ELSINORE VALLEY
MUNICIPAL WATER DISTRICT

Baker Street Water Supply Assessment



April 2025 / FINAL

carollo

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Abbreviations

AF	Acre Feet
AFY	Acre Feet per Year
AVP	Auld Valley Pipeline
BCGSA	Bedford-Coldwater Groundwater Sustainability Authority
Carollo	Carollo Engineers, Inc.
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CLGC	Canyon Lake Golf Course
CLWTP	Canyon Lake Water Treatment Plant
County	County of Riverside
CUP	conjunctive use program
CWC	California Water Code
DWR	California Department of Water Resources
EMWD	Eastern Municipal Water District
EVGSA	Elsinore Valley Subbasin Groundwater Sustainability Agency
EVMWD	Elsinore Valley Municipal Water District
GAC	granulated activated carbon
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
gw	groundwater
GWMP	Groundwater Management Plan
IPR	Indirect Potable Reuse
IRP	Integrated Resources Plan
IX	Ion Exchange
Metropolitan	Metropolitan Water District of Southern California
mgd	million gallons per day
MWH	Montgomery Watson Harza, Inc.
NPDES	National Pollutant Discharge Elimination System
PFAS	Per- and Polyfluoroalkyl Substances
POA	Property Owners Association
PPC	persons per connections
Project	Baker Street Project Planning Application No. 2020-103
RCWD	Rancho California Water District
SARRCUP	Santa Ana River Regional Conjunctive Use Project

SB	Senate Bill
SBBA	San Bernardino Basin Area
SCADA	supervisory control and data acquisition
SCAG	Southern California Association of Governments
SGMA	Sustainable Groundwater Management Act
SRRRA	Santa Rosa Regional Resources Authority
SWP	State Water Project
TDS	total dissolved solids
TDSA	Temescal Division Service Area
TVP	Temescal Valley Pipeline
TVRWP	Temecula Valley Recycled Water Pipeline
TVWD	Temescal Valley Water District
TWC	Temescal Water Company
UWMP	Urban Water Management Plan
WDR	Waste Discharge Requirement
Western	Western Municipal Water District
WRF	Water Reclamation Facility
WSA	Water Supply Assessment
WTP	Water Treatment Plant

EXECUTIVE SUMMARY

This Water Supply Assessment (WSA) was prepared on behalf of the Elsinore Valley Municipal Water District (EVMWD) by Carollo Engineers, Inc. (Carollo) in accordance with the California Water Code (CWC) Section 10910-10912 for the Baker Street Project Planning Application No. 2020-103 referred herein as the Project.

ES.1 Purpose

The Project is a proposed industrial warehouse building planned to occupy approximately 66 acres of land and is therefore subject to Senate Bill (SB) 610 (the requirements of SB 610 are detailed in Section 1.1). A WSA is required and must address whether the projected water supply under normal, single dry, and multiple dry water years over a 20-year projection is adequate to meet the demand projected for the Project plus existing and planned future uses.

ES.2 EVMWD Service Area

EVMWD provides water services to two divisions: the Elsinore Division and the Temescal Division Service Area (TDSA), which includes the cities of Lake Elsinore and Canyon Lake, portions of Wildomar and Murrieta, and unincorporated Riverside County and Orange County land. EVMWD currently provides service to approximately 164,000 people and expects to serve nearly 240,000 people by 2045. The Project is located within the Elsinore Division.

ES.3 Project Description

The Project would consist of two new industrial warehouse buildings totaling 1,000,451 square feet on approximately 66 acres of land designated for limited industrial use. The Project is located at the southeast intersection of Baker Street and Pierce Street, south of Nichols Road, in the City of Lake Elsinore.

ES.4 Demands

Over the past five years, EVMWD used an average of 23,200 acre feet per year (AFY) of potable water. As part of its Urban Water Management Plan (UWMP), EVMWD analyzed several scenarios for potential future demands. Demands were developed using an annual growth rate of 1.5 percent, consistent with historical growth, and a population growth rate based on projections by the Southern California Association of Governments (SCAG). Both scenarios included an analysis based on gallons per capita per day (gpcd), and a 10 percent buffer was added to account for uncertainties. Ultimately, EVMWD elected to use a demand projection based on a 1.5 percent growth rate. The demand projections established in the 2020 UWMP include anticipated demand for planned developments.

EVMWD included this Project as a planned development as Reference No. 364 in the 2020 UWMP. The anticipated demands for the Project are estimated to be 52 AFY, as shown in Table ES.1.

Table ES.1 Project Area Demands

Land Use Designation	Acres	2024 Water System Master Plan Water Duty Factor (gpd/acre)	Expected Average Day Demand (gpd)	Annual Average Demand (AFY)
Limited Industrial	65.8	700	46,060	52
Development Total	65.8		46,060	52

Notes:
gpd - gallons per day

ES.5 Supplies

EVMWD utilizes three primary sources of potable water to meet demands, which include:

- Local groundwater pumped from EVMWD-owned wells throughout the Elsinore groundwater basin.
- Surface water from Canyon Lake Reservoir treated at the Canyon Lake Water Treatment Plant (CLWTP).
- Imported water purchased from the Metropolitan Water District of Southern California (Metropolitan) through Western Municipal Water District (Western).

EVMWD also produces recycled water for landscape and golf course irrigation. EVMWD plans to use these supplies to meet current and future demands under normal, single dry, and five consecutive dry years. EVMWD plans to utilize existing local sources prior to imported water. In addition, EVMWD has identified several projects to increase reliability in all years. Future projects include well replacement, construction of new wells, treatment upgrades at CLWTP, and indirect potable reuse (IPR).

EVMWD's anticipated future supplies are shown in Table ES.2.

Table ES.2 Projected Water Supplies, AFY (2020 UWMP Table 6-14)

Supply Type	Water Supply	2025	2030	2035	2040	2045
Imported Water	Treated Imported Water Western/Metropolitan(1)	26,286	26,286	26,286	26,286	26,286
Imported Water	Raw Imported Water Western/Metropolitan(1,2)	0	3,700	3,700	3,700	3,700
Groundwater	Elsinore Valley Subbasin	5,500	5,500	5,500	5,500	5,500
Groundwater	Coldwater Subbasin	1,200	1,200	1,200	1,200	1,200
Groundwater	Bedford Subbasin	1,300	1,300	1,300	1,300	1,300
Groundwater	Lee Lake Subbasin	875	875	875	875	875
Groundwater	Palomar Well Replacement	450	450	450	450	450
Groundwater	Temecula-Pauba Subbasin	0	0	750	750	750
Surface Water	Raw Water from Canyon Lake/CLWTP(3)	2,500	2,500	2,500	2,500	2,500
Other	IPR at Regional WRF(4)	0	0	0	940	1,970
Recycled Water	Regional WRF to Temescal Wash and Lake Elsinore Replenishment(4)	7,270	8,027	8,863	8,960	8,960

Supply Type	Water Supply	2025	2030	2035	2040	2045
Recycled Water	Metered Customers(5)	1,459	1,459	1,459	1,459	1,459
Recycled Water	Canyon Lake and Summerly Golf Course(5)	378	378	378	378	378
	Total	47,219	51,675	53,261	54,298	55,328

Notes:
WRF - water reclamation facility
(1) Imported water will be used to fill the gaps and will be based on the availability of local supplies. EVMWD can purchase more water at an additional charge.
(2) Starting in 2026, EVMWD plans to start purchasing about 3,700 AFY of raw imported water from Western/Metropolitan for treatment at the CLWTP.
(3) In settlement of litigation, EVMWD agreed not to treat more than 8,000 AFY of San Jacinto River flows in any water year at EVMWD's CLWTP. This 8,000 AFY limit applies only to San Jacinto River runoff and excludes any imported water conveyed in the river channel.
(4) In accordance with its National Pollutant Discharge Elimination System (NPDES) permit, EVMWD is permitted to discharging 0.5 million gallons per day (mgd) to Temescal Wash and 7.5 mgd to Lake Elsinore. EVMWD is planning to use excess wastewater collected at the Regional WRF to implement an IPR project. It is anticipated that this water will be available between 2035 and 2040.
(5) Includes recycled water produced by the three EVMWD WRFs and recycled water from Santa Rosa Regional Resources Authority (SRRRA) and Eastern.

ES.6 Supply and Demand Comparison

EVMWD has a surplus of water to meet its projected demands, which include the anticipated demands of 52 AFY for the Project. Therefore, EVMWD's supplies are adequate to provide the Project demands. EVMWD has a diverse supply portfolio that provides operational flexibility and reliability. In 2020, EVMWD relied on local groundwater to meet about 36 percent of the potable demands, promoted the use of recycled water to offset potable water needs, and imported water to meet any remaining demands. EVMWD intends to continue promoting conservation, evaluating supplemental supplies, and participating in projects, when feasible, to ensure EVMWD's water supply sources are protected and sustainable throughout the future. To mitigate and adapt to unpredictable conditions, EVMWD will continue to diversify its local water supply portfolio.

SECTION 1 INTRODUCTION AND PURPOSE

This WSA was prepared on behalf of the EVMWD by Carollo in accordance with the CWC Section 10910-10912 for the Baker Street Project Planning Application No. 2020-103, referred herein as the Project. This Section provides an overview of EVMWD and the Project.

In 2001, the California Legislature enacted SB 610 (Chapter 643, Statutes of 2001) and SB 221 (Chapter 642, Statutes of 2001), which amended the CWC to improve the linkage between water supply planning and new development. As required by SB 610, EVMWD is responsible for determining if its total projected water supplies will meet the projected water demand for the Project, in addition to EVMWD's existing and planned future uses.

The Project site has the existing land use designation of limited industrial under the General Plan and is currently vacant and undeveloped. The Project proposes the construction of two new industrial warehouse buildings totaling 1,000,451 square feet, along with auto and trailer parking areas. The Project area spans approximately 66 acres and is located within the County of Riverside (County).

The County is the Lead Agency for the Project under the California Environmental Quality Act (CEQA) and has determined that the Project is subject to review under CEQA (Public Resources Code, Section 21000 et. seq.), and the state CEQA Guidelines (California Code of Regulations, Section 15000 et. seq.). EVMWD must provide the assessment results to the County for inclusion in the CEQA document for the Project.

This section provides an overview of the law and purpose, EVMWD's service area, and the Project description.

1.1 Overview of the Law and Purpose

Effective January 1, 2001, the California Legislature enacted SB 610 (CWC Section 10910), which requires water suppliers to prepare a WSA for certain new developments, and SB 221 (California Government Code Section 66473.7), which mandates that any agency approving a subdivision (as defined in the code) must include written evidence that an adequate water supply is available as a condition for approval. SB 610 and SB 221 are companion measures intended to promote more collaborative planning between local water suppliers and cities and counties. Both statutes require detailed information regarding water availability to be provided to the city and county decision-makers before approving any specified large development projects.

Under SB 610, a water supplier must prepare a WSA for any project meeting specific size criteria and provide the results of the WSA to the Lead Agency for inclusion in the CEQA document. As defined in CWC Section 10912, a "project" is a development that is subject to CEQA and meets one of the following criteria:

1. A proposed residential development of more than 500 dwelling units.
2. A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
3. A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.

4. A proposed hotel or motel, or both, having more than 500 rooms.
5. A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
6. A mixed-use project that includes one or more of the projects specified in this subdivision.
7. A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

Per the California Government Code Section 66473.7, a "subdivision" means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, "subdivision" means any proposed residential development that would account for an increase of 10 percent or more in the number of the service connections. Based on this definition, the Project is not subject to SB 221.

The Project is subject to SB 610 because it is an industrial park planned to occupy more than 40 acres of land. A WSA must address whether the projected water supply under normal, single dry, and multiple dry water years is adequate to meet the demand projected for the Project plus existing and planned future uses. This WSA was prepared in accordance with SB 610 and includes the following:

- Section 1 - Introduction and Purpose. This chapter provides an overview of the WSA requirements, EVMWD service area, and the Project.
- Section 2 - Water Demands. This section describes EVMWD's existing and projected water demands.
- Section 3 - Water Supplies. This section summarizes EVMWD's existing and projected water supplies.
- Section 4 - Water Supply and Demand Analysis. This section compares demands and supplies under normal, single dry, and multiple dry water years to determine if supplies are adequate to meet the demand projected for the Project plus existing and planned future uses.

The EVMWD's 2020 UWMP was reviewed as it serves as a foundational document for a WSA. In addition, the following documents and information were reviewed to assess whether the projected supplies are sufficient to meet the Project demand in addition to the existing and planned future demands:

- 2024 Water System Master Plan, prepared in April 2024.
- 2024 Sewer System Master Plan, prepared in May 2024.
- Elsinore Valley Subbasin Groundwater Sustainability Plan (GSP), prepared in January 2022.
- Bedford-Coldwater Subbasin GSP, prepared in November 2021.
- EVMWD's planned developments tracking list.
- Draft Integrated Resources Plan, prepared in January 2024.

Based on a review of the aforementioned documents and information, the projected supplies were determined to be sufficient to meet the demands of planned developments, including the Project. Per Appendix H of the 2020 UWMP, the total estimated demand for planned developments was determined as approximately 12,800 AFY. This value was estimated using information about planned developments throughout the service area at the time, including the Project. As described in Section 2, the anticipated demand for the Project is 52 AFY. The demand projections in the UWMP account for the entire demand expected for the Project.

Since then, additional planned developments have been identified, with associated water demands estimated at approximately 2,490 AFY. Despite this increase in demand, the projected supplies from the 2020 UWMP remain sufficient to meet the total demand.

1.2 EVMWD Service Area

EVMWD, a public nonprofit agency, was created on December 23, 1950, under the Municipal Water District Act of 1911. As a special district, EVMWD's powers include the provision of public water service, water supply development and planning, wastewater treatment and disposal, and recycling. Currently, EVMWD has over 48,772 water, wastewater, and agricultural service connections.

EVMWD's service area has two divisions: the Elsinore Division and the TDSA. EVMWD's water service area includes the cities of Lake Elsinore and Canyon Lake, portions of Wildomar and Murrieta, and unincorporated Riverside County and Orange County land. A map of the service area is shown in Figure 1.

The Elsinore Division makes up most of the service area, with approximately 48,050 active domestic connections, encompassing an area of 96 square miles. The TDSA is located northwest of the EVMWD service area and is a self-sustained water division, hydraulically separate from EVMWD. It covers an area of approximately 2.5 square miles and has approximately 722 connections. EVMWD currently obtains its water from 13 operating groundwater wells, the CLWTP, and imported water from Metropolitan through the Auld Valley Pipeline (AVP) and the Temescal Valley Pipeline (TVP).

EVMWD currently operates three WRFs: Regional WRF, Horsethief Canyon WRF, and Railroad Canyon WRF. In addition, wastewater flow in the southern part of EVMWD's service area is treated at the Santa Rosa WRF owned and operated by the SRRRA. These four reclamation facilities serve four major service areas within EVMWD's wastewater collection system. Each service area consists of gravity collectors, trunk lines, lift stations, and force mains, which convey flow to the treatment plants. Effluent from all of these WRFs meets Title 22 disinfected tertiary standards and can be used for non-potable water supply to EVMWD's recycled water system. EVMWD's wastewater system is described in more detail in the 2024 EVMWD Sewer System Master Plan (Carollo, 2024a).

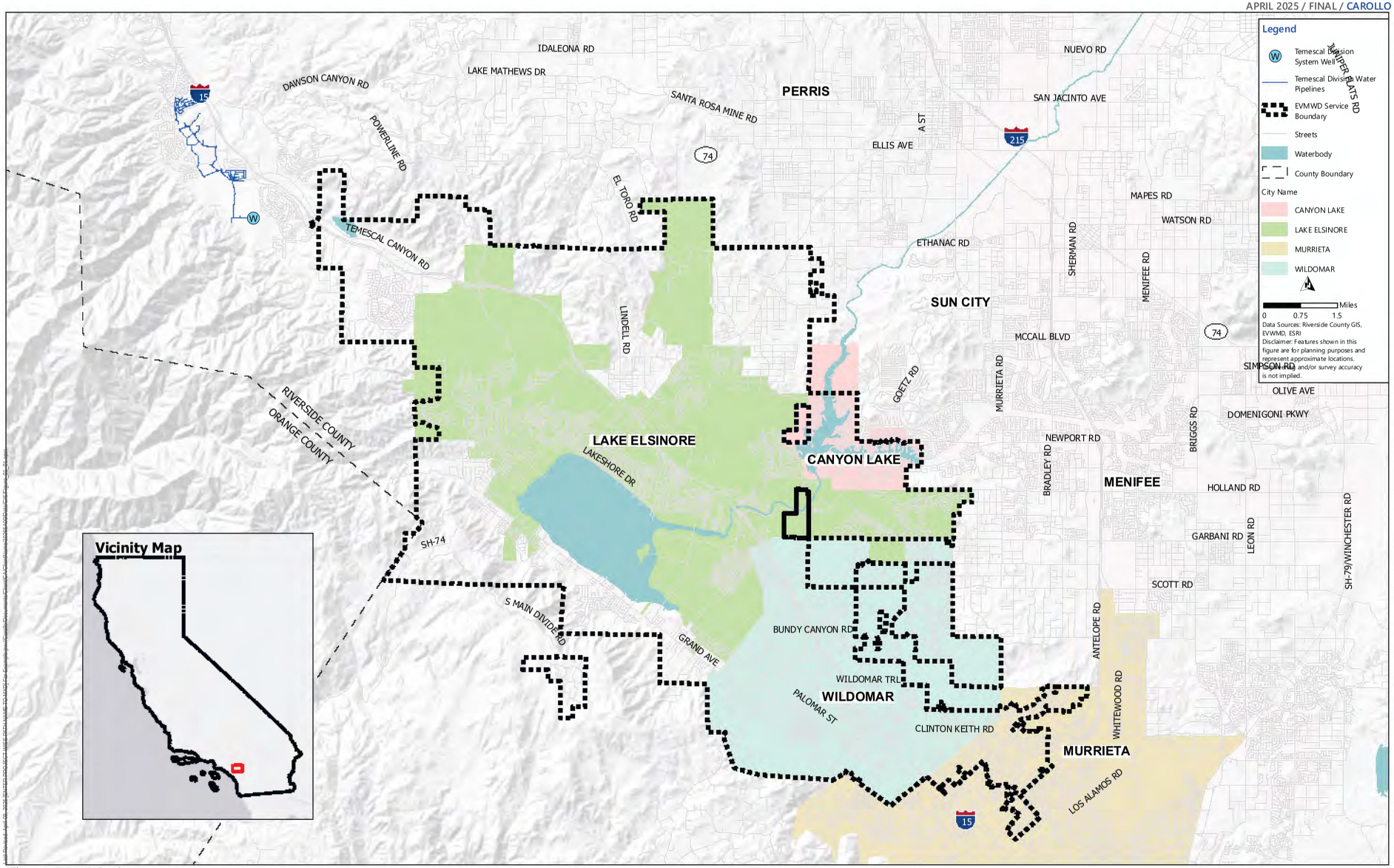


Figure 1 EVMWD Service Area
ELSINORE VALLEY MUNICIPAL WATER DISTRICT
BAKER STREET WATER SUPPLY ASSESSMENT

1.2.1 Service Area Population

Per the 2020 EVMWD UWMP, the District's 2020 population is approximately 163,984. Future service area population was estimated using the Department of Water Resources (DWR) Population Tool Persons per Connections (PPC) value and a 1.5 percent growth rate in the number of residential connections. Table 1 shows the current and projected populations for the EVMWD service area.

Table 1 Current and Projected Population (2020 UWMP Table 3-2)

Population Served(1)	2020	2025	2030	2035	2040	2045
EVMWD	163,984	176,657	190,310	205,018	220,863	237,932

Notes:
(1) Based on DWR's online Population Tool and adjusting the tool to use the 2010 PPC values. The projected populations are based on 2010 census data and a connection annual growth rate of 1.5 percent.

1.2.2 Land Uses within Service Area

Per the 2020 EVMWD UWMP, EVMWD serves portions of several cities and unincorporated county lands. The percentage of these cities and unincorporated areas that fall within the EVMWD service area is provided in Table 2. The current land uses within the EVMWD service area, obtained from the SCAG, are shown in Table 3 (Southern California Association of Governments, 2020).

Table 2 EVMWD Service Area Compositions per Jurisdiction (2020 UWMP Table 3-5)

Jurisdiction	Percentage of Jurisdiction's Area Within EVMWD
Lake Elsinore	100%
Canyon Lake	88%
Wildomar	94%
Murrieta	16%
Unincorporated	7%

Table 3 Land Uses Within the EVMWD Service Area (2020 UWMP Table 3-4)

Land Use	Acres	Percentage of EVMWD Area
Single Family Residential	23,009	37%
Multi-Family Residential	497	0.8%
Mixed Residential	357	0.6%
Rural Residential	3,593	6%
Commercial and Services	1,601	3%
General Office	28	0%
Facilities	612	1%
Industrial	1,310	2%
Transportation, Communications, and Utilities	348	0.6%
Mixed Commercial and Industrial	276	0.4%
Mixed Residential and Commercial	709	1%
Open Space and Recreation	7,414	12%

Land Use	Acres	Percentage of EVMWD Area
Water	981	2%
Specific Plan	13,328	21%
Other	8,048	13%
Total	62,110	100%

1.3 Baker Street Proposed Project Description

The Baker Street Proposed Project area consists of approximately 66 acres as shown in Table 4. The Project is planned to construct two new industrial warehouse buildings totaling 1,000,451 square feet with no set construction date. The Project is located at the southeast intersection of Baker Street and Pierce Street, south of Nichols Road, in the City of Lake Elsinore. Figure 2 depicts the Project location. Additional maps are provided in Appendix A.

Table 4 Baker Street Proposed Project Land Use Plan Summary

Land Use Designation	Acres
Limited Industrial	65.8
Project Total	65.8



Figure 2 Baker Street Project Location
ELSINORE VALLEY MUNICIPAL WATER DISTRICT
BAKER STREET WATER SUPPLY ASSESSMENT

SECTION 2 WATER DEMANDS

This section discusses existing and future potable and recycled water demands and the projected demands for the Project.

2.1 Existing Water Demands

Over the past five years, EVMWD used an average of 23,200 AFY of potable water. The most recent peak in demand occurred in 2020, with a total demand of 23,653 AFY, which is a 1,290 AFY increase since 2016. Table 5 shows 2016 through 2020 water demands. Residential demand accounts for about 71 percent of the total demand and has remained relatively constant since 2016. In 2020, however, there was a 3 percent increase in residential use compared with 2019 and a 1 percent reduction in commercial water use. Water use in 2020 was affected by the COVID-19 pandemic, government-mandated closures of schools and businesses, and extended stay-at-home orders.

Table 5 Historical and Current Potable Water Use by Customer Class, AFY (2020 UWMP Table 4-1)

Customer Class	2016	2017	2018	2019	2020
Residential	15,425	16,130	16,964	15,769	17,162
Commercial	4,570	4,889	5,103	4,364	4,409
Institutional/Governmental	108	116	121	117	82
EVMWD	118	111	2,365	118	54
Hydrant	205	174	181	236	168
Sales/Transfers/Exchanges to Other Agencies - Farm Mutual Water Company	282	294	319	305	332
Losses(1)	1,659	1,183	-1,590	1,488	1,446
Total Consumption	22,367	22,898	23,462	22,397	23,653

Notes:
(1) In 2018, there were about 2,300 acre feet (AF) reported under the EVMWD at no charge. This is likely a reporting discrepancy, which caused the calculated water loss to be negative.

In 2020, about 1,218 AFY of recycled water was used by EVMWD customers for landscape and golf course irrigation. This included recycled water produced by the three EVMWD WRFs and from SRRRA and recycled water from Eastern Municipal Water District (EMWD).

The effluent from the Regional WRF is discharged to Temescal Wash and Lake Elsinore under CA Order No. R8-2013-0019, NPDES No. CA8000027. EVMWD is required to discharge into Lake Elsinore for lake stabilization and 0.5 mgd to Temescal Wash for wetland enhancement. In 2020, about 6,585 AFY (5.87 mgd) was discharged to Temescal Wash and Lake Elsinore.

2.2 Future Water Demands

The potable and recycled water demands presented in the 2020 UWMP are shown in Table 6. The potable demands were estimated using a constant value of gpcd, with a constant growth rate in connections and

population of 1.5 percent per year, and a 10 percent planning buffer. The demand projections in the 2020 UWMP include planned developments as documented in Appendix H of the 2020 UWMP.

Table 6 Total Gross Water Use, AFY (2020 UWMP Table 4-7)

	2020(1)	2025(2)	2030	2035	2040	2045
Potable Water	23,653	29,825	32,130	34,613	37,288	40,170
Recycled Water	7,803	9,107	9,864	10,700	10,797	10,797
Total Water Use	31,456	38,932	41,994	45,313	48,085	50,967

Notes:
(1) Historical demands for 2020.
(2) Projected demands for 2025 through 2045.

Per the 2020 UWMP, the projected potable demand by customer class is summarized in Table 7.

Table 7 Projected Demands for Potable Water, AFY (2020 UWMP Table 4-6)

Use Type	Projected Water Use				
	2025	2030	2035	2040	2045
Residential	20,594	22,300	24,137	26,114	28,247
Commercial	5,560	5,989	6,452	6,951	7,488
Institutional/Governmental	103	111	119	129	138
EVMWD	65	70	75	81	87
Hydrant	212	228	246	265	285
Sales/Transfers/Exchanges to Other Agencies - Farm Mutual Water Company	1,464	1,464	1,464	1,464	1,464
Losses	1,827	1,968	2,120	2,284	2,461
Total	29,825	32,130	34,613	37,288	40,170

The recycled water projections by demand category are shown in Table 8. The recycled water demands include the discharge requirements for Temescal Wash and Lake Elsinore for reference.

Table 8 Projected Recycled Water Demands, AFY (2020 UWMP Table 6-9)

Recycled Water Demands	2020	2025	2030	2035	2040	2045
Temescal Wash and Lake Elsinore Replenishment	6,585	7,270	8,027	8,863	8,960	8,960
Metered Customers	895	1,459	1,459	1,459	1,459	1,459
Canyon Lake and Summerly Golf Course	323	378	378	378	378	378
Total Water Use:	7,803	9,107	9,864	10,700	10,797	10,797

2.3 Baker Street Proposed Project Demands

Per the information in the application exhibits provided to Riverside County on July 22, 2024, for Planning Application No. 2020-103, the Project consists of approximately 65.8 acres of land designated for limited industrial land use. The Project demand, shown in Table 9, was estimated using the 2024 Water System Master Plan water duty factor for the associated land use multiplied by the project area. The estimated demand for the Project is about 46,060 gpd or 52 AFY.

Table 9 Project Area Demand Projections

Land Use Designation	Acres	2024 Water System Master Plan Water Duty Factor (gpd/acre)	Expected Average Day Demand (gpd)	Annual Average Demand (AFY)
Light Industrial	65.8	700	46,060	52
Development Total	65.8		46,060	52

2.4 Summary of Future Demands

Per the 2020 UWMP, the potable demand is anticipated to increase by 6,170 AFY by 2025 and by 16,520 AFY by 2045. The 2020 UWMP Appendix H included the Project as Reference No. 364. The total demand for planned developments tracked at that time, including the Project, was estimated at 12,800 AFY. The Project has an estimated demand of 52 AFY.

Based on the most recent planned development tracking list, additional developments identified after the 2020 UWMP have an estimated demand of 2,490 AFY, as detailed in Appendix B. The total demand for all planned developments at the time of this WSA is now estimated to be 15,290 AFY, which remains within the projected demand increase of 16,520 AFY by 2045.

SECTION 3 WATER SUPPLIES

This section identifies and quantifies, to the extent practicable, the existing and planned water supplies for EVMWD through 2045. EVMWD has three primary water sources to meet potable demands: groundwater, surface water, and imported water. EVMWD also provides recycled water throughout its service area for landscape and golf course irrigation.

