1 Load** 90.0 %	**Nominal speed - 1/1 Load** 2300 rpm
Power factor - 3/4 Load 0.95	**Motor efficiency - 3/4 Load** 91.0 %	**Nominal speed - 3/4 Load** 2070 rpm
Power factor - 1/2 Load 0.95	**Motor efficiency - 1/2 Load** 91.0 %	**Nominal speed - 1/2 Load** 1840 rpm

Starting current
3.6 A

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-2250

Monitoring and Control equipment

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

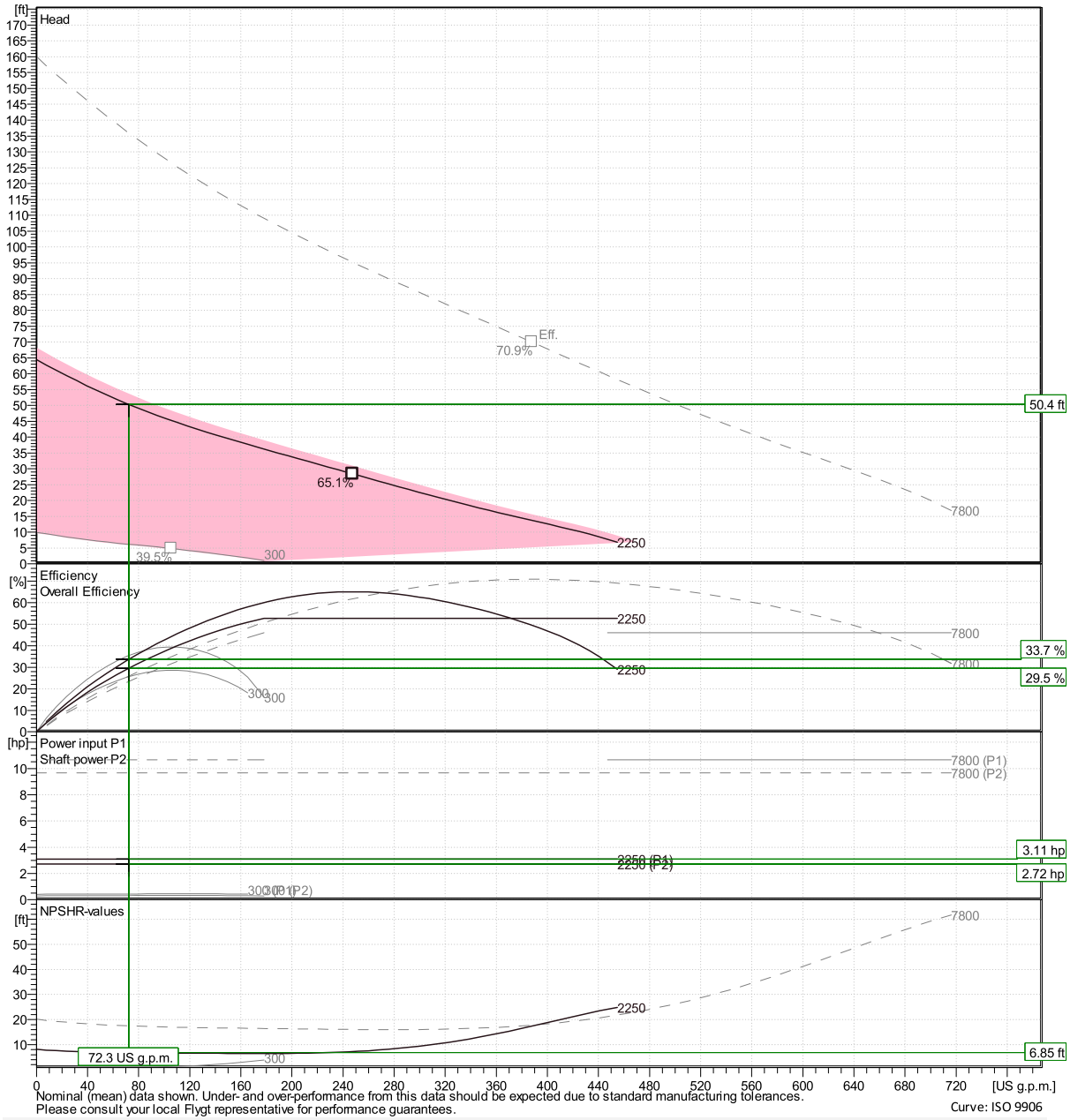
Concertor DP N80-2250

Performance curve

Duty point

Flow	Head
72.3 US g.p.m.	50.4 ft

Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

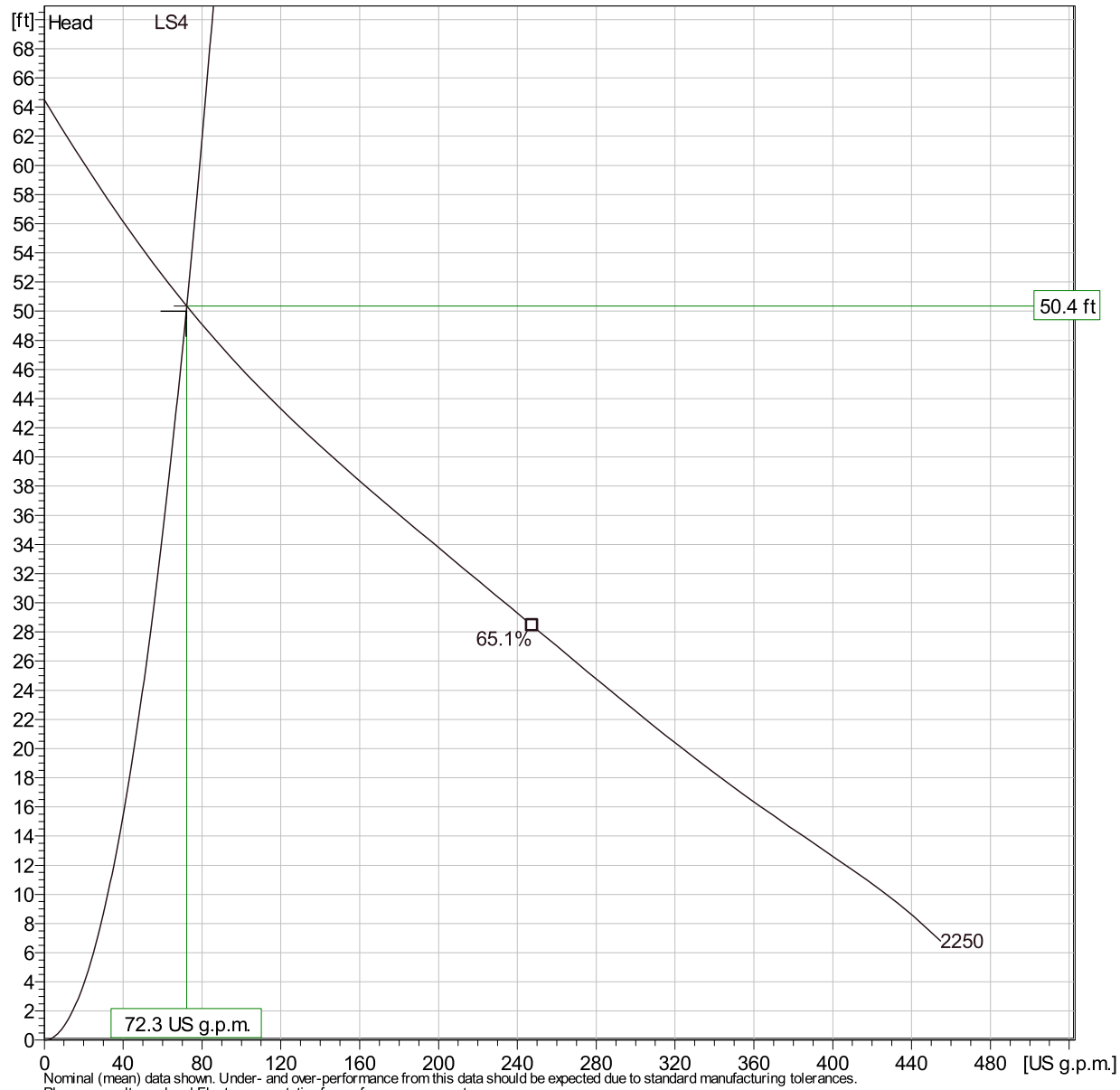
Curve: ISO 9906

Project	Xylect-22161321	**Created by**	Alan Dahlqvist	**Last update**	4/17/2024
Block		**Created on**	4/17/2024		

Concertor DP N80-2250

Duty Analysis

Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

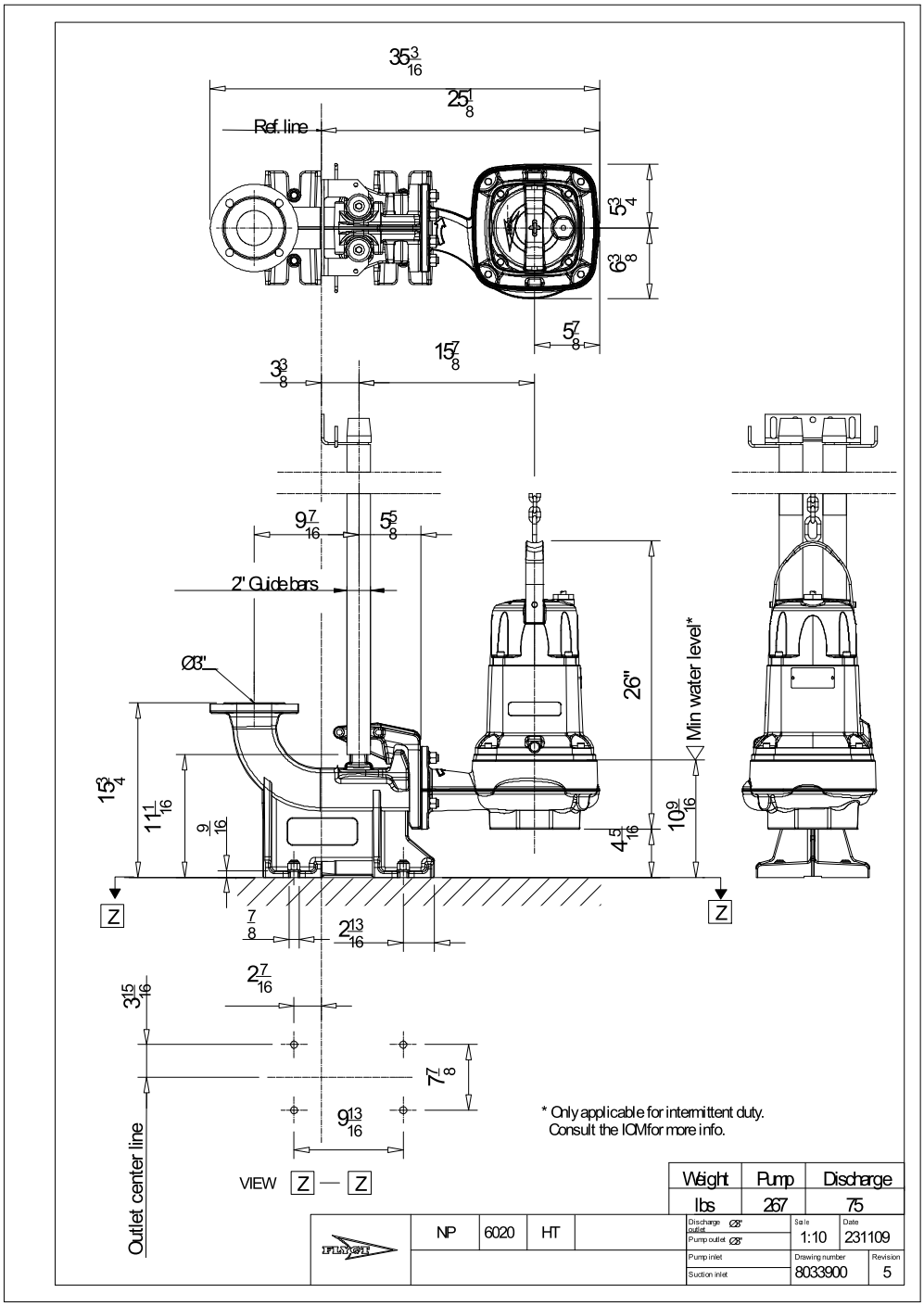
Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
LS4	72.3	50.4	2.72	72.3	50.4	2.72	33.7 %	534	6.85

Project		**Created by**	Alan Dahlqvist		
Block	Xylect-22161321	**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-2250

Dimensional drawing



Project	Xylect-22161321	**Created by**	Alan Dahlqvist
Block		**Created on**	4/17/2024 **Last update** 4/17/2024

FLYGT
a xylem brand



Flygt Concertor®

THE WORLD'S FIRST WASTEWATER PUMPING SYSTEM WITH INTEGRATED INTELLIGENCE

xylem
Let's Solve Water

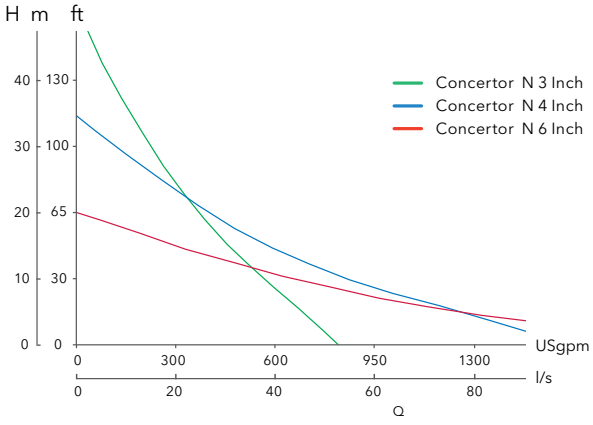
Flygt Concertor®
Intelligent Pumping System (iPS)

A new level of technology with unlimited possibilities

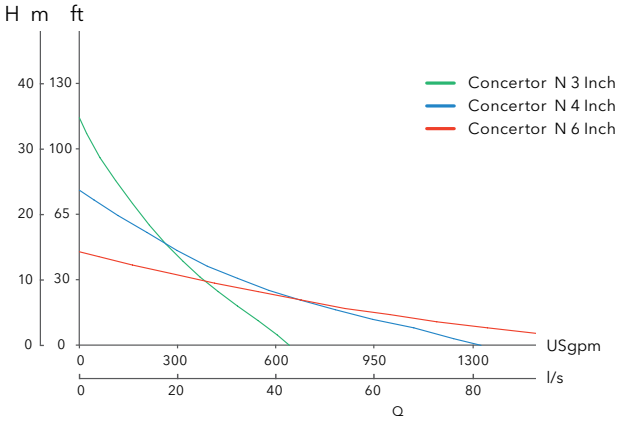
Xylem is proud to introduce the world's first wastewater pumping system with integrated intelligence. A real breakthrough innovation, Flygt Concertor® is capable of sensing the operating conditions of its environment, adapting its performance in real time and providing feedback to pumping station operators. With this new system, Xylem is now bringing smart and interconnected solutions to the world of wastewater pumping.

A new way of thinking
Concertor combines a fully integrated control system with our patented Adaptive N-hydraulics and intelligent functionality. The control system automatically adapts to the changing pumping environment, growing with your needs and delivering the optimal level of performance at the lowest cost of ownership. The built-in intelligence also makes it easier to set up and operate, as well as allowing for a significantly smaller footprint.

10HP / 380-480V / 3 phase



5.5HP / 200-240V / 3 phase



Trouble-free Pumping SAFER SYSTEM

NEW PANEL
FLYGT CONCERTOR iPS





INTELLIGENT CONTROL PANEL



SYSTEM THAT CAN BE LOCALLY ADJUSTED

INTELLIGENT CONTROL PANEL
RETROFIT KIT (INC. PRE-ENGINEERING)



* Retrofit kit includes MultiSmart controller, DP gateways, surge protector, modem kit with antenna, power supply and battery

- Clog free guarantee 24 months
- Improved operator safety – built in pump cleaning function
- Easily retrofitted into existing systems
- No more nuisance service calls due to clogging
- End to manual station cleaning – integrated sump and pipe cleaning
- Reduced odor and grease build-up
- Easy installation – impossible to wire the pump backwards
- Quick start-up – pre-engineered solution with simple set-up wizard
- Includes intelligent pump station manager
- Adjustable flow rate – automatically adjusts to optimal speed
- No VFD trips on hot days / no need for HVAC or cleaning fan filters
- Don't have time to check your stations in person? Flygt Cloud ready for remote monitoring and diagnostics
- Quick ROI – energy savings average 46% for installed systems
- Extended system warranty - 7 years

Basic Retrofit



CONCERTOR DP RETROFIT

** Basic retrofit kit includes DP gateway, surge protector and HMI

FB273 • Flygt Concertor Sales • 5/2018 • NACT

- Clog free guarantee 12 months
- Improved operator safety – built in pump cleaning function
- No more nuisance service calls due to clogging
- Easy installation – impossible to wire the pump backwards
- Quick start-up – pre-engineered solution with simple set-up wizard
- No VFD trips on hot days / no need for HVAC or cleaning fan filters
- Adjustable flow rate – remotely or on site
- Compatible with 3rd party controllers – accepts 4-20mA signal
- Quick ROI – energy savings at least 25%
- System warranty - 5 years

ONE PUMP TAKES CARE OF IT ALL

SIMPLE - Eliminates complex installation, programming and operation.