3.1 Existing Water Supplies

EVMWD's three primary sources of potable water supply are:

1. Local groundwater pumped from EVMWD-owned wells.
2. Surface water from Canyon Lake Reservoir treated at the CLWTP.
3. Imported water purchased from Metropolitan through Western.

EVMWD also produces recycled water for landscape and golf course irrigation.

EVMWD plans to use these supplies to meet current and future demands under normal, single dry, and five consecutive dry years. EVMWD is also planning several projects to increase the reliability of its local water supplies, which include adding or replacing groundwater wells, purchasing raw imported water, and pursuing an IPR project.

Figure 3 shows historical water production by source for 2016 through 2020. In 2020, EVMWD met customer demands using groundwater and imported water only because the CLWTP was taken offline in March 2020 following detection of per- and polyfluoroalkyl substances (PFAS). Until PFAS levels have been treated and reduced, EVMWD will continue to use additional imported water. EVMWD has evaluated multiple treatment alternatives for PFAS in Canyon Lake and is pursuing a hybrid granular activated carbon and ion exchange (GAC/IX) treatment approach to lower levels of PFAS and address other water quality concerns, including taste and odor. As part of these upgrades, the CLWTP treatment capacity will be expanded to produce a total of 6,200 AFY of water. It is anticipated that about 2,500 AFY will be produced using natural runoff entering Canyon Lake, and 3,700 AFY will be produced by purchasing raw imported water from Western. Upgrades at the CLWTP are anticipated to be completed in 2028.

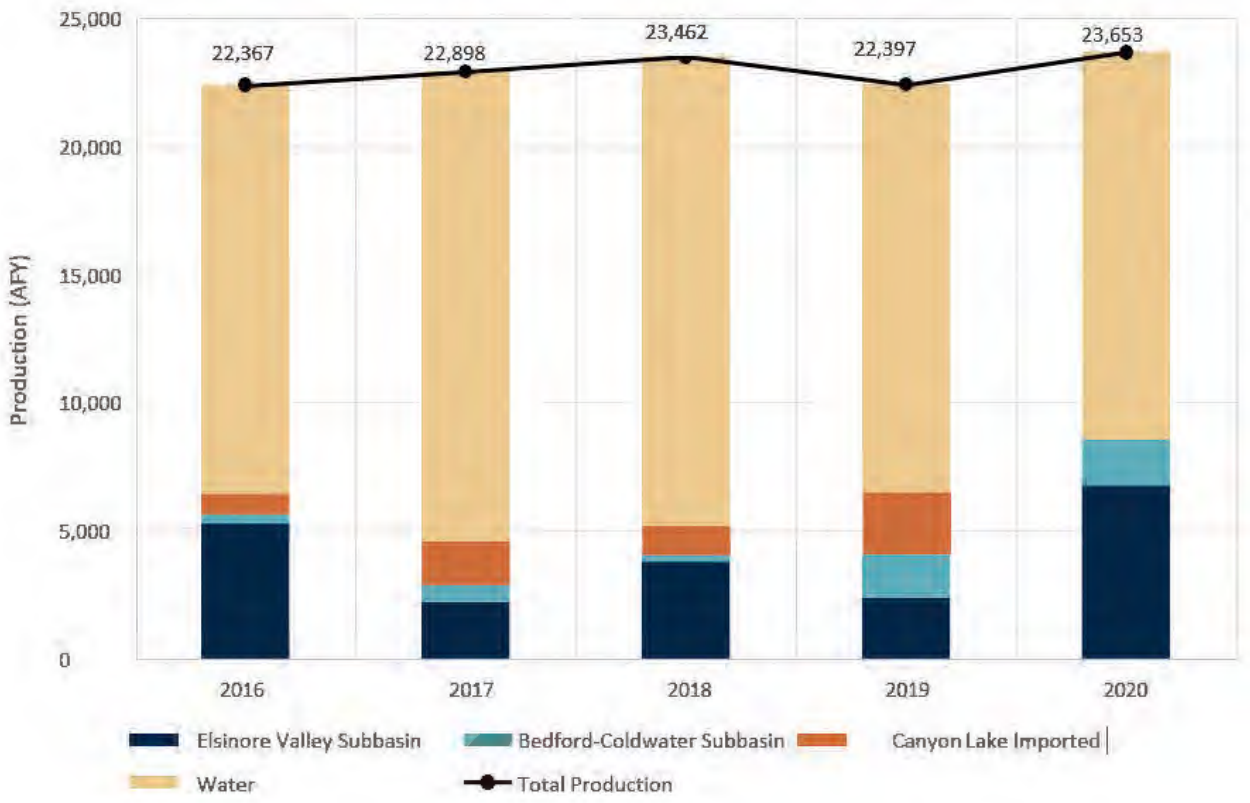


Figure 3 EVMWD Historical Water Production, AFY (from 2020 Urban Water Management Plan)

3.1.1 Purchased or Imported Water

EVMWD first relies on local supplies before purchasing water from Western. EVMWD purchases water from Metropolitan through Western and receives the water at two locations. The first location provides water treated at Metropolitan's Robert A. Skinner Treatment Plant, which primarily blends Colorado River water with a small amount of State Water Project (SWP) water. This water is pumped through the AVP and interconnection EM-17. EVMWD can receive or acquire a maximum flow rate of 20.2 mgd through the AVP. To reserve capacity for maximum day demand conditions, it is assumed that EVMWD will be able to obtain 16,256 AFY (or 14.5 mgd) from the AVP annually during average and wet years. This provides reserve capacity to meet maximum day demands.

EVMWD also receives imported water from Western through the TVP. The TVP delivers SWP water treated at Metropolitan's Mills Treatment Plant and conveyed through Western's Mills Gravity Pipeline. Through a series of transfers, the EVMWD has the capacity to receive 13.6 mgd (15,200 AFY) in the TVP. The TVP was designed to convey 26.5 mgd with the construction of a proposed booster pumping station. The current hydraulic capacity of the TVP is limited to 12.7 mgd (14,190 AFY) based on gravity flow from the Mills Gravity Pipeline. It is assumed that EVMWD can obtain 8.9 mgd (10,030 AFY) from the TVP annually. Therefore, EVMWD will be able to obtain 23.4 mgd (26,286 AFY) of treated imported water from the two connections during average and wet years.

The total volume of purchased water from 2016 to 2020 is presented in Table 10. The highest purchased year was in 2017, toward the end of the drought period.

Table 10 2016-2020 Purchased Water, AFY (2020 UWMP Table 6-1)

Year	TVP	AVP	Total
2016	6,598	9,347	15,945
2017	6,919	11,404	18,322
2018	5,774	12,503	18,276
2019	4,998	10,918	15,917
2020	5,338	9,777	15,115
Average	5,925	10,790	16,715

3.1.2 Groundwater

EVMWD relies on local groundwater basins as a significant source to meet current and future potable demands. Currently, EVMWD pumps water from the Elsinore Valley Subbasin and the Bedford-Coldwater Subbasin. EVMWD has been actively managing the groundwater subbasins and currently serves as the Groundwater Sustainability Agency (GSA) for the Elsinore Valley Subbasin, referred to as "EVGSA," and as a partner in the Bedford-Coldwater Groundwater Sustainability Authority (BCGSA), which serves as the GSA for the Bedford-Coldwater Subbasin. Both GSAs have developed GSPs, which call for the basins to be sustainably managed. Detailed descriptions of the groundwater basins that supply EVMWD are presented in this section.

3.1.2.1 Elsinore Groundwater Basin

The Elsinore Groundwater Basin, designated by the DWR as basin 8-004, is a major source of potable groundwater supply for EVMWD and other private groundwater producers. Water rights for the Elsinore Basin are not adjudicated (Montgomery Watson Harza, Inc. [MWH], 2005).

In 2005, EVMWD adopted the Groundwater Management Plan (GWMP) for portions of the DWR-designated Elsinore Groundwater Basin (MWH, 2006). The mapped boundaries of the basin, however, were not well aligned with the alluvial materials and did not cover the Bedford-Coldwater area. In 2016, as part of the Sustainable Groundwater Management Act (SGMA), EVMWD collaborated with the City of Corona and Temescal Valley Water District (TVWD) to formally modify the Elsinore Basin boundary. This update partitioned the Elsinore Basin into two subbasins: Elsinore Valley Subbasin, which includes the Elsinore Valley, Warm Springs, and Lee Lake groundwater basins, and the Bedford-Coldwater Subbasin. The Bedford-Coldwater area is within the Temescal Wash watershed. The revised basin boundaries are presented in Figure 4, and the EVGSA and BCGSA boundaries are presented in Figure 5 and Figure 6, respectively.

As part of SGMA compliance, EVMWD became the exclusive GSA for the Elsinore Valley subbasin. EVMWD, the City of Corona, and the TVWD formed a GSA to manage the Bedford-Coldwater subbasin. The GSAs' authorizations are included in Appendix C. Both GSAs have developed separate GSPs to achieve long-term groundwater sustainability. The GSPs determine the sustainable water budget for these subbasins, develop sustainable management criteria, establish minimum thresholds to evaluate groundwater conditions, and implement a monitoring network. In addition, projects to ensure that these basins are sustainable are identified. Descriptions of these subbasins are provided in this section.

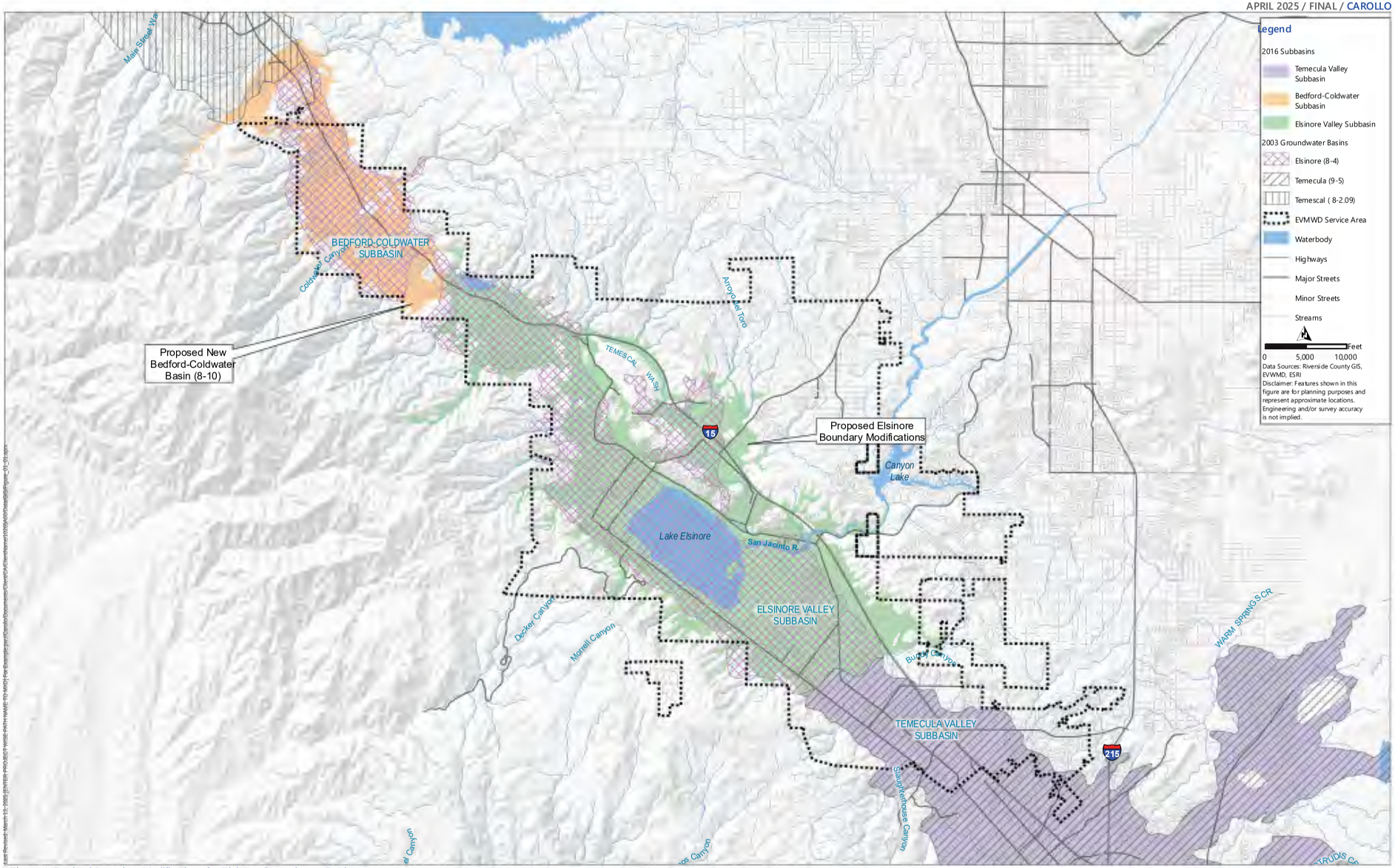


Figure 4 Revised Boundary Modifications for Elsinore Groundwater Basin
ELSINORE VALLEY MUNICIPAL WATER DISTRICT
BAKER STREET WATER SUPPLY ASSESSMENT

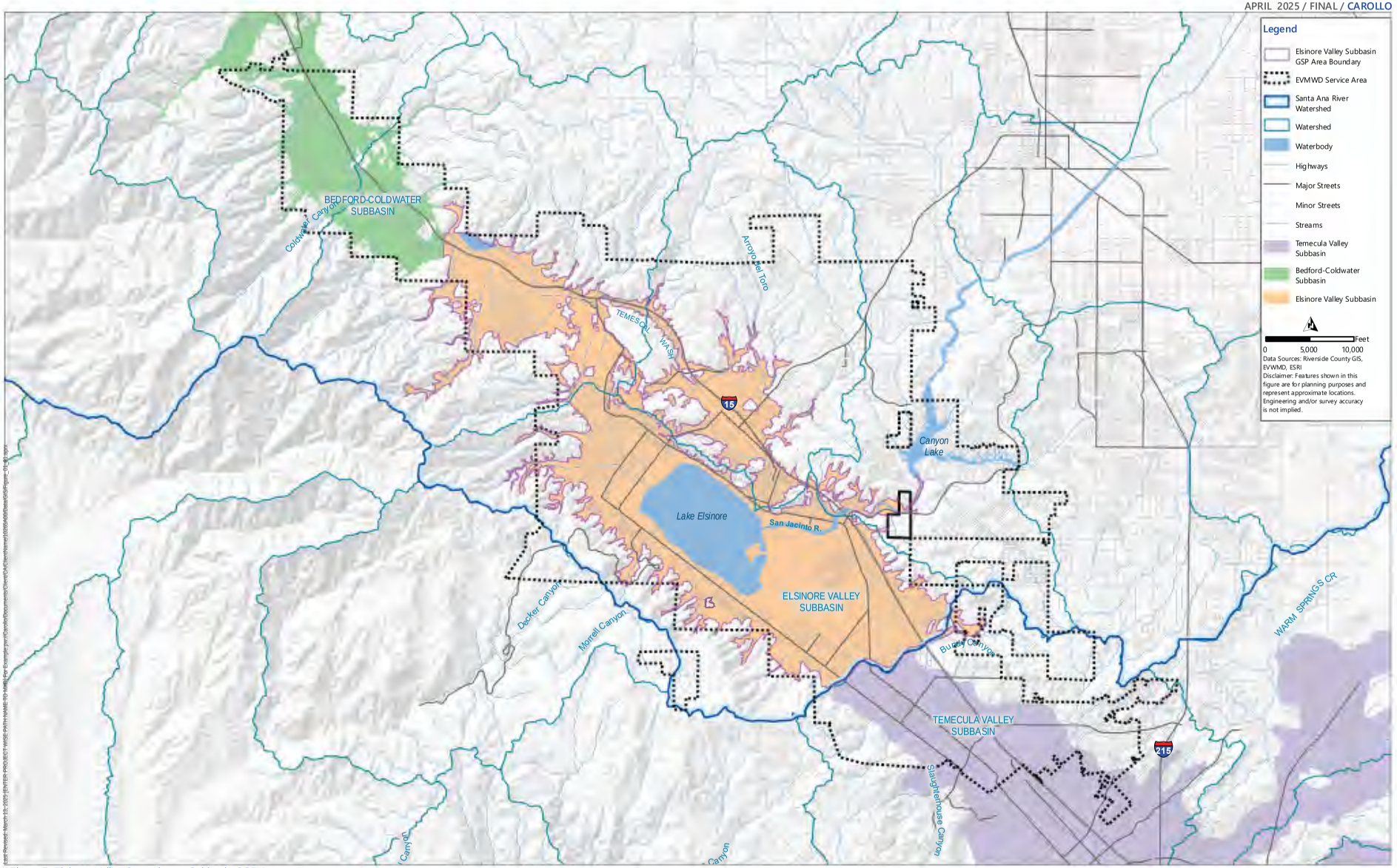


Figure 5 Elsinore Valley Groundwater Subbasin GSP Area
ELSINORE VALLEY MUNICIPAL WATER DISTRICT
BAKER STREET WATER SUPPLY ASSESSMENT

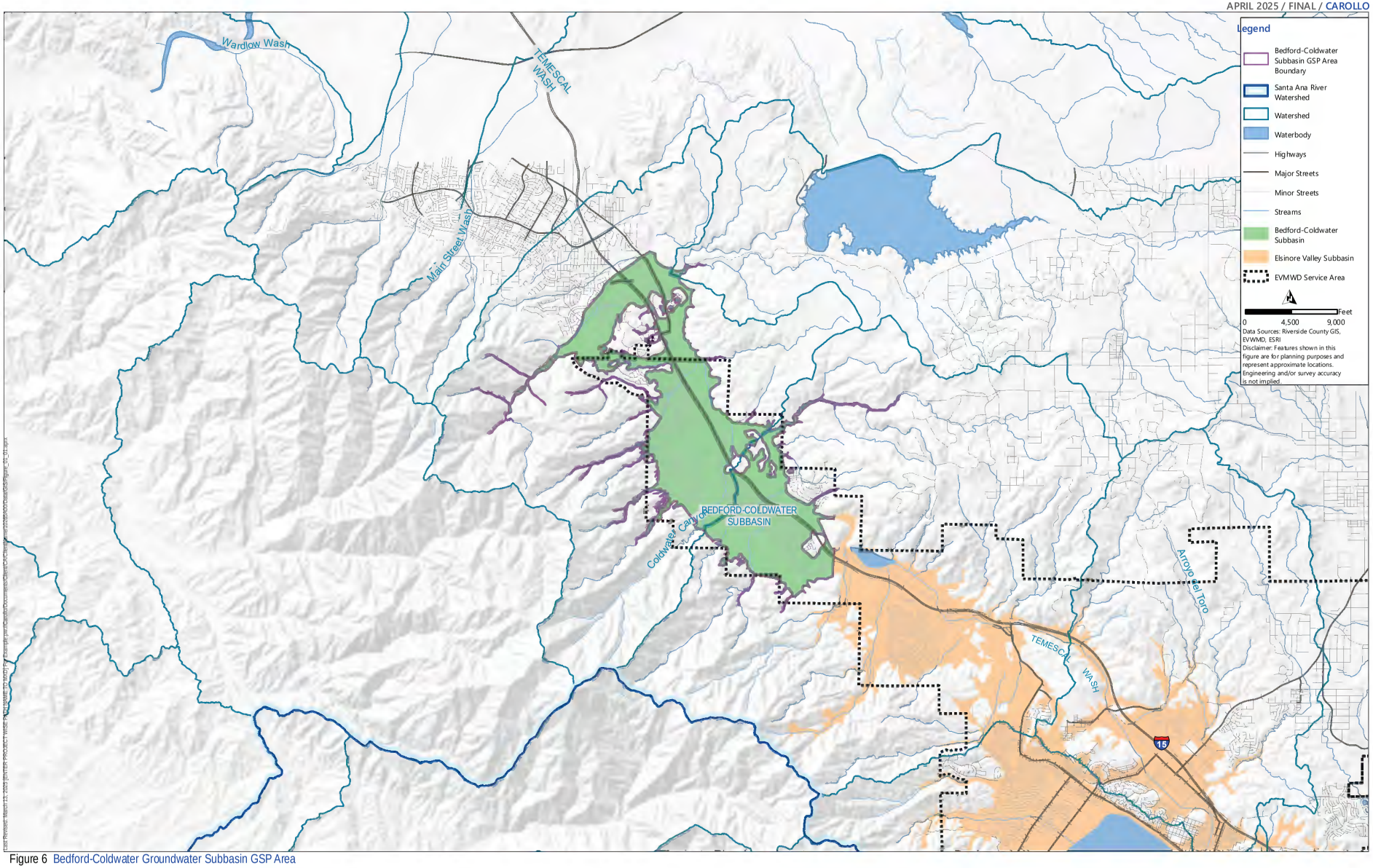


Figure 6 Bedford-Coldwater Groundwater Subbasin GSP Area
ELSINORE VALLEY MUNICIPAL WATER DISTRICT
BAKER STREET SSUPPLY ASSESSMENT

Elsinore Valley Subbasin

The Elsinore Valley Subbasin (8-4.1) underlies a portion of the Elsinore Groundwater Basin (8.4) in southwestern Riverside County and covers approximately 200 square miles, or 23,600 acres. The Elsinore Valley Subbasin is classified as a medium-priority basin and is not identified as being subject to critical conditions of overdraft. As a medium-priority basin, the Elsinore Valley Subbasin was required to complete a GSP by January 31, 2022.

The Elsinore Valley Subbasin is adjacent to two other groundwater basins/subbasins: the Bedford-Coldwater Subbasin of the Elsinore Groundwater Basin (8-4.2) to the north and the Temecula Valley Basin (9-5) to the south (Carollo, 2022) and consists of the Elsinore, Lee Lake, and Warm Springs hydrologic areas or management areas, as shown in Figure 5. The Elsinore area is the largest area and provides most of the groundwater production. EVMWD is the primary producer of groundwater in the subbasin and accounts for 99 percent of groundwater production. Since the adoption of the 2005 GWMP, EVMWD has limited its pumping (to approximately 5,550 AFY) to be consistent with the safe yield of the Elsinore Valley Basin (Carollo, 2022). The sustainable yield for the Elsinore Valley, Lee Lake, and Warm Springs management areas were confirmed in the GSP and are provided in Table 11 below.

Table 11 Estimated Sustainable Yield (Elsinore Valley Subbasin GSP Table 5.5)

Management Area	Sustainable Yield (AFY)		
	Historical Period (1993 to 2017)(1)	Baseline 50-Year Period(2)	Growth Plus Climate Change 50-Year Period(4)
Elsinore	6,878	6,301	6,617
Warm Springs	103	27	958(5)
Lee Lake	1,040	410(3)	1,108(6)
Total	8,021	6,737	8,683

Notes:
(1) Historical periods reflect 1993 to 2017 conditions.
(2) The 50-year baseline simulation assumes that current pumping practices will continue in the future and use historical hydrology for 1993-2017 two times in succession. This scenario assumes increased pumping in dry years and decreased pumping in wet years due to conjunctive use program (CUP) agreements.
(3) In recent years, the Lee Lake Area has had reduced pumping due to a reduction in agricultural irrigation demands in the area.
(4) The 50-year growth plus climate change simulation assumes that increased demand in the future and use historical hydrology for 1993-2017 two times in succession. This scenario assumes increased pumping in dry years and decreased pumping in wet years due to CUP agreements.
(5) The growth plus climate change simulation assumes increased pumping in the Warm Springs Area as documented in the Hydrogeologic Study of the Warm Springs Groundwater Basin report (Geoscience and Kennedy/Jenks Consultants 2017).
(6) The growth plus climate change simulation assumes increased pumping in the Lee Lake Area due to plans for using this Area as a municipal supply.

Bedford-Coldwater Subbasin

EVMWD currently has two production wells in the Bedford Subbasin and two wells in the Coldwater Subbasin. The Bedford-Coldwater Subbasin (8-4.2) is classified as a very low-priority basin and is not identified as being subject to critical conditions of overdraft. Although not required to complete a GSP, the BCGSA has elected to continue the GSP development process to gain a more comprehensive understanding of the groundwater basin and ensure that it is sustainably managed into the future.

The Bedford-Coldwater Subbasin (8-4.2) is located north of the Elsinore Valley Subbasin, as shown in Figure 6. To the northwest, the subbasin is bound by a groundwater divide near the Bedford Wash and bounded by consolidated rocks of the Estelle Mountains and Santa Ana Mountains on the east and west (California Department of Water Resources, n.d.). The subbasin is approximately 7,030 acres in size (Groundwater Exchange, n.d.). The sustainable yield for the Bedford and the Coldwater subbasins were estimated in the GSP and are provided in Table 12 below.

Table 12 Estimated Sustainable Yield (Bedford-Coldwater Subbasin GSP Table 5-5)

Management Area	Sustainable Yield (AFY)		
	Historical Period (1993 to 2017)(1)	Baseline 50-Year Period(2)	Growth Plus Climate Change 50-Year Period(2)
Bedford	1,808	1,419	2,047
Coldwater	4,319	4,581	5,088
Total	6,127	6,000	7,134

Notes:
(1) For the historical sustainable yield estimate, average annual water budgets during 1993 to 2017 were used.
(2) The 50-year future simulation uses historical hydrology for 1993 to 2017 two times in succession.

The City of Corona, EVMWD, and TVWD have all relied on groundwater from the basin for municipal use. In 2008, Corona and EVMWD established a legal agreement for the Coldwater area, where most of the pumping occurs, with a goal of giving Corona and EVMWD the ability to estimate annual groundwater production that ensures the sustainability of the subbasin as a water supply (Todd et al., 2021). The agreement provides a process for allocating production on an annual basis, accounting for production rights and a groundwater storage account. Historically, EVMWD has pumped approximately one-third of the total water production in the Coldwater area, and it is expected that EVMWD's production share will remain the same.

3.1.2.2 Other Considerations

Well Production Capacity

EVMWD has nine active production wells within the Elsinore Valley Subbasin and two active production wells within the Bedford Subbasin. Wells within the Bedford Subbasin serve the Elsinore Division area. There are two active production wells within the Coldwater Subbasin that primarily serve the TDSA. The combined total pump capacity from these wells is 20,027 AFY, if the wells are run continuously, and is presented in Table 13.

Table 13 Active EVMWD Groundwater Wells (2020 UWMP Table 6-2)

Basin	Groundwater Well	Capacity, AFY
Elsinore Valley Subbasin	Cereal No. 1 Well	2,330
	Cereal No. 3 Well	1,730
	Cereal No. 4 Well	2,720
	Corydon Street Well	1,630
	Diamond Well	2,510
	Joy Street Well	1,000

Basin	Groundwater Well	Capacity, AFY
	Machado Street Well	1,145
	Summerly Well	2,742
	Terra Cotta Well	1,250
Bedford Subbasin	Flagler 2A	810
	Flagler 3A	820
Coldwater Subbasin	Mayhew Well	930
	Station 71 Well	410
Total		20,027

EVMWD's groundwater facilities also include the Back Basin Groundwater Treatment Plant. The treatment plant provides centralized treatment for arsenic for two EVMWD wells, Cereal 3 and Cereal 4. The existing capacity of the plant is 3,500 gallons per minute (gpm) (approximately 5,600 AFY), with the ability to expand to 7,000 gpm (approximately 11,300 AFY). If the plant was expanded, then groundwater extracted from other wells could also be treated for arsenic (Carollo, 2021). Currently, the Joy and Machado wells are blended together, and the Cereal 1, Corydon, Diamond, and Summerly wells are blended together for arsenic (Carollo, 2024b).

In 2019, the Flagler Wells were completed. The Project converted two wells that were used for agricultural irrigation into drinking water wells (Flagger 2A and Flagger 3A) and constructed the Flagler Water Treatment Plant and pump station.

EVMWD also has two non-potable wells that have been used to augment Lake Elsinore water levels. Since the development of the 2005 GWMP, the wells have only been used when there has been insufficient storm water and recycled water available to maintain the minimum lake elevation goal of 1,240 feet in Lake Elsinore (MWH, 2011).

Groundwater Storage Program

The 2005 GWMP estimated that the Elsinore Basin has significant storage capacity to support groundwater storage programs and identified conjunctive use projects as an important element of basin management. This storage capacity can be used to store water during wet years (when available) and perform extractions during dry-year conditions. Metropolitan has funded recharge projects as part of a groundwater storage program.

Since 2005, EVMWD has been a participant in the Metropolitan CUP. Eight of EVMWD's groundwater wells were converted to dual-purpose injection/extraction (Carollo, 2022). The Elsinore Basin CUP agreement was issued in December 2006 and amended in May 2008. Typically, during any fiscal year (beginning on July 1 and ending on June 30), Metropolitan can deliver up to 3,000 AFY of water for storage in the Elsinore Basin. EVMWD's dual-purpose wells are used to inject these deliveries into the Elsinore Basin. The total maximum that can be stored in the groundwater basin is 12,000 AF. Metropolitan may also extract up to 4,000 AFY of water stored in the Elsinore Basin as part of the CUP program. During a dry year, when stored Metropolitan water is required from EVMWD, imported supply from Western is reduced rather than EVMWD extracting groundwater to deliver to Metropolitan. The program has been successfully implemented for the past 10 years, storing a total of 15,251 AF and extracting approximately 8,109 AF.

More recently, in-lieu groundwater recharge has been implemented and is expected to continue given its advantages compared with using dual-purpose wells.

Santa Ana River Conservation and CUP

The Santa Ana River Conservation and CUP (SARCCUP) is a multiagency, watershed-wide program that develops dry-year supply by banking wet-year water; it integrates water-conservation measures and habitat enhancements efforts. The SARCCUP will develop a 180,000 AF groundwater bank storage program. The SARCCUP will have the capacity to store 60,000 AFY during each of three wet years in a decade and extract 60,000 AFY during three dry years within a decade.

The SARCCUP component in the Elsinore Valley Subbasin would have a 4,500 AF storage capacity and facilitate average annual recharge of 1,500 AF over three years. As part of SARCCUP, the construction of two production wells in the Lee Lake Subbasin is anticipated to be completed in mid- to late 2025. The groundwater storage will be achieved by using an in-lieu recharge program approach, which consists of EVMWD decreasing its annual pumping compared with the historical average value (safe yield) by 1,500 AFY during the three-year cycle to store delivered SARCCUP water in the Elsinore Valley Subbasin. The SARCCUP projects will supplement EVMWD's existing CUP with Metropolitan.

Other Groundwater Rights

EVMWD acquired the Temescal Water Company (TWC) in 1989, making EVMWD the majority shareholder (57.85 percent) in the Meeks and Daley water rights. This stock provides EVMWD with water rights; production/conveyance capacity within the Gage Canal and Riverside Canal; and rights to the Palm Avenue Well, located in Grand Terrace, Riverside County. The basin is managed per the 1969 judgment in the case of Western Municipal Water District of Riverside County v. East San Bernardino County Water District. The construction of Seven Oaks Dam in 1998 allowed for capture of "new conservation" water. Starting in 2013, based on the proportional share (3.38 percent) of the total new conservation water, the Meeks and Daley water rights increased to 8,091 AFY in the Bunker Hill Basin. Because EVMWD receives 57.85 percent of the Meeks and Daley water rights, this new water increases EVMWD's water right entitlement to 4,680.6 AFY from the Bunker Hill Basin (MWH, 2016b).

Also, as part of the 1969 judgment, Meeks and Daley have an annual base right of 836 AFY to extract water from the Colton Basin; 801 AF and 35 AF of the base right water volumes can be delivered for use in Riverside and San Bernardino counties, respectively. For the period 1989-2013, the total average yearly extraction was 551.5 AF from the Colton Basin, representing 66 percent of the base water right amount. For the cited period, the total amount of unused water was 8,289 AF. Because EVMWD receives 57.85 percent of the Meeks and Daley water rights, EVMWD receives 484.6 AFY from the Colton Basin. EVMWD can extract water from the Riverside Basin area at an annual base right of 1,263 AFY. The total water right amount can be delivered for use in Riverside County. For the period 1989-2013, total average yearly extraction was 849.6 AFY, representing 67 percent of the base right amount. For the cited period, the total amount of unused water was 13,100 AF.

In addition, Meeks and Daley has the right to a one-time amount of approximately 1,448 AF of water that was stored in the San Bernardino Basin Area (SBBA) during the 1998 to 2012 period.

In summary, EVMWD has a total of 6,428.2 AFY of water rights in San Bernardino/Riverside groundwater basins as a part of the acquisition of TWC, as shown in Table 14. Presently, EVMWD does not have the

infrastructure available to deliver water available from Meeks and Daley groundwater basins to its service area in the Elsinore Division. In November 2020, EVMWD and Western extended their 20-year agreement allowing Western to lease EVMWD's water rights in the SBBA, totaling 4,680 AFY. Western will lease this water from EVMWD and use an existing agreement with the City of Riverside to produce, treat, and deliver the water to its Riverside retail service area at a lower cost than imported water. The lease agreement, which provides cost savings to Western customers and revenue to EVMWD of approximately $930,000 per year, also includes an optional 20-year extension.

Table 14 Adjudicated Groundwater Rights (2020 UWMP Table 6-3)

Water Suppliers	Quantity, AFY	Notes
Bunker Hill Basin	4,680.6	Based on the 1969 Judgment includes "new conservation"
Rialto-Colton Basin	484.6	Based on the 1969 Judgment
Riverside Basin	1,263	Based on the 1969 Judgment
Total	6,428.2	

3.1.2.3 Past Five Years

Between 2016 and 2020, groundwater accounted for an average of 22 percent of EVMWD's total supply. Over that same period, groundwater accounted for as little as 13 percent and up to 36 percent of the total supply portfolio. In 2020, groundwater accounted for 36 percent because the CLWTP was not operating. EVMWD currently extracts groundwater from the Elsinore Valley Subbasin and the Bedford-Coldwater Subbasin.

Table 15 summarizes groundwater production from 2016 through 2020 by subbasin. As mentioned above, these subbasins are not adjudicated, and the completion of the GSPs will provide more guidance, such as revised safe yields, to better manage these groundwater basins.

Table 15 Groundwater Volume Pumped, AFY (2020 UWMP Table 6-4)

Groundwater Type	Location or Basin Name	2016	2017	2018	2019	2020
Alluvial Basin	Bedford-Coldwater Subbasin(1)	348	668	248	1,697	1,786
Alluvial Basin	Elsinore Valley Subbasin	5,266	2,198	3,779	2,369	6,751

Notes:
(1) Includes Mayhew Well, Station 71, Flagler 2A, and Flagler 3A. The Flagler wells were completed in 2019 and draw from the Bedford Subbasin.

3.1.3 Surface Water

The CLWTP is an integral part of EVMWD's local water supply portfolio, but this water source is currently not in use because PFAS was detected above the established notification levels in March 2020. EVMWD evaluated improvements for the CLWTP to increase its treatment capacity and treat for PFAS in Canyon Lake. As part of this process, the EVMWD has selected reestablishing the treatment capacity of the CLWTP to 7 mgd (average operation, 6,200 AFY). Currently, during the winter months, Canyon Lake receives approximately 2,500 AFY of water via natural runoff. To reach a capacity of 6,200 AFY, EVMWD will need to purchase an additional 3,700 AFY of raw water from Western through WR-31 that will be delivered via the San Jacinto River into Canyon Lake. This water will be purchased over an 8-month period because

most of the natural runoff occurs during the four winter months, when there is little need for purchased water. The water will discharge through a flow-control structure directly into the San Jacinto River.

The CLWTP was constructed in 1957 and was designed to treat 9 mgd. The existing treatment processes include coagulation, clarification, filtration, and disinfection. In past years, the CLWTP operation was limited between April and September at a production rate between 3 and 5 mgd because of water quality issues. As part of the alternative to address PFAS as well as taste and odor, EVMWD is pursuing a hybrid GAC/IX process. This alternative includes improvements to the following components: intake pumps, static and rapid mix, flocculation and sedimentation, ultraviolet disinfection, chlorine contact tank, and PFAS treatment with a control structure. Treatment for a maximum instantaneous flow of 7 mgd includes five 12-foot-diameter vessels placed in the lead position, three IX vessels placed in the lag position, and a 50,000-gallon backwash tank. Upgrades at the CLWTP are anticipated to be completed in 2028.

The total volume of surface water treated from 2016 to 2020 is shown in Table 16.

Table 16 2016-2020 Surface Water Production (2020 UWMP Table 6-5)

Year	Canyon Lake, AFY	Percentage of Total Supply
2016	808	4%
2017	1,709	7%
2018	1,158	5%
2019	2,414	11%
2020	0	0%

Through the acquisition of the TWC, EVMWD has the rights to divert up to 12,000 AFY of natural drainage from the San Jacinto River from approximately December 1 to June 1 and store water in Canyon Lake, also called the Railroad Canyon Reservoir, pursuant to Water Rights License 1533 (SDPW-DWR, 1935). A subsequent license allows the diversion of 2.4 cubic feet per second (cfs) of San Jacinto River water from approximately April 1 to May 31 of each season pursuant to Water Rights License 6327 (SWRB, 1961). As a part of this purchase, a River Lake Study was completed in October 2018 to assess the water balance in the San Jacinto. The study estimated a 10 percent water loss in the river.

In settlement of litigation regarding the release of water into Lake Elsinore, EVMWD and the City of Lake Elsinore agreed that EVMWD would not treat more than 8,000 AFY of San Jacinto River flows in any water year at EVMWD's CLWTP. This 8,000 AFY limit applies only to San Jacinto River runoff and excludes any imported water conveyed in the river channel. The Canyon Lake Property Owners Association (POA) leases the surface rights for Canyon Lake and land around the lake for recreational purposes under an agreement dating from 1968. The lease agreement between EVMWD and the Canyon Lake POA requires that the minimum lake elevation be kept at 1,372 feet above mean sea level. Historically, EVMWD discontinued the operation of the CLWTP if the lake level was expected to drop below 1,372 feet. If the level falls below 1,372 feet, EVMWD could purchase imported water to maintain the minimum lake elevation. Failure to maintain minimum lake levels costs EVMWD 1/365 of that year's annual costs to the Canyon Lake POA for each day the lake level drops below 1,372 feet.

3.1.4 Wastewater and Recycled Water

EVMWD currently operates three WRFs: Regional WRF, Horsethief Canyon WRF, and Railroad Canyon WRF. In addition, wastewater flow in the southern part of EVMWD's service area is treated at the Santa

Rosa WRF, operated by SRRRA. These four reclamation facilities serve four major service areas within EVMWD's wastewater collection system. Each service area consists of gravity collectors, trunk lines, lift stations, and force mains, which convey flow to the treatment plants. Effluent from all of these WRFs meets Title 22 disinfected tertiary standards and can be used for non-potable water supply to EVMWD's recycled water system. EVMWD's wastewater system is described in more detail in the 2024 EVMWD Sewer System Master Plan (Carollo, 2024a). A general overview of the wastewater and recycled water systems is provided below.

To minimize the need for imported water, EVMWD plans to expand its recycled water system to provide recycled water for irrigation users and to maintain water levels in Lake Elsinore and Temescal Wash during normal and dry years.

3.1.4.1 Regional WRF

This facility currently has an 8 mgd average design flow capacity. The design of the 4.0-mgd expansion is nearly complete and expected to include a membrane bioreactor process for secondary/tertiary treatment. The biological processes at the existing Regional WRF and proposed expansion are designed to remove nutrients (nitrogen and phosphorus) to meet the stringent requirements of the NPDES permit. The effluent from the Regional WRF is discharged to Temescal Wash and Lake Elsinore under CA Order No. R8-2013-0019, NPDES No. CA8000027. EVMWD is permitted to discharge up to 8 MGD: up to 7.5 MGD into Lake Elsinore for lake stabilization and 0.5 mgd to Temescal Wash for wetland enhancement. A small portion of the Regional WRF recycled water is used for irrigation at the Regional WRF facility and a few office buildings.

3.1.4.2 Horsethief Canyon WRF

This facility currently has a 0.5 mgd average design flow capacity and is currently undergoing an expansion to treat up to 0.8 mgd. Horsethief Canyon WRF is currently operated under Waste Discharge Requirement (WDR) Order No. 96-63. The effluent from Horsethief Canyon WRF receives tertiary treatment and meets Title 22 requirements for recycled water use. The recycled water is used for landscape irrigation in the Horsethief Canyon recycled water service area. During low demand periods, excess recycled water is percolated into a pond. Upgrades are in progress to provide nitrification and denitrification at this plant to remove nitrogen to meet potential new permit requirements. The Horsethief WRF is a peaking plant that balances supply with demand. Excess effluent from the Horsethief WRF that cannot be used for recycled water irrigation is sent to local percolation ponds for disposal.

3.1.4.3 Railroad Canyon WRF

This facility currently has a 1.12 mgd average design flow capacity and is operated under WDR Order No. 96-34. The recycled water is used for landscape and golf course irrigation in the Railroad Canyon recycled water service area. Excess recycled water during low-demand months is discharged into the sewer to be conveyed to the Regional WRF. EVMWD can also supplement the recycled water ponds with potable water to meet recycled water needs during high-demand periods.

The average inflow into the Railroad Canyon WRF of 0.68 mgd is not sufficient to meet the Canyon Lake Golf Course (CLGC) demands during periods of high demand. Therefore, EVMWD has an agreement with EMWD to purchase supplemental recycled water from its Reach 4 pipeline. The 54-inch Reach 4 pipeline travels east to west through the Railroad Canyon service area. Reach 4 can supply the additional recycled

water the CLGC requires during peak demand conditions. Reach 4 has metering devices at the turnout, including supervisory control and data acquisition (SCADA), telemetry capabilities, and pressure and flow monitoring capabilities, allowing EVMWD to quantify the amount of recycled water purchased from EMWD. Per the agreement, however, EMWD recycled water can provide recycled water supply to the CLGC only, not to the recycled water customers in the Canyon Hills area.

3.1.4.4 Southern Section (Santa Rosa WRF)

In November 2015, EVMWD, EMWD, and Rancho California Water District (RCWD) formed the SRRRA, which is a Joint Powers Authority responsible for the collection, transmission, treatment, and disposal of wastewater from its member agencies relating to flows to the Santa Rosa WRF in Murrieta, California. The Santa Rosa WRF was formerly owned and operated by the RCWD but was purchased by SRRRA in August 2017. RCWD continues to operate the Santa Rosa WRF and is also the administrator of the SRRRA.

In addition, EVMWD, EMWD, and RCWD entered into an agreement in March 2009 to establish wholesale recycled water prices for EVMWD and RCWD. EVMWD does not own or operate any WRFs in the Southern Sewershed area, and wastewater generated from this area is conveyed to four connection points in RCWD's system and conveyed to the Santa Rosa WRF for treatment. According to the agreement, in return for paying RCWD to treat the wastewater sent to the Santa Rosa WRF, EVMWD is allocated an equal amount of recycled water from the 48-inch Temecula Valley Recycled Water Pipeline (TVRWP) at no additional cost. EVMWD's recycled water allocation for each year is adjusted at the beginning of the fiscal year and depends on the amount of wastewater delivered to the Santa Rosa WRF. On average, this flow is approximately 0.8 mgd.

There are two operational supply constraints in the agreement with EMWD for the Wildomar system: the total instantaneous flow rate must be less than approximately 2.0 mgd (1,668 gpm), and the average daily volume for each month cannot exceed the wastewater flow to the RCWD from the previous fiscal year. Because EVMWD supplies on average 0.8 mgd (896 AFY) of wastewater to Santa Rosa WRF, EVMWD receives in return 0.8 mgd of recycled water from the 48-inch TVRWP. The TVRWP has a metering device at the turnout that includes SCADA, telemetry capabilities, and pressure and flow monitoring capabilities to measure the inflow into the EVMWD's service area.

3.1.5 Water Exchanges and Transfers

3.1.5.1 Exchanges

EVMWD does not have any current potable water exchanges with other water agencies. An agreement between EVMWD and EMWD exists to exchange wastewater for recycled water.

3.1.5.2 Transfers

In November 2020, EVMWD and Western finalized agreements to maintain the long-term availability of imported water. In exchange for EVMWD-owned Meeks and Daley water rights, EVMWD can purchase up to 9 cfs of imported water from Western's Mills Gravity Line and reserve an additional 12 cfs of capacity within the Mills Gravity Line through 2024.

3.2 Future Water Supplies

As part of the 2017 Integrated Resources Plan (IRP), EVMWD evaluated 44 long-term supply alternatives to increase supply reliability. Alternatives were assigned a score based on set criteria and a weighting factor for each criterion. Evaluation criteria included average year yield, dry year yield, source availability, water quality, cost, supply reliability, environmental impacts, and potential for implementation. The IRP then identified seven alternative scenarios, each targeting a specific goal of the IRP, to determine the best combination of future projects to meet EVMWD's future demands. Scenario 7, the Hybrid Scenario, was the recommended alternative because it optimized local water supply assets, achieved a reasonable unit cost relative to the current and forecasted costs for imported water, and exhibited one of the lowest values for total dissolved solids (TDS), a critical issue for EVMWD given the regulatory and financial implications of TDS management in groundwater basins. The projects from this scenario and an additional 10 percent supply buffer against uncertainties, such as climate change, make up EVMWD Core Resources Strategy. EVMWD envisions implementing the Core Resources Strategy as a multifaceted approach that includes supply development strategies that can adapt to changing conditions.

In general, the Core Resources Strategy consists of three phases:

- **Phase 1:** Implement near-term local supply projects to increase total supplies.
- **Phase 2:** Maximize local assets, such as EVMWD's stored water within Canyon Lake and groundwater.
- **Phase 3:** Consider the implementation of two main projects beyond 2030: the Temecula-Pauba Well in 2032 and IPR in 2035.

Since the completion of the 2017 IRP, EVMWD has made a few modifications to the original Core Resources Strategy projects to meet the changing needs of EVMWD's customers. All short- and long-term future projects that will be used to meet demands under normal, single dry, and multiple dry years are presented in Table 17. These projects have the potential to increase the water supply by 7,745 AFY by 2045.

EVMWD is constructing two Lee Lake Wells and replacing the Palomar well, which will allow EVMWD to extract groundwater from Lee Lake and the Temecula-Pauba groundwater basins, respectively. In 2025, EVMWD is planning to complete the Palomar Well 2 replacement project, which will pump about 450 AFY of water from the Temecula-Pauba Subbasin. The Palomar Well 2 replacement is located in an area known as "Palomar Area." This well is a replacement of the original Palomar well, which has been abandoned and was in operation from 1967 to 2006.

Table 17 Expected Future Water Supply Projects or Programs (2020 UWMP Table 6-12)

Name of Future Projects or Programs	Joint Project With Other Suppliers	Agency Name	Description	Planned Implementation Year	Planned for use in Year Type	Expected Increase in Water Supply to Supplier, AFY
Palomar Well Replacement	No	EVMWD	Groundwater Project	2023	All Year Types	450
Pump Lee Lake Basin GW	No	EVMWD	Groundwater Project	2024	All Year Types	875
Canyon Lake WTP(1)	No	EVMWD	Raw Imported Water	2025	All Year Types	3,700

Name of Future Projects or Programs	Joint Project With Other Suppliers	Agency Name	Description	Planned Implementation Year	Planned for use in Year Type	Expected Increase in Water Supply to Supplier, AFY
Temecula-Pauba GW	No	EVMWD	Groundwater Project	2032	All Year Types	750
IPR at Regional WRF(2)	No	EVMWD	Indirect Potable Reuse	2040	All Year Types	0 - 1,970

Notes:
gw - groundwater
(1) The CLWTP treatment capacity will be expanded to produce a total of 6,200 AFY of water. It is anticipated that about 2,500 AFY will be produced using natural runoff entering Canyon Lake, and 3,700 AFY will be produced by purchasing raw imported water from Western. Upgrades at the CLWTP are anticipated to be completed in early/mid 2025.
(2) EVMWD is planning to use excess wastewater collected at the Regional WRF to implement an IPR project. It is anticipated that this water will be available between 2035 and 2040.

EVMWD continues to evaluate additional local projects to decrease dependence on imported water and increase local reliability. A summary of projected future supply is provided in Table 18.

Table 18 Projected Water Supplies, AFY (2020 UWMP Table 6-14)

Supply Type	Water Supply	2025	2030	2035	2040	2045
Imported Water	Treated Imported Water Western/Metropolitan(1)	26,286	26,286	26,286	26,286	26,286
Imported Water	Raw Imported Water Western/Metropolitan(1,2)	0	3,700	3,700	3,700	3,700
Groundwater	Elsinore Valley Subbasin(3)	5,500	5,500	5,500	5,500	5,500
Groundwater	Coldwater Subbasin(3)	1,200	1,200	1,200	1,200	1,200
Groundwater	Bedford Subbasin(3)	1,300	1,300	1,300	1,300	1,300
Groundwater	Lee Lake Subbasin(3)	875	875	875	875	875
Groundwater	Palomar Well Replacement(3)	450	450	450	450	450
Groundwater	Temecula-Pauba Subbasin(3)	0	0	750	750	750
Surface Water	Raw Water from Canyon Lake/CLWTP(4)	2,500	2,500	2,500	2,500	2,500
Other	IPR at Regional WRF(5)	0	0	0	940	1,970
Recycled Water	Regional WRF to Temescal Wash and Lake Elsinore Replenishment(5)	7,270	8,027	8,863	8,960	8,960
Recycled Water	Metered Customers(6)	1,459	1,459	1,459	1,459	1,459
Recycled Water	Canyon Lake and Summerly Golf Course(6)	378	378	378	378	378
	Total(7)	47,219	51,675	53,261	54,298	55,328

Notes:
(1) Imported water will be used to fill the gaps and will be based on the availability of local supplies. There is no total right or safe yield. EVMWD can purchase more water at an additional charge.
(2) Starting in 2026, EVMWD plans to start purchasing about 3,700 AFY of raw imported water from Western/Metropolitan for treatment at the CLWTP.
(3) The safe yield for the groundwater subbasins will be established with their respective GSPs.

(4) In settlement of litigation, EVMWD agreed not to treat more than 8,000 AFY of San Jacinto River flows in any water year at EVMWD's CLWTP. This 8,000 AFY limit applies only to San Jacinto River runoff and excludes any imported water conveyed in the river channel.
(5) In accordance with its NPDES permit, EVMWD is permitted to discharge 0.5 mgd to Temescal Wash and 7.5 mgd to Lake Elsinore. EVMWD is planning to use excess wastewater collected at the Regional WRF to implement an IPR project. It is anticipated that this water will be available between 2035 and 2040.
(6) Includes recycled water produced by the three EVMWD WRFs and recycled water from SRRRA and Eastern.
(7) The total right or safe yield were not calculated because the groundwater safe yields are being updated as part of the GSP projects.

The projected water supplies from the Elsinore Valley, Coldwater, Bedford, and Lee Lake subbasins in Table 18 are below the safe yields for the Elsinore Valley and Bedford-Coldwater subbasins outlined in the GSPs.

The 2024 IRP update applied a similar ranking of alternatives to potential supply options and evaluated options on criteria metrics, including reliability, cost, water quality, implementation, operational, and environmental metrics. The 2024 IRP applied an adaptive management approach to strategy implementation, where the outcome of near-term activities and actions taken influence the implementation of projects in the mid-term and long-term. Based on the 2024 IRP, near-term strategies have the goal of developing approximately 11,000 AFY of new water supply by 2035, implementation of mid-term strategies target an additional 5,000 to 9,000 AFY of additional water supply by 2040, and long-term strategies have the target of adding another 6,000 to 10,000 AFY of water supply by 2050.

3.3 Summary of Water Supplies

EVMWD's three primary sources of potable water supply are:

- Local groundwater pumped from EVMWD-owned wells.
- Surface water from Canyon Lake Reservoir and treated by the CLWTP. This source is offline until treatment upgrades are completed.
- Imported water purchased from Metropolitan through Western.

EVMWD first relies on local supplies prior to importing water. EVMWD is planning to use these supplies to meet its future demands under normal, single-dry, and five-consecutive-year drought conditions.

EVMWD is also planning to implement the following projects to increase the reliability of its supplies:

- Palomar well replacement - anticipated to be completed in 2025.
- Lee Lake Basin wells - anticipated to be completed in 2025.
- Treatment upgrades at CLWTP - anticipated to be completed in 2028.
- Temescal Pauba groundwater well - anticipated to be completed in 2032.
- IPR at the Regional Wastewater Reclamation Facility - anticipated to be completed in 2034.

The new projects have the potential to increase the water supply by 6,420 AFY by 2045. The implementation of these projects is critical to maintaining service reliability of potable water system.

SECTION 4 WATER SUPPLY AND DEMAND ANALYSIS

This section compares the available water supply with the projected water demands under normal, single dry, and five consecutive dry years for at least the next 20 years. This section demonstrates that EVMWD has sufficient water supplies to meet existing and planned future demands, which includes the Project.

As part of the 2020 UWMP, EVMWD evaluated its water service reliability under normal, single dry, and five consecutive dry years for the next 20 years. In general, water service reliability is dependent upon the variability of supplies and availability of infrastructure to meet projected demand. Evaluating the water service reliability is critical for water management as it can help identify potential shortfalls before they occur. Water managers can then take proactive steps to mitigate shortages by encouraging water use efficiency, securing new water supplies, and/or investing in infrastructure.

4.1 Water Service Reliability Assessment

As part of the 2020 UWMP, EVMWD completed a water service reliability assessment, which compares total projected water supply and demands over the next 25 years in five-year increments under normal, single dry, and five consecutive dry years. The supply reliability assessment considered factors that could limit the expected quantity of current and projected water sources through 2045. Demand projections in the 2020 UWMP account for the expected demand of the Project. As mentioned in Section 2.4, while there have been additional planned developments since, the associated water demands remain within the projected potable demand increase through 2045.

This analysis concluded that EVMWD will have a surplus of water under normal, single dry, and five consecutive dry years. EVMWD is committed to continuing water conservation efforts to ensure reliability and resiliency in the future.

Results of the water supply and demand analysis for normal, single dry, and five-year consecutive droughts are shown in the following sections.

4.1.1 Water Service Reliability – Normal Year

Table 19 compares the total potable and non-potable supply and demand for the 25-year projection under normal (average) conditions, and Table 20 compares the potable supply and demand only. Under normal conditions, EVMWD will have a surplus of water and will be able to meet the potable and non-potable demands. As the planning horizon is extended, the total potable and non-potable surplus is reduced. The non-potable demand is mainly attributed to maintaining the Temescal Wash and Lake Elsinore requirements. It is expected that any excess recycled water will be used for the IPR project.

Table 19 Normal Year Supply and Demand Comparison (Potable and Non-Potable), AFY (2020 UWMP Table 7-4)

	2025	2030	2035	2040	2045
Supply Totals	47,218	51,675	53,261	54,298	55,328
Demand Totals	38,932	41,994	45,313	48,085	50,967
Difference	8,286	9,681	7,948	6,213	4,361

Table 20 Normal Year (Potable System Only) Water Supply and Demand Comparison, AFY (2020 UWMP Table 7-5)

	2025	2030	2035	2040	2045
Supply Totals	38,111	41,811	42,561	43,501	44,531
Demand Totals	29,825	32,130	34,613	37,288	40,170
Difference	8,286	9,681	7,948	6,213	4,361

4.1.2 Water Service Reliability - Single Dry Year

Table 21 compares the total potable and non-potable supply and demand for the 25-year projection under a single dry year, and Table 22 compares the potable supply and demand only. Under single dry conditions, EVMWD will have a surplus of water and will be able to meet the potable and non-potable demands. As the planning horizon is extended, the surplus is reduced. The single dry year scenario is the worst-case scenario, as it assumes that natural runoff from Canyon Lake would be 178 AFY. If needed, EVMWD could meet additional demands by purchasing more treated or untreated imported water to mitigate this impact.