SMART - Cleans the station, auto-reverses upon blockage, and automatically runs at reduced speed as required.

SAFE - Keeps operators safe. Station cleaning and clogged pumps at 2:00 am just became obsolete.

SAVINGS - Provides true value. Taking energy, maintenance, & operations savings to a whole new level never seen before.

One powerful solution. Unlimited possibilities.

xylem
Let's Solve Water

Xylem, Inc.
14125 South Bridge Circle
Charlotte, NC 28273
Tel 704.409.9700
Fax 704.295.9080
855-XYL-H2O1 (855-995-4261)

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services, and agricultural settings. With its October 2016 acquisition of Sensus, Xylem added smart metering, network technologies and advanced data analytics for water, gas and electric utilities to its portfolio of solutions. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to **www.flygt.com**

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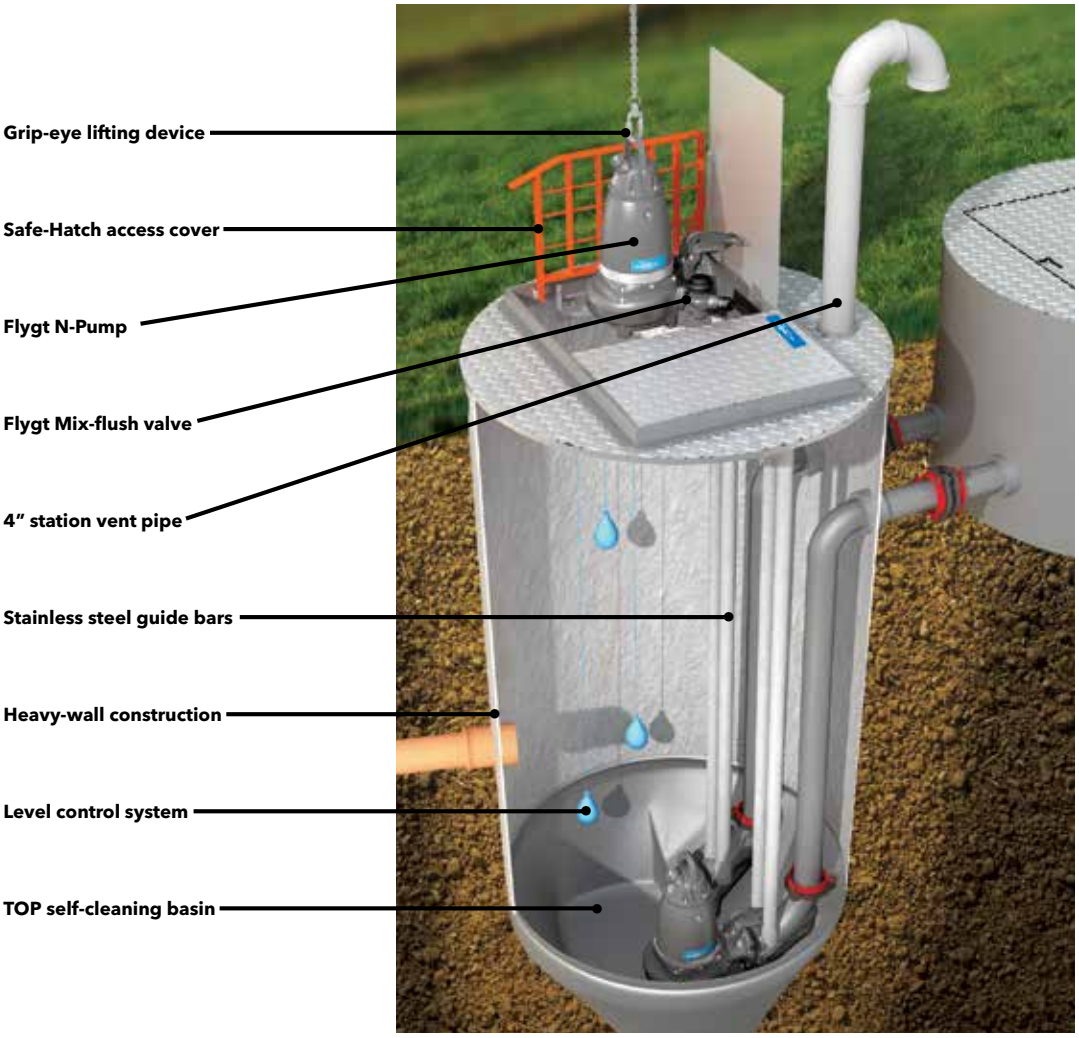
TOP Pre-Engineered Fiberglass Pump Station

THE OPTIMUM PUMP STATION

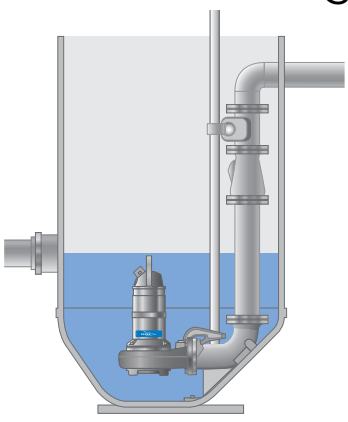
FLYGT

a xylem brand

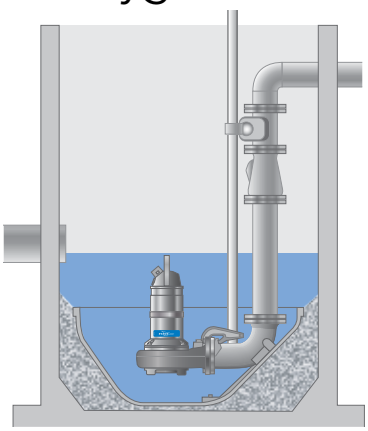
Flygt TOP Pre-Engineered Pump Station



The self-cleaning team: Flygt TOP Sump and N-Pump



TURNKEY PUMP STATIONS
Install a prepackaged pump station with Flygt TOP self cleaning design in corrosion resistant fiberglass construction.



RETROFIT EXISTING SUMPS
Install the prefabricated Flygt TOP sump floor and fill the gap between the old floor and the new with concrete. Wait a few hours until dry, then put your pump station back online. No additional excavation is required.



N IMPELLER & WEAR PLATE
N-Impeller with back swept vanes and guide pin with relief groove provide sustained efficiency while pumping modern trash such as flushable wipes.

Continuously removes suspended solids

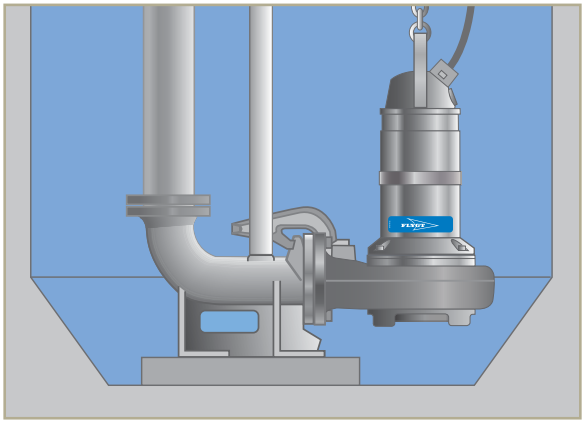
The Flygt TOP station delivers outstanding self-cleaning performance both in laboratory tests and under real-life operating conditions.

Flygt conducted a laboratory test comparing the Flygt TOP sump to a traditional sump. The test sumps were each filled with 105 US gallons (400 liters) of water and 108 lbs. (49 kg) of sand. The water was pumped back and forth 10 times from one sump to the other.

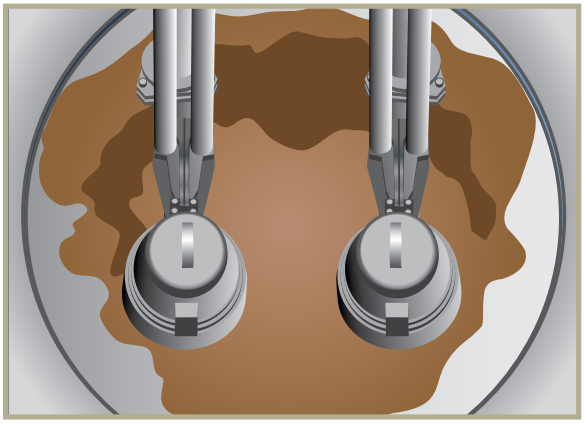
At the end of the test 207 lbs. (94 kg) of solids accumulated in the conventional sump, while only 9 lbs. (4 kg) of solids remained in the TOP sump.

These lab test results are replicated on a daily basis in thousands of Flygt TOP stations operating around the world. The results are definitive: Flygt TOP stations with self cleaning hopper shaped bottom reduce settled solids in turn reducing maintenance and downtime.

Conventional pump sump

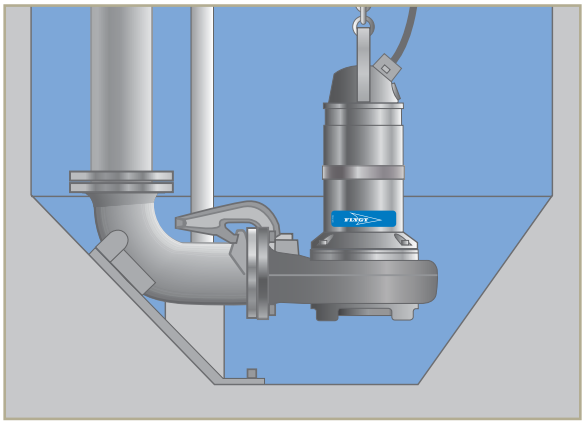


Conventional large flat sump floor encourages buildup of sludge and solids.

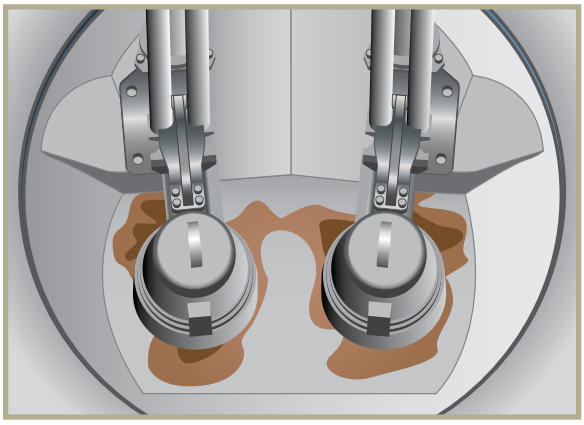


The further away the sumps walls are from the pumps, the greater the sedimentation.

Flygt TOP sump



Minimal floor area and optimized geometries ensure high velocity, which efficiently suspends settled solids in wastewater.

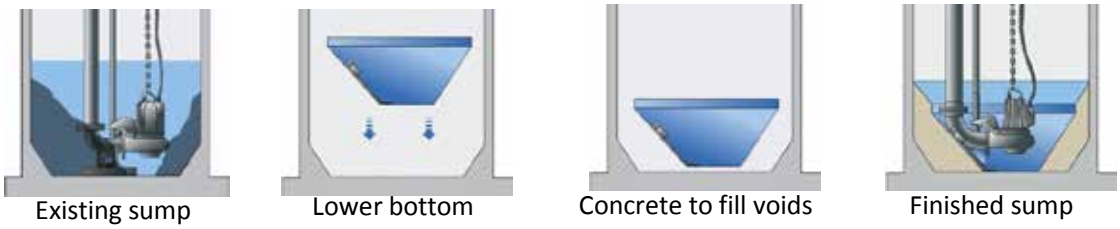


Optimized geometry draws any solids remaining in the sump closer to the pumps, where pump suction is the strongest. This eliminates the risk of solids buildup.

Retrofits easier and turnkey solutions possible

Top Stations are available as turnkey fully assembled pump stations, with rails, valves, and all discharge piping fully assembled. The other option is to retrofit the exsiting station with a TOP self-cleaning bottom. Just lower the insert into the station, fill the gap between the old floor and the new with concrete.

Retrofit Solution install process



TOP Sizes	TOP 4	TOP 5	TOP 6	TOP 100 Retrofit Liner	TOP 150 Retrofit Liner
Station Diameter	4 ft.	5 ft.	6 ft.	4 ft.	5 ft.
Discharge Sizes	2, 3, 4"		2, 3, 4, 6"	2, 3, 4, 6"	
Pipe Material	316 Stainless Steel /PVC			Determined by Engineer	

Depths up to 25 ft. standard. Designs over 25 ft. possible please consult factory

FB012 • Flygt TOP Pre-engineered Fiberglass Pump Station Brochure • 1/2017 • NACT

xylem
Let's Solve Water

Flygt is a brand of Xylem, whose 12,000 employees are addressing the most complex issues in the global water market.

www.xyleminc.com

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www.xyleminc.com

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Focardi, Dana

From: Dahlqvist, Alan - Xylem <Alan.Dahlqvist@xylem.com>
Sent: Friday, May 31, 2024 3:18 PM
To: Requieron, Wynneth
Subject: RE: EXTERNAL: RE: Inquiry on Pre-packaged Lift Stations for Quail Valley
Attachments: LS5 NP3085MT463 2.2HP.pdf; LS2 NP3085SH256 4HP.pdf; LS3 NP3069SH275 2.7HP.pdf; LS4 NP3085SH255 4HP.pdf

Hi Wynneth
Here are some conservative budgetary prices for the equipment with standard pumps

List station
4'Dia x22'Deep FRP wet well 3" SS discharge piping NO Valve vault (no valves supplied) - $46,400

2- LS5 pumps with installation accessories - $19,600
2- LS4 pumps with installation accessories - $23,000
2- LS3 pumps with installation accessories - $13,800
2- LS2 pumps with installation accessories - $23,000

Not applicable. Using Concertor Pumps.

Control Panel for this size pump $20-30k for a typical design with NEMA3R SS enclosure, depending on components required, VFD's etc

Please let me know if you have any questions

Best regards
Alan

Alan Dahlqvist
Flygt – Pumps, Repairs, Controls
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Engineered Projects
Cell: 951-553-1493
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Mira Loma, CA 91752
www.flygtus.com/

O: 951.332.3668 F: 951.332.3679

Focardi, Dana

From: Dahlqvist, Alan - Xylem <Alan.Dahlqvist@xylem.com>
Sent: Monday, May 6, 2024 9:53 AM
To: Requieron, Wynneth
Subject: RE: EXTERNAL: RE: Inquiry on Pre-packaged Lift Stations for Quail Valley

Hi Wynneth
Here are some conservative budgetary prices for the equipment

Not applicable. Using 4' Dia.

List station
6'Dia x22'Deep FRP wet well 3" SS discharge piping with 6' Dia x 6' deep Valve vault - $90,000

2- Concertor pumps with installation accessories - $26,000

Control Panel for this size pump $30k for a typical design with NEMA3R SS enclosure

Please let me know if you have any questions

Best regards
Alan

Alan Dahlqvist
Flygt – Pumps, Repairs, Controls
San Diego, Riverside, San Bernardino, Imperial and Orange County
Engineered Projects
Cell: 951-553-1493
Alan.Dahlqvist@xylem.com

Direct Sales Representative
11161 Harrel Street, Suite B
Mira Loma, CA 91752
www.flygtus.com/

O: 951.332.3668 F: 951.332.3679

APPENDIX E – LS-5 Prepackaged Lift Station Alternatives

APPENDIX E – LS-5 Prepackaged Lift Station Alternatives

Sierra Peak System

H - Height Options

☐60"	☐108"	☐156"	☐204"
☐66"	☐114"	☐162"	☐210"
☐72"	☐120"	☐168"	☐216"
☐78"	☐126"	☐174"	☐222"
☐84"	☐132"	☐180"	☐228"
☐90"	☐138"	☐186"	☐234"
☐96"	☐144"	☐192"	☐240"
☐102"	☐150"	☐198"	☒288"

D - Diameter Options

☐36"	☒48"	☐72"
☐42"	☐60"	☐96"

COD - Cover Over Discharge Options

- ☒ 24" (min. 60" basin)
- ☐ 30" (min. 66" basin)
- ☐ 36" (min. 72" basin)
- ☐ 42" (min. 78" basin)
- ☐ 48" (min. 84" basin)
- ☐ 54" (min. 90" basin)
- ☐ 60" (min. 96" basin)
- ☐ 66" (min. 102" basin)
- ☐ 72" (min. 108" basin)
- ☐ 78" (min. 114" basin)
- ☐ 84" (min. 120" basin)
- ☐ 90" (min. 126" basin)
- ☐ 96" (min. 132" basin)
- ☐ 102" (min. 138" basin)
- ☐ 108" (min. 144" basin)

Inlet Grommet Options

☐4" SCH40 Grommet (Standard, unless noted otherwise) ☐4" SDR35 Grommet
☐8" DWV Cast Iron Hub ☐6" SCH40 Grommet
☐8" SDR35 Cast Iron Hub ☐6" SDR35 Grommet

Float Options

Number of Floats:
☐3 ☒4 ☐5

Mounting:
☐Float Tree ☒Float Bracket

Cover Options

- ☐ Solid Fiberglass
- ☒ Aluminum Single Leaf Hatch
- ☐ Aluminum Double Leaf Hatch

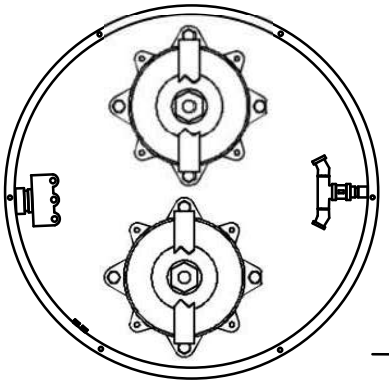
*Covers are rated for Pedestrian Traffic only

Pump Details

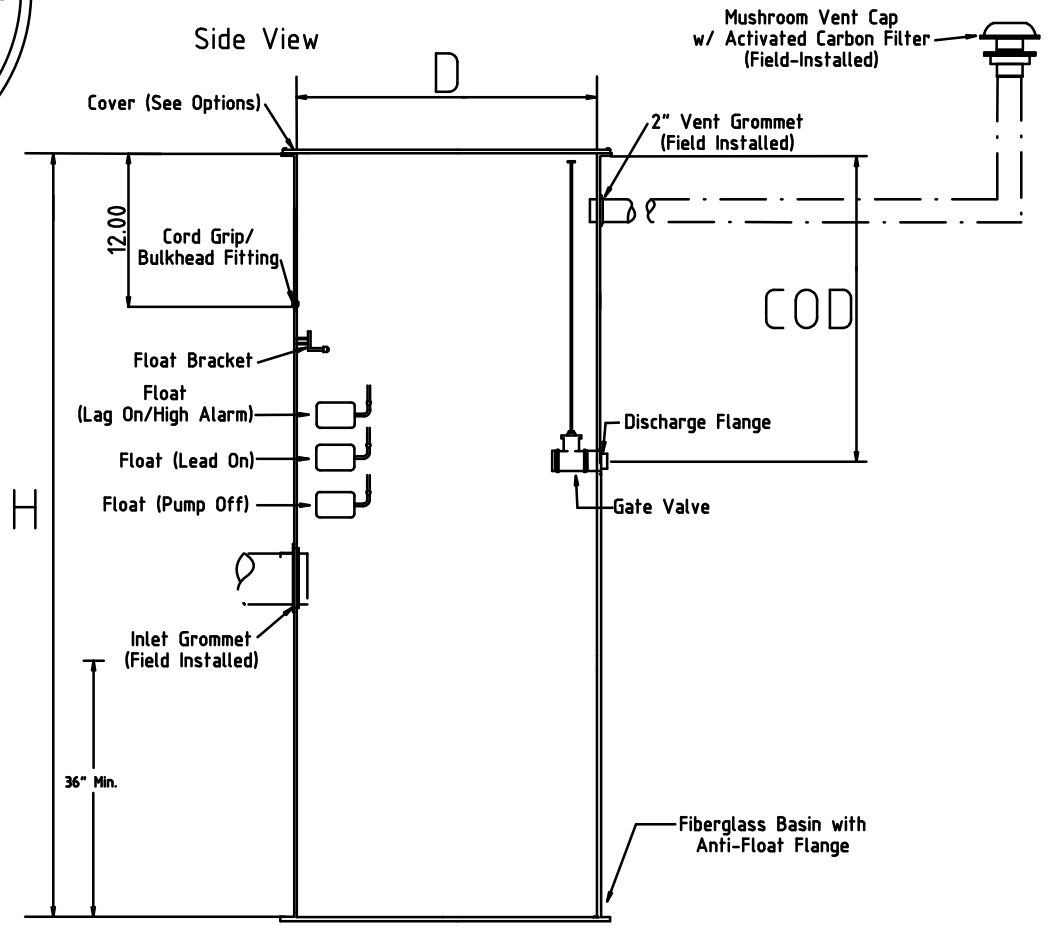
Model:
☒Rail/Liftout ☐Flex Hose/Stand

Discharge Coupling:
☐1-1/4" ☐1-1/5" ☒2"

Top View



Side View



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1615 Monrovia Ave
Costa Mesa, CA 92627

Duplex Basin Options

Consult Rep

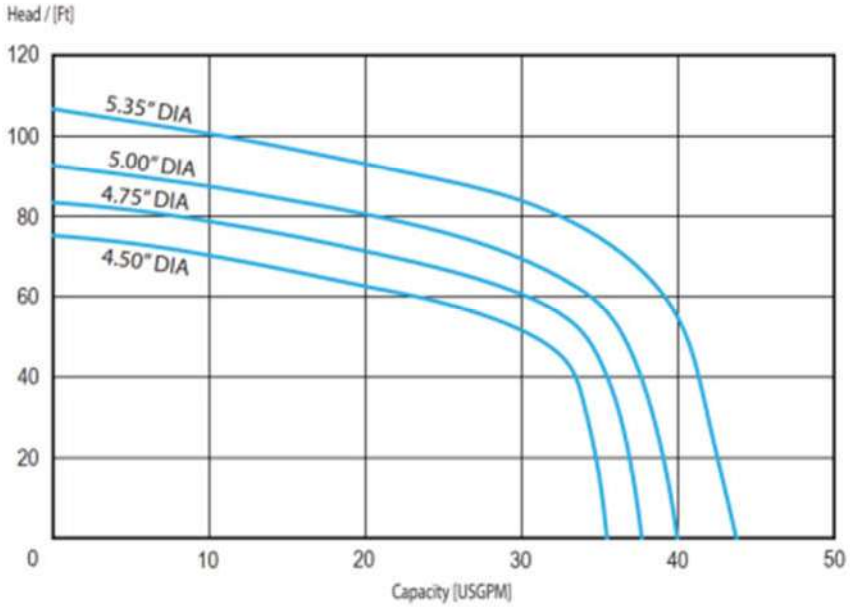
Part No.		
LB230012	1 of 1	1
Drawing No.	Sheet	Rev

Model SP2A23-SL

Sierra Peak Pump Systems

Operational Information-Centrifugal Grinder

Performance Curve



Motor Data	
HP/Power Supply	2 HP, 60 Hz
Full Load Amps	15.5 amps (208V, 1Φ) 14.5 amps (240V, 1Φ) 10 amps (208V, 3Φ) 9 amps (240V, 3Φ) 4.5 amps (460V, 3Φ)
Rated Speed	3450 RPM
Insulation Class	F Class
Start Capacitor	Option for Internal or External
Cooling	Oil-Filled
Mechanical Seal	Dual Silicon Carbide
Grinding Mechanism	Axial Slicer or Radial Grinder Available
Discharge	1-1/4” FPT

Pump Features

Available in FM Div. 1, Class 1 Rating

Double Barrier Moisture Protection at Cord Entry

High-Tensile Iron Pump Construction

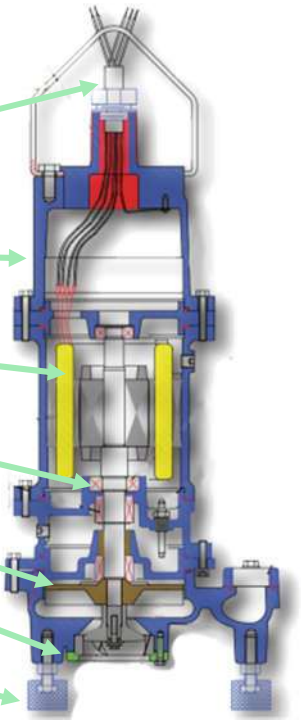
3-Bearing Support

Dual Silicon Carbide Mechanical Seal

Recessed Centrifugal Impeller

Stainless Steel Hardened Slicer Assembly (Heat Treated and Precision Ground)

Anti-Vibration Mounting Feet



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Quotation

Main/Billing Office
1615 Monrovia Ave.
Costa Mesa, CA 92627
Phone # 949-548-1125
Fax # 949-257-0587

Northern CA Branch
29441 Kohoutek Way
Union City, CA 94587

Arizona Branch
2604 W. 1st Street., Ste. 46
Tempe, AZ 85281

Date	Estimate #
05/13/24	**Q240383-1**

Quotes are valid for 30 days from date listed above.

Project
EMWD Quail Valley

Name / Address
Michael Baker International - Temecula
40810 County Center Drive, Suite 200
Temecula, CA 92591

Delivery Address
Michael Baker International - Temecula
Need Shipping Address
Quail Valley, CA

FOB	Terms	Warehouse/Shop	Rep	Contact	Phone
Origin	Prepaid	Costa Mesa Branch	Natalia S Tortorello	Wynneth Requieron	951-506-2053

Description	Qty	Unit Price	Total
2 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 31,887.88	$ 0.00
3 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 41,080.68	$ 0.00
5 HP Basin Duplex Grinder Pump Package:	0.00 ea	$ 45,335.88	$ 0.00
2 HP Basin Triplex Grinder Pump Package:	0.00 ea	$ 45,165.96	$ 0.00
		Subtotal	$ 0.00
		Sales Tax	$ 0.00
		Total	$ 0.00

Budgetary Estimate for Design Options

All basins are 48" Diameter x 22' Height.

APPENDIX E – LS-5 Prepackaged Lift Station Alternatives

Jensen System

Technical Information

GRP12/1FM

HOMA PUMPEN MIT SYSTEM

Operating data

Flow	35 US g.p.m.
Head	19 ft
Shaft power P2	1.15 hp
Pump efficiency	18.9 %
Required pump NPSH	
Pump type	Single pump
No. of pumps	1
Fluid	Wastewater

Pump

Pump Code	GRP12/1FM
Impeller	Vane impeller with cutter sys.
Impeller size	$4^{7}/_{16}$"
Solid size	
Discharge port	1 ¼" - 11 ½ NPT
Suction port	

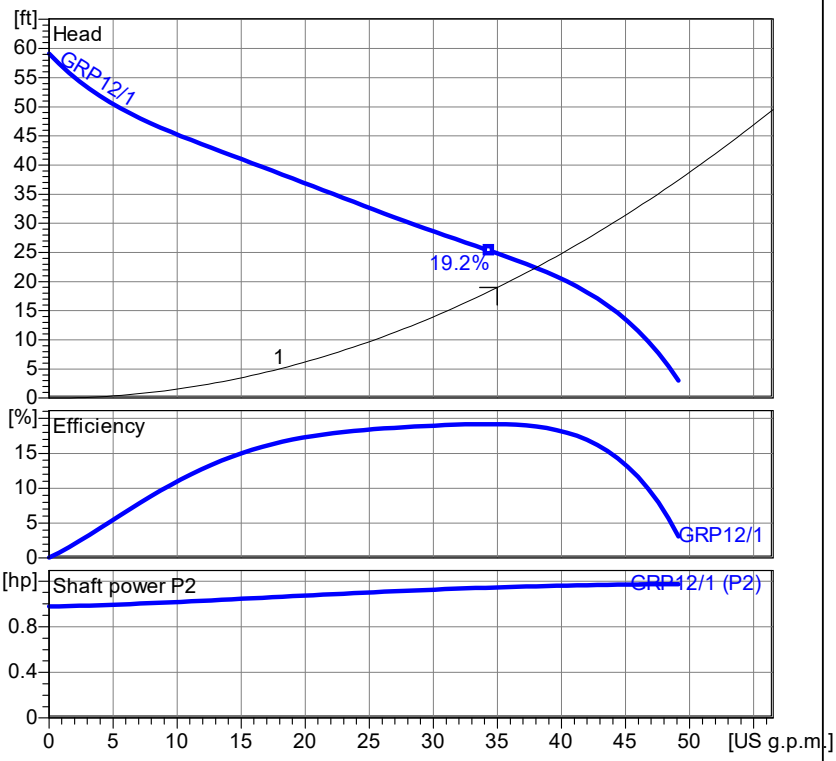
Motor

Rated voltage	230 V
Frequency	60 Hz
Rated power P2	1.2 hp
Rated speed	3450 rpm
Number of poles	2
Efficiency	74 %
Rated current	5.2 A
Degree of protection	IP 68

Materials

Motor housing	Cast Iron ASTM A48;Cl.40B
Pump housing	Cast Iron ASTM A48;Cl.40B
Motor bearing cover	Cast Iron ASTM A48;Cl.40B
Impeller	Cast Iron ASTM A48;Cl.40B
Cutting system	Hardened Stainless Stell HRC55
Motor shaft	AISI 430 F Stainless Steel
Bolts	AISI 304 Stainless Steel
O-Rings	Nitrile Rubber
Mechanical seal on medium side	SiC / SiC
Shaft seal (motor side)	Nitrile Rubber
Lower Bearing	Double row angular ball bearing
Upper Bearing	Deep Groove Ball Bearing

Testnorm: **HI Standard Sect. 11.6.5.4**



Wet well installation with coupling kit
Dimensions in mm [inch], letters see table

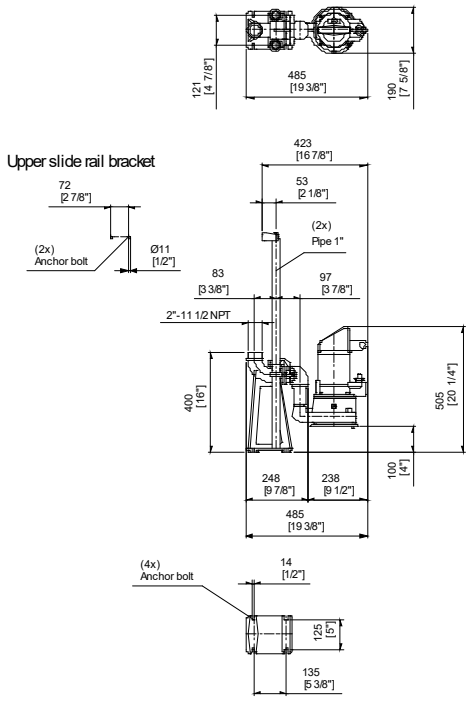


Table Dimensions (inch)