Table 21 Single Dry Year Supply and Demand Comparison (Potable and Non-Potable), AFY (2020 UWMP Table 7-6)

	2025	2030	2035	2040	2045
Supply Totals	44,896	49,353	50,939	51,976	53,006
Demand Totals	38,932	41,994	45,313	48,085	50,967
Difference	5,964	7,359	5,626	3,891	2,039

Table 22 Single Dry Year Supply (Potable System Only) and Demand Comparison, AFY (2020 UWMP Table 7-7)

	2025	2030	2035	2040	2045
Supply Totals	35,789	39,489	40,239	41,179	42,209
Demand Totals	29,825	32,130	34,613	37,288	40,170
Difference	5,964	7,359	5,626	3,891	2,039

4.1.3 Water Service Reliability – Five Consecutive Dry Years

Table 23 compares the total potable and non-potable supply and demand under five consecutive dry years conditions for the 25-year planning horizon, and Table 24 compares the potable supply and demand only. Under this scenario, EVMWD will have a surplus of water and will be able to meet the potable and non-potable demands. During years of extreme drought, EVMWD could meet additional demands by purchasing more treated or untreated imported water to mitigate this impact.

Table 23 Multiple Dry Years Supply and Demand Comparison (Potable and Non-Potable), AFY (2020 UWMP Table 7-8)

		2025	2030	2035	2040	2045
First Year	Supply Totals	44,896	49,353	50,939	51,976	53,006
	Demand Totals	38,932	41,994	45,313	48,085	50,967
	Difference	5,964	7,359	5,626	3,891	2,039
Second Year	Supply Totals	49,350	50,107	51,693	52,730	53,760
	Demand Totals	38,932	41,994	45,313	48,085	50,967
	Difference	10,418	8,113	6,380	4,645	2,793
Third Year	Supply Totals	49,585	50,342	51,928	52,965	53,995
	Demand Totals	38,932	41,994	45,313	48,085	50,967
	Difference	10,653	8,348	6,615	4,880	3,028
Fourth Year	Supply Totals	50,382	51,139	52,725	53,762	54,792
	Demand Totals	38,932	41,994	45,313	48,085	50,967
	Difference	11,450	9,145	7,412	5,677	3,825
Fifth Year	Supply Totals	49,227	49,983	51,569	52,606	53,636
	Demand Totals	38,932	41,994	45,313	48,085	50,967
	Difference	10,294	7,989	6,256	4,521	2,669

Table 24 Multiple Dry Years (Potable System Only) Supply and Demand Comparison, AFY (2020 UWMP Table 7-9)

		2025	2030	2035	2040	2045
First Year	Supply Totals	35,789	39,489	40,239	41,179	42,209
	Demand Totals	29,825	32,130	34,613	37,288	40,170
	Difference	5,964	7,359	5,626	3,891	2,039
Second Year	Supply Totals	40,243	40,243	40,993	41,933	42,963
	Demand Totals	29,825	32,130	34,613	37,288	40,170
	Difference	10,418	8,113	6,380	4,645	2,793
Third Year	Supply Totals	40,478	40,478	41,228	42,168	43,198
	Demand Totals	29,825	32,130	34,613	37,288	40,170
	Difference	10,653	8,348	6,615	4,880	3,028
Fourth Year	Supply Totals	41,275	41,275	42,025	42,965	43,995
	Demand Totals	29,825	32,130	34,613	37,288	40,170
	Difference	11,450	9,145	7,412	5,677	3,825
Fifth Year	Supply Totals	40,119	40,119	40,869	41,809	42,839
	Demand Totals	29,825	32,130	34,613	37,288	40,170
	Difference	10,294	7,989	6,256	4,521	2,669

4.2 Determination of Water Supply Sufficiency

As shown in Table 19 through Table 24, EVMWD has a surplus of water to meet its projected demands, which include demands for the Project. EVMWD has adequate supplies to maintain a surplus during anticipated future conditions, while including the demand associated with the Project. EVMWD has a diverse supply portfolio that provides operational flexibility and reliability. In 2020, EVMWD relied on local groundwater to meet about 36 percent of the potable demands, promoted the use of recycled water to offset potable water needs, and imported water to meet any remaining demands. EVMWD intends to continue promoting conservation, evaluating supplemental supplies, and participating in projects, when feasible, to ensure EVMWD's water supply sources are protected and sustainable throughout the future. To mitigate and adapt to unpredictable conditions, EVMWD will continue to diversify its local water supply portfolio.

SECTION 5 REFERENCES

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APPENDIX A

BAKER STREET PROJECT PLANNING APPLICATION NO. 2020-103 PROJECT INFORMATION

DocuSign Envelope ID: BEB342BF-3755-47AD-8A52-C16F9B4A4E65

CITY OF LAKE ELSINORE
PLANNING DIVISION

For City Staff Use Only	
PA#: PA 2020-103	Date Submitted:
Project #(s):	

PLANNING APPLICATION

The Planning Application review process applies to all projects requiring a discretionary action. Discretionary refers to projects that involve a level of judgment and discretion by the decision-maker in taking action to approve, approve with conditions or deny a project, with findings. Depending on the level of review, a decision-maker on a discretionary project is the Director of Community Development, Planning Commission or City Council. Typical types of projects that require a discretionary action include; Conditional Use Permits, Design Review, General Plan Amendments, Tentative Parcel or Tract Maps, Variances, and Zone Change.

PROPERTY INFORMATION

Address:		APN(s):
South of Baker St and Pierce St Intersection		378-020-014, -015, -016, -028, -029, -030, -031, -036, -037, -048
General Plan Designation: Limited Industrial	Zoning Designation: M-1, M-2	

Current Use/Description of the property:
Vacant and undeveloped with one residence located on 378-020-029.

PROJECT INFORMATION (CHECK ALL THAT APPLY)

☐ Annexation	☐ Substantial Conformance
☒ Conditional Use Permit	☐ Specific Plan
☒ Design Review (Specify Type: Commercial/Industrial)	☐ Sign Program
☐ Extension of Time	☐ Surface Mining and Reclamation Plan
☐ General Plan Amendment	☒ Tentative Parcel Map
☐ Public Convenience or Necessity	☐ Tentative Tract Map
☐ Planned Unit Development	☐ Variance
☐ Pre-Application Consultation	☒ Zone Change

Project Description
Development of 2 high cube warehouses totaling 212,730 SF and 789,181 SF and related site improvements. Previously submitted as PAR 2021-05.

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CONTACT INFORMATION

Property Owner *	Applicant
Name: RIVERSIDE LEGACY IV NICHOLS ROAD, LLC	Name: RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
Mailing Address: 5550 Newbury Street, Suite B	Mailing Address: 5550 Newbury Street, Suite B
City/State/Zip Code: Baltimore, MD 21209	City/State/Zip Code: Baltimore, MD 21209
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Email: trygg@ecosystempartners.com	Email: trygg@ecosystempartners.com
Architect	**Engineer**
Name: RGA	Name: EPD Solutions
Mailing Address:	Mailing Address: 3333 Michelson Drive, Suite 500
City/State/Zip Code:	City/State/Zip Code: Irvine, CA 92612
Phone: 949-341-0920 ext 102	Phone: 949-466-1199
Email: mike@rga-architects.com	Email: heather@epdsolutions.com

*For additional property owners, attach a separate page with APN(s), address, contact information, and signatures.

PROPERTY OWNER/APPLICANT SIGNATURE

I hereby certify that I am the applicant or designated agent named herein and that I am familiar with the rules and regulations with respect to preparing and filing this petition for discretionary action, and that the statements and answers contained herein and the information attached are in all respects true and accurate to the best of my knowledge and belief. Please note all correspondence will be directed to the designated applicant.

The property owner further certifies that they are the legal owner of the property, consent to the filing of this application, and have authorized the applicant below to represent them with respect to the processing of this application.

Finally, I understand that incomplete applications cannot be transmitted or processed. To process a case in an expeditious manner, a complete application package is necessary.

Property Owner(s)

Name (Print):	Signature:	Date:
Heath Rushing	DocuSigned by: C292881C77934EC...	8/9/2023
Name (Print):	Signature:	Date:

Applicant

Name (Print):	Signature:	Date:
Heath Rushing	DocuSigned by:	8/9/2023

☐ *Please check this box if you are willing to receive staff reports via emails*

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CITY OF LAKE ELSINORE
DREAM EXTREME™

Planning Application Submittal Requirements

Submittal Requirements	Annexation	CUP	DR (C, I, & R)	EOT	GPA	PCN	PUD	PA	SC	Specific Plan	SP	SM&RP	TPM	TTM	VAR	ZC
Application and Filing Fee	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Signed Cost Recovery Agreement	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Preliminary Title Report and all supporting documents	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Environmental Information Form	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1
Hazardous Waste/Well Site Information Form	1	1	1	1	1		1	1	1	1		1	1	1	1	1
Preliminary Drainage, Geology, & Hydrology Studies		2	2	2			2		2			2			2	
Preliminary Water Quality Management Plan if priority water project and/or Completed WQMP Project Checklist		2	2	2			2		2			2			2	
Digital Copy of all Application Materials	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Colors and Materials Information		1	1	1			1	1	1		1				1	
Project Description	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Plans listed in this block MUST be assembled together in sets and stapled (sets are site plans, preliminary grading plans, architectural elevations, floor plans, conceptual utility plans, and conceptual landscaping plans) and folded to a MAXIMUM size of 8 ½" X 11"																
Site Plans or Tract/Parcel Maps (Full Size 24"x36"),	2	2	2	5	2	2	2	2	2	2	2	2	2	2	2	2
Preliminary Grading and Drainage Plans (Full Size)	2		2	5			2					2	2	2	2	
Architectural Elevations, (Full Size)		2	2	5				2	2		2	2			2	
Floor Plans (Full Size)		2	2	5		2	2	2	2						2	
Conceptual Dry and Wet Utilities Plans, (Full Size)		2	2	5					2	2					2	
Conceptual Landscaping Plans (Full Size)		2	2	5					2	2					2	
Fence and Wall Plan			2	5					2	2					2	
11 x 17 reduction of COMPLETE SETS of required plans	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

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SITE PLAN CONTENT

Scale: Engineering scale not to exceed 1"=40'.

The following information shall be included on the plan:

- ❑ Licensed land surveyor or registered civil engineer shall sign, seal and provide their California registration or license number and the date of expiration of such number.
- ❑ List the names, addresses, and telephone numbers of the owners of record, and the surveyor, or engineer preparing the map.
- ❑ List the names, addresses and telephone numbers of all utility companies which will serve the project including, but not limited to, water supply, sewage disposal, telephone, cable, electrical and natural gas.
- ❑ Clearly show the north arrow (directed toward the top of the map), the scale of the plan, the boundary lines, dimensions of the project and the date of preparation of the plan.
- ❑ Provide a vicinity map at a scale of one (1) inch equals eight hundred (800) feet of the area showing the proposed subdivision in relation to the adjacent subdivision, established roads, landmarks, etc., within one –quarter (1/4) mile of the exterior boundaries of the proposed project.
- ❑ List the Assessor's Parcel Number (s) for the entire project.
- ❑ Provide a legal description of the land included within the proposed project.
- ❑ Provide information demonstrating legal, dedicated access to the subdivision and all proposed lots within the subdivision. Also demonstrate that no adjoining parcels are landlocked subsequent to the proposed project.
- ❑ Show all boundary lines of the proposed project with appropriate bearings and distances.
- ❑ Show the General Plan land use designation, zoning district classification and land use or uses of the adjoining property within one hundred (100) feet of the proposed project, including that which is across any streets. Indicate the distances from all property lines and use of any structures on adjoining property.
- ❑ Show the locations, names and existing rights-of all adjoining highways, streets, alleys and /or ways, roads, etc. If none exist, show access to the property.
- ❑ Show the centerline profile and grade for each proposed highway, street or drainage improvement shown on the plan.
- ❑ Show the width and location of all recorded and/or proposed easements, dedication of streets

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or rights-of-way.

- ❑ Show the radius of all curves on highways and streets.
- ❑ Show the location and outline, to scale, of each existing building, utility pole or other above ground structure. Note on the map whether such building, pole or structure is to be removed from, or remain within the project.
- ❑ Show the location of existing and proposed water lines, sewers, culverts, bridges, drain pipes, fire hydrants and water wells within the project.
- ❑ Show the location of existing and proposed easements for water, sewers, culverts, bridges, drain pipes, and fire hydrants within the project.
- ❑ Total square footage of each building, number of stories, number and size of dwelling units and number of bedrooms, it applicable.
- ❑ Number of parking and loading spaces required and provided.
- ❑ Square footage and percent of the site devoted to building, landscaping, and paved areas for parking and circulation.
- ❑ Property lines, dimensions, and net lot area (lot coverage).
- ❑ Footprint of all structures and any overhangs or projections.
- ❑ Location of all entrances and loading doors.
- ❑ All setbacks and distances between buildings and/or structures.
- ❑ Location, typical dimensions, and type of surfacing for all driveways, parking spaces and loading areas.
- ❑ Location of all trash enclosures, transformers and any equipment outside of building.
- ❑ Location, height, and materials of all walls and fences.
- ❑ Location of all existing fire hydrants.
- ❑ Proposed phases of project (if any).

PRELIMINARY GRADING AND DRAINAGE PLAN CONTENT

Scale: Engineering scale not to exceed 1"=40'.

The following information shall be included on the plan:

- ❑ Name, address, phone and fax number of applicant, architect and/or engineer
- ❑ Graphic scale (with bar scale) and north arrow
- ❑ Vicinity map
- ❑ Estimated quantities of earth to be moved

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- ❑ Direction of drainage flow with slope in percentage
- ❑ Location of onsite and offsite drainage and utility facilities
- ❑ Location and width of adjacent right-of-ways and onsite easements
- ❑ Location of existing and proposed improvements
- ❑ Proposed grades and elevations
- ❑ All existing contours and structures within 25' of the boundaries of the site
- ❑ Location and elevation of all existing and proposed circulation and drainage improvements and drainage courses within 100' of the boundaries of the site

BUILDING ELEVATION (S) CONTENT

Scale: Architectural No less than 1/4" (large projects no less than 1/8" with 1/4" details).

Building elevations showing all sides of the proposed buildings and enhanced rear and side elevations for buildings visible to the public. All building elevations shall be in color. Provide building elevations for each architectural style. All floor plan options that require changes to the exterior elevations shall be provided.

The following information shall be included on the elevation plans:

- ❑ Name, address and phone number, of the applicant, architect and/or engineer
- ❑ Location of building address
- ❑ Shading, as applicable, to give the elevations some graphic dimension
- ❑ A schedule for colors and materials (which corresponds to the color and material board) and specific location of their use for all building types
- ❑ Height of buildings with dimensions
- ❑ Locations of sign envelopes on applicable elevations **(Commercial, Industrial)**
- ❑ Show spandrel glass locations **(Commercial, Industrial)**
- ❑ Show all sides of proposed structures
- ❑ Show cross-sections of all proposed buildings
- ❑ Type of stucco finish proposed, if applicable
- ❑ Label specific type of architectural style proposed for the building(s) onsite
- ❑ Show location of all exterior wall mounted light fixtures
- ❑ Provide details of all exterior wall mounted light fixtures. Fixtures must compliment/enhance architectural style

FLOOR PLAN/ROOF PLAN CONTENTS

Scale: Architectural The scale used on the floor and roof plans shall be no less than 1/4" per foot. Large

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projects shall be no less than 1/8" per foot with 1/4" per foot details. The following information shall be included on the floor plans:

- ❑ Proposed use for each room
- ❑ Proposed square footage for each room
- ❑ Bathrooms
- ❑ Exits
- ❑ Provide the interior dimensions of the garage (Code requires a minimum of 20 feet X 20 feet clear) **(Residential)**
- ❑ Patios
- ❑ Elevators
- ❑ Fire sprinkler riser room (with direct exterior access), **(Multi-Family, Commercial, Industrial)**
- ❑ Location of Knox Box **(Multi-Family, Commercial, Industrial)**
- ❑ Location of Fire Department connection (If wall mounted) **(Multi-Family, Commercial, Industrial)**
- ❑ Location(s), dimensions and total square footage of private open space areas required by the Zoning Ordinance **(Multi-Family Residential)**
- ❑ Location, number and type of laundry facilities required by the Zoning Ordinance **(Multi-Family Residential)**
- ❑ Location, dimensions and total footage of exterior storage spaces required by Zoning Ordinance **(Multi-Family Residential)**

The following information shall be included on the roof plan:

- ❑ All roof pitches and direction of fall
- ❑ Location and detail of all mechanical equipment **(Multi-Family, Commercial, Industrial)**
- ❑ Spot elevations or other cross-sections necessary to verify that mechanical equipment is fully screened **(Multi-Family, Commercial, Industrial)**

Colors and Materials Information

Size: 8 ½" X 11". The colors and materials information is intended to provide a fair representation of the major exterior materials to be used on the project together with colors and stains. The list shall show the following:

- ❑ Sample of all roofing materials

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- ❑ Sample of window glazing
- ❑ Sample of all wall materials including texture(s) (i.e. Santa Barbara stucco finish, wood, tile, rock, etc.
- ❑ Samples of all paint and stain colors to be used on the buildings applied to the surface of actual exterior building material samples
- ❑ Manufacturers name and identification numbers of paint colors that correspond to the proposed materials

CONCEPTUAL LANDSCAPE PLAN CONTENT

Scale: Engineering scale not to exceed 1"=40'.

- ❑ Plant palette and sizes of materials.
- ❑ Locations and numbers of trees, shrubs and acres of ground covering, including spacing of ground cover. Identify slope areas.
- ❑ Proposed wall & fences and their materials.
- ❑ For Tentative Tract Maps landscape plans should address streetscapes, entry statements, and public spaces such as detention basins.

FENCE AND WALL PLANS CONTENT

Scale: Engineering scale not to exceed 1"=40'.

- ❑ Legend (indicating all existing and proposed walls fences and gates
- ❑ Location of all types of fencing being proposed with dimensions from building and property lines
- ❑ Dimensioned elevation drawings with details of all types of fencing, walls and gates proposed including colors and materials
- ❑ Identify location of all proposed entry statements and elevations **(Multi-Family Residential, Commercial, Industrial)**
- ❑ Show dimensioned details of all proposed entry statements and gates including colors and materials, sign envelope areas and dimensions **(Multi-Family Residential, Commercial, Industrial)**

TENTATIVE TRACT MAP CONTENT

Scale: Engineering scale not to exceed 1"=40'.

- ❑ Name, address, and telephone number of owner and developer of subject property

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- ❑ Name, address, and telephone number of person preparing plan
- ❑ The words "Tentative Tract Map" shall be printed conspicuously on the map
- ❑ North arrow and scale
- ❑ Tract Map Number assigned by County Surveyor/Engineer
- ❑ Sufficient legal description of the land included on the map to define the boundaries of the tentative map
- ❑ Scale of map (preferred scale is 1" = 40'. Maximum scale is 1" = 100'.)
- ❑ Date map was prepared
- ❑ Provide a lot summary table which identifies the total lot size and pad area for each proposed lot along with the overall average lot size, minimum lot size and maximum lot size
- ❑ Name and address of utility companies, including water, sewer, electric, gas, cable, and telephone companies
- ❑ A vicinity or area map showing the existing major street pattern and major watercourses, and flood control channels within one-half mile of exterior boundaries of the subdivision.
- ❑ All boundary lines of the subdivision with appropriate bearings and distances described with identifying tree rows, dikes, or channels
- ❑ Existing buildings or structures identified by use, including those within 100' of tract boundary, noting if they are to remain or be removed
- ❑ All watercourses, if applicable
- ❑ Identify the 100-year floor plain (Base Flood Level), if applicable
- ❑ Existing and future adjacent streets with widths of right-of-way and proposed connections to existing streets
- ❑ Proposed street grades
- ❑ Proposed street cross-sections
- ❑ Centerline radii of all street curves
- ❑ Adjoining property lines and land uses, including adjacent tract numbers, if any
- ❑ The drainage areas tributary to the land division and a preliminary plan of proposed on-site and off-site drainage system
- ❑ All proposed lot lines and dimensions
- ❑ The width and approximate locations of all existing and proposed easements for railroads, flood-control channels, public utilities, or other easements of right-of-way
- ❑ Grading pattern including adjacent land
- ❑ Existing trees having a truck diameter of 4 inches or more

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- ❑ Locations of all streets, easements, pedestrian ways, trails, and other lands, whether for public or private purposes, to be dedicated or offered for dedication
- ❑ Location of lands intended to be dedicated for park purposes and/or statement as to whether fees are proposed to be paid in-lieu therefore
- ❑ The location of existing wells, water lines, cesspools, sewers, culverts, drainpipes, underground structures, or sand, gravel, or other excavations within the land division and within 200 feet of any portion of the subdivision noting thereon whether or not they are to be abandoned, removed, or used
- ❑ The contour of the land at intervals of not more than 2' if the general slope of the land is less than 10% or if not more than 5' if the general slope of the land is more than 10%. All elevations shall be based on U.S.G.S. datum, or other datum acceptable to the City Engineer. Copies of U.S.G.S. maps are not acceptable
- ❑ Type of improvement, including but not limited to streets, drainage, water, sewer, grading, utilities, pedestrian ways, streetlights, and tree planting, which are proposed to be installed, and the time at which such improvements are proposed to be completed
- ❑ Proposed method of sewage disposal and sewer connection point
- ❑ Existing and proposed zoning and general plan designation of property to be divided
- ❑ Appropriate net acreage of each lot containing an area of one acre or more
- ❑ Proposed use of all lots
- ❑ If private streets are proposed, the method by which their maintenance will be accomplished and financed
- ❑ Such other information as the City Engineer, Community Development Director, Planning Commission, or City Council determines is necessary to properly consider the proposed division, including, but not limited to, proposed grading
- ❑ Provision of future passive or natural heating or cooling opportunities. Refer to Government Code Section 66473.1 (Subdivision Map Act)
- ❑ Copies of grant deeds for the existing parcel(s)
- ❑ If the required information cannot be placed on the tentative map, then a report containing the material shall be submitted with the map
- ❑ If the proposed map is not being submitted in conjunction with a proposed development or previously approved development, an illustrative plan shall be submitted demonstrating that the property can be developed in accordance with City Standards

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TRACT MAINTENANCE PLAN

Scale: Engineering scale not to exceed 1"=40'.

Provide at Tract Maintenance Plan (including and map and written summary table) which identifies the responsible parties for the construction, ownership and maintenance of the following improvements

- ❑ Public and/or private streets
- ❑ Public and private parks
- ❑ Public and private trails
- ❑ Common landscape areas
- ❑ Maintained and/or natural common slope areas
- ❑ Public and private walls fences and entry monumentation and signage
- ❑ Flow control and drainage facilities and structures
- ❑ Other onsite utilities

DEVELOPMENT PHASING PLAN CONTENT

Scale: Engineering scale not to exceed 1"=40'.

- ❑ Name, address, and phone number of applicant, architect and/or engineer, and property owner(s)
- ❑ Graphic scale (with bar scale) and north arrow
- ❑ Location of all proposed lots, streets, parks and common areas within the development
- ❑ Location and labeling of proposed development phase lines
- ❑ Onsite pedestrian and vehicular circulation patterns associated with each development phase
- ❑ Demonstrate how onsite parking requirements will be complied with in association with each development phase
- ❑ Show emergency vehicle access patterns and turn around areas associated with each development phase
- ❑ Show construction traffic circulation patterns associated with each development phase
- ❑ Show infrastructure connections associated with each development phase
- ❑ Show location and type of interim landscaping improvements and/or other screening methods on undeveloped phase areas
- ❑ Demonstrate compliance with N.P.D.E.S. requirements in association with each development phase

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CITY OF LAKE ELSINORE
PLANNING DEPARTMENT
AGREEMENT FOR COST RECOVERY

Project Name: Baker Street Industrial

Planning Application Number(s): _____

CRS Number(s): _____

The application(s) for the above referenced project may generate processing costs in excess of the amount of the filing fee. If applicable, your initial deposit amount of $ $35,904.51 will be applied toward your application. Draws against this deposit will be made based on staff time and materials needed to process your application. Statements will be sent to you documenting the draws against your deposit. If the deposit reaches a balance of $500.00 or less, you will be asked to make a subsequent deposit. You will be expected to pay these bills within 30 days of invoice date. The remaining $500.00 or less will be used to reconcile your final bill. If there is a balance remaining after reconciling the final bill, a refund check will be mailed to you.

I Heath Rushing* (as responsible party), agree that actual recorded costs plus overhead, incurred in the processing of this application(s) will be paid to City of Lake Elsinore, c/o Lake Elsinore Planning Department, 130 S. Main Street, Lake Elsinore, CA 92530. Additionally, I understand that, in the event that my account is not paid within 30 days of the invoice date, processing will be suspended until such time that payment is made.

In order to implement the cost recovery provisions, please sign this statement indicating your agreement to the cost recovery procedure. The signed agreement is required for your application to be accepted for processing.

Responsible Party's Signature: DocuSigned by: _____

Date: 8/9/2023

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CITY OF LAKE ELSINORE
PLANNING DIVISION

ENVIRONMENTAL INFORMATION FORM

Date Filed:	
Planning Application No.	

GENERAL INFORMATION

Developer or Applicant	RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
Contact Person	Trygg Darnforth
Address	5550 Newbury Street, Suite B Baltimore, MD 21209
Telephone	617-877-7637
Email	trygg@ecosystempartners.com
Address of Project:	South of Baker St and Pierce St Intersection
Proposed Use of Site:	High cube warehousing
Assessors Parcel Numbers:	378-020-014, -015, -016, -028, -029, -030, -031, -036, -037, -048
For Residential Development	
Number of Units	
Unit Sizes	
Units per Acre	
Lot Sizes:	
Number of Parking Spaces	
For Commercial and Other Development	
Type of Development:	
Number of Buildings:	2
Size of Buildings:	Building 1 - 212,028 SF, Building 2 - 788,423 SF, Total - 1,000,451 SF
Number of Parking Spaces:	Building 1 - 174, Building 2 - 232, Total - 406

ENVIRONMENTAL INFORMATION

PLEASE PROVIDE A SEPARATE WRITTEN RESPONSE FOR QUESTIONS #1-4, IT IS RECOMMENDED THAT PHOTOGRAPHS BE PROVIDED IN SUPPORT OF SUBMITTED ANSWERS.

Responses in separate document

1. Describe the project site and any existing structures as they exists before the project, including information on topography, soil stability, plants and animals, and any cultural or scenic aspects.

2. Describe the surrounding properties, including information on plants and animals and any cultural, historical or scenic aspects.
3. Describe the typed of surrounding land use, intensity of land use, and sale of development.

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4. Identify any other related permits and other public approvals required for this project including those required by the City, regional, State, Federal agencies, not including approvals from the City, fire department, sheriff's department, and Elsinore Valley Municipal Water District.

   Is any part of the Project, on- or off-site, located within a Criteria Cell pursuant to the Multiple Species Habitat Conservation Plan (MSHCP)? If so, what are the Criteria Cell #(s)? If not known, please enter all APNs at the following website to run a report, and **include the report** with submittal of this form: http://www.rctlma.org/online/content/rcip_report_generator.aspx

The City is a Lead Agency under CEQA, and is required under State law to ensure compliance. All projects are subject to a review under the California Environmental Quality Act (CEQA) and will consist of one (1) or more of the following:

- If not exempt, preparation of technical studies will be required to support determination of appropriate CEQA process, as described below.
- Determination by Planning Division that all project impacts are less than significant, or can be mitigated to less than significant. As such, the City will direct preparation of a Negative Declaration (ND) or Mitigated Negative Declaration (MND).
- Determination by Planning Division that at least one (1) project impact cannot be mitigated to less than significant levels. As such, the City will direct preparation of an Environmental Impact Report (EIR).

All CEQA documents must be prepared either by City Staff OR by a qualified, City-approved consultant under direct contract with the City, but funded by the Applicant.

Depending on the environmental impacts potentially resulting from your project, technical studies that may be required, but are not be limited, include:

- Air Quality Analysis
- Noise Study
- Traffic Impact Analysis
- Geotechnical Study
- Phase I Environmental Site Assessment (Hazardous Materials)
- Hydrology Study or Conceptual Drainage Plan
- Conceptual Water Quality Management Plan
- Biological Resources Study (also used to support MSHCP consistency work)
- Cultural Resources Study

CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge.