Project	Project no.:	Created by:	Page:	Date:
			1	4/26/2024

Performance Curve

GRP12/1FM

HOMA PUMPEN MIT SYSTEM

Impeller

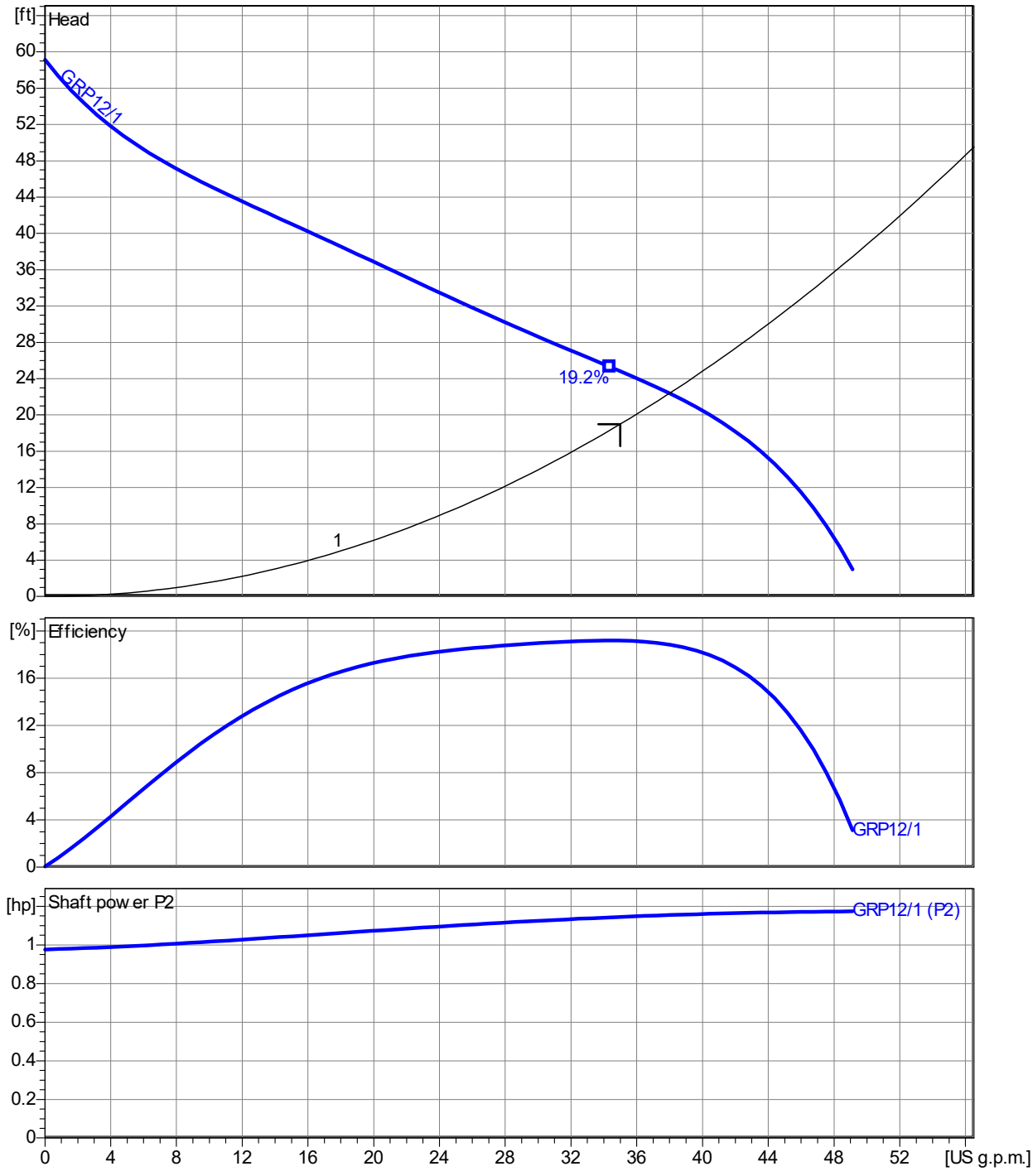
Impeller type:	Solid size Ø:	Max. Ø:	Min. Ø:	Sel. Ø:	
Vane impeller with cutter sys.		$5^{9}/_{16}$"	$4^{7}/_{16}$"	$4^{7}/_{16}$"	

Operating data

Speed:	Frequency:	Duty point:	Shaft power P2:	Discharge port:
3450 rpm	**60 Hz**	**Q =35 US g.p.m. H =19 ft**	**1.15 hp**	**1 ¼" - 11 ½ NPT**

Power data referred to:
Water, clean [100%] ; 68°F; 62.322lb/ft³; 1.0818E-5ft²/s

Testnorm: **HI Standard Sect. 11.6.5.4**



2.0.1 - 18.03.2024 (Build 147)

Project	Project no.:	Created by:	Page:	Date:
			2	**4/26/2024**

Dimensions

GRP12/1FM

Wet well installation with coupling kit
Dimensions in mm [inch], letters see table

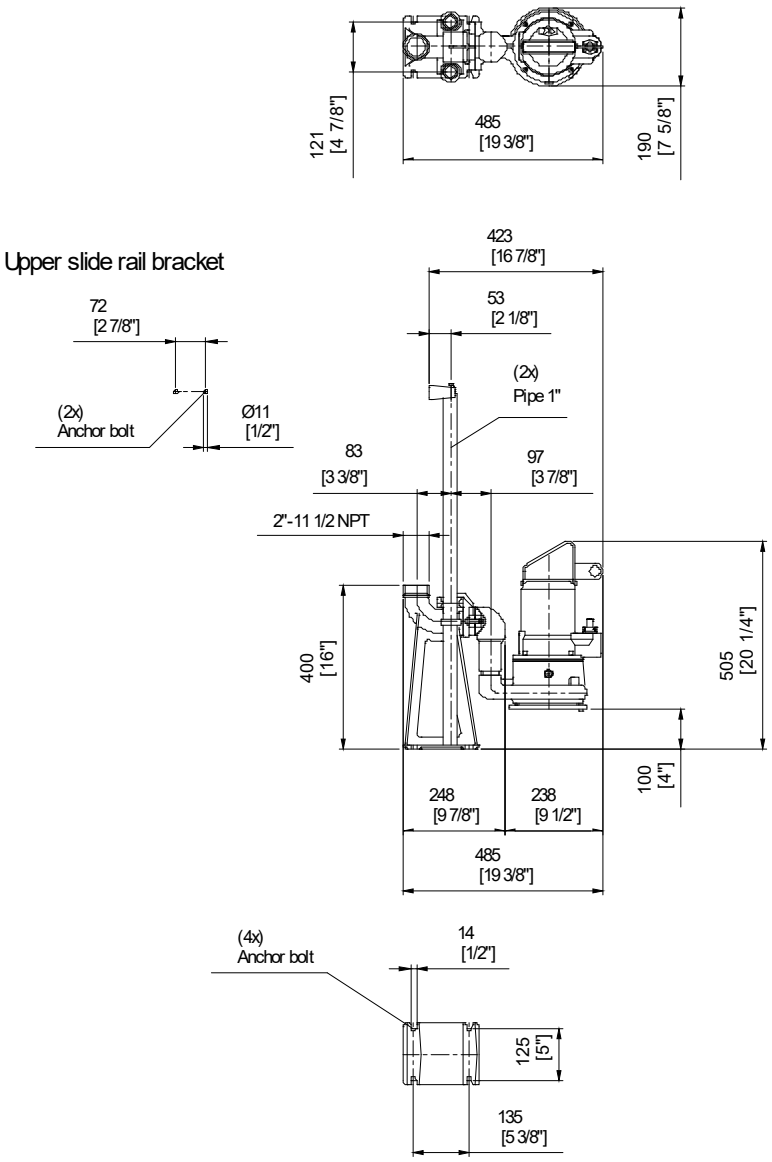


Table Dimensions (inch)

Project	Project no.:	Created by:	Page: 3	Date: 4/26/2024

Technical Data

GRP12/1FM

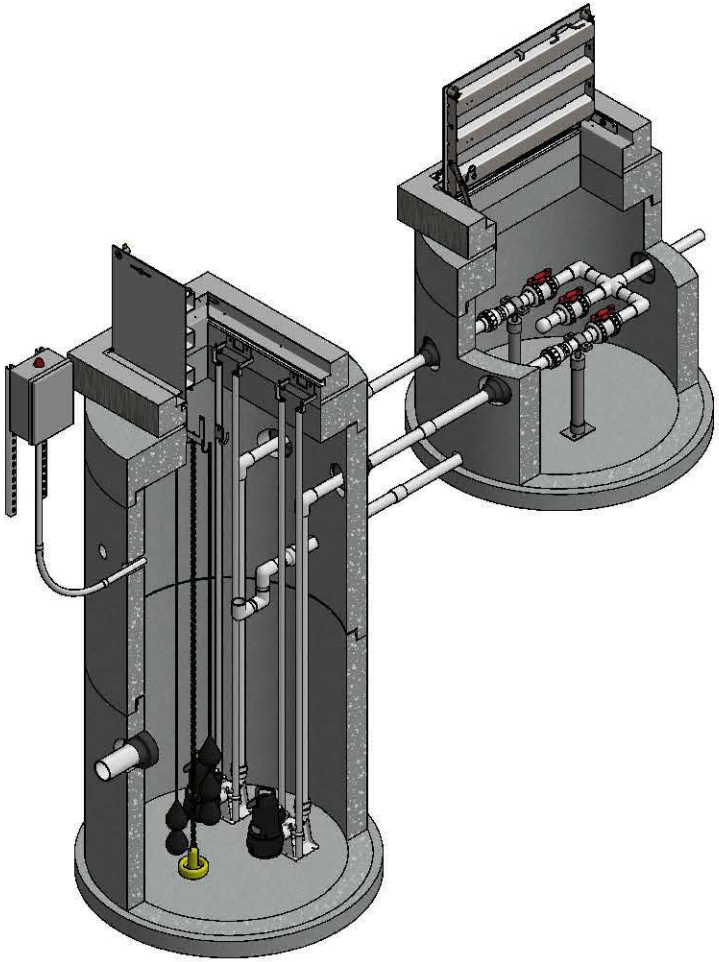
Operating data					
Flow	**35 US g.p.mUS g.p.m.**		**Head**	**19 ft**	**ft**
Shaft power P2	**1.2**	**hp**	**Static head**	**0**	**ft**
Pump efficiency	**18.9**	**%**	**Required pump NPSH**		**ft**
Pump type	Single pump		No. of pumps	1	
Fluid	Wastewater		Temperature	68	°F
Density	62.31	lb/ft³	Kin. viscosity	1.077E-5	ft²/s

Pump					
Pump Code	GRP12/1FM		Speed	3450	rpm
Suction port			Head Max.	59.1	ft
Discharge port	1 ¼" - 11 ½ NPT		Head Min.	3.0	ft
Impeller type	Vane impeller with cutter sys.		Flow Max.	49.1	US g.p.m.
Solid size		inch	Pump efficiency max.	19.2	%
Impeller Ø	4.41	inch	Required rated power max. P2	1.2	hp

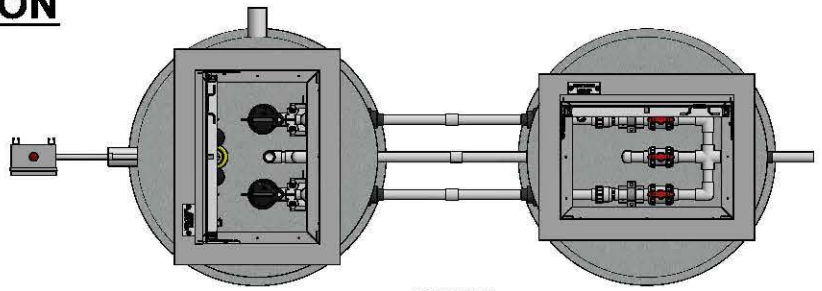
Motor					
Motor design	Submersible motor		Insulation class	H	
Motor name	AM120TM.1,6/2/1		Degree of protection	IP 68	
Frequency	60	Hz	Temperature class	T4	
Rated power P2	1.2	hp	NEMA code	F	
			Explosion protection	Class I, Div. 1, Grp. C&D	
Rated speed	3450	rpm	Efficiency at % rated power 100%	74.0	%
Rated voltage	230 V | 1~		Efficiency at % rated power 75%		%
Rated current	5.2	A	Efficiency at % rated power 50%		%
Starting current, direct starting	28.1	A	cos phi at % rated power 100%	0.97	
Starting current, star-delta	9.	A	cos phi at % rated power 75%		
Starting mode	Directly		cos phi at % rated power 50%		
Power cable	7X1,5 / 6G1,5		Control cable		
Type of power cable	NSSHÖU-J / H07RN8-F PLUS		Type of control cable		
Cable length	32.8 ft		Service factor	1.15	
Shaft seal	Mechanical seal on medium side		SiC / SiC		
	Shaft seal (motor side)		Nitrile Rubber		
Bearing	Lower Bearing		Double row angular ball bearing		
	Upper Bearing		Deep Groove Ball Bearing		
Remarks	Start-/ Runcapacitor: 50µF / 25µF				

Materials / Weight			
Motor housing	Cast Iron ASTM A48;Cl.40B	Motor shaft	AISI 430 F Stainless Steel
Pump housing	Cast Iron ASTM A48;Cl.40B	Bolts	AISI 304 Stainless Steel
Motor bearing cover	Cast Iron ASTM A48;Cl.40B	O-Rings	Nitrile Rubber
Impeller	Cast Iron ASTM A48;Cl.40B		
Cutting system	Hardened Stainless Stell HRC55		
Weight aggregate	55.115 lb		

248-DV SERIES STANDARD
DUPLEX PUMP STATION



TOP LEFT ISOMETRIC VIEW w/ SECTION
NOT TO SCALE



PLAN VIEW
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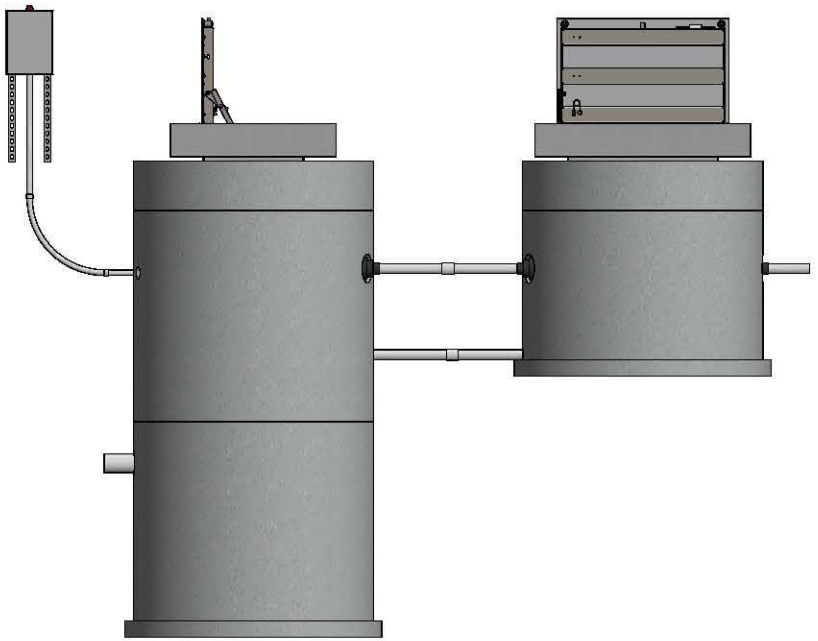

PROFILE VIEW
NOT TO SCALE

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2.) These layout drawings are intended to show overall system design only. All concrete component thicknesses, dimensions, and joint orientations may vary across Jensen Precast's manufacturing facilities. Contractor to confirm all thicknesses, dimensions, and joint orientations prior to installation.
3.) System design criteria has been provided to Jensen Precast. Others are responsible for verification that system meets intended application.
4.) Foundation, subgrade, and backfill to be designed by others.

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521 DUNN CIRCLE, SPARKS, NV 89431
www.jensenwaterresources.com
(855) 468-6500

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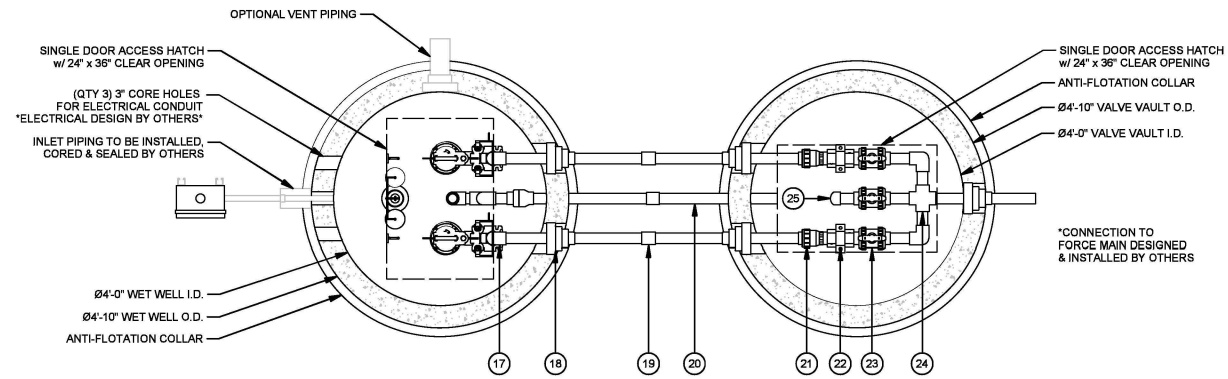
DESCRIPTION: Quail Valley - LS5

PART NUMBER:	248-DV Series Standard	DRAWN BY:	T. Tidball
CREATED:		MODIFIED:	1/26/21

REV:

SHEET: 1 OF 2

248-DV Series Standard.dwg



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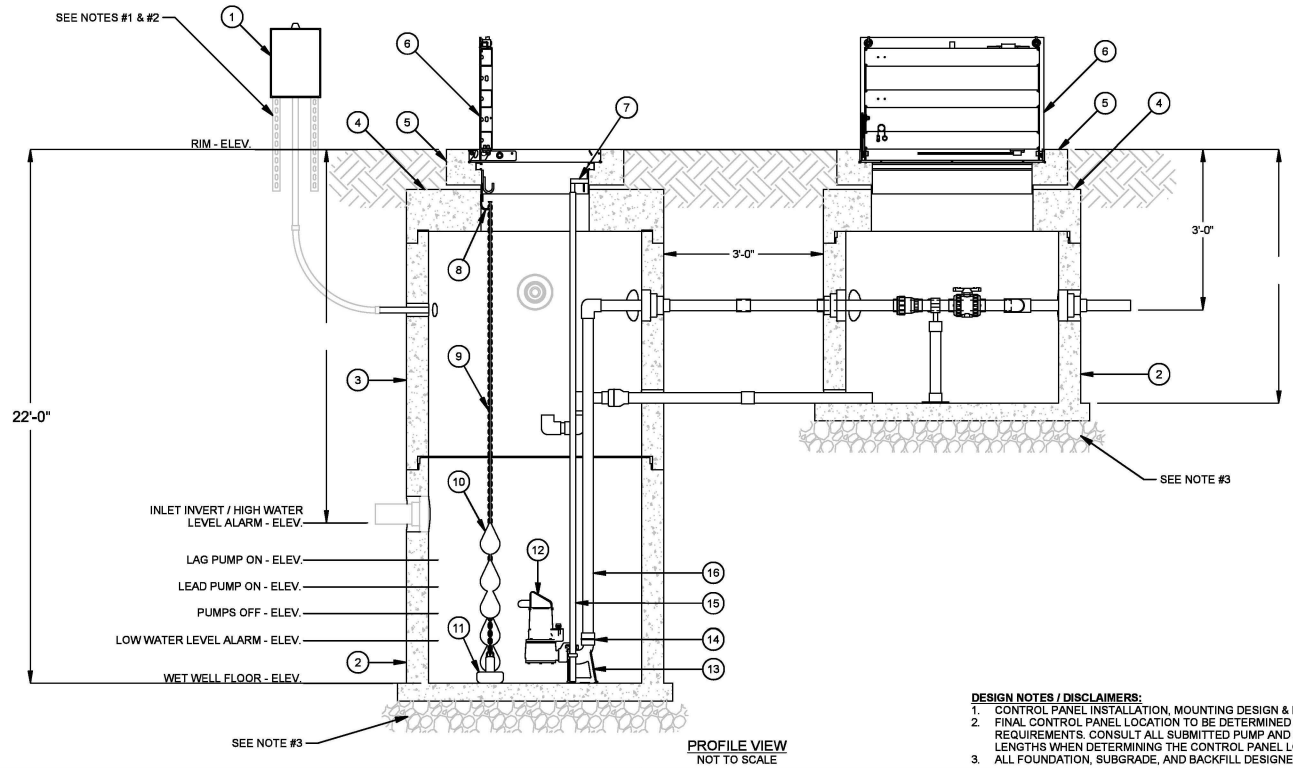

PROFILE VIEW
NOT TO SCALE

DESIGN NOTES / DISCLAIMERS:

1. CONTROL PANEL INSTALLATION, MOUNTING DESIGN & HARDWARE BY OTHERS.
2. FINAL CONTROL PANEL LOCATION TO BE DETERMINED ACCORDING TO PROJECT REQUIREMENTS. CONSULT ALL SUBMITTED PUMP AND LEVEL CONTROL CABLE LENGTHS WHEN DETERMINING THE CONTROL PANEL LOCATION.
3. ALL FOUNDATION, SUBGRADE, AND BACKFILL DESIGNED BY OTHERS.

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION
1	1	DUPLEX ALTERNATING CONTROL PANEL
2	2	48IN DIA JENSEN PRECAST CONCRETE MANHOLE BASE *HEIGHT VARIES*
3	1	48IN DIA JENSEN PRECAST CONCRETE MANHOLE BARREL *HEIGHT VARIES *
4	2	48IN DIA JENSEN PRECAST CONCRETE MANHOLE FLAT TOP
5	2	JENSEN PRECAST CONCRETE HATCH RISER
6	2	SINGLE DOOR HATCH WITH A CLEAR OPENING OF 24IN X 36IN
7	2	UPPER GUIDE RAIL BRACKET 2IN
8	1	FLOAT BRACKET 3 HOOK TYPE 316SS
9	10 LF	LF CHAIN 1/4IN 316SS
10	5	FLOAT SWITCH w/ 100' CABLE
11	1	ANCHOR 15LB PVC COATED
12	2	2IN SUBMERSIBLE PUMP
13	2	AUTOCOUPLING ASSY 2IN STD
14	2	ADAPTER 2IN FML THRD X SLIP SCH 80 PVC
15	40 LF	LF PIPE 1IN SCH40 GUIDE RAIL 304SS
16	40 LF	LF PIPE PVC SCH 80 2IN DIA
17	4	90 DEG ELBOW 2IN SCH 80 PVC SLIP
18	5	FLEXIBLE PIPE CONNECTORS
19	2	FITTING PVC SCH 80 2IN DIA COUPLING SLIP
20	1	2IN DIA PVC SCH40 VAULT DRAIN w/ CHECK VALVE, TRAP & FITTINGS
21	2	BALL CHECK VALVE 2IN SCH 80 PVC SLIP
22	2	PIPE SUPPORTS
23	3	BALL VALVE 2IN SCH 80 PVC SLIP
24	1	CROSS 2IN SCH 80 PVC SLIP
25	1	CAP 2IN SCH 80 PVC SLIP

PROJECT SPECIFIC INFORMATION

FINISHED GRADE (Ft.)	
RIM ELEV. (Ft.)	
INLET ELEV. (Ft.)	
FORCE MAIN DISCHARGE ELEV. (Ft.)	
AVAILABLE POWER SUPPLY	120V ☐ 240V ☑ 480V ☐
AVAILABLE POWER PHASE	Single ☑ Three ☐

SYSTEM CHARACTERISTICS

APPLICATION	SEWAGE ☑ STORM WATER ☐
DESIGN FLOW (gpm)	35
TOTAL DYNAMIC HEAD (Ft.)	19
STATIC HEAD (Ft.)	
PUMP MAKE & MODEL	HOMA GRP12/1 FM
PUMP MOTOR (Std / XP)	Standard ☐ XP/FM ☑
PUMP TYPE	Non-Clog ☐ Grinder ☑ Chopper ☐ Vortex ☐
PUMP RATED HP & CURRENT	1.2hp / 5.2A
ACCESS HATCH LOAD LEVEL	Pedestrian ☐ Incidental H-20 ☐ Parking Lot H-20 ☐ Full Traffic H-20 ☑

ADDITIONAL OPTIONS

OPTION	YES	NO
CONTROL PANEL SS ENCLOSURE	☐	☑
CONTROL PANEL AC UNIT	☐	☑
CONTROL PANEL REMOTE ALARM MONITORING	☐	☑
AIR RELEASE/VACUUM VALVE	☐	☑
INTERIOR LINER	☐	☑
CONCRETE WATERPROOFING	☐	☑
VENT PIPE	☐	☑
ODOR CONTROL VALVE	☐	☑
LIFTING CRANE	☐	☑
GENERATOR RECEPTACLE	☐	☑

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DESCRIPTION:

Quail Valley - LS5

REV:

PART NUMBER:	248-DV Series Standard	DRAWN BY:	T. Tidball
CREATED:		MODIFIED:	4/26/24

SHEET: 2 OF 2

248-DV Series Standard.idw

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

Quoted By: DENNIS MORGAN

Document Address:
JENSEN CUSTOMER
CUSTOMER BILLING ADDRESS
. . .

Delivery Address:
JENSEN CUSTOMER

Menifee CA 92587

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS2)	Delivered FOB Truck	1	PCS	53,458.00	53,458.00

Notes: Wet Well:
• 48” Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 22’-0” Rim To Sump
• 24” X 36” Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Valve Vault:
• 48” Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6’-0” Rim To Sump
• 24” X 36” Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Pump Package:
• (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables
• Pump Lift Out/Autocoupling System
• Mounting Bracket And Hardware For Guide Rails And Base Elbows

Piping, Fittings, And Valves:
• 2” PVC SCH80 Piping And Fittings With Glue As Required
• 2” PVC SCH80 Check And Plug Valves

Controls:
• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
• Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per Project Basis.
• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
		• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply • Others Responsible For Offloading, Setting And Installation Of All Components • Delivery Includes One Hour On Site Per Delivery Truck • Additional Hours To Be Billed At $185.00 Per Hour • Suitable And Safe Access Must Be Provided For Delivery Notes: • Extremely Heavy Product – Setting And Handling Limitations Are Critical • Precast Coring For Pipe Penetrations Not Included In Jensen's Scope • Interior/Exterior Liners Not Included In Jensen's Scope					
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS3)	Delivered FOB Truck	1	PCS	53,408.00	53,408.00
		Notes: Wet Well: • 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 21'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Valve Vault: • 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Pump Package: • (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables • Pump Lift Out/Autocoupling System • Mounting Bracket And Hardware For Guide Rails And Base Elbows Piping, Fittings, And Valves: • 2" PVC SCH80 Piping And Fittings With Glue As Required • 2" PVC SCH80 Check And Plug Valves Controls: • Standard Duplex Control Panel • (5) Mechanical Float Switches W/ 50ft Cables • Mounting Bracket And Hardware For Floats Included Services: • Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per					

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount
		Project Basis. • One Year Full System Warranty • Standard Jensen Water Resources O&M Documents Delivery: • Delivery To Job Site Customer To Off Load And Set • Estimated Heaviest Pick Weight At 7,000lbs • Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production • If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply • Others Responsible For Offloading, Setting And Installation Of All Components • Delivery Includes One Hour On Site Per Delivery Truck • Additional Hours To Be Billed At $185.00 Per Hour • Suitable And Safe Access Must Be Provided For Delivery Notes: • Extremely Heavy Product – Setting And Handling Limitations Are Critical • Precast Coring For Pipe Penetrations Not Included In Jensen's Scope • Interior/Exterior Liners Not Included In Jensen's Scope					
	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS4)	Delivered FOB Truck	1	PCS	53,408.00	53,408.00
		Notes: Wet Well: • 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 21'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Valve Vault: • 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump • 24" X 36" Hatch Rated For Level 5 Loading • Joint Sealant As Needed Pump Package: • (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables • Pump Lift Out/Autocoupling System • Mounting Bracket And Hardware For Guide Rails And Base Elbows Piping, Fittings, And Valves: • 2" PVC SCH80 Piping And Fittings With Glue As Required • 2" PVC SCH80 Check And Plug Valves Controls:					

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount

• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
• Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per Project Basis.
• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production
• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply
• Others Responsible For Offloading, Setting And Installation Of All Components
• Delivery Includes One Hour On Site Per Delivery Truck
• Additional Hours To Be Billed At $185.00 Per Hour
• Suitable And Safe Access Must Be Provided For Delivery

Notes:
• Extremely Heavy Product – Setting And Handling Limitations Are Critical
• Precast Coring For Pipe Penetrations Not Included In Jensen's Scope
• Interior/Exterior Liners Not Included In Jensen's Scope

	Q10211	248-DV Series Standard Triplex Submersible Pump Station Per Jensen Drawing Dated 4.26.24 (LS5)	Delivered FOB Truck	1	PCS	49,615.00	49,615.00

Notes: Wet Well:
• 48" Diameter Jensen Precast Concrete Wet Well And Flat Top, Up To 22'-0" Rim To Sump
• 24" X 36" Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Valve Vault:
• 48" Diameter Jensen Precast Concrete Valve Vault And Flat Top, Up To 6'-0" Rim To Sump
• 24" X 36" Hatch Rated For Level 5 Loading
• Joint Sealant As Needed

Pump Package:
• (2) Submersible Grinder Pumps W/ 50ft Power/Control Cables

Group	Part No	Description	Shipping Code	Qty	Unit	Unit Price	Net Amount

• Pump Lift Out/Autocoupling System
• Mounting Bracket And Hardware For Guide Rails And Base Elbows

Piping, Fittings, And Valves:
• 2" PVC SCH80 Piping And Fittings With Glue As Required
• 2" PVC SCH80 Check And Plug Valves

Controls:
• Standard Duplex Control Panel
• (5) Mechanical Float Switches W/ 50ft Cables
• Mounting Bracket And Hardware For Floats

Included Services:
• Courtesy One Day (Up To 8 Hours) Site Visit With A Jensen Representative To Assist With Supervisory Direction For Station Commissioning And Training. Multiple Or Additionally Requested Site Visits To Be Billed At A Flat Rate And Quoted On A Per Project Basis.
• One Year Full System Warranty
• Standard Jensen Water Resources O&M Documents

Delivery:
• Delivery To Job Site Customer To Off Load And Set
• Estimated Heaviest Pick Weight At 7,000lbs
• Items Quoted Include Delivery To Job Site, Delivery Quantities Are Estimated And Will Be Determined At Time Of Production
• If Multiple Or Separate Deliveries Are Required At The Customer's Request, Additional Charges Will Apply
• Others Responsible For Offloading, Setting And Installation Of All Components
• Delivery Includes One Hour On Site Per Delivery Truck
• Additional Hours To Be Billed At $185.00 Per Hour
• Suitable And Safe Access Must Be Provided For Delivery

Notes:
• Extremely Heavy Product – Setting And Handling Limitations Are Critical
• Precast Coring For Pipe Penetrations Not Included In Jensen's Scope
• Interior/Exterior Liners Not Included In Jensen's Scope

Quotation Notes

FOR TECHNICAL QUESTIONS PLEASE CONTACT CHRIS PURDIE @ 775-352-6361

ITEMS INCLUDED IN THIS QUOTE ARE PER JENSEN PUMP STATION'S INTERPRETATION AND ARE LISTED AS CLOSE TO "AS EQUAL" AND "AN ALTERNATIVE" WHICH ARE SUBJECT TO FINAL APPROVAL. ANY CHANGES MIGHT REQUIRE A REQUOTE FROM JENSEN WATER RESOURCES.

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

ANY AGENCY INSPECTION REQUIREMENT FEES NOT INCLUDED.

ALL PRODUCTS ABOVE ARE SUITABLE FOR H-20 LOADING IN DRY SOIL CONDITIONS. ANY ADDITIONAL LOADING REQUIREMENTS MAY RESULT IN REVISED PRICING.

SALES TAX HAS BEEN ESTIMATED WITH THIS QUOTATION. CUSTOMER IS RESPONSIBLE TO DETERMINE AND PAY ALL ASSOCIATED SALES TAX.

ADDITIONAL FUEL SURCHARGES MAY APPLY AT TIME OF DELIVERY

JENSEN PRECAST TERMS AND CONDITIONS APPLY.

LEAD TIMES WILL BE PRESENTED AFTER JENSEN RECEIVES APPROVED SUBMITTALS. DELIVERY SCHEDULE IS SUBJECT TO CHANGE BASED ON CAPACITY, MATERIAL AVAILABILITY, AND PRECEDING CUSTOMER ORDERS. CURRENT SUPPLY CHAIN ISSUES ARE AFFECTING MANY INDUSTRIES AND MAY IMPACT LEAD TIMES.

PRIOR TO PROVIDING SUBMITTALS, JENSEN PRECAST REQUESTS A SIGNED COPY OF THIS QUOTATION, CUSTOMER PURCHASE ORDER, OR LETTER OF INTENT TO PURCHASE.

CREDIT SALES WILL BE MADE ONLY AFTER RECEIPT OF A SIGNED JENSEN PRECAST CREDIT APPLICATION AND WRITTEN CREDIT APPROVAL BY JENSEN PRECAST'S CREDIT MANAGER.

ITEMS INCLUDED IN THIS QUOTATION ARE CUSTOM PRODUCTS. JENSEN PRECAST MAY REQUIRE PARTIAL OR FULL PAYMENT PRIOR TO PROCUREMENT, MANUFACTURING, OR SHIPMENT OF ANY ITEMS.

THIS OFFER TO SELL IS BASED ON CUSTOMER BUYING THIS COMPLETE BILL OF MATERIALS. PRICES MAY BE SUBJECT TO CHANGE IF INDIVIDUAL LINE ITEMS ARE PURCHASED SEPARATELY.

FOR FURTHER INFORMATION CONCERNING JENSEN ENGINEERED SYSTEMS, PLEASE VISIT OUR WEBSITE @ HTTPS://WWW.JENSENPRECAST.COM/WATER-RESOURCES

THANK YOU FOR ALLOWING US TO PROVIDE YOU WITH THIS QUOTATION. WE LOOK FORWARD TO WORKING WITH YOU ON THIS PROJECT.

Net Total:	**209,889.00**
Estimated Tax:	**18,365.29**
Gross Total	**228,254.29**

All orders are subject to credit acceptance by seller.
A 3% credit card service fee may be added for all credit card payments.
Delivery trips, setting time, or materials not noted above will be billed accordingly.
Offer to sell subject to Jensen Precast's company policies, terms and conditions.
Please refer to https://www.jensenprecast.com/terms-of-service/ for complete terms and conditions which are hereby incorporated by reference.
All specialized product may be subject to a deposit prior to submittals and/or fabrication.
Quotation is valid for 30 days.
Thank you for choosing Jensen Precast!