SIGNATURE: DocuSigned by: C292861C77934EC... DATE: 8/9/2023

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CITY OF LAKE ELSINORE
PLANNING DIVISION

HAZARDOUS WASTE SITE & PUBLIC WELL SITE INFORMATION

Government Code Section 65962.5, which became effective July 1, 1987, requires the applicant for any development project to consult specified state-prepared lists of hazardous waste sites and submit a signed statement to the local agency indicating whether the project is located on or near an identified site. Under the statute, no application shall be accepted without the signed statement.

PART A

To determine if your project is on or near an identified Hazardous Waste Site please refer to any State identified Hazardous Waste Sites as listed by the County of Riverside Department of Environmental Health.

Is the project located on or near a State identified Hazardous Waste Site? Yes ☐ No ☒
(If you answered yes to the above question, please fill out the information below. If you answered no, please sign and date the certification below).

Name of Applicant:	
Address	Baltimore, MD 21209
Phone Number	
Address of Site	
Local Agency (City/County)	
APN(s)	
Specify any list pursuant to Section 65962.5 of the Government Code	
Regulatory ID Number	
Date of List	

PART B

To determine if your project is within one (1) mile radius of a public well site, which could potentially be affected by a hazardous waste generator, please refer to the State identified Public Well Sites.

Is your project within a one-mile radius of an identified public well? Yes ☒ No ☐

If yes, please identify: 0406500132, 0406500093 - both classified as "Dry Hole" and status is "Plugged"

CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge.

SIGNATURE: DocuSigned by: C29280...

DATE: 8/9/2023

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CITY OF LAKE ELSINORE

ENGINEERING DIVISION

130 South Main Street, Lake Elsinore, CA 92530, P 951.674.3124, F 951.674.8761
www.lake-elsinore.org

PRELIMINARY
WATER QUALITY MANAGEMENT PLAN (WQMP)
PLAN CHECK SUBMITTAL APPLICATION

Instructions

1. **Complete Checklist on reverse side. If any question is answered "YES", a project-specific WQMP is required.**
2. **Complete form below and submit with land use application. If WQMP is required, submit, below-listed documents & fees**

NOTE: THE PROJECT APPLICATION CANNOT BE DEEMED COMPLETE UNTIL SUCH TIME THAT THE PRELIMINARY WQMP IS APPROVED

PROJECT LOCATION

APN (S): 378-020-014, -015, -016, -028, -029, -030, -031, -036, -037, -048	**DECIMAL DEGREES:** (ex, 33.0000/-117.0000) 33 42'03.72N, 117 21'43.80W
PARCEL/TRACT NO:	**WATERSHED:** San Jacinto
PROJECT STREET ADDRESS: Baker Street	
CROSS STREETS: Baker Street, Pierce Street	**PROJECT AREA** (to 0.1 acre) : 65.8
LIST PROPOSED BMPS:	

CONTACT INFORMATION

SUBMITTED BY: EPD Solutions	**COMPANY:**
STREET ADDRESS CITY/STATE/ZIP: 3333 Michelson Drive, Suite 500 Irvine, CA 92612	
PHONE: 949-466-1199	**EMAIL:** heather@epdsolutions.com
ENGINEER:	**COMPANY:** KWC Engineers
STREET ADDRESS CITY/STATE/ZIP: 1880 Compton Avenue, Suite 100 Corona CA 92881	
PHONE: 951-734-2130 ext 203	**EMAIL:** brandon.barnett@kwcengineers.com
OWNER/APPLICANT: RIVERSIDE LEGACY IV NICHOLS ROAD, LLC	**COMPANY:**
STREET ADDRESS CITY/STATE/ZIP: 5550 Newbury Street, Suite B Baltimore, MD 21209	
PHONE: 617-877-7637	**EMAIL:** trygg@ecosystempartners.com

SUBMITTAL CHECKLIST

SUBMIT THE FOLLOWING ITEMS WITH THIS APPLICATION

	1 Copy Preliminary WQMP in approved format. - FORMAT: Use WQMP Guidance Document and Template for Santa Ana Region 8, Riverside County
	1 Copy of Proposed Tentative Map and/or Site Plan
	$1,850.00 Application Fee ($1,750.00 Plan Check Fee + $100 Administrative Fee)

NOTES:

Plan Check Fee covers 3 reviews/plan checks. If more plan checks are required, then additional charges based on time and material will be assessed and due

City Plan Check Turnaround Standard: 3 weeks 1st submittal / 2 weeks each subsequent submittal. Expedited plan check of 2 weeks/1 week available at additional charge of 50% of original plan check fee ($875.00)

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CITY OF LAKE ELSINORE DREAM EXTREME

Checklist for Identifying Projects Requiring a Project-Specific WQMP within the Santa Ana Region

Project File No.:	
Project Name:	Baker Street Industrial
Project Location:	Southwest of the Baker Street/Pierce Street Intersection
Project Description:	Development of 2 high cube warehouses totaling 212,730 SF and 786,181 SF and related site improvements. Previously submitted as PAR 2021-06.

Proposed Project Consists of or Includes:	Yes	No
Significant Redevelopment: The addition or replacement of 5,000 square feet or more of impervious surface on an already developed site. Does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of the constructed facility or emergency redevelopment activity required to protect public health and safety.	☐	☑
Residential developments that create 10,000 square feet or more of impervious surface (collectively over the entire project site), including residential housing subdivisions requiring a Final Map (i.e., detached single family home subdivisions, multi-family attached subdivisions, condominiums, or apartments, etc.).	☐	☑
New industrial and commercial development where the land area[1] represented by the proposed map or permit is 10,000 square feet or more.	☑	☐
Mixed use developments that create 10,000 square feet or more of impervious surface (collectively over the entire project site).	☐	☑
Automotive repair shops [Standard Industrial Classification (SIC) codes[2] 5013, 5014, 5541, 7532, 7533, 7534, 7536, 7537, 7538, and 7539].	☐	☑
Restaurants (SIC code 5812) where the land area of development is 5,000 square feet or more.	☐	☑
Hillside developments disturbing 5,000 square feet or more which are located on areas with known erosive soil conditions or where the natural slope is 25 percent or more.	☐	☑
Developments of 2,500 square feet of impervious surface or more adjacent to (within 200 feet) or discharging directly into ESAs. "Directly" means situated within 200 feet of the ESA; "discharging directly" means outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.	☐	☑
Parking lots of 5,000 square feet or more exposed to stormwater, where "parking lot" is defined as a land area or facility for the temporary parking or storage of motor vehicles.	☑	☐
Retail Gasoline Outlets that are either 5,000 square feet or more of impervious surface with a projected average daily traffic of 100 or more vehicles per day.	☐	☑
Public Projects, other than Transportation Projects, that are implemented by a Permittee and similar in nature to the priority projects described above and meets the thresholds described herein.	☐	☑
Condition of Approval requires preparation of a WQMP.	☐	☑

1 Land area is based on acreage disturbed.
2 Descriptions of SIC codes can be found at http://www.osha.gov/pls/imis/sicsearch.html.

DETERMINATION: Circle appropriate determination

Any question answered **"YES"** Project requires a project-specific WQMP.

All questions are answered "NO" Project requires incorporation of Site Design BMPs and Source Control BMPs imposed through Conditions of Approval or permit conditions.

Contact the City NPDES Coordinator for more information or visit the City's Stormwater/NPDES webpage at www.lake-elsinore.org.

BOARD OF DIRECTORS
Chance Edmondson, President
Harvey R. Ryan, Vice President
Darcy M. Burke, Treasurer
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Vacant, Director

GENERAL MANAGER Greg Thomas
LEGAL COUNSEL Best, Best & Krieger
DISTRICT SECRETARY Christy Gonzalez

August 20, 2024

Attn: Joey Mendoza
City of Lake Elsinore
130 South Main Street
Lake Elsinore, CA 92530

SUBJECT: PLANNING APPLICATION (PA) NO. 2020-103
BAKER STREET WAREHOUSE – CITY OF LAKE ELSIONRE
EVMWD APPLICATION # 2024-00411-DD

Elsinore Valley Municipal Water District (District) received the subject planning application. The project consists of two new warehouse buildings totaling 1,000,451 SF on 6581 acres located at APN 378-020-14, 012, 015, 016, 028, 029, 030, 031, 036, 037, 039, 048, southeasterly of the intersection of Pierce Street and Baker Street. The site plan for this project is attached as Exhibit A and the existing water and sewer map is attached as Exhibit B.

This project attended a Due Diligence Meeting with the District on June 12, 2023, and a Service Requirements Letter was issued. That letter is still current and is attached as Exhibit C.

If you have any questions, please contact the Engineering Department at (951) 674-3146 Ext. 6705, engservices@evmwd.net.

Respectfully,

Julianna Zaleski
Senior Civil Engineer – Development Services

LEGAL DESCRIPTION

Real property in the City of Lake Elsinore, County of Riverside, State of California, described as follow:

PARCEL A: (APN: 378-020-014)

PARCEL 1:

ALL THAT PORTION OF LOT 1, IN BLOCK "A" OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 8 PAGE 377 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST WESTERLY CORNER OF THAT CERTAIN TRACT OF LAND CONVEYED BY CHARLES HUDSON AND DESSIE HUDSON, HUSBAND AND WIFE, TO GREAT COAST AL OIL CORPORATION, A CORPORATION AND RECORDED ON THE 8TH DAY OF MAY 1936, IN BOOK 275 AT PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY, CALIFORNIA; THENCE SOUTH FORTY-SIX DEGREES FIFTY MINUTES EAST (SOUTH 46° 50' EAST) A DISTANCE OF 236 FEET; THENCE NORTH FORTY- THREE DEGREES TEN MINUTES EAST (NORTH 43° 10' EAST) A DISTANCE OF 300 FEET TO THE TRUE POINT OF BEGINNING; THENCE NORTH FORTY-THREE DEGREES TEN MINUTES EAST (NORTH 43° 10' EAST) A DISTANCE OF 30 FEET; THENCE NORTH FORTY-SIX DEGREES FIFTY MINUTES WEST (NORTH 46° 50' WEST) A DISTANCE OF 80 FEET; THENCE SOUTH FORTY-THREE DEGREES TEN MINUTES WEST (SOUTH 43° 10' WEST) A DISTANCE OF 30 FEET; THENCE SOUTH FORTY-SIX DEGREES FIFTY MINUTES EAST (SOUTH 46° 50' EAST) A DISTANCE OF 80 FEET TO THE TRUE POINT OF BEGINNING.

EXCEPTING THEREFROM MINERALS, OIL AND GAS AS RESERVED BY DEED RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 .

PARCEL 2: (APN: 378-020-015 AND 378-020-016)

THE NORTHWEST HALF OF THE SOUTHWEST HALF OF THE FOLLOWING DESCRIBED PROPERTY: ALL THAT PORTION OF LOTS 1, 2 AND 3, IN BLOCK "A" OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 8 PAGE 377 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, PARTICULARLY DESCRIBED AS FOLLOWS: COMMENCING AT THE MOST NORTHERLY CORNER OF LOT 50 OF COUNTRY CLUB HEIGHTS UNIT "B", AS SHOWN BY MAP ON FILE IN BOOK 17, PAGES 25 AND 26 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE NORTH 43° 24' EAST ALONG THE SOUTHERLY EXTENSION OF THE MOST WESTERLY LINE AND ALONG THE MOST WESTERLY LINE OF THAT CERTAIN PARCEL OF LAND CONVEYED TO THE MOST NORTHERLY POINT IN SAID MOST WESTERLY LINE, FOR THE POINT OF BEGINNING; THENCE SOUTH 46° 50' EAST, FORMERLY RECORDED SOUTH 47° EAST, 3067.6 FEET; THENCE NORTH 43° 10' EAST, FORMERLY RECORDED NORTH 43° EAST, 1100 FEET TO THE MOST EASTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, BY DEED RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE NORTH 46° 50' WEST ALONG THE NORTHEASTERLY LINE OF SAID PARCEL SO CONVEYED TO GREAT COASTAL OIL CORPORATION, 3960 FEET TO THE NORTHWESTERLY LINE OF LOT 1 IN BLOCK "A", ABOVE DESCRIBED; THENCE SOUTHWESTERLY ALONG SAID NORTHWESTERLY LINE AND ALONG THE SOUTHWESTERLY PROLONGATION OF SAID NORTHWESTERLY LINE, TO A POINT WHICH BEARS NORTH 46° 50' WEST FROM THE POINT OF BEGINNING, SAID POINT BEING THE MOST WESTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, HEREINABOVE REFERRED TO; THENCE SOUTH 46° 50' EAST, ALONG THE SOUTHWESTERLY LINE OF SAID PARCEL, TO THE POINT OF BEGINNING, EXCEPTING THEREFROM ALL THAT PORTION THEREOF DESCRIBED AS FOLLOWS: COMMENCING AT THE MOST WESTERLY CORNER OF THAT CERTAIN TRACT OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, BY DEED RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE SOUTH 46° 50' EAST, 236 FEET; THENCE NORTH 43° 10' EAST, 300 FEET OR THE POINT OF BEGINNING; THENCE NORTH 43° 10' EAST, 30 FEET; THENCE NORTH 46° 50' WEST, 80 FEET; THENCE SOUTH 43° 10' WEST, 30 FEET; THENCE SOUTH 46° 50' EAST, 80 FEET TO THE POINT OF BEGINNING; ALSO EXCEPTING THEREFROM A STRIPS OF LAND 1 ROD WIDE, 4.5 FEET ON THE EASTERLY SIDE AND 12 FEET ON THE WESTERLY SIDE OF THE CENTER LINE OF THE PIPELINE OF THE TEMESCAL WATER COMPANY, AS NOW LAID OVER AND ACROSS THE HEREINABOVE DESCRIBED PROPERTY AS CONVEYED TO THE TEMESCAL WATER COMPANY, A CORPORATION, BY DEED RECORDED MAY 12, 1917 IN BOOK 362 PAGE 56, OF DEEDS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA. ALSO EXCEPTING THEREFROM THE 1/8 PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY, CALIFORNIA

PARCEL B: (APN: 378-020-020)

PARCEL 1 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, ON FILE IN BOOK 98 PAGE 69 OF PARCEL MAPS, RIVERSIDE COUNTY RECORDS, EXCEPTING THE REFROM 1/8 PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE ACCRUED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL C: (APN: 378-020-007 AND OTHER PROPERTY)

PARCEL 2 OF PARCEL MAP 8913, AS SHOWN BY MAP ON FILE IN BOOK 36, PAGE 29 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA. EXCEPTING THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275, PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL D: (APN: 378-020-008)

PARCEL 3 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 98, PAGE 69, OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY. EXCEPTING THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275, PAGE 344, OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL E: (APN: 378-020-009)

PARCEL 4 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 98, PAGE 69, OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY. EXCEPTING THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275, PAGE 344, OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL F: (APN: 378-020-046)

PARCEL 1:

THE SOUTHEAST ONE-HALF OF THE SOUTHWEST ONE-HALF OF THE FOLLOWING DESCRIBED PROPERTY: ALL THAT PORTION OF LOTS 1, 2 AND 3 IN BLOCK A OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, AS SHOWN BY MAP ON FILE IN BOOK 8 PAGE 377 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, PARTICULARLY DESCRIBED AS FOLLOWS: COMMENCING AT THE MOST NORTHERLY CORNER OF LOT 50 OF COUNTRY CLUB HEIGHTS, UNIT "B" AS SHOWN BY MAP ON FILE IN BOOK 17, PAGES 25 AND 26 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE NORTH 43° 24' EAST ALONG THE SOUTHERLY EXTENSION OF THE MOST WESTERLY LINE AND ALONG THE MOST WESTERLY LINE OF THAT CERTAIN PARCEL OF LAND CONVEYED TO C. SCHULTZ, BY DEED RECORDED NOVEMBER 15, 1928 IN BOOK 789, PAGE 273 OF DEEDS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, TO THE MOST NORTHERLY POINT IN SAID MOST WESTERLY LINE, FOR THE POINT OF BEGINNING; THENCE SOUTH 46° 50' EAST, FORMERLY RECORDED SOUTH 47° EAST, 3067.6 FEET; THENCE NORTH 43° 10' EAST, FORMERLY RECORDED NORTH 43° EAST, 1100 FEET TO THE MOST EASTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, BY DEED RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS OF SAID RIVERSIDE COUNTY; THENCE NORTH 46° 50' WEST ALONG THE NORTHEASTERLY LINE OF SAID PARCEL SO CONVEYED TO GREAT COASTAL OIL CORPORATION, 3960 FEET TO THE NORTHWESTERLY LINE OF LOT 1 IN BLOCK A, ABOVE DESCRIBED; THENCE SOUTHWESTERLY ALONG SAID NORTHWESTERLY LINE AND ALONG THE SOUTHWESTERLY PROLONGATION OF SAID NORTHWESTERLY LINE, TO A POINT WHICH BEARS NORTH 46° 50' WEST FROM THE POINT OF BEGINNING, SAID POINT BEING THE MOST WESTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, HEREINABOVE REFERRED TO; THENCE SOUTH 46° 50' EAST, ALONG THE SOUTHWESTERLY LINE OF SAID PARCEL, TO THE POINT OF BEGINNING, EXCEPTING THEREFROM THAT PORTION CONVEYED TO EL SINORE VALLEY MUNICIPAL WATER DISTRICT, A PUBLIC CORPORATION BY DEED RECORDED APRIL 8, 1987 AS INSTRUMENT NO. 96352 OF OFFICIAL RECORDS.

PARCEL 2:

AN EASEMENT FOR ROAD PURPOSES, 20 FEET WIDE, OVER AND ACROSS THE EXISTING ROAD, THE CENTER LINE BEING THE NORTHEASTERLY LINE OF THE ABOVE DESCRIBED PROPERTY AND THE NORTHWESTERLY EXTENSION OF SAID LINE AS EXTENDED TO THE SOUTHEAST SIRLY LINE OF PIERCE STREET, EXCEPTING THEREFROM THAT PORTION INCLUDED WITHIN PARCEL 1 ABOVE. EXCEPTING THEREFROM 1/8 THINTERE ST OF ALL OIL, GAS AND MINERAL RIGHTS THEREOF.

PARCEL F: (APN: 378-020-026)

PARCEL 2 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 98, PAGE 69, OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA. EXCEPT THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL G: (APN: 378-020-030)

PARCEL 3 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 98, PAGE 69, OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY. EXCEPTING THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275, PAGE 344, OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL H: (APN: 378-020-009 AND OTHER PROPERTY)

PARCEL 1 OF PARCEL MAP 8913, AS SHOWN BY MAP ON FILE IN BOOK 36, PAGE 29 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA. EXCEPTING THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275, PAGE 344 OF OFICIAL RECORDS, RIVERSIDE COUNTY, RECORDS.

SITE LEGEND:

- ON-SITE LANDSCAPED AREA
- OFF-SITE LANDSCAPED AREA
- SITE PROPERTY LINES
- CITY CURB AND GUTTER LINES
- STREET CENTERLINES
- TYPICAL AUTO PARKING STALLS 9'X18'
- TYPICAL SITE LIGHT POLE 20 HPS/P PHOTOMETRIC

SHEET INDEX

A1-1	OVERALL SITE PLAN
A1-2	BUILDING 1 SITE PLAN
A1-3	BUILDING 2 SITE PLAN
A1-3.1	BUILDING 2 ENLARGED SITE PLAN
A1-4	FENCE AND WALL PLAN
A1-5	SITE SECTIONS
A1-6	GOOD NEIGHBOR POLICY EXHIBIT
1A2-1	BUILDING 1 FLOOR PLAN
1A2-2	BUILDING 1 ROOF PLAN
1A3-1	BUILDING 1 ELEVATIONS
2A2-1	BUILDING 2 FLOOR PLAN
2A3-1	BUILDING 2 ELEVATIONS
1	TITLE SHEET
2	CROSS SECTION AND DETAILS SHEET
3-6	CONCEPTUAL GRADING PLAN SHEETS
1	TENTATIVE PARCEL MAP
LL1	PRELIM LANDSCAPE PLAN ENLARGEMENT
LL2	PRELIM LANDSCAPE PLAN ENLARGEMENT
L2.0	PLANT IMAGERY

VICINITY MAP



GENERAL NOTES

1. THE PROPOSED PROJECT SHALL COMPLY WITH THE PROVISIONS OF THE CITY OF LAKE ELSINORE PLANNING PLAN
2. A LANDSCAPING PLAN SHALL BE SUBMITTED TO THE PLANNING DEPARTMENT FOR APPROVAL PRIOR TO ISSUANCE OF BUILDING PERMITS AND SHALL BE IMPLEMENTED PRIOR TO OCCUPANCY.
3. THE PROJECT DOES NOT PROPOSE ANY TENANT SIGNAGE AT THIS TIME.
4. THERE ARE NO PROJECTED PLANTS ON SITE.
5. ALL ROOF DRAINS AT STREET FRONTAGES SHALL BE IN THE INTERIOR OF THE BUILDING ENVELOPE.
6. ALL LANDSCAPE SHALL BE BOUND BY A 6" HIGH CONCRETE CURB.
7. A LIGHT PLAN SHALL BE SUBMITTED SHOWING CONFORMANCE WITH MINIMUM FOOTCANDLE LEVELS AND MARCH AIR BASE STANDARDS. FIXTURES SHALL BE SHIELDED LED

APPLICATION TYPE

PLANNING APPLICATION NO. 2023-103
EXISTING ZONING: M-1/M-2
PROPOSED ZONING: M-2
GENERAL PLAN: LIMITED INDUSTRIAL
PERMITTED LAND USE: WAREHOUSE, OFFICE AS PERMITTED

PROJECT DESCRIPTION

NEW INDUSTRIAL WAREHOUSE BUILDING WITH AUTO AND TRAILER PARKING AREAS.

LAND OWNER

RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
2330 MARINSHIP WAY, SUITE 120
SAUSALITO, CA 94965
TEL: 415-465-4423
CONTACT: GLEN WILLIAMS
glen@eccsystempartners.com

APPLICANT

RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
2330 MARINSHIP WAY, SUITE 120
SAUSALITO, CA 94965
TEL: 415-465-4423
CONTACT: GLEN WILLIAMS
glen@eccsystempartners.com

PLAN PREPARER

RGA, OFFICE OF ARCHITECTURAL DESIGN, INC.
1523 I ALTON PARKWAY, SUITE 100
IRVINE, CA 92618
CONTACT: CHRIS SAVAGE

CIVIL ENGINEER

KWC ENGINEERS
1880 COMPTON AVENUE, SUITE 100
CORONA, CA 92881
CONTACT: BRANDON BARNETT

UTILITIES & SERVICES

SEE CIVIL DRAWINGS

ASSESSOR'S NUMBERS:

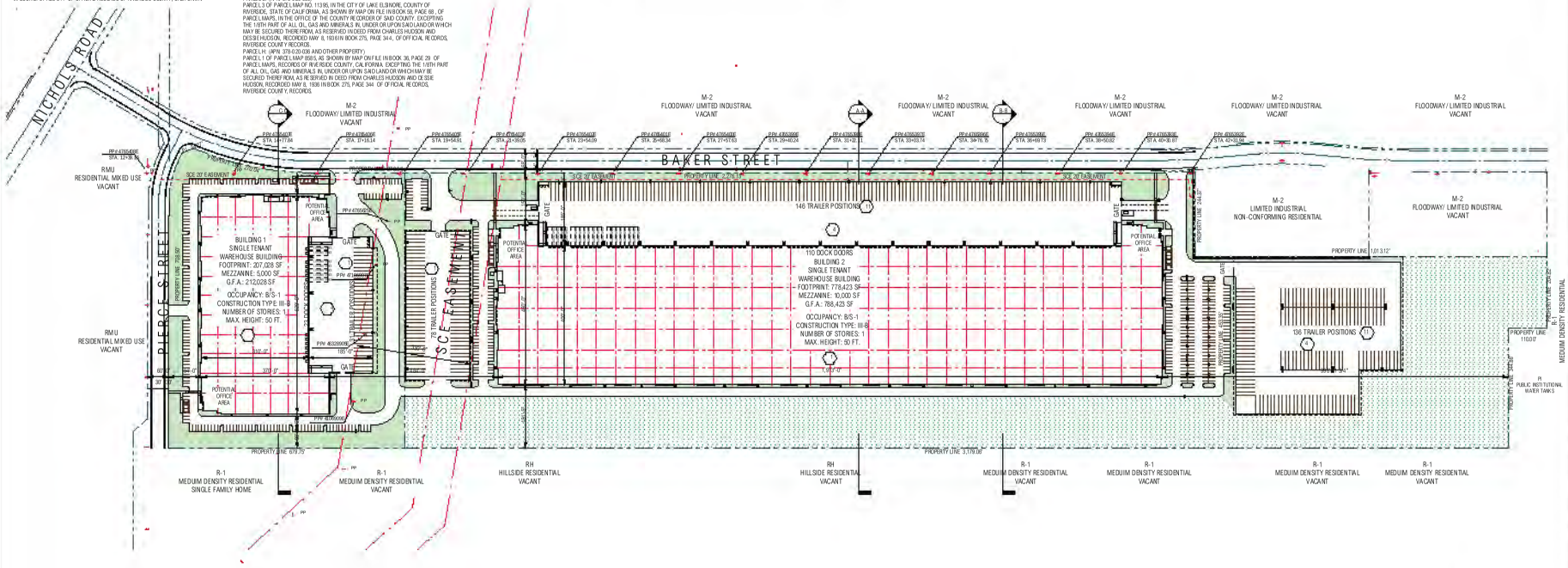
APN: 378-020-014, 015, 016, 028, 029, 030, 031, 036, 037, 048

KEYNOTES:

1. PROPOSED PAINTED CONCRETE TILT-UP INDUSTRIAL BUILDING.
2. TYP. OL PARKING STALL - 9' X 18'.
3. EVCS PARKING STALL PER CODE - 9' X 18'.
4. CONCRETE TRUCK YARD PER CIVIL.
5. FULLY IRRIGATED LANDSCAPE AREA BOUNDED BY 6" CONCRETE CURB - SEE CONCEPT LANDSCAPE PLAN.
6. PRIMARY BUILDING ENTRANCE W/ DECORATIVE CONCRETE ENTRY WALK.
7. 8'-0" HIGH TRASH AND RECYCLABLE BINS. SEE SHEET A2-1 FOR ELEVATION AND SECTIONS.
8. 8'-0" HIGH BLACK TUBE STEEL FENCE.
9. PROPERTY LINES.
10. PROPOSED ELECTRICAL TRANSFORMER LOCATION. ALL UTILITY STRUCTURES SHALL BE SCREENED BY LANDSCAPE, SEE LANDSCAPE PLAN.
11. 11' X 53' TRUCK TRAILER PARKING STALLS.
12. ACCESSIBLE PARKING STALLS 9' X 18'-0" MIN.
13. DASHED LINE INDICATES: - NEW 5'-0" WIDE SURFACE WALK. ACCESSIBLE PATH OF TRAVEL FROM PUBLIC SIDEWALK & PARKING STALLS TO PRIMARY BUILDING ENTRANCE.
14. TYP. 8' HIGH PAINTED CONCRETE SCREEN WALL ELEVATION W/ ACCENT REVEALS AND PAINTED ACCENTS TO MATCH BUILDING ARCHITECTURE.
15. NEW CURB AND GUTTER PER CITY STANDARD.