JENSEN CUSTOMER Signature **Date**

JENSEN CUSTOMER PO

Quotation DM072324A

Quotation Date: 7/23/24
Revision No: 2
Customer No: JENCUS
Project Name: Quail Valley Lift Stations
Payment Terms:

TERMS AND CONDITIONS

ORDERING INSTRUCTIONS

Please refer to the quotation number and date on all orders. Indicate desired delivery dates, quantities and item priority if applicable. Please contact our office for delivery schedules. Delivery lead-time will be estimated upon receipt of order, and is based on actual demand at that time. Any dates discussed prior to order are non-binding estimates. Orders for non-standard products should be accompanied by specifications, and blue prints or scale drawings. Notify us as soon as possible to insure prompt delivery.

COMPANY POLICIES TERMS AND CONDITIONS

THE POLICY TERMS AND CONDITIONS, DELINEATED HEREIN SHALL APPLY TO ALL QUOTATIONS, OR OFFERS TO SELL

1. Goods to Be Provided: Jensen Enterprises, Inc. dba Jensen Precast ("Jensen Precast") agrees to sell to Customer, on the terms and conditions stated herein, the materials and related items (the "goods") identified in Jensen Precast's quotation to Customer. Customer is solely responsible for determining whether the goods listed are the correct types and/or sufficient in number to meet Customer's needs and/or requirements. Jensen Precast's offer to sell is based on customer approval of Jensen Precast standard product drawings or submittals, and not in accordance with any plans and specifications, unless agreed to in writing by a duly authorized representative of Jensen Precast.
2. No Additional Terms of Sale: Customer's acceptance of Jensen Precast's quotation is limited to these Terms and Conditions of Sale. Any new or different terms or conditions stated or proposed by Customer in its acceptance of Jensen Precast's quotation or in any accompanying or related purchase order or other document are hereby rejected by Jensen Precast and shall not be binding upon Jensen Precast. The entire contract is embodied in this writing. This writing constitutes the final expression of the parties' agreement, and it is a complete and exclusive statement of the terms of that agreement.
3. Payment Terms: Jensen Precast may require payment in full prior to manufacture or shipment of any goods. If Jensen Precast agrees to provide materials on a "Cash on Delivery" basis, payment in full is due upon arrival of Jensen Precast's equipment, prior to setting of product or unloading of trucks. Credit sales will be made only after receipt of a signed Jensen Precast credit application and written credit approval by Jensen Precast's credit manager. On all credit sales, payment in full is due within 30 days after Customer's receipt of materials or services. Customer agrees to pay a service charge of 1.5% per month on all invoices not paid when due. At its option, Jensen Precast may decline to make delivery or shipment to Customer if any invoice remains past due. Customer waives and releases any claim against Jensen Precast for loss or damage allegedly sustained by Customer as a result of Jensen Precast's refusal to make delivery or shipment under such circumstances. All payments shall be made in U.S. dollars and, unless otherwise designated by Jensen Precast in writing, shall be sent to Jensen Precast's Corporate Office, 9895 Double R Blvd, Reno, NV 89521.
4. Price: The price(s) stated in Jensen Precast's quotation to Customer are firm for 30 days. The prices stated in Jensen Precast's quotation are subject to sales and use tax. Customer shall reimburse Jensen Precast for all sales and use taxes imposed upon: (a) the sale of the goods; and/or, (b) the use of any materials consumed by Jensen Precast; and/or, (c) the sale of any fixtures or equipment incident to this contract. Prices are subject to delivery charges unless quoted as delivered (see shipping code definitions on quotation). Jensen Precast reserves the right to increase the cost of delivery or shipment if Customer increases mileage or number of trucks specified in the original quotation. Prices quoted are based on quantities indicated, and on customer acceptance of the entire quote. Jensen Precast reserves the right to accept or reject partial orders.
5. Time for Performance: Jensen Precast will endeavor to meet any reasonable shipping date(s) requested by Customer. However, Jensen Precast does not guarantee that the goods will be furnished by any particular date. All shipping dates stated or indicated are estimates only and are based upon conditions known at the time the dates were stated or indicated. Jensen Precast shall not in any event be liable for any loss or damage sustained by Customer on account of failure to meet any delivery or shipping date.
6. Delivery: Customer or its designated representative shall be prepared to unload, receive, and accept the goods at the time specified on the order. Customer shall provide assistance in delivering the goods, including but not limited to assisting in backing and directing Jensen Precast's truck at the delivery site, providing access to the delivery site that is acceptable to Jensen Precast, and providing a setting location for the truck, crane or other delivery equipment that is acceptable to Jensen Precast. Jensen Precast shall not be liable for any property damage arising from or related to delivery of the goods, including without limitation damage to sidewalks, curbs, fences, valves, conduit, pipes, concrete, asphalt, lawns, trees, or landscaping. All excessive unloading or stand-by time, resetting or re-delivery will be charged for at the current hourly or mileage rates of the equipment involved. If for any reason Jensen Precast cannot set the goods at the time of delivery, Customer shall be responsible for setting the goods by other means, at no cost to Jensen Precast.
7. Customer Responsibilities: The Customer or its designated representative shall be solely responsible for accomplishing the following:
a. Finish grade, leveling and position of the goods.
b. Grouting and/or sealing of vault sections, grade rings, risers, frames, covers, pipes or similar structures, unless a duly authorized representative of Jensen Precast has stated in writing that Jensen Precast will perform installation and sealing of the goods.
c. Excavation, bedding, shoring, backfilling, compacting and grading.
d. Water and/or flotation control.
e. Setting and adjusting ladders, racking, grates or other hardware.
f. Providing a one- or two-person ground crew to assist the Jensen Precast crane operator.
g. All other site work not specified above.
8. Returns: The goods shall not be returned for credit without prior written authorization and approval by a duly authorized representative of Jensen Precast. A minimum handling charge of 15% plus actual shipping or delivery costs shall be made on all goods returned to compensate for costs of accounting, reconditioning, restocking and delivery, except when due to fault or error of Jensen Precast. No credits shall be allowed on used, damaged, custom, specially ordered or specially manufactured goods. Customer shall bear the cost of any labor, damage or transportation associated with return of the goods.
9. Equipment: Unless otherwise agreed to in a writing signed by a duly authorized representative of Jensen Precast, equipment belonging to Jensen Precast cannot be left at any job site for the purpose of unloading or setting by others.
10. Project Information: Customer agrees to furnish to Jensen Precast promptly upon request all project information necessary for Jensen Precast to perfect or provide notice of its mechanic's lien, stop notice, and/or payment bond rights.
11. Buy America(n) Requirements. Purchaser must clearly and affirmatively notify Jensen Precast of the applicability of any order, law, regulation or other requirement that the Products be produced, manufactured, or substantially transformed in the United States, or consist wholly or partly of materials or components produced, manufactured, or substantially transformed in the United States, or that the raw material comprising the Products be of domestic origin. If Purchaser fails to notify Jensen Precast of any such requirements, Purchaser must accept delivery and pay for the Products, regardless of any such requirements, and Purchaser agrees to fully indemnify and hole Jensen Precast harmless from and against any liability, costs and expenses, including reasonable attorney fees, incurred by Jensen Precast in connection with Purchaser's omission.
12. Force Majeure: Jensen Precast will not be liable for any delay or for failure to perform its obligations hereunder resulting from any cause beyond Jensen Precast's reasonable control including, but not limited to: Customer's failure to timely supply Jensen Precast with necessary data or specifications; any changes in such data or specifications at Customer's request; fires; explosions; floods; acts of God; epidemics; quarantine; embargoes; strikes; work stoppages or slowdowns or other industrial disputes; accidents; riots or civil disturbances; acts of civil or military authorities; inability to obtain any license or consent necessary in respect of any the goods; inability to obtain equipment, materials, labor, fuel or supplies; and delay by suppliers or material shortages.
13. Limited Warranty: For a period of one year from the date of shipment or delivery to Customer, Jensen Precast warrants all of the goods which it has manufactured to be free of material defects. If any such goods are found to be materially defective during the warranty period, Jensen Precast agrees to, in its sole discretion, repair or replace the defective goods without charge to Customer. Customer's remedy with respect to such goods is limited to repair or replacement. For goods not manufactured by Jensen Precast, Customer agrees to accept as its sole remedy the warranty, if any, offered by the manufacturer or manufacturers of such goods.

AS TO ALL GOODS SOLD BY JENSEN PRECAST TO CUSTOMER, THE WARRANTY DESCRIBED IN THIS PARAGRAPH SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

JENSEN PRECAST SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR LIQUIDATED DAMAGES OF ANY KIND, WHETHER THE CUSTOMER'S CLAIM IS BASED UPON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

14. Indemnity: Customer is solely responsible for the selection, installation, and use of the goods. Therefore, to the fullest extent permitted by law, Customer agrees to defend and indemnify Jensen Precast from and against any claim for loss or damage, including attorneys' fees and experts' or consultants' fees, arising from or relating to such selection, installation, and use. This indemnity applies regardless of any active and/or passive negligent act or omission on the part of Jensen Precast or its employees; provided, however, Customer shall not be obligated to indemnify Jensen Precast for the sole negligence or willful misconduct of Jensen Precast or its employees.
15. Risk of Loss: The risk of loss shall pass to Customer based on the applicable shipping code:
a. "Delivered and Set": Risk of loss shall pass to Customer when Jensen Precast's delivery truck has unloaded the product.
b. "Delivered - F.O.B. Truck": Risk of loss shall pass to Customer when Jensen Precast's delivery truck arrives at Customer's jobsite.
c. "Delivered and offloaded": Risk of loss shall pass to Customer when Jensen Precast's delivery truck arrives at Customer's jobsite.
d. "F.O.B. Jensen Precast Yard": Risk of loss shall pass upon tender of delivery of the goods to a common carrier or Customer's truck. Buyer shall procure and maintain insurance on the goods sufficient to protect its interests.
16. Dispute Resolution: All disputes arising from or relating to these Terms and Conditions of Sale and/or the furnishing of any goods by Jensen Precast to Customer shall be heard and decided exclusively in the state or federal court where the delivery or pick up of the Product(s) is located. The construction, interpretation and performance of this order and all transactions hereunder shall be governed by the laws of the state where delivery or pick up the Products is located, without regard to its choice of law principles. These Terms and Conditions of Sale (the "Terms") apply to all quotations and sales by Jensen Precast's (including its Water Resources, Metal Tech and other branded products) products, materials, services, components, accessories, and panels (collectively, "Products"). No terms or conditions other than those stated in these Terms, and no agreement or understanding, oral or written, purporting to modify these Terms, whether contained in a purchaser's purchase forms or elsewhere, will be binding on Jensen Precast unless signed by an authorized executive manager of Jensen Precast. Customer consents to these Terms for all Products. In any legal proceedings, the prevailing party shall be entitled to recover its reasonable attorneys' fees and costs.
17. Submittals and Tests: Jensen Precast reserves the right to charge customers for the cost of submittals, engineering or tests that are in addition to those customarily provided.
18. Custom Products: Jensen Precast will charge customer for any work completed at the time of cancellation of a custom or special order. All custom orders will be invoiced to customer if not released for delivery within 30 days past estimated date of delivery.
19. Storage Fees: For every month beyond the requested manufacture date that the product remains in Jensen Precast's possession, a fee of 3% per month of total sale price of product will be added to the invoice total due upon final delivery/pick up.
20. Invoice Date: Customer will be invoiced for product at either, date of delivery or 60 days past date of originally requested delivery/pick up date.

SHIPPING POLICY

1. The customer will be prepared to receive products at the specified delivery time. Excessive unloading or stand-by time, resetting or re-delivery not caused by Jensen Precast will be charged at the hourly rate for the equipment involved.
2. The customer will be solely responsible for the following:
a. Finish grade, leveling, and position of product.
b. Grouting, and/or sealing of vault sections, grade rings, risers, frames and covers, pipes, etc.
c. Excavation, bedding, shoring, backfilling, compacting and grading.
d. Water and/or flotation control.
e. Setting and adjusting ladders, racking, grates or other hardware.
f. All other site work not specifically referred to.
3. Equipment belonging to the company cannot be left at any jobsite for the purpose of unloading or setting by others unless previously agreed to in writing between Jensen Precast and the customer.
4. Carriers are responsible for goods lost or damaged in transit. Damages or shortages should be indicated on the carrier's delivery receipt and any claims should be made in writing directly to the carrier.
5. All products are to be delivered in the number of trips specified. Charges will be added for additional trips.

SHIPPING CODE DEFINITIONS

Code #1 - DELIVERED AND SET

Quoted prices include product delivery and setting with our boom truck subject to the following provisions:
a. Jensen Precast will provide driver/crane operator services only using Jensen Precast's boom truck, unless otherwise specified.
b. Customer will be solely responsible for all other site work associated with setting and installing this product unless specifically referred to in writing.
c. Most products require assistance from the customer in setting (generally one or two laborers). Contact Jensen Precast for the specific requirements of each product.
d. The customer will provide a properly prepared, sized and graded, excavation. Access and setting location for our boom truck must be acceptable to our driver or representative.
e. Since site conditions, products, and delivery equipment vary, the logistics must be considered to determine the best approach for setting the product.
Attention must be given to the variables of the set, including:
a. Capacity of the Jensen Precast boom truck and truck crane to be used.
b. The maximum product weight relative to the setting distance from the center of the crane to the center of the excavation cannot exceed the boom truck rated capacity.
c. The route to the setting location must be accessible for the boom truck without towing or pushing.
d. The type of terrain, site slope, and ground conditions for outrigger footings, at the setting location.
e. Overhead restrictions and other physical constraints.
f. Any or all of the above could prevent Jensen Precast from setting the product. In cases where Jensen Precast cannot set the product, we will off load the product in accordance with shipping code definition #3 herein.
NOTE: If for any reason Jensen Precast cannot set the product, Jensen Precast will not be responsible, or charged, for setting by any other means.

Code #2 - DELIVERED - F.O.B. TRUCK:

Quoted prices include product delivery to the job site only; "Free On Board" the truck. Generally, this would be a flatbed truck without a crane or other unloading equipment subject to the following provisions:
a. The company will provide driver services only and the customer will supply means of unloading and setting products at time of delivery. 1 hour of off-load time is allotted per truck from time of arrival at delivery location or entry point. Additional standby time not caused by Jensen Precast will be charged at the hourly rate for the equipment involved.

Code #3 - DELIVERED AND OFFLOADED:

Quoted prices include product delivery to the job site and unloaded from our truck subject to the following provisions:
a. Jensen Precast will provide driver services and a means of unloading products.

b. The customer will provide an acceptable location for unloading and storing products, and the means for setting the product in the permanent location.

Code #4 - F.O.B. - JENSEN PRECAST YARD:

Quoted prices include product loading on customer or common carrier trucks in the yard subject to the following provisions:
a. Customer will be responsible for any additional charges, including charges for freight, shipping, delivery and setting.
b. Customer or common carrier will be responsible for tie down, dunnage, pallets, etc., unless specifically referred to.
c. Yard location will be addressed in section one of the quotation.

Code #5 - OTHER AS SPECIFIED:

If not specified in section one of this quotation, please consult our office for more specific information or written clarification.

APPENDIX E – LS-5 Prepackaged Lift Station Alternatives

Flygt System

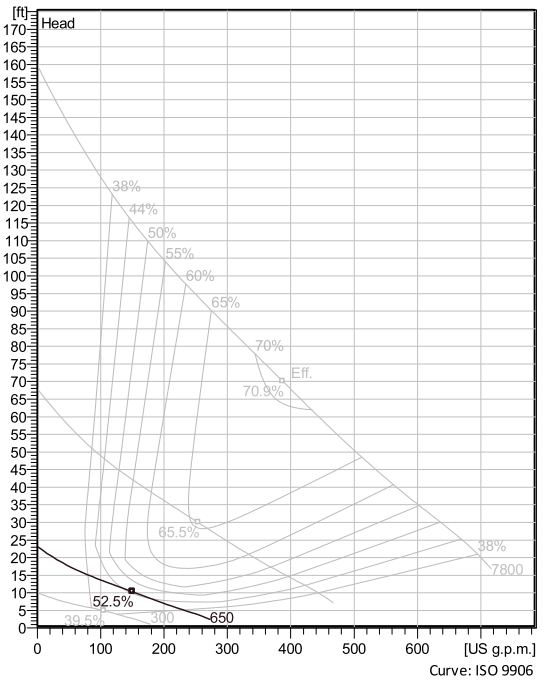
Concertor DP N80-650

A process-controlled wastewater pumping system suitable for customers who utilize specially designed process control algorithms and want to benefit from lower capital costs, smaller control cabinets and higher pump system efficiencies. Concertor DP is also suitable as a reliable and energy efficient on/off controlled wastewater pumping system for customers who want to benefit from easily adjustable pump performance, soft start/soft stop, constant power and motor protection. This system is scalable to as many pumps as required by your application, with one gateway per pump.