PROJECT DATA

	BUILDING 1		BUILDING 2		TOTAL
SITE AREA	547,317	SF	2,319,450	SF	**2,866,767 SF**
	12.565	AC	53.247	AC	**65.812 AC**
BUILDING AREA					
FOOTPRINT	207,028	SF	778,423	SF	**985,451 SF**
MEZZANINE	5,000	SF	10,000	SF	**15,000 SF**
TOTAL	212,028	SF	788,423	SF	**1,000,451 SF**
F.A.R	38.74%		33.99%		**34.90%**
BUILDING AREA BY USE					
OFFICE	10,000	SF	20,000	SF	**30,000 SF**
WAREHOUSE	202,028	SF	788,423	SF	**970,451 SF**
AUTO PARKING					
1/1000 1ST 40K SF	40		40		**80**
1/4000 > 40K SF	43		187		**230**
TOTAL	83		227		**310**
PARKING PROVIDED					
STANDARD STALLS	111		133		**244**
ADA STALLS	7		8		**15**
EV STALLS	34		59		**93**
AUTOS IN SCE ESMT.	20		94		**114**
PARKING PROVIDED EXC. SCE	152		200		**352**
TOTAL PROVIDED	172		294		**466**
DOCK LOADING ZONES					
REQUIRED	7		18		**25**
PROVIDED	31		110		**141**
TRAILER PARKING	31		360		**391**
LANDSCAPE REQUIRED	65,678	SF	278,334	SF	**344,012 SF**
LANDSCAPE PROVIDED	142,000	SF	745,000	SF	**887,000 SF**
LANDSCAPE COVERAGE	25.94%		32.12%		**30.94%**
PAVING AREA	198,289	SF	796,027	SF	**994,818 SF**



OVERALL SITE PLAN

SCALE: 1" = 100'-0"

PROJECT NORTH

TRUE NORTH

RGA
Office of Architectural Design
210 Progress ,Suite 220
Innovation Park
Irvine, CA 92618
T 949-341-0920
FX 949-341-0922

CONSULTANT

PROFESSIONAL SEALS

BAKER / PIERCE STREET DEVELOPMENT

0000 BAKER STREET
CITY OF LAKE ELSINORE, CA

APPLICANT:
RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
2330 MARINSHIP WAY, SUITE 120
SAUSALITO, CA 94965
TEL: 415-465-4423
CONTACT: GLEN WILLIAMS
glen@eccsystempartners.com

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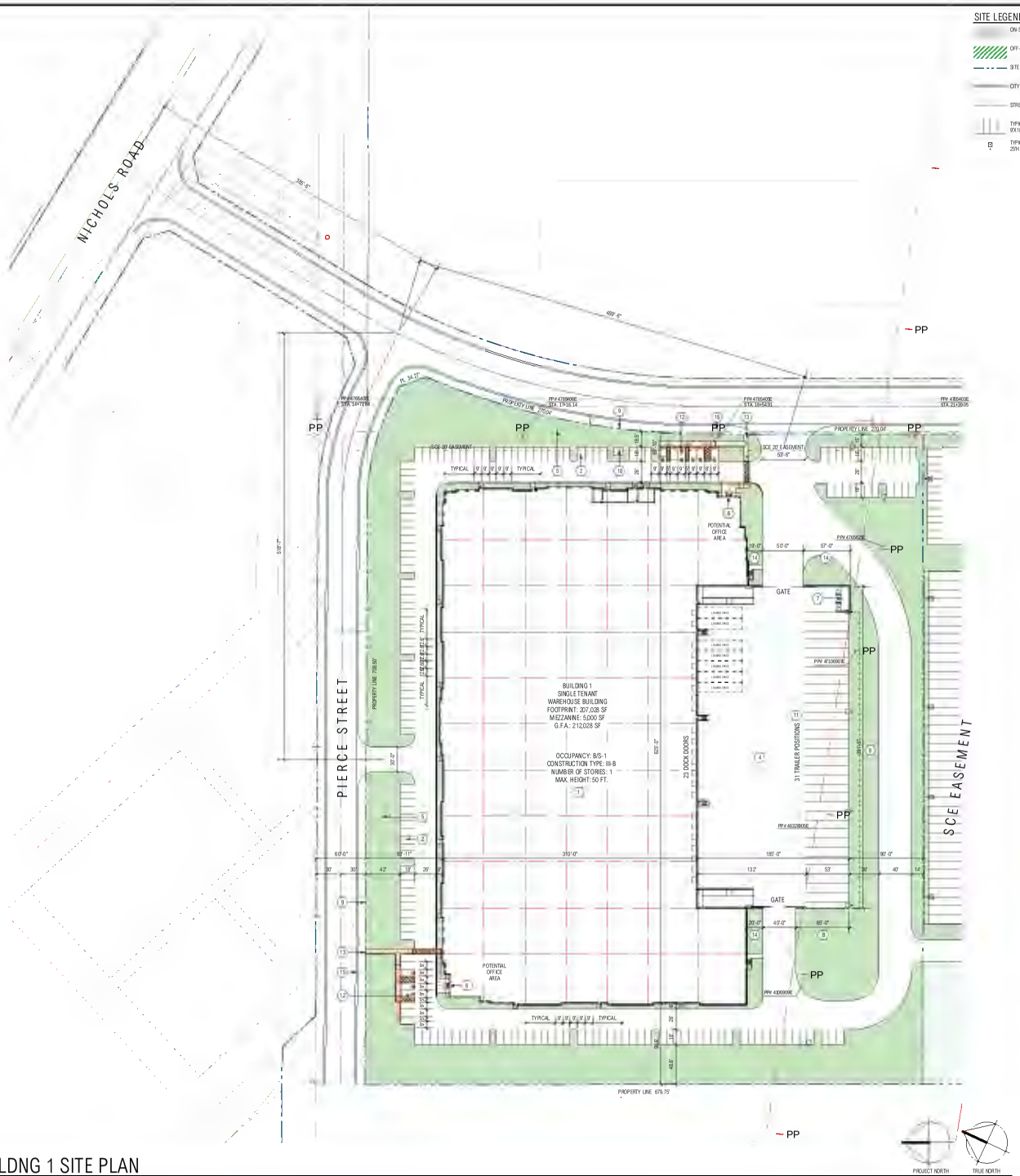
3D	7/15/24	PL ANNING REVISIONS
3D	6/18/24	PL ANNING REVISIONS
3D	03/04/23	SCHEMATIC DESIGN
MARK	DATE	DESCRIPTION

RGA PROJECT NO: 2304.00
OWNER PROJECT NO: 00000.00
CAD FILE NAME: 2304-00-A1-1P
DRAWN BY: CS
CHK'D BY: CS

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RGA, OFFICE OF ARCHITECTURAL DESIGN

SHEET TITLE
OVERALL SITE PLAN

SHEET: A1-1P



BUILDNG 1 SITE PLAN

SCALE: 1" = 50'-0"

SITE LEGEND:

- ON-SITE LANDSCAPED AREA
- OFF-SITE LANDSCAPED AREA
- SITE PROPERTY LINES
- CITY CURB AND GUTTER LINES
- STREET CENTERLINES
- TYPICAL AUTO PARKING STALLS 9'X18'
- TYPICAL SITE LIGHT POLE 25'H PER PHOTOMETRIC

KEYNOTES:

1. PROPOSED PAINTED CONCRETE TILT-UP INDUSTRIAL BUILDING.
2. TYPICAL PARKING STALL - 9' X 18'.
3. EVCS PARKING STALL PER CODE - 9' X 18'.
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15. NEW CURB AND GUTTER PER CITY STANDARD.

RGA
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T 949-341-0920
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CONSULTANT

PROFESSIONAL SEALS

BAKER / PIERCE STREET DEVELOPMENT

0000 BAKER STREET
CITY OF LAKE ELSINORE, CA

APPLICANT:

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PH: 415-465-4423

MARK	DATE	DESCRIPTION
SD	7/15/24	PLANNING REVISIONS
SD	6/18/24	PLANNING REVISIONS
SD	08/04/23	SCHEMATIC DESIGN

RGA PROJECT NO:	23041.00
OWNER PROJECT NO:	00000.00
CAD FILE NAME:	23041-00-A1-2P
DRAWN BY:	CS
CHK'D BY:	CS

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RGA, OFFICE OF ARCHITECTURAL DESIGN

SHEET TITLE

BUILDING 1
SITE PLAN

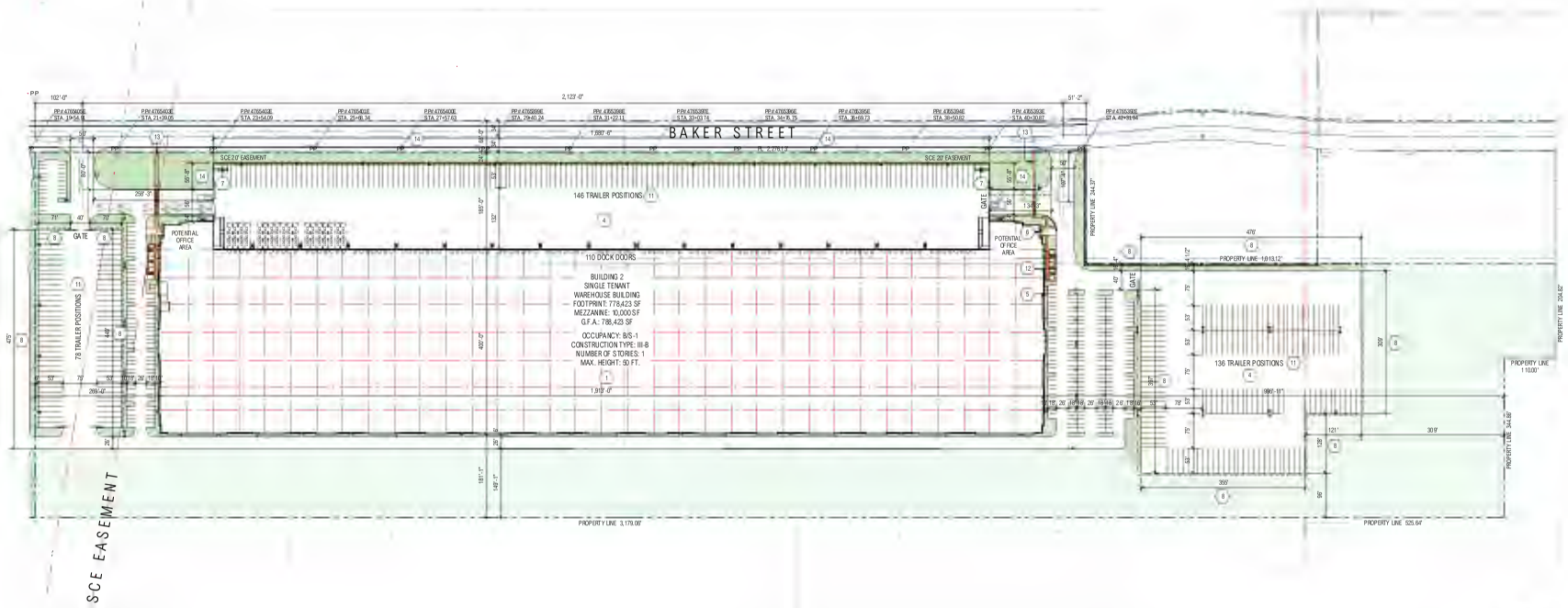
SHEET: A1-2P

SITE LEGEND:

- ON-SITE LANDSCAPED AREA
- OFF-SITE LANDSCAPED AREA
- SITE PROPERTY LINES
- CITY CURB AND GUTTER LINES
- STREET CENTERLINES
- TYPICAL AUTO PARKING STALLS 9'X18'
- TYPICAL SITE LIGHT POLE 25FT PER PHOTOMETRIC

KEYNOTES: (10)

1. PROPOSED PAINTED CONCRETE TILT-UP INDUSTRIAL BUILDING.
2. TYPICAL PARKING STALL - 9' X 18'.
3. EVCS PARKING STALL PER CODE - 9' X 18'.
4. CONCRETE TRUCK YARD PER CIVIL.
5. FULLY IRRIGATED LANDSCAPE AREA BOUNDED BY 6" CONCRETE CURB - SEE CONCEPT LANDSCAPE PLAN
6. PRIMARY BUILDING ENTRANCE W/ DECORATIVE CONCRETE ENTRY WALK
7. 8'-0" HIGH TRASH AND RECYCLABLE BINS. SEE SHEET A2-1 FOR ELEVATION AND SECTIONS.
8. 8'-0" HIGH BLACK TUBE STEEL FENCE.
9. PROPERTY LINES.
10. PROPOSED ELECTRICAL TRANSFORMER LOCATION ALL UTILITY STRUCTURES SHALL BE SCREENED BY LANDSCAPE, SEE LANDSCAPE PLAN
11. 1 1' X 53' TRUCK TRAILER PARKING STALLS.
12. ACCESSIBLE PARKING STALLS 9' X 18'-0" MIN.
13. DASHED LINE INDICATES : NEW 5'-0" WIDE SURFACE WALK ACCESSIBLE PATH OF TRAVEL FROM PUBLIC SIDEWALK & PARKING STALLS TO PRIMARY BUILDING ENTRANCE
14. TYP. 8' HIGH PAINTED CONCRETE SCREEN WALL ELEVATION W/ ACCENT REVEALS AND PAINTED ACCENTS TO MATCH BUILDING ARCHITECTURE.
15. NEW CURB AND GUTTER PER CITY STANDARD.



BUILDING 2 SITE PLAN

SCALE: 1" = 100'-0"

PROJECT NORTH TRUE NORTH

RGA

Office of Architectural Design

210 Progress ,Suite 220
Innovation Park
Irvine, CA 92618

T 949-341-0920
FX 949-341-0922

CONSULTANT

PROFESSIONAL SEALS

BAKER / PIERCE STREET DEVELOPMENT

0000 BAKER STREET
CITY OF LAKE ELSINORE, CA

APPLICANT:

RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
2330 MARINSHIP WAY, SUITE 120
SAUSALITO, CA 94965
TEL: 415-465-4423
CONTACT: GLEN WILLIAMS
glen@eccapitalpartners.com

OWNER:

RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
2330 MARINSHIP WAY, SUITE 120
SAUSALITO, CA 94965
TEL: 415-465-4423
CONTACT: GLEN WILLIAMS
glen@eccapitalpartners.com

RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
2330 MARINSHIP WAY
SUITE 120
SAUSALITO, CA 94965
ATTN: GLEN WILLIAMS
PH: 415-465-4423

MARK	DATE	DESCRIPTION
SD	7/15/24	PLANNING REVISIONS
SD	6/18/24	PLANNING REVISIONS
SD	08/04/23	SCHEMATIC DESIGN

RGA PROJECT NO:	23041.00
OWNER PROJECT NO:	00000.00
CAD FILE NAME:	23041-00-A1-3P
DRAWN BY:	CS
CHK'D BY:	CS

COPYRIGHT
RGA, OFFICE OF ARCHITECTURAL DESIGN

SHEET TITLE

BUILDING 2
SITE PLAN

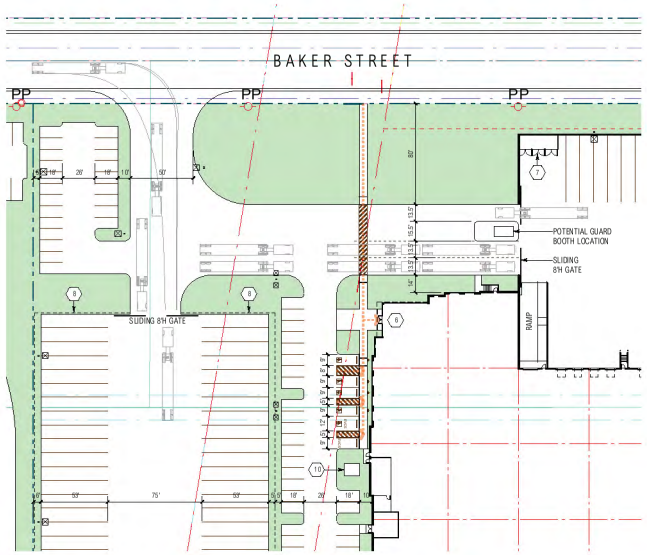
SHEET: A1-3P

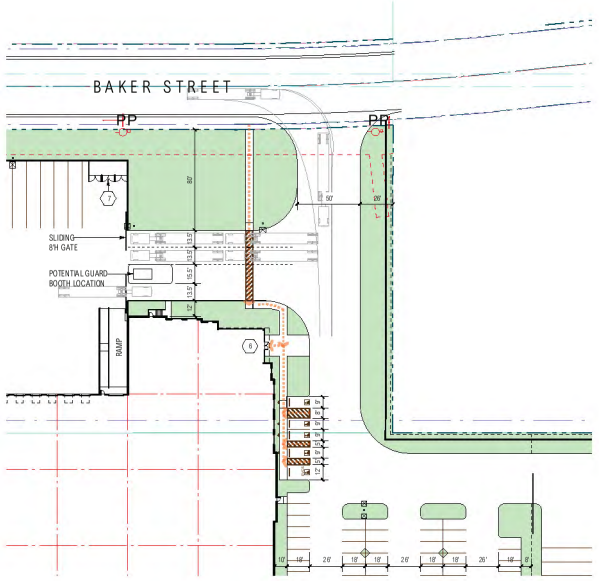
SITE LEGEND:

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15. NEW CURB AND GUTTER PER CITY STANDARD.





BUILDING 2 SITE PLAN ENLARGEMENTS

SCALE: 1" = 50'-0"

PROJECT NORTH

TRUE NORTH

RGA
Office of Architectural Design
210 Progress ,Suite 220
Innovation Park
Irvine, CA 92618
T 949-341-0920
FX 949-341-0922

CONSULTANT

PROFESSIONAL SEALS

BAKER / PIERCE STREET DEVELOPMENT

0000 BAKER STREET
CITY OF LAKE ELSINORE, CA

APPLICANT:
RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
2330 MARINSHIP WAY, SUITE 120
SAUSALITO, CA 94965
TEL: 415-465-4423
CONTACT: GLEN WILLIAMS
glen@ecosystempartners.com

OWNER:
RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
2330 MARINSHIP WAY, SUITE 120
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NICHOLS ROAD, LLC
2330 MARINSHIP WAY
SUITE 120
SAUSALITO, CA 94965
ATTN: GLEN WILLIAMS
PH: 415-465-4423

MARK	DATE	DESCRIPTION
SD	7/15/24	PLANNING REVISIONS
SD	6/18/24	PLANNING REVISIONS
SD	08/04/23	SCHEMATIC DESIGN

RGA PROJECT NO:	23041.00
OWNER PROJECT NO:	00000.00
CAD FILE NAME:	23041-00-A1-3.P
DRAWN BY:	CS
CHK'D BY:	CS

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RGA, OFFICE OF ARCHITECTURAL DESIGN

SHEET TITLE

BUILDING 2
SITE PLAN ENLARGEMENTS

SHEET: A1-3.1P

Water and Sewer Map



Legend

- EVMWD Boundary
- EVMWD Sphere of Influence
- Highways
- Street Centerlines
- Parcels
- Non Potable Pressure Mains
- Air Release
- Blowoff
- Distribution Main
- Hydrant Lateral
- Sampling Point
- Transmission Main
- Drain Line
- Fee Credits Sewer
- Fee Credits Water
- Reimbursements - Sewer
- Reimbursements - Water
- Force Main
- Gravity Mains
- Lift Station
- Ag Line
- Ag Line
- Open Canal
- Siphon
- Fire Hydrants
- Fire Hydrant
- Wharfhead

Data Sources: EVMWD, County of Riverside

N

Date: 7/25/2024
Time: 11:44:36 AM

ELSINORE VALLEY MUNICIPAL WATER DISTRICT

EVMWD GIS
Anthony M. Vazquez

ELSINORE VALLEY
MUNICIPAL WATER DISTRICT

BOARD OF DIRECTORS
Andy Morris, President
Chance Edmondson, Vice President
Harvey R. Ryan, Treasurer
Darcy M. Burke, Director
Jack T. Ferguson, Director

GENERAL MANAGER Greg Thomas
LEGAL COUNSEL Best, Best & Krieger
DISTRICT SECRETARY Terese Quintanar

October 24, 2023

EPD Solutions
Attn: Dane Palanjian
3333 Michelson Drive
Irvine CA, 92612

SUBJECT: SERVICE REQUIREMENTS FOR BAKER INDUSTRIAL – APPLICATION NO. 23-062

On June 12, 2023, a Due Diligence meeting was held with Elsinore Valley Municipal Water District (District) and the Owner/Developer and/or Engineer of the subject project to discuss the water and/or sewer requirements for this project. The project consists of two industrial buildings 207,550 SF and 778,720 SF located at 378-020-014, 015, 016, 028, 029, 030, 031, 036, 037 and 048. The project site plan is attached herein.

The Owner/Developer shall comply with the following preliminary requirements to obtain water and/or sewer service from the District. A map of the existing water and/or sewer facilities is attached herein.

Project Specific Requirements:

1. The Owner/Developer shall provide a hydraulic water study that analysis average day demand, peak hour demand, max day demand and max day and fire flow demand per the Water Master Plan criteria. The water study must be approved prior to plan check submittal.
2. The Owner/Developer shall construct public water facilities as noted on the approved Water and/or Sewer Studies.
3. The Owner/Developer shall construct a mastered planned (FT-17) public Zone 1434 36-inch transmission main in Baker Street from Nichols Road to the 1434 Reservoir.
4. The Owner/Developer shall construct an offsite public Zone 1434 minimum 12-inch watermain in Baker Street along the project's frontage as shown in in exhibit attached herein. The project team asked if they could connect to the 1434 transmission main instead of constructing a parallel 12-inch waterline, this can be considered if proof is provided that no other development will need to connect to the required 12-inch water main.
5. The Owner/Developer shall construct an onsite public Zone 1434 minimum 8-inch looped watermain within the development.
6. The Owner/Developer shall construct an offsite public minimum 8-inch gravity sewer main in Baker Steet from the project easternly boundary to the existing temporary Nichols Rd Lift Station.
7. The project shall demonstrate to have sewer capacity allocated for the project to the existing or upgrade of the Nichols Rd Lift Station through an agreement for sewer services. If not, the Owner/Developer shall construct the mastered planned (RLS-16) permanent Nichols Rd Lift Station.

General Requirements:

8. The Owner/Developer shall construct a public individual minimum 2-inch domestic water service with backflow device for each building/suite.
9. The Owner/Developer shall construct a public individual minimum 2-inch irrigation water service with backflow device for each parcel.
10. The Owner/Developer shall construct a private minimum 6-inch sewer lateral for each parcel.
11. The Owner/Developer shall submit a Fire Flow Test Application if required by the Fire Department.
12. The Owner/Developer shall submit a Will Serve Application to quote the water and sewer capacity fees.
13. The Owner/Developer shall dedicate to the District an easement for all public water and sewer facilities constructed within the private property. A minimum 20-ft wide easement is required for one utility. No building, fences, walls or other structures of any kind, or trees, shall be installed, constructed, erected, placed planted or maintained in any portion of the easement area, and no shrubs or other plants or vegetation shall be placed, planted or maintained in the portion of easement area.
14. The Owner/Developer shall record a Water Rights Grant Deed to grant the water rights to the District.
15. The Owner/Developer shall submit a Plan Check application for the review of the Water and Sewer Improvement Plans for the project.
16. The Owner/Developer shall submit an Inspection Application for the inspection of the facilities to be constructed.

The District has assigned the following work order number to this project **WO# 23-062**. All future correspondence to this project must include the work order number provided.

Attached as **Exhibit A** is a list of forms, application and fees required to comply with the requirements mentioned above.

If you have any questions, please contact the Engineering Department at (951) 674-3146 Ext. 6705, engservices@evmwd.net.

EVMWD offers a variety of rebates and resources to help our customers save water. For more information, visit our Water Efficiency page at www.evmwd.com/conservation or contact our Water Efficiency Specialist at 951-674-3146 x8247.

Respectfully,

Mayra A. Cabrera
Principal Engineer – Development Services

CC:File; City of Lake Elsinore

Attachments: Forms, Applications and Fees
Site Plan
Water and Sewer Map

Forms, Applications and Fees

The list below details all the typical forms, application and fees that are submitted to Engineering Department. **ONLY THE CHECKED ITEMS ARE REQUIRED FOR THIS PROJECT.**

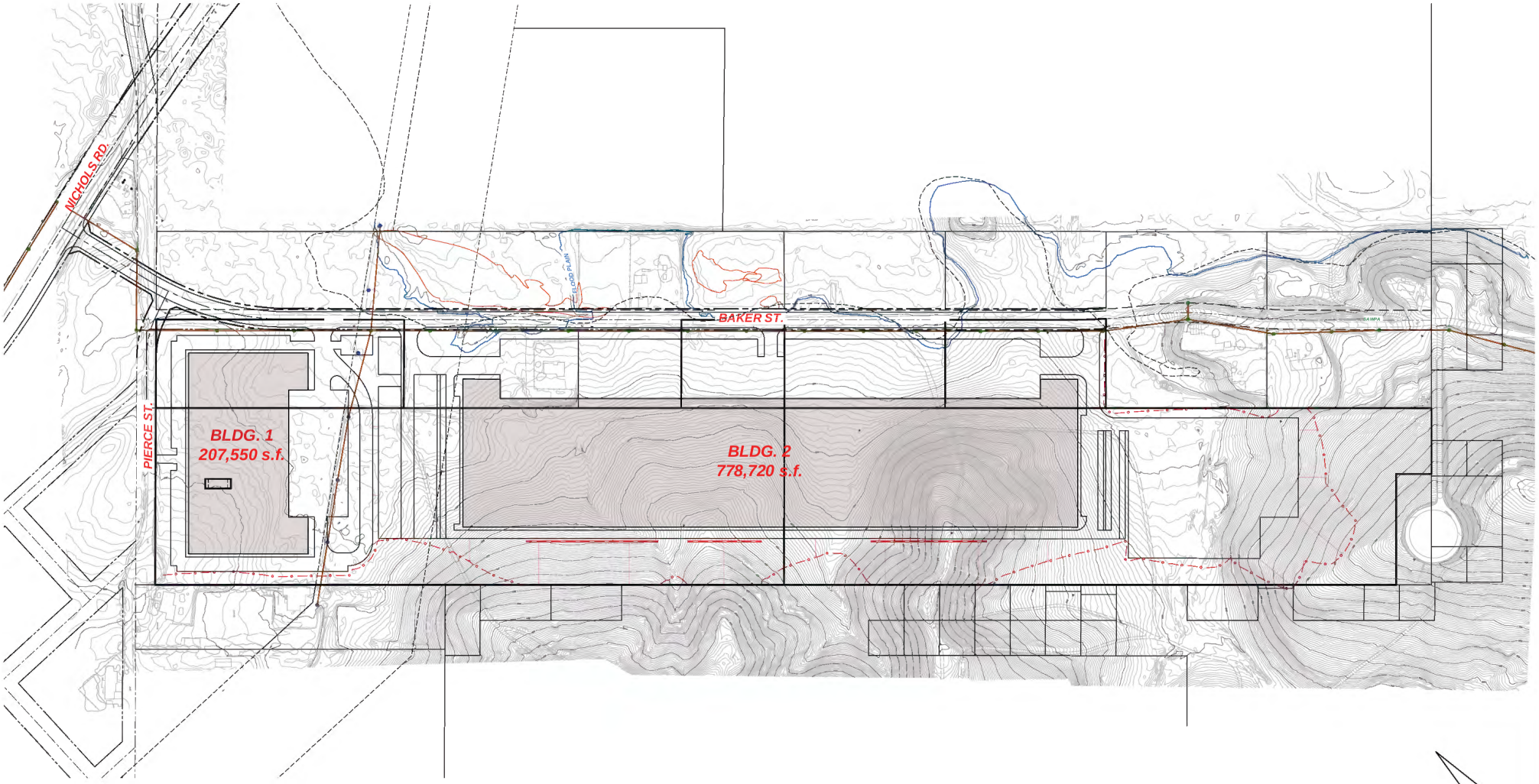
The application and forms may be downloaded by clicking the hyperlinks below or by visiting the following website: https://evmwd.com/development/forms-applications-and-related-documents/

Req. Items	Name	Description	Fees/Deposit [1]
Plan Review			
☒	Utility Request Form	This form is required to obtain existing record drawings.	No Fee Duration – 3-5 days
☒	Studies (Plan Check Application)	This application is required to initiate the review of water and sewer studies. Use the following templates: Water Study Template Sewer Study Template	**Deposit** – min. $5,000.00 Duration – 4 weeks
☒	Plans (Plan Check Application)	This application is required to initiate the plan review of the water, sewer and or recycled water improvement plans. The plans must conform to the District's Standards and Title Block requirements. Use the following templates: Easement Template – Required for public water and/or facilities within private property. Water Rights Grant Deed Template – Required for all multi-family, commercial, and industrial projects.	**Deposit** - 3% of Engineers Cost Estimate (min. $3,500.00) **Duration** – 4 weeks
☒	Fire Flow Application	This application is required to request Fire Flow information from a specific hydrant within the water system.	**Application Fee** - $125.00 Fire Flow Credit Card Form Duration – 3 weeks
☒	Will Serve Application	This application is required to determine the water and sewer capacity fees for residential developments. These capacity fees will be due prior to water meter installation.	**Application Fee** - $170.00 for Single Family Residence or $340.00 for Tract **Fee** – Refer to Capacity Fees **Duration** – 6 weeks
☒	Commercial Industrial Information Form	This application initiates the review of regulatory environmental compliance of discharges into the sewer system for commercial and industrial developments.	No initial fees. Fees will be determined after application had been reviewed.
Construction			
☒	Inspection Application	This application initiates the inspection for the construction of the project.	**Deposit** – 16.5% of Engineers Cost Estimate (15% for inspection services and 1.5% **fee** for mapping services) (min. $7,000.00) **Duration –** 3 weeks (Materials Submittals)

[1] The fees and deposits noted are the rates at issuance of this letter. The Owner/Developer will be responsible to pay the most current rates published by the District at the time of payment.