Technical specification



Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N6020.091 18-08-1AZ-W 3hp

Installation type
P - Semi permanent, Wet

Impeller diameter
170 mm

Discharge diameter
3 inch

Pump information

Impeller diameter
170 mm

Discharge diameter
3 inch

Inlet diameter
110 mm

Maximum operating speed
800-2094.6 rpm

Number of blades
2

Max. fluid temperature
40 °C

Materials

Impeller
Hard-Iron ™

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-650

Technical specification

Motor - General

Motor number N6020.091 18-08-1AZ-W 3hp	**Phases** 3~	**Rated speed** 800-2095 rpm	**Rated power** 3 hp
ATEX approved FM	**Insulation class** H	**Rated current** 3.6 A	**Type of Duty** S1
Frequency 60 Hz	**Rated voltage** 460 V	**Motor efficiency class** IE4 according to IEC/TS 60034-30-2 Ed. 1	

Motor - Technical

Power factor - 1/1 Load 0.95	**Motor efficiency - 1/1 Load** 90.0 %	**Nominal speed - 1/1 Load** 2300 rpm
Power factor - 3/4 Load 0.95	**Motor efficiency - 3/4 Load** 91.0 %	**Nominal speed - 3/4 Load** 2070 rpm
Power factor - 1/2 Load 0.95	**Motor efficiency - 1/2 Load** 91.0 %	**Nominal speed - 1/2 Load** 1840 rpm

Starting current
3.6 A

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-650

Monitoring and Control equipment

Project	Xylect-22161321	**Created by**	Alan Dahlqvist		
Block		**Created on**	4/17/2024	**Last update**	4/17/2024

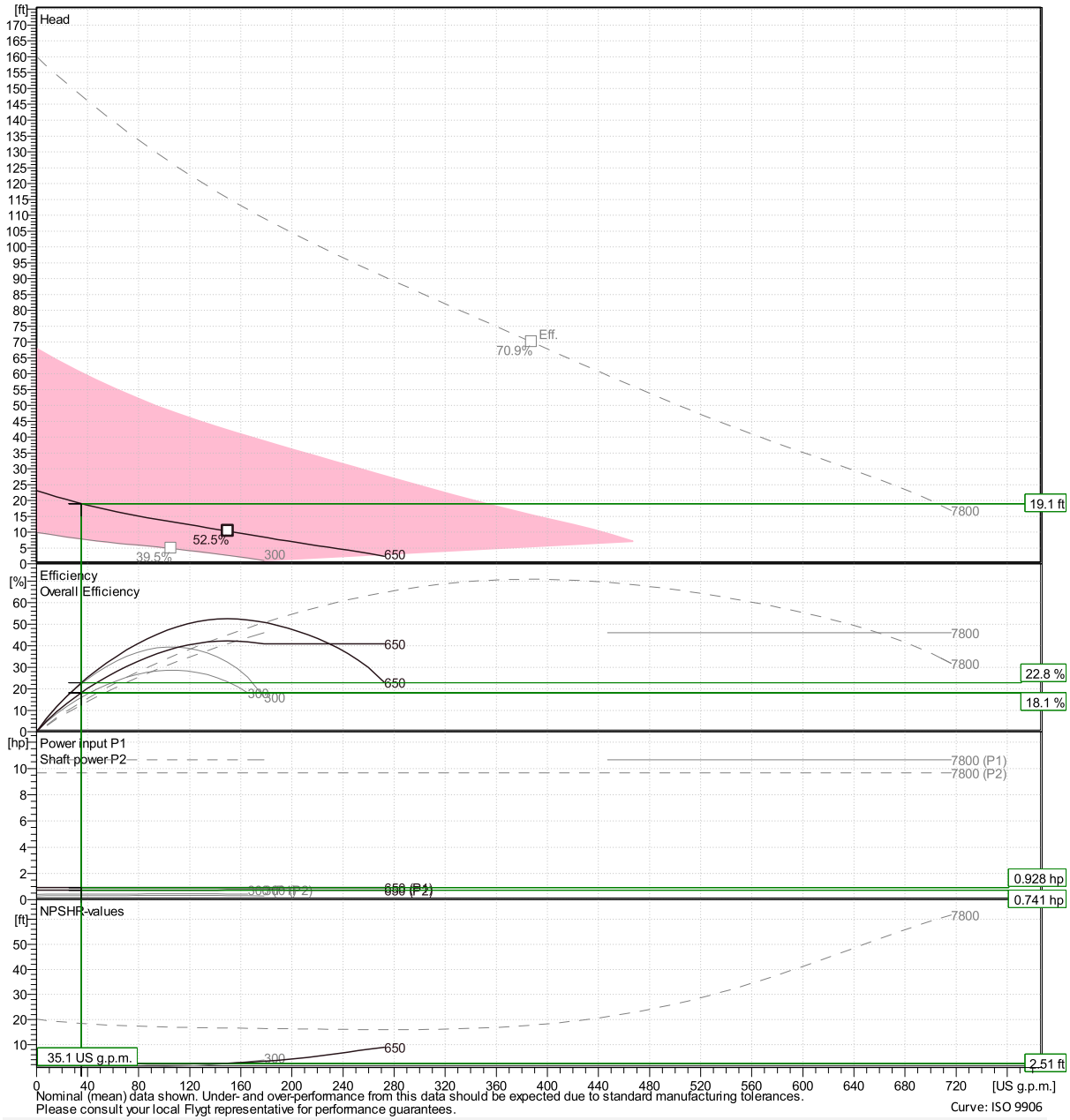
Concertor DP N80-650

Performance curve

Duty point

Flow	Head
35.1 US g.p.m.	19.1 ft

Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

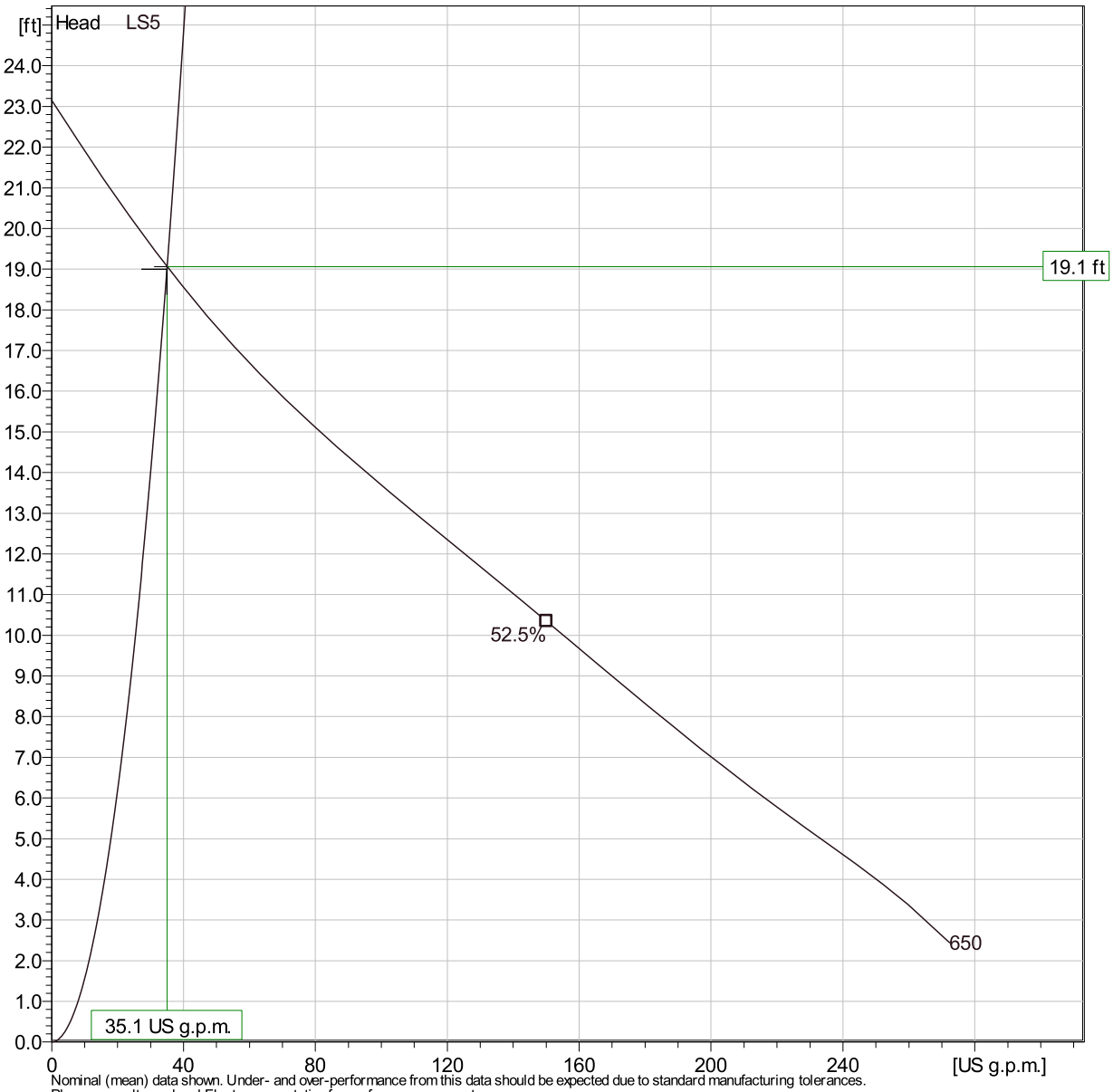
Curve: ISO 9906

Project	Xylect-22161321	**Created by**	Alan Dahlqvist	**Last update**	4/17/2024
Block		**Created on**	4/17/2024		

Concertor DP N80-650

Duty Analysis

Curves according to: Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

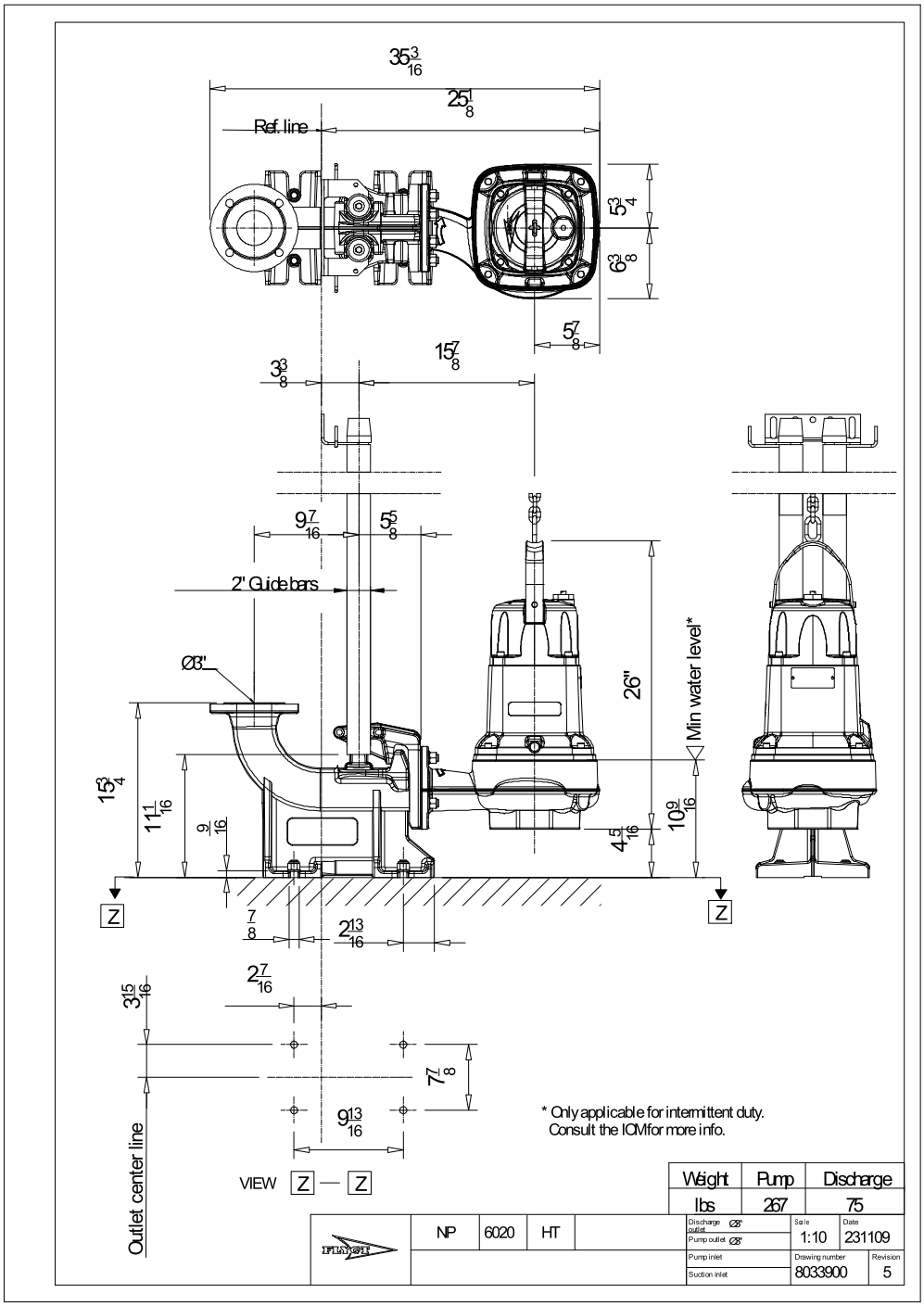
Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
LS5	35.1	19.1	0.741	35.1	19.1	0.741	22.8 %	329	2.51

Project		**Created by**	Alan Dahlqvist		
Block	Xylect-22161321	**Created on**	4/17/2024	**Last update**	4/17/2024

Concertor DP N80-650

Dimensional drawing



Project	Xylect-22161321	**Created by**	Alan Dahlqvist
Block		**Created on**	4/17/2024 **Last update** 4/17/2024

FLYGT
a xylem brand



Flygt Concertor®

THE WORLD'S FIRST WASTEWATER PUMPING SYSTEM WITH INTEGRATED INTELLIGENCE

xylem
Let's Solve Water

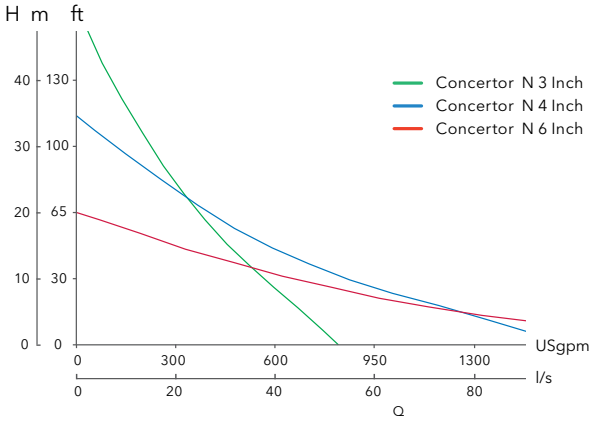
Flygt Concertor®
Intelligent Pumping System (iPS)

A new level of technology with unlimited possibilities

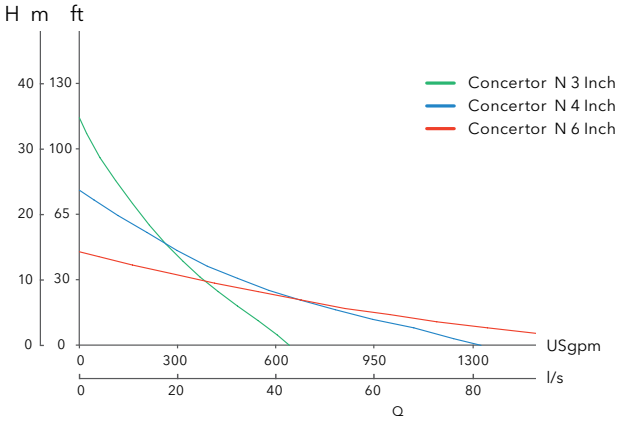
Xylem is proud to introduce the world's first wastewater pumping system with integrated intelligence. A real breakthrough innovation, Flygt Concertor® is capable of sensing the operating conditions of its environment, adapting its performance in real time and providing feedback to pumping station operators. With this new system, Xylem is now bringing smart and interconnected solutions to the world of wastewater pumping.

A new way of thinking
Concertor combines a fully integrated control system with our patented Adaptive N-hydraulics and intelligent functionality. The control system automatically adapts to the changing pumping environment, growing with your needs and delivering the optimal level of performance at the lowest cost of ownership. The built-in intelligence also makes it easier to set up and operate, as well as allowing for a significantly smaller footprint.