BAKER INDUSTRIAL CONCEPT SITE PLAN

LAKE ELSINORE, CA



LEGEND

- FLOODPLAIN ZONE (2020)
- VALLEY–IVYGLEN SCE LINE ALIGNMENT
- RELOCATED POWER POLES
- VALLEY–IVYGLEN POWER POLES
- EXISTING POWER POLES

80' 0 80' 160'
SCALE IN FEET

UPDATED 4–3–2023

KWC ENGINEERS

R:\19\1994\PREZ\Art\Civil\NEW Civil\Site Plan – Baker Industrial – Draft.dwg 04/28/2023 14:25

JOB 1

Vicinity Map - Baker Industrial - 2 Industrial Buildings - Water & Sewer



Legend

- Parcels _Query result
- EVMWD Boundary
- EVMWD Sphere of Influence
- Highways
- Street Centerlines
- Parcels
- Non Potable Pressure Mains
- Air Release
- Blowoff
- Distribution Main
- Hydrant Lateral
- Sampling Point
- Transmission Main
- Drain Line
- Fee Credits Sewer
- Fee Credits Water
- Reimbursements - Sewer
- Reimbursements - Water
- Force Main
- Gravity Mains
- Lift Station
- Ag Line
- Ag Line
- Open Canal
- Siphon

Data Sources: EVMWD, County of Riverside

N

Date: 5/23/2023
Time: 11:25:26 AM

LEGAL DESCRIPTION

Real property in the City of Lake Elsinore, County of Riverside, State of California, described as follow:

PARCEL A: (APN: 378-020-014)

PARCEL 1:

ALL THAT PORTION OF LOT 1, IN BLOCK "A" OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 8 PAGE 377 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST WESTERLY CORNER OF THAT CERTAIN TRACT OF LAND CONVEYED BY CHARLES HUDSON AND DESSIE HUDSON, HUSBAND AND WIFE, TO GREAT COAST AL OIL CORPORATION, A CORPORATION AND RECORDED ON THE 8TH DAY OF MAY 1936, IN BOOK 275 AT PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY, CALIFORNIA; THENCE SOUTH FORTY-SIX DEGREES FIFTY MINUTES EAST (SOUTH 46° 50' EAST) A DISTANCE OF 236 FEET; THENCE NORTH FORTY- THREE DEGREES TEN MINUTES EAST (NORTH 43° 10' EAST) A DISTANCE OF 300 FEET TO THE TRUE POINT OF BEGINNING; THENCE NORTH FORTY-THREE DEGREES TEN MINUTES EAST (NORTH 43° 10' EAST) A DISTANCE OF 30 FEET; THENCE NORTH FORTY-SIX DEGREES FIFTY MINUTES WEST (NORTH 46° 50' WEST) A DISTANCE OF 80 FEET; THENCE SOUTH FORTY-THREE DEGREES TEN MINUTES WEST (SOUTH 43° 10' WEST) A DISTANCE OF 30 FEET; THENCE SOUTH FORTY SIX DEGREES FIFTY MINUTES EAST (SOUTH 46° 50' EAST) A DISTANCE OF 80 FEET TO THE TRUE POINT OF BEGINNING.

EXCEPTING THEREFROM MINERALS, OIL AND GAS AS RESERVED BY DEED RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 .

PARCEL 2: (APN: 378-020-015 AND 378-020-016)

THE NORTHWEST HALF OF THE SOUTHWEST HALF OF THE FOLLOWING DESCRIBED PROPERTY: ALL THAT PORTION OF LOTS 1, 2 AND 3, IN BLOCK "A" OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 8 PAGE 377 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, PARTICULARLY DESCRIBED AS FOLLOWS: COMMENCING AT THE MOST NORTHERLY CORNER OF LOT 50 OF COUNTRY CLUB HEIGHTS UNIT "B", AS SHOWN BY MAP ON FILE IN BOOK 17, PAGES 25 AND 26 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE NORTH 43° 24' EAST ALONG THE SOUTHERLY EXTENSION OF THE MOST WESTERLY LINE AND ALONG THE MOST WESTERLY LINE OF THAT CERTAIN PARCEL OF LAND CONVEYED TO ABE CORLIN AND HENRY C. SCHULTZ, BY DEED RECORDED NOVEMBER 15, 1928 IN BOOK 789, PAGE 273 OF DEEDS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, TO THE MOST NORTHERLY POINT IN SAID MOST WESTERLY LINE, FOR THE POINT OF BEGINNING; THENCE SOUTH 46° 50' EAST, FORMERLY RECORDED SOUTH 47° EAST, 3067.6 FEET; THENCE NORTH 43° 10' EAST , FORMERLY RECORDED NORTH 43° EAST , 1100 FEET TO THE MOST EASTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, BY DEED RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE NORTH 46° 50' WEST ALONG THE NORTHEASTERLY LINE OF SAID PARCEL SO CONVEYED TO GREAT COASTAL OIL CORPORATION, 3960 FEET TO THE NORTHWESTERLY LINE OF LOT 1 IN BLOCK "A", ABOVE DESCRIBED; THENCE SOUTHWESTERLY ALONG SAID NORTHWESTERLY LINE AND ALONG THE SOUTHWESTERLY PROLONGATION OF SAID NORTHWESTERLY LINE, TO A POINT WHICH BEARS NORTH 46° 50' WEST FROM THE POINT OF BEGINNING, SAID POINT BEING THE MOST WESTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, HEREINABOVE REFERRED TO; THENCE SOUTH 46° 50' EAST, ALONG THE SOUTHWESTERLY LINE OF SAID PARCEL, TO THE POINT OF BEGINNING, EXCEPTING THEREFROM ALL THAT PORTION THEREOF DESCRIBED AS FOLLOWS: COMMENCING AT THE MOST WESTERLY CORNER OF THAT CERTAIN TRACT OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, BY DEED RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE SOUTH 46° 50' EAST, 236 FEET; THENCE NORTH 43° 10' EAST, 300 FEET OR THE POINT OF BEGINNING; THENCE NORTH 43° 10' EAST, 30 FEET; THENCE NORTH 46° 50' WEST, 80 FEET; THENCE SOUTH 43° 10' WEST, 30 FEET; THENCE SOUTH 46° 50' EAST, 80 FEET TO THE POINT OF BEGINNING; ALSO EXCEPTING THEREFROM A STRIPS OF LAND 1 ROD WIDE, 4.5 FEET ON THE EASTERLY SIDE AND 12 FEET ON THE WESTERLY SIDE OF THE CENTER LINE OF THE PIPELINE OF THE TEMESCAL WATER COMPANY, AS NOW LAID OVER AND ACROSS THE HEREINABOVE DESCRIBED PROPERTY AS CONVEYED TO THE TEMESCAL WATER COMPANY, A CORPORATION, BY DEED RECORDED MAY 12, 1917 IN BOOK 362 PAGE 56 , OF DEEDS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA. ALSO EXCEPTING THEREFROM THE 1/8 PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA

PARCEL B: (APN: 378-020-020)

PARCEL 1 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, ON FILE IN BOOK 58 PAGE 68 OF PARCEL MAPS, RIVERSIDE COUNTY RECORDS, EXCEPTING THE REFROM 1/8 PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE ACCRUED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL C: (APN: 378-020-007 AND OTHER PROPERTY)

PARCEL 2 OF PARCEL MAP 8913, AS SHOWN BY MAP ON FILE IN BOOK 36, PAGE 29 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA. EXCEPTING THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275, PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL D: (APN: 378-020-008)

PARCEL 3 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 58, PAGE 68, OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY. EXCEPTING THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275, PAGE 344, OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL E: (APN: 378-020-009)

PARCEL 1 OF PARCEL MAP 8913, AS SHOWN BY MAP ON FILE IN BOOK 36, PAGE 29 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA. EXCEPTING THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275, PAGE 344 OF OFIICIAL RECORDS, RIVERSIDE COUNTY, RECORDS.

PARCEL F: (APN: 378-020-010)

THE SOUTHEAST ONE-HALF OF THE SOUTHWEST ONE-HALF OF THE FOLLOWING DESCRIBED PROPERTY: ALL THAT PORTION OF LOTS 1, 2 AND 3 IN BLOCK A OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, AS SHOWN BY MAP ON FILE IN BOOK 8 PAGE 377 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, PARTICULARLY DESCRIBED AS FOLLOWS: COMMENCING AT THE MOST NORTHERLY CORNER OF LOT 50 OF COUNTRY CLUB HEIGHTS, UNIT "B" AS SHOWN BY MAP ON FILE IN BOOK 17 PAGES 25 AND 26 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE NORTH 43° 24' EAST, ALONG THE SOUTHERLY EXTENSION OF THE MOST WESTERLY LINE AND ALONG THE MOST WESTERLY LINE OF THAT CERTAIN PARCEL OF LAND CONVEYED TO ABE CORLIN AND HENRY C. SCHULTZ, BY DEED RECORDED NOVEMBER 15, 1928 IN BOOK 789 PAGE 273 OF DEEDS, RECORDS OF RIVERSIDE COUNTY, TO THE MOST NORTHERLY POINT IN SAID MOST WESTERLY LINE, FOR THE POINT OF BEGINNING; THENCE 46° 50' EAST , FORMERLY RECORDED SOUTH 47° EAST, 3067.6 FEET; THENCE NORTH 43° 10' EAST , FORMERLY RECORDED NORTH 43° EAST, 1100 FEET TO THE MOST EASTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, BY DEED RECORDED MAY 8, 1936 IN BOOK 275 PAGE 344 OF OFICIAL RECORDS OF SAID RIVERSIDE COUNTY; THENCE NORTH 46° 50' WEST, ALONG THE NORTHEASTERLY LINE OF SAID PARCEL SO CONVEYED TO GREAT COASTAL OIL CORPORATION, 3960 FEET TO THE NORTHWESTERLY LINE OF LOT 1 IN BLOCK A, ABOVE DESCRIBED; THENCE SOUTHWESTERLY ALONG SAID NORTHWEST LINE AND ALONG THE SOUTHWESTERLY PROLONGATION OF SAID NORTHWESTERLY LINE, TO A POINT WHICH BEARS NORTH 46° 50' WEST FROM THE POINT OF BEGINNING, SAID POINT BEING THE MOST WESTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, HEREINABOVE REFERRED TO; THENCE SOUTH 46° 50' EAST, ALONG THE SOUTHWESTERLY LINE OF SAID PARCEL, TO THE POINT OF BEGINNING. EXCEPTING THEREFROM THAT PORTION CONVEYED TO EL SINORE VALLEY MUNICIPAL WATER DISTRICT, A PUBLIC CORPORATION BY DEED RECORDED APRIL 8, 1987 AS INSTRUMENT NO. 96352 OF OFFICIAL RECORDS.

PARCEL 2

AN EASEMENT FOR ROAD PURPOSES, 20 FEET WIDE, OVER AND ACROSS THE EXISTING ROAD, THE CENTER LINE BEING THE NORTHEASTERLY LINE OF THE ABOVE DESCRIBED PROPERTY AND THE NORTHWESTERLY EXTENSION OF SAID LINE AS EXTENDED TO THE SOUTHEAST SIDE LINE OF PIERCE STREET, EXCEPTING THEREFROM THAT PORTION INCLUDED WITHIN PARCEL A ABOVE. EXCEPTING THEREFROM 1/8 THINTERE ST OF ALL OIL, GAS AND MINERAL RIGHTS THEREOF.

PARCEL F: (APN: 378-020-026)

PARCEL 2 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 58, PAGE 68 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA. EXCEPT THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275, PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL G: (APN: 378-020-030)

PARCEL 3 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 58, PAGE 68 , OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY. EXCEPTING THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275, PAGE 344 , OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL H: (APN: 378-020-009 AND OTHER PROPERTY)

PARCEL 1 OF PARCEL MAP 8913, AS SHOWN BY MAP ON FILE IN BOOK 36, PAGE 29 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA. EXCEPTING THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 275, PAGE 344 , OF FICIAL RECORDS, RIVERSIDE COUNTY, RECORDS.

SITE LEGEND:

- ON-SITE LANDSCAPED AREA
- OFF-SITE LANDSCAPED AREA
- SITE PROPERTY LINES
- CITY CURB AND GUTTER LINES
- STREET CENTERLINES
- TYPICAL AUTO PARKING STALLS 9'X18'
- TYPICAL SITE LIGHT POLE 20' HPS/P PHOTOMETRIC

VICINITY MAP



SHEET INDEX

A1-1	OVERALL SITE PLAN
A1-2	BUILDING 1 SITE PLAN
A1-3	BUILDING 2 SITE PLAN
A1-3.1	BUILDING 2 ENLARGED SITE PLAN
A1-4	FENCE AND WALL PLAN
A1-5	SITE SECTIONS
A1-6	GOOD NEIGHBOR POLICY EXHIBIT
1A2-1	BUILDING 1 FLOOR PLAN
1A2-2	BUILDING 1 ROOF PLAN
1A3-1	BUILDING 1 ELEVATIONS
2A2-1	BUILDING 2 FLOOR PLAN
2A3-1	BUILDING 2 ELEVATIONS
1	TITLE SHEET
2	CROSS SECTION AND DETAILS SHEET
3-5	CONCEPTUAL GRADING PLAN SHEETS
1	TENTATIVE PARCEL MAP
LL1	PRELIM LANDSCAPE PLAN ENLARGEMENT
LL2	PRELIM LANDSCAPE PLAN ENLARGEMENT
L2.0	PLANT IMAGERY

GENERAL NOTES

1. THE PROPOSED PROJECT SHALL COMPLY WITH THE PROVISIONS OF THE CITY OF LAKE ELSINORE PLANNING PLAN

2. A LANDSCAPING PLAN SHALL BE SUBMITTED TO THE PLANNING DEPARTMENT FOR APPROVAL PRIOR TO ISSUANCE OF BUILDING PERMITS AND SHALL BE IMPLEMENTED PRIOR TO OCCUPANCY.

3. THE PROJECT DOES NOT PROPOSE ANY TENANT SIGNAGE AT THIS TIME.

4. THERE ARE NO PROTECTED PLANTS ON SITE.

5. ALL ROOF DRAINS AT STREET FRONTAGES SHALL BE IN THE INTERIOR OF THE BUILDING ENVELOPE.

6. ALL LANDSCAPE SHALL BE BOUND BY A 6" HIGH CONCRETE CURB.

7. A LIGHT PLAN SHALL BE SUBMITTED SHOWING CONFORMANCE WITH MINIMUM FOOTCANDLE LEVELS AND MARCH AIR BASE STANDARDS. FIXTURES SHALL BE SHIELDED LED.

APPLICATION TYPE

PLANNING APPLICATION NO. 2023-103
EXISTING ZONING: M-1/M-2
PROPOSED ZONING: M-2
GENERAL PLAN: LIMITED INDUSTRIAL
PERMITTED LAND USE: WAREHOUSE, OFFICE AS PERMITTED

PROJECT DESCRIPTION

NEW INDUSTRIAL WAREHOUSE BUILDING WITH AUTO AND TRAILER PARKING AREAS.

LAND OWNER

RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
2330 MARINSHIP WAY, SUITE 120
SAUSALITO, CA 94965
TEL: 415-465-4423
CONTACT: GLEN WILLIAMS
glen@eccsystempartners.com

APPLICANT

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glen@eccsystempartners.com

PLAN PREPARER

RGA, OFFICE OF ARCHITECTURAL DESIGN, INC.
1523 I ALTON PARKWAY, SUITE 100
IRVINE, CA 92618
CONTACT: CHRIS SAVAGE

CIVIL ENGINEER

KWC ENGINEERS
1880 COMPTON AVENUE, SUITE 100
CORONA, CA 92881
CONTACT: BRANDON BARNETT

UTILITIES & SERVICES

SEE CIVIL DRAWINGS

ASSESSOR'S NUMBERS:

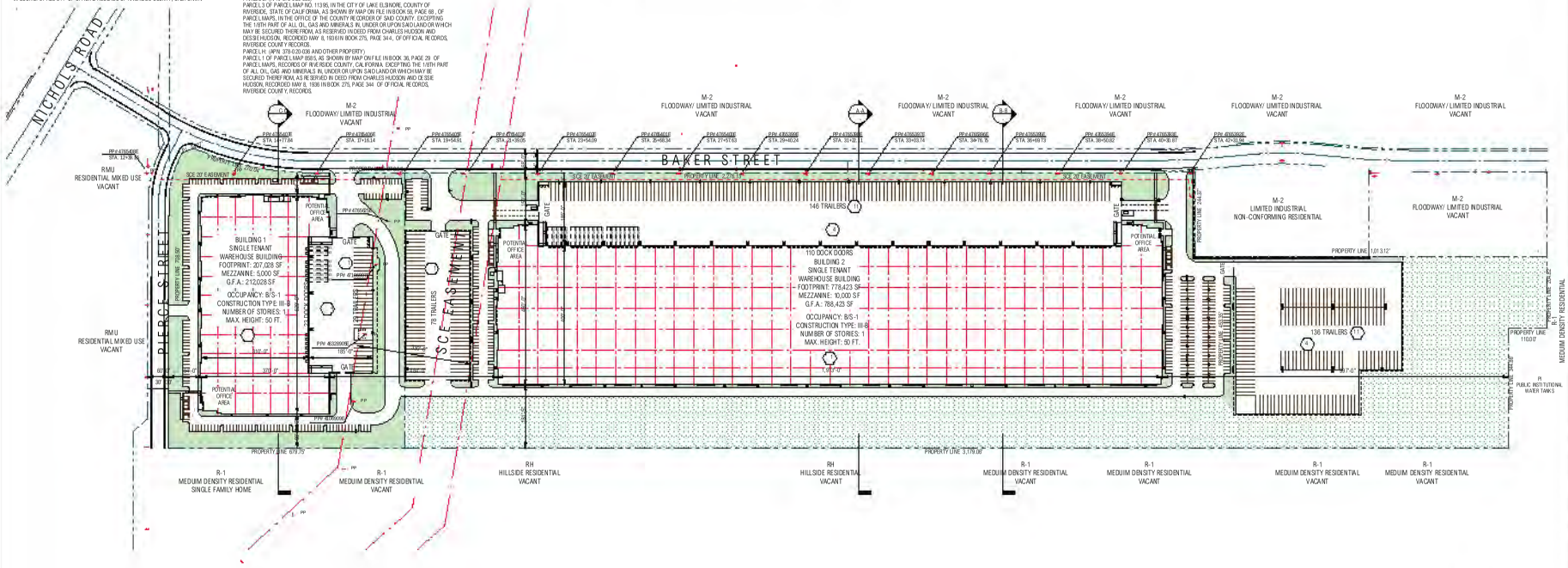
APN: 378-020-014, 015, 016, 028, 029, 030, 031, 036, 037, 048

KEYNOTES:

1. PROPOSED PAINTED CONCRETE TILT-UP INDUSTRIAL BUILDING.
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3. EVCS PARKING STALL PER CODE - 9' X 18'.
4. CONCRETE TRUCK YARD PER CIVIL.
5. FULLY IRRIGATED LANDSCAPE AREA BOUNDED BY 6" CONCRETE CURB - SEE CONCEPT LANDSCAPE PLAN.
6. PRIMARY BUILDING ENTRANCE W/ DECORATIVE CONCRETE ENTRY WALK.
7. 8'-0" HIGH TRASH AND RECYCLABLE BINS. SEE SHEET A2-1 FOR ELEVATION AND SECTIONS.
8. 8'-0" HIGH BLACK TUBE STEEL FENCE.
9. PROPERTY LINES.
10. PROPOSED ELECTRICAL TRANSFORMER LOCATION. ALL UTILITY STRUCTURES SHALL BE SCREENED BY LANDSCAPE, SEE LANDSCAPE PLAN.
11. 11' X 53' TRUCK TRAILER PARKING STALLS.
12. ACCESSIBLE PARKING STALLS 9' X 18'-0" MIN.
13. DASHED LINE INDICATES: NEW 5'-0" WIDE SURFACE WALK. ACCESSIBLE PATH OF TRAVEL FROM PUBLIC SIDEWALK & PARKING STALLS TO PRIMARY BUILDING ENTRANCE.
14. TYP. 8' HIGH PAINTED CONCRETE SCREEN WALL ELEVATION W/ ACCENT REVEALS AND PAINTED ACCENTS TO MATCH BUILDING ARCHITECTURE.
15. NEW CURB AND GUTTER PER CITY STANDARD.

PROJECT DATA

	BUILDING 1		BUILDING 2		TOTAL
SITE AREA	547,317	SF	2,319,450	SF	**2,866,767 SF**
	12.565	AC	53.247	AC	**65.812 AC**
BUILDING AREA					
FOOTPRINT	207,028	SF	778,423	SF	**985,451 SF**
MEZZANINE	5,000	SF	10,000	SF	**15,000 SF**
TOTAL	212,028	SF	788,423	SF	**1,000,451 SF**
F.A.R	38.74%		33.99%		**34.90%**
BUILDING AREA BY USE					
OFFICE	10,000	SF	20,000	SF	**30,000 SF**
WAREHOUSE	202,028	SF	768,423	SF	**970,451 SF**
AUTO PARKING					
1/1000 1ST 40K SF	40		40		**80**
1/4000 > 40K SF	43		187		**230**
TOTAL	83		227		**310**
PARKING PROVIDED					
STANDARD STALLS	111		133		**244**
ADA STALLS	7		8		**15**
EV STALLS	34		59		**93**
AUTOS IN SCE ESMT.	20		94		**114**
PARKING PROVIDED EXC. SCE	152		200		**352**
TOTAL PROVIDED	172		294		**466**
DOCK LOADING ZONES					
REQUIRED	7		18		**25**
PROVIDED	23		110		**133**
TRAILER PARKING	29		360		**389**
LANDSCAPE REQUIRED	65,678	SF	278,334	SF	**344,012 SF**
LANDSCAPE PROVIDED	142,000	SF	745,000	SF	**887,000 SF**
LANDSCAPE COVERAGE	25.94%		32.12%		**30.94%**
PAVING AREA	198,289	SF	796,027	SF	**994,316 SF**



OVERALL SITE PLAN

SCALE: 1" = 100'-0"

PROJECT NORTH | TRUE NORTH

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CONSULTANT

PROFESSIONAL SEAL S

BAKER / PIERCE STREET DEVELOPMENT

0000 BAKER STREET
CITY OF LAKE ELSINORE, CA

APPLICANT:
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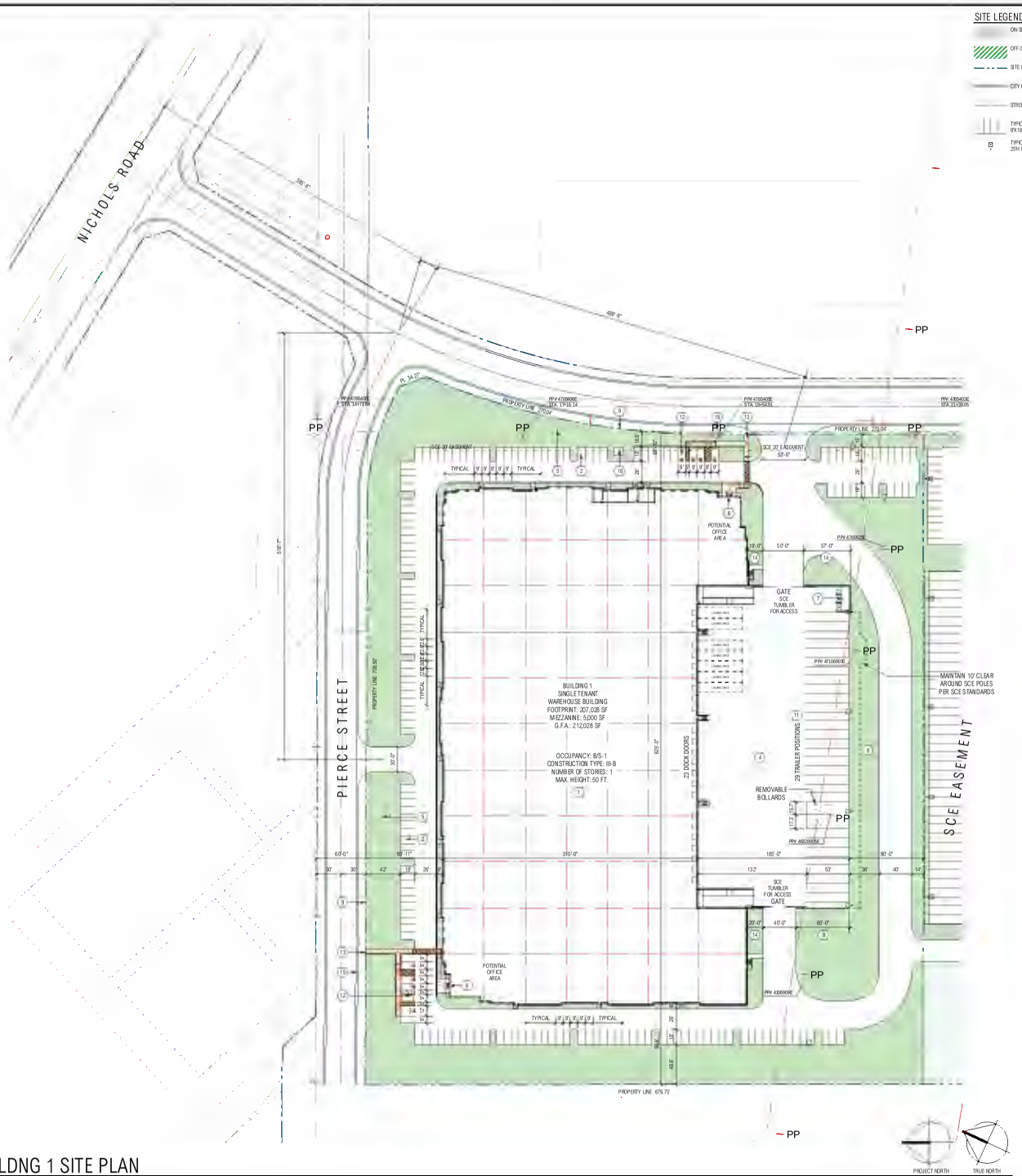
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3D	7/15/24	PLANNING REVISIONS
3D	6/18/24	PLANNING REVISIONS
3D	08/04/23	SCHEMATIC DESIGN
MARK	DATE	DESCRIPTION

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CAD FILE NAME: 23041-00-A1-1P
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CHK'D BY: CS

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SHEET TITLE
OVERALL SITE PLAN