10HP / 380-480V / 3 phase



5.5HP / 200-240V / 3 phase



Trouble-free Pumping SAFER SYSTEM

NEW PANEL
FLYGT CONCERTOR iPS





INTELLIGENT CONTROL PANEL



SYSTEM THAT CAN BE LOCALLY ADJUSTED

INTELLIGENT CONTROL PANEL
RETROFIT KIT (INC. PRE-ENGINEERING)



* Retrofit kit includes MultiSmart controller, DP gateways, surge protector, modem kit with antenna, power supply and battery

- Clog free guarantee 24 months
- Improved operator safety – built in pump cleaning function
- Easily retrofitted into existing systems
- No more nuisance service calls due to clogging
- End to manual station cleaning – integrated sump and pipe cleaning
- Reduced odor and grease build-up
- Easy installation – impossible to wire the pump backwards
- Quick start-up – pre-engineered solution with simple set-up wizard
- Includes intelligent pump station manager
- Adjustable flow rate – automatically adjusts to optimal speed
- No VFD trips on hot days / no need for HVAC or cleaning fan filters
- Don't have time to check your stations in person? Flygt Cloud ready for remote monitoring and diagnostics
- Quick ROI – energy savings average 46% for installed systems
- Extended system warranty - 7 years

Basic Retrofit



CONCERTOR DP RETROFIT

** Basic retrofit kit includes DP gateway, surge protector and HMI

FB273 • Flygt Concertor Sales • 5/2018 • NACT

- Clog free guarantee 12 months
- Improved operator safety – built in pump cleaning function
- No more nuisance service calls due to clogging
- Easy installation – impossible to wire the pump backwards
- Quick start-up – pre-engineered solution with simple set-up wizard
- No VFD trips on hot days / no need for HVAC or cleaning fan filters
- Adjustable flow rate – remotely or on site
- Compatible with 3rd party controllers – accepts 4-20mA signal
- Quick ROI – energy savings at least 25%
- System warranty - 5 years

ONE PUMP TAKES CARE OF IT ALL

SIMPLE - Eliminates complex installation, programming and operation.

SMART - Cleans the station, auto-reverses upon blockage, and automatically runs at reduced speed as required.

SAFE - Keeps operators safe. Station cleaning and clogged pumps at 2:00 am just became obsolete.

SAVINGS - Provides true value. Taking energy, maintenance, & operations savings to a whole new level never seen before.

One powerful solution. Unlimited possibilities.

xylem
Let's Solve Water

Xylem, Inc.
14125 South Bridge Circle
Charlotte, NC 28273
Tel 704.409.9700
Fax 704.295.9080
855-XYL-H2O1 (855-995-4261)

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services, and agricultural settings. With its October 2016 acquisition of Sensus, Xylem added smart metering, network technologies and advanced data analytics for water, gas and electric utilities to its portfolio of solutions. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to **www.flygt.com**

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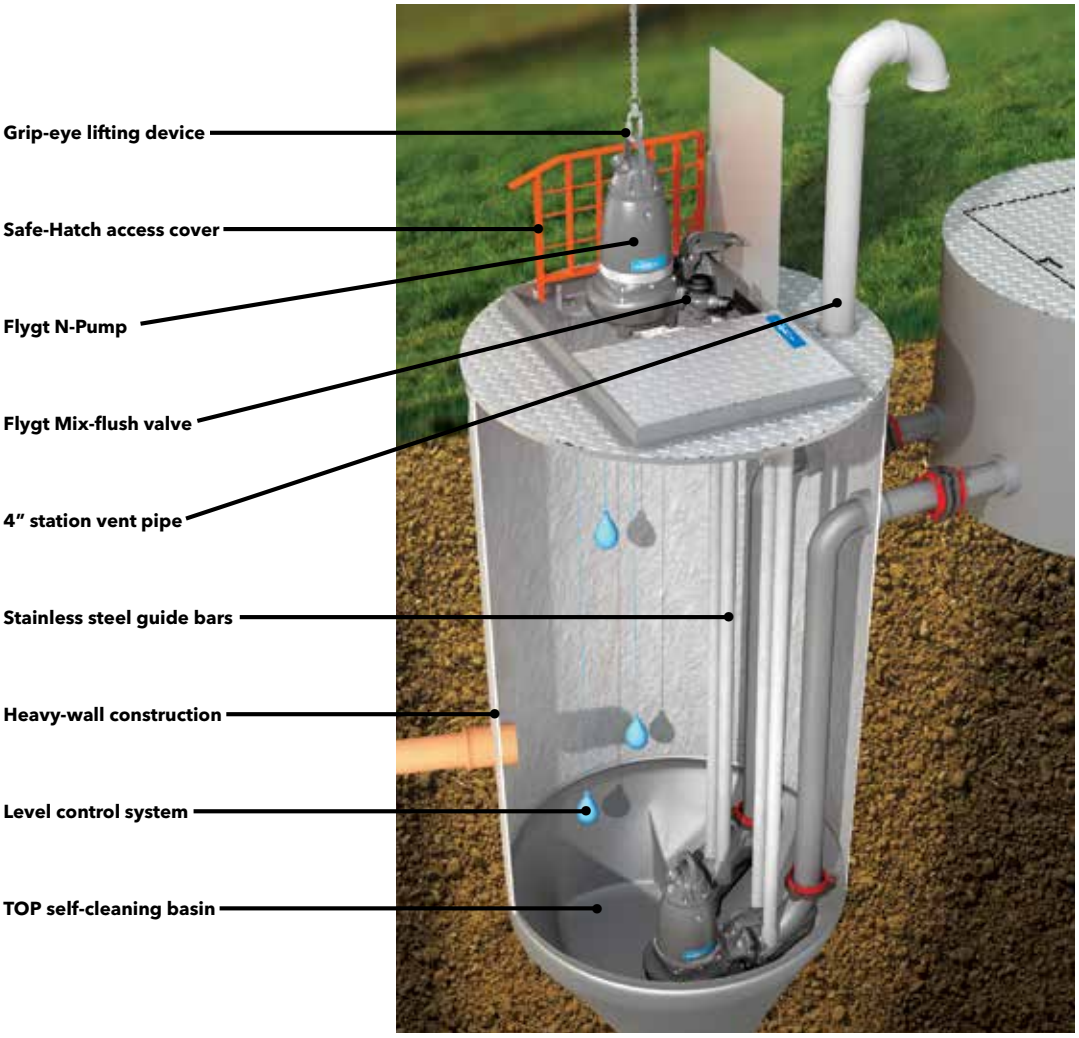
TOP Pre-Engineered Fiberglass Pump Station

THE OPTIMUM PUMP STATION

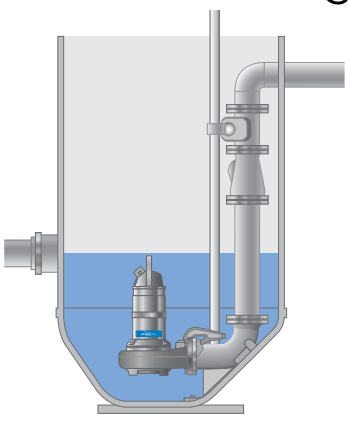
FLYGT

a xylem brand

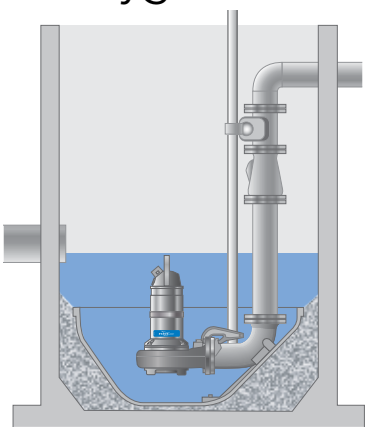
Flygt TOP Pre-Engineered Pump Station



The self-cleaning team: Flygt TOP Sump and N-Pump



TURNKEY PUMP STATIONS
Install a prepackaged pump station with Flygt TOP self cleaning design in corrosion resistant fiberglass construction.



RETROFIT EXISTING SUMPS
Install the prefabricated Flygt TOP sump floor and fill the gap between the old floor and the new with concrete. Wait a few hours until dry, then put your pump station back online. No additional excavation is required.



N IMPELLER & WEAR PLATE
N-Impeller with back swept vanes and guide pin with relief groove provide sustained efficiency while pumping modern trash such as flushable wipes.

Continuously removes suspended solids

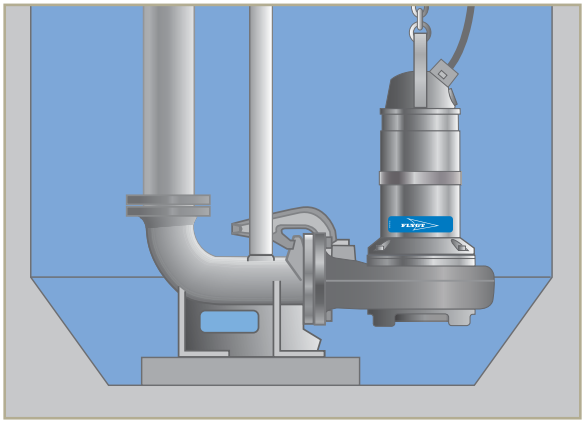
The Flygt TOP station delivers outstanding self-cleaning performance both in laboratory tests and under real-life operating conditions.

Flygt conducted a laboratory test comparing the Flygt TOP sump to a traditional sump. The test sumps were each filled with 105 US gallons (400 liters) of water and 108 lbs. (49 kg) of sand. The water was pumped back and forth 10 times from one sump to the other.

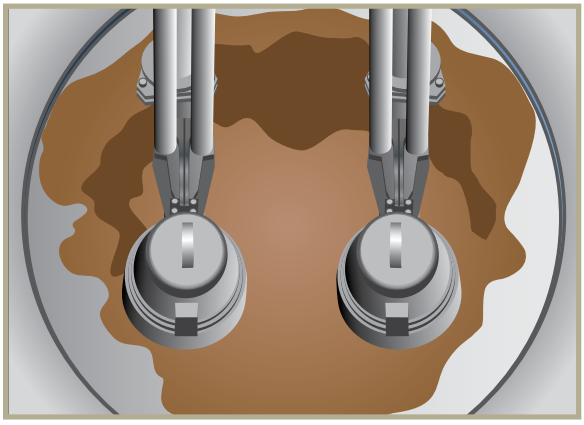
At the end of the test 207 lbs. (94 kg) of solids accumulated in the conventional sump, while only 9 lbs. (4 kg) of solids remained in the TOP sump.

These lab test results are replicated on a daily basis in thousands of Flygt TOP stations operating around the world. The results are definitive: Flygt TOP stations with self cleaning hopper shaped bottom reduce settled solids in turn reducing maintenance and downtime.

Conventional pump sump

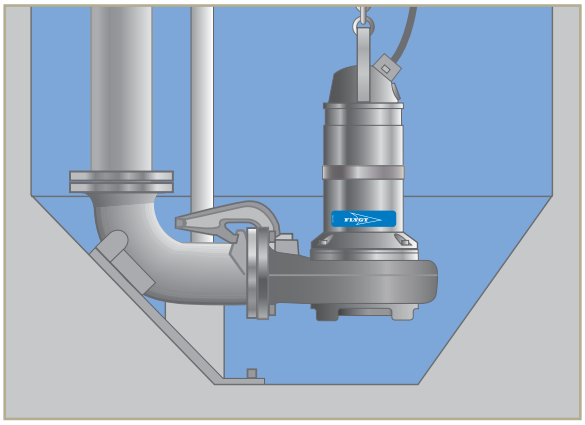


Conventional large flat sump floor encourages buildup of sludge and solids.

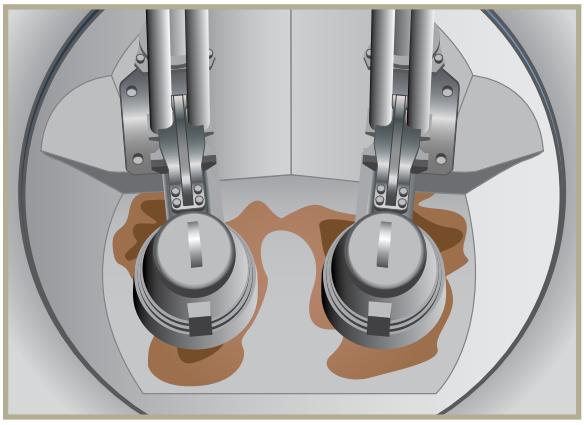


The further away the sumps walls are from the pumps, the greater the sedimentation.

Flygt TOP sump



Minimal floor area and optimized geometries ensure high velocity, which efficiently suspends settled solids in wastewater.

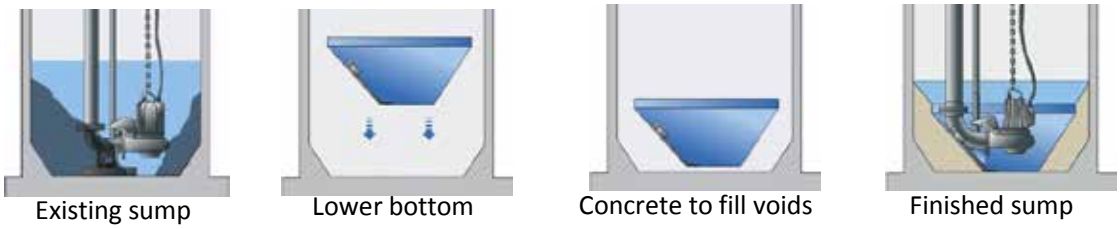


Optimized geometry draws any solids remaining in the sump closer to the pumps, where pump suction is the strongest. This eliminates the risk of solids buildup.

Retrofits easier and turnkey solutions possible

Top Stations are available as turnkey fully assembled pump stations, with rails, valves, and all discharge piping fully assembled. The other option is to retrofit the exsiting station with a TOP self-cleaning bottom. Just lower the insert into the station, fill the gap between the old floor and the new with concrete.

Retrofit Solution install process



TOP Sizes	TOP 4	TOP 5	TOP 6	TOP 100 Retrofit Liner	TOP 150 Retrofit Liner
Station Diameter	4 ft.	5 ft.	6 ft.	4 ft.	5 ft.
Discharge Sizes	2, 3, 4"		2, 3, 4, 6"	2, 3, 4, 6"	
Pipe Material	316 Stainless Steel /PVC			Determined by Engineer	

Depths up to 25 ft. standard. Designs over 25 ft. possible please consult factory

FB012 • Flygt TOP Pre-engineered Fiberglass Pump Station Brochure • 1/2017 • NACT

xylem
Let's Solve Water

Flygt is a brand of Xylem, whose 12,000 employees are addressing the most complex issues in the global water market.

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855-XYL-H2O1 (855-995-4261)
www.xyleminc.com

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Focardi, Dana

From: Dahlqvist, Alan - Xylem <Alan.Dahlqvist@xylem.com>
Sent: Friday, May 31, 2024 3:18 PM
To: Requieron, Wynneth
Subject: RE: EXTERNAL: RE: Inquiry on Pre-packaged Lift Stations for Quail Valley
Attachments: LS5 NP3085MT463 2.2HP.pdf; LS2 NP3085SH256 4HP.pdf; LS3 NP3069SH275 2.7HP.pdf; LS4 NP3085SH255 4HP.pdf

Hi Wynneth
Here are some conservative budgetary prices for the equipment with standard pumps

List station
4'Dia x22'Deep FRP wet well 3" SS discharge piping NO Valve vault (no valves supplied) - $46,400

2- LS5 pumps with installation accessories - $19,600
2- LS4 pumps with installation accessories - $23,000
2- LS3 pumps with installation accessories - $13,800
2- LS2 pumps with installation accessories - $23,000

Not applicable. Using Concertor Pumps.

Control Panel for this size pump $20-30k for a typical design with NEMA3R SS enclosure, depending on components required, VFD's etc

Please let me know if you have any questions

Best regards
Alan

Alan Dahlqvist
Flygt – Pumps, Repairs, Controls
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Engineered Projects
Cell: 951-553-1493
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O: 951.332.3668 F: 951.332.3679

Focardi, Dana

From: Dahlqvist, Alan - Xylem <Alan.Dahlqvist@xylem.com>
Sent: Monday, May 6, 2024 9:53 AM
To: Requieron, Wynneth
Subject: RE: EXTERNAL: RE: Inquiry on Pre-packaged Lift Stations for Quail Valley

Hi Wynneth
Here are some conservative budgetary prices for the equipment

Not applicable. Using 4' Dia.

List station
6'Dia x22'Deep FRP wet well 3" SS discharge piping with 6' Dia x 6' deep Valve vault - $90,000

2- Concertor pumps with installation accessories - $26,000

Control Panel for this size pump $30k for a typical design with NEMA3R SS enclosure

Please let me know if you have any questions

Best regards
Alan

Alan Dahlqvist
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