SHEET: A1-1P



BUILDNG 1 SITE PLAN

SCALE: 1" = 50'-0"

SITE LEGEND:

- ON-SITE LANDSCAPED AREA
- OFF-SITE LANDSCAPED AREA
- SITE PROPERTY LINES
- CITY CURB AND GUTTER LINES
- STREET CENTERLINES
- TYPICAL AUTO PARKING STALLS 9'X18'
- TYPICAL SITE LIGHT POLE 25'H PER PHOTOMETRIC

KEYNOTES:

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CAD FILE NAME:	23041-00-A1-2P
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CHK'D BY:	CS

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SHEET TITLE

BUILDING 1
SITE PLAN

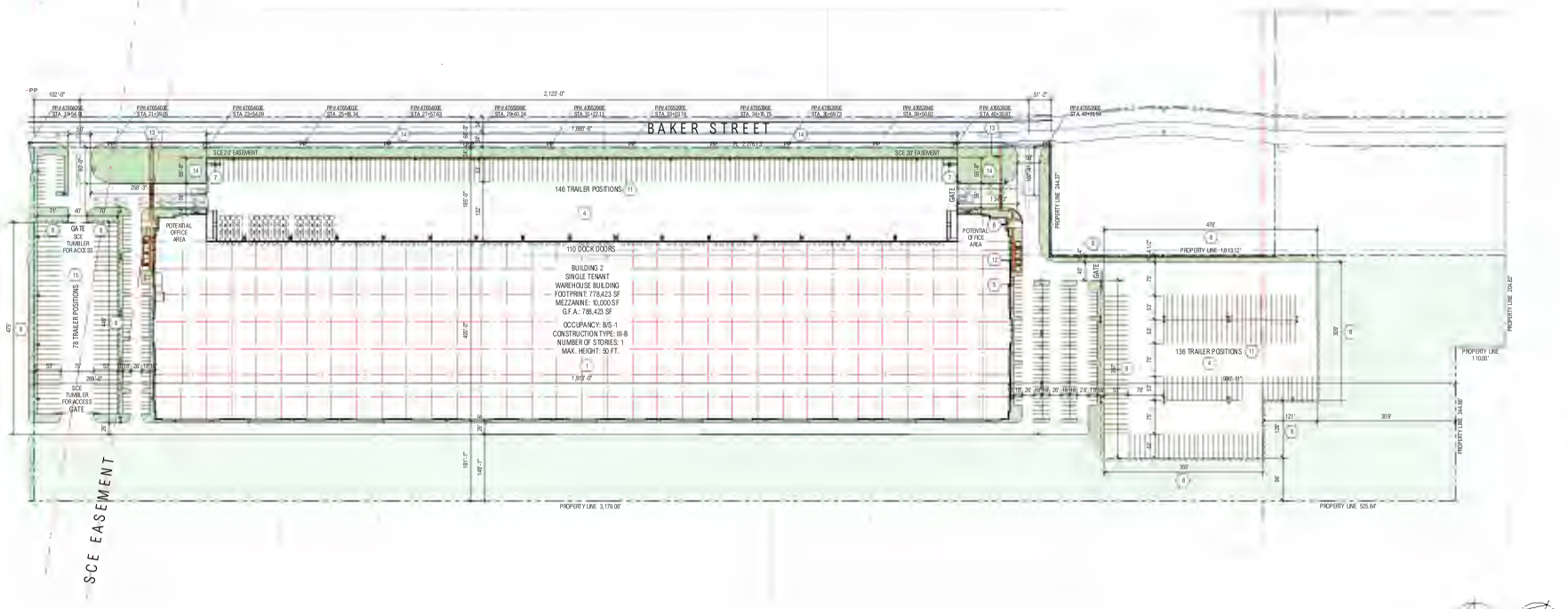
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SITE LEGEND:

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BUILDING 2 SITE PLAN

SCALE: 1" = 100'-0"

PROJECT NORTH TRUE NORTH

RGA

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SHEET TITLE

BUILDING 2
SITE PLAN

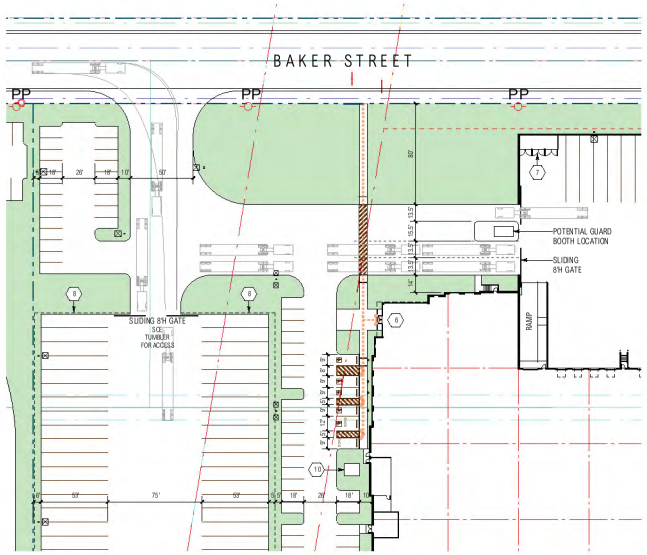
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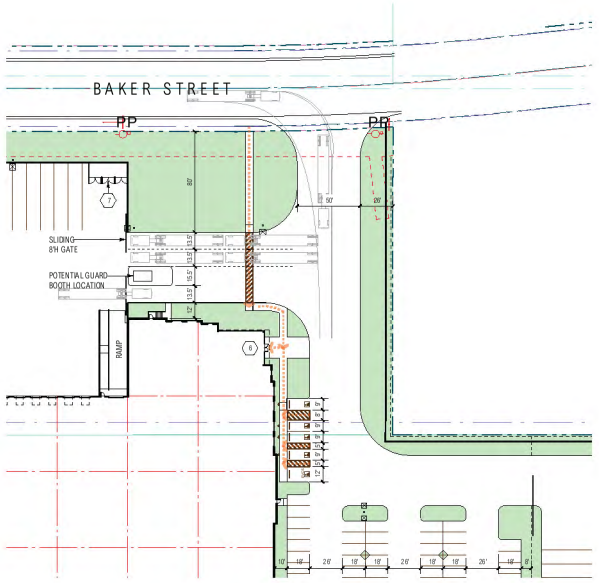
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KEYNOTES: (10)

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PROJECT NORTH

TRUE NORTH

BUILDING 2 SITE PLAN ENLARGEMENTS

SCALE: 1" = 50'-0"

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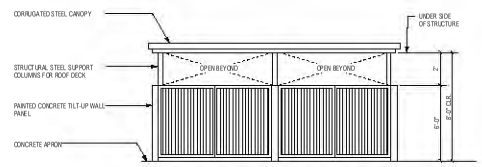
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SHEET TITLE

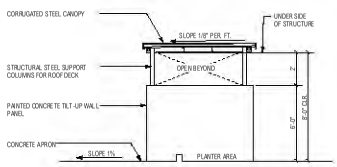
BUILDING 2
SITE PLAN ENLARGEMENTS

SHEET: A1-3.1P



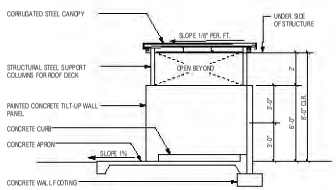
TRASH ENCLOSURE FRONT ELEVATIONS

SCALE: 1/4" = 1'-0"



TRASH ENCLOSURE SIDE ELEVATIONS

SCALE: 1/4" = 1'-0"



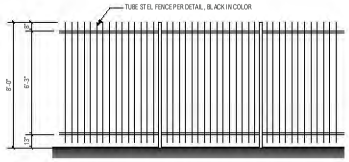
TYPICAL TRASH ENCLOSURE SECTION

SCALE: 1/4" = 1'-0"

FENCE & WALL LEGEND

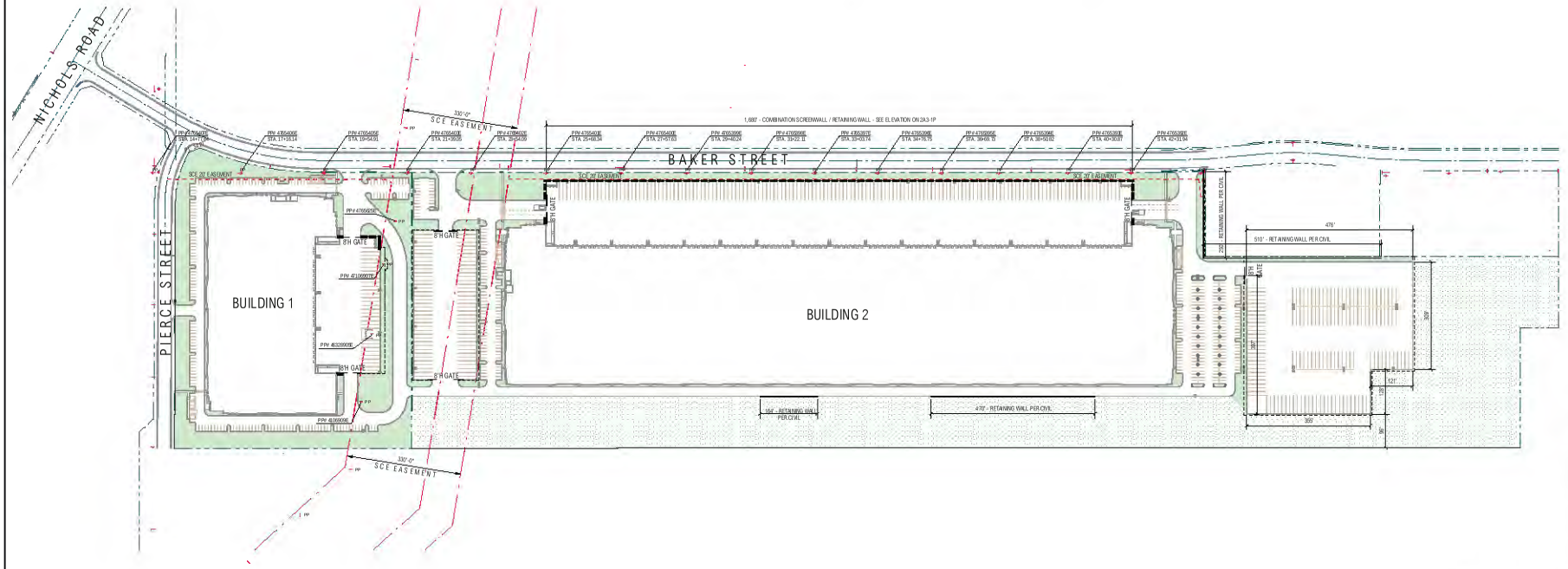
8'-0" BLACK PAINTED TUBULAR STEEL PICKET FENCE.

14'-0" PAINTED CONCRETE SCREEN WALL PAINT AND REVEALS



TYPICAL TUBE STEEL FENCE ELEVATION

SCALE: 1/4" =1'-0"



FENCE & WALL PLAN

SCALE: 1" = 120'-0"

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SD	7/15/24	PLANNING REVISIONS
SD	6/18/24	PLANNING REVISIONS
SD	08/04/23	SCHEMATIC DESIGN

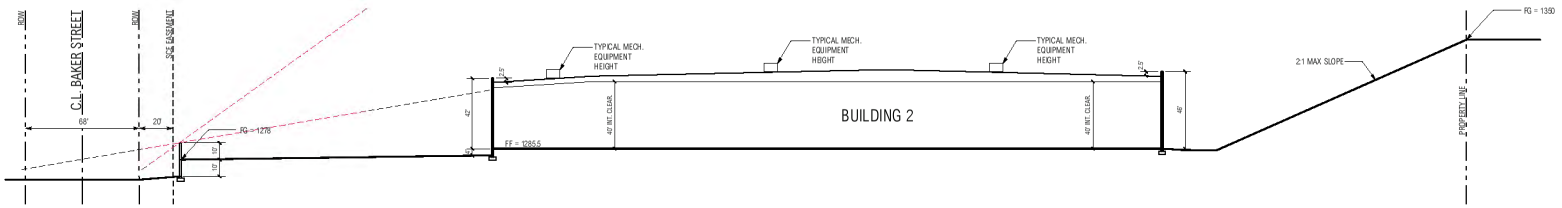
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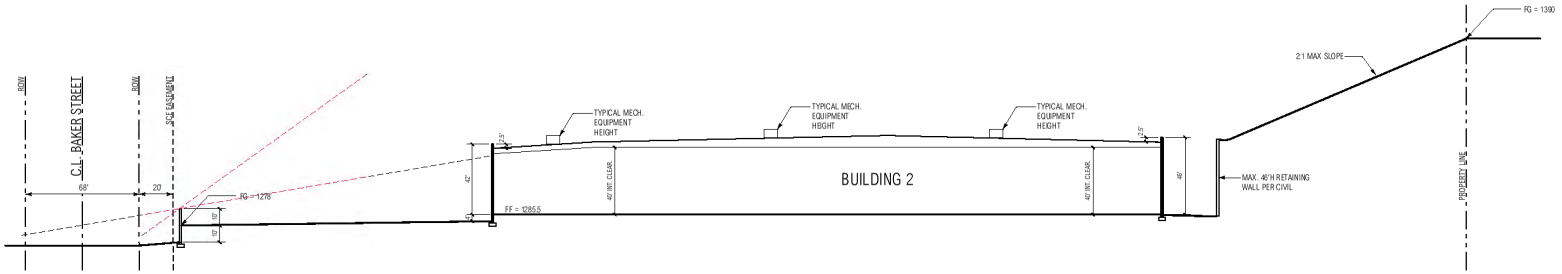
FENCE AND WALL PLAN

SHEET: A1-4P



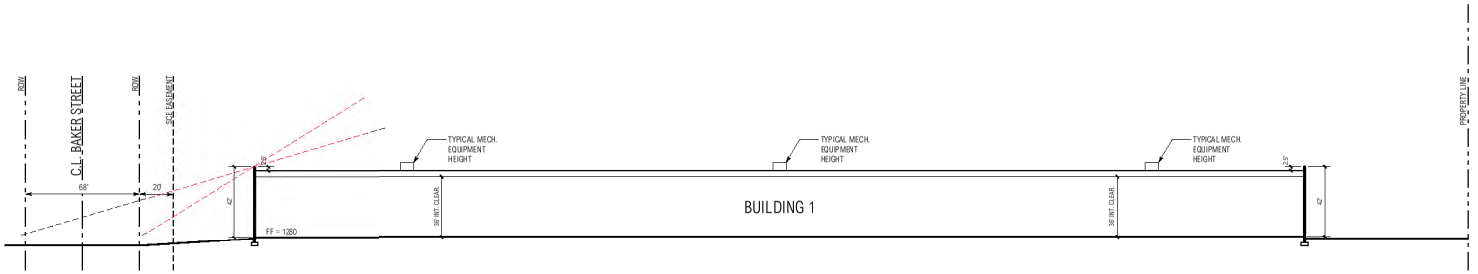
SECTION A-A

SCALE: 1" = 30'-0"



SECTION B-B

SCALE: 1" = 30'-0"



SECTION C-C

SCALE: 1" = 30'-0"

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SHEET TITLE

SITE SECTIONS

SHEET: A1-5P

GATE STACKING CALCULATION: (NORTH GATE)

STACKING DISTANCE REQUIRMENTS PER GNP:
140'-0" BASE REQUIRED
+70'-0" PER EVERY 40 DOORS OVER 400 DOORS

NUMBER OF BUILDING DOCK DOORS:
110

STACKING DISTANCE REQUIRED AT GATE
140'-0"
+140'-0" (110 DOORS - 40)/40)=1.40'-0" EXTRA
280'-0" REQUIRED AT THIS GATE

STACKING DISTANCE PROVIDED
250'-0"
+268'-0"
518'-0"

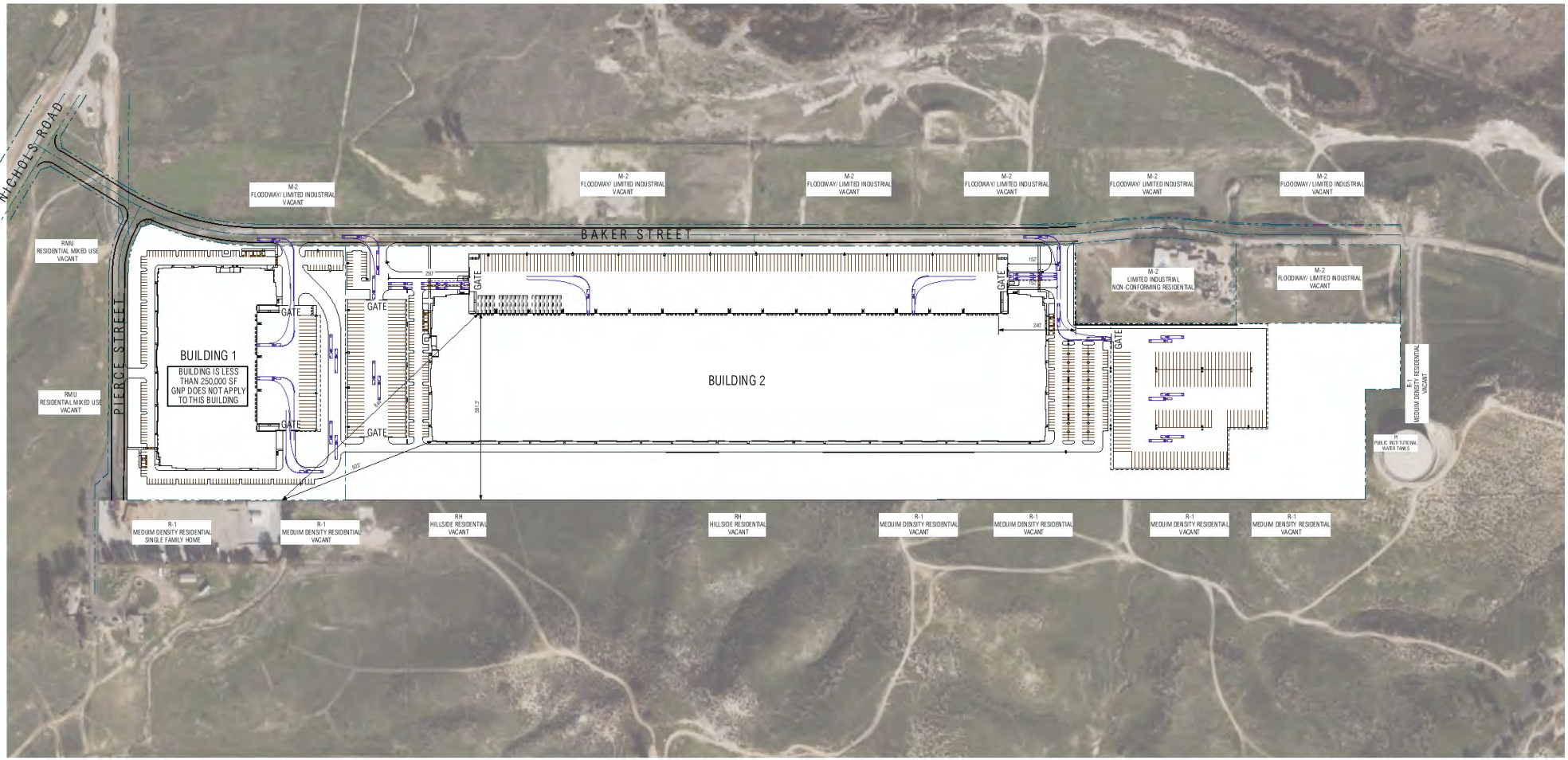
GATE STACKING CALCULATION: (SOUTH GATE)

STACKING DISTANCE REQUIRMENTS PER GNP:
140'-0" BASE REQUIRED
+70'-0" PER EVERY 40 DOORS OVER 400 DOORS

NUMBER OF BUILDING DOCK DOORS:
110

STACKING DISTANCE REQUIRED AT GATE
140'-0"
+140'-0"(110 DOORS - 40)/40)=1.40'-0" EXTRA
280'-0" REQUIRED AT THIS GATE

STACKING DISTANCE PROVIDED
152'-0"
+152'-0"
304'-0"

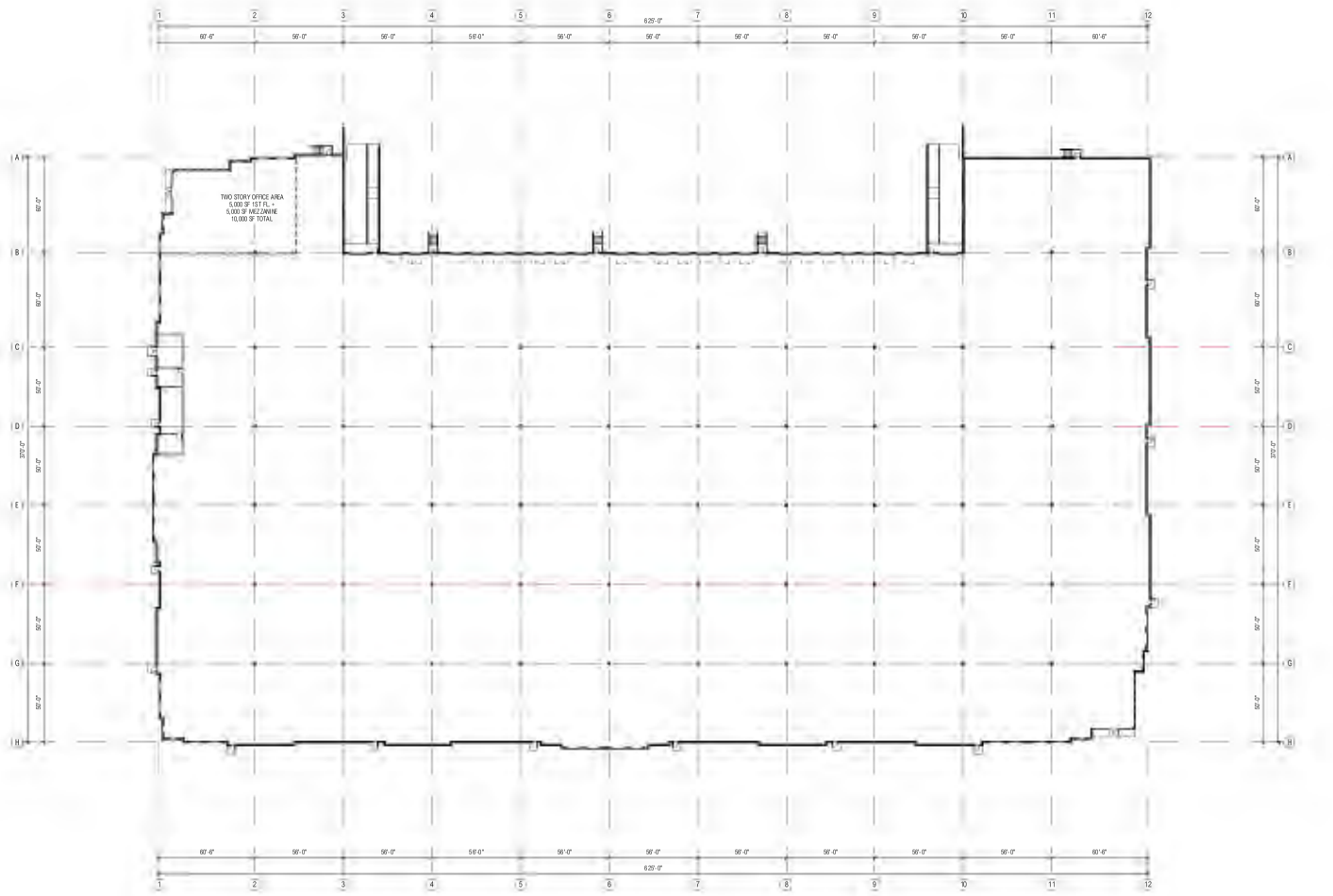


GOOD NEIGHBOR EXHIBIT

SCALE: 1" = 120'-0"

PROJECT NORTH

TRUE NORTH



BUILDNG 1 FLOOR PLAN

SCALE: 1" = 30'-0"

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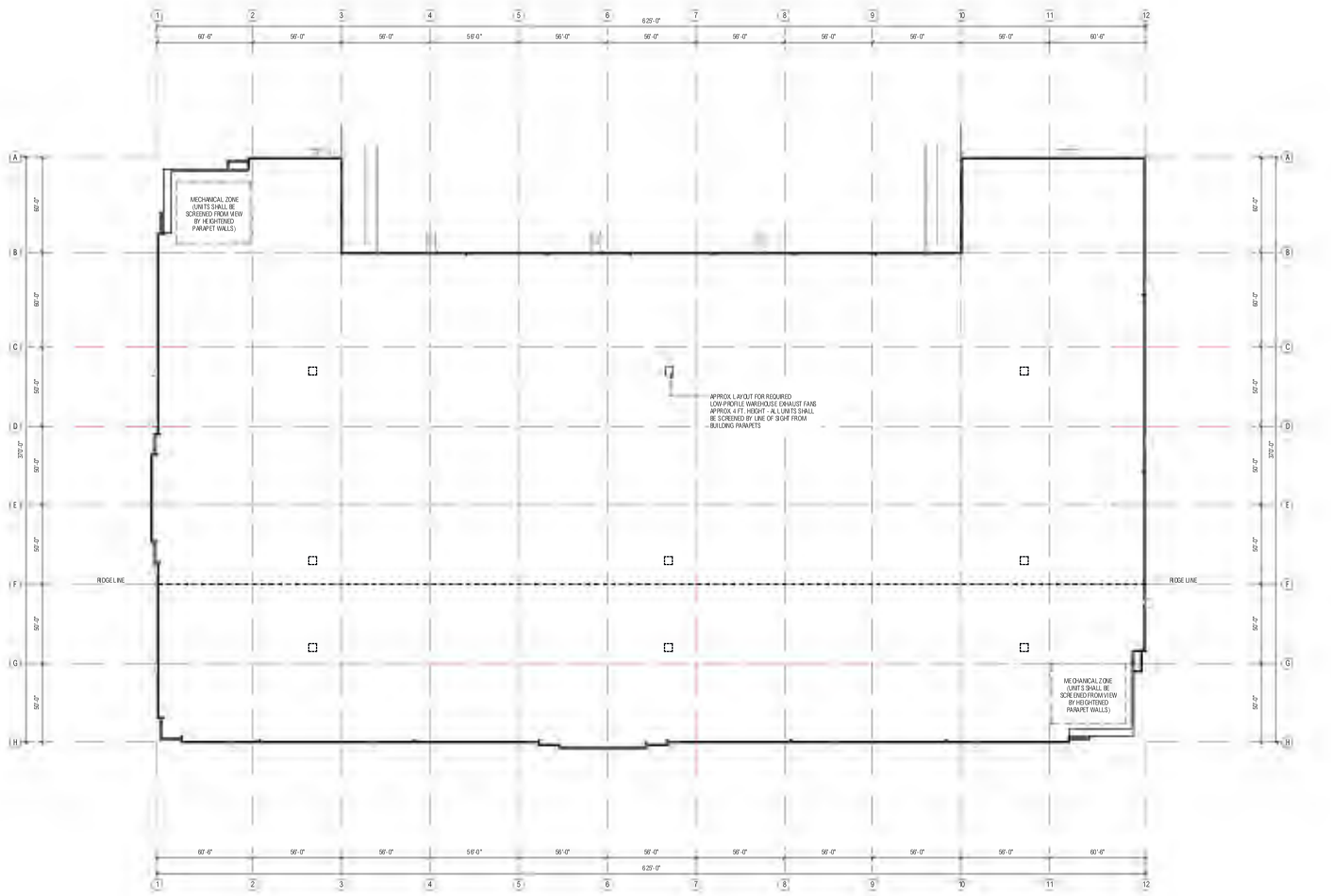
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SHEET TITLE
BUILDING 1
FLOOR PLAN

SHEET: A2-1P



BUILDNG 1 ROOF PLAN

SCALE: 1" = 30'-0"

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SHEET TITLE
BUILDING 1
ROOF PLAN

SHEET: A2-2P



EAST ELEVATION
SCALE: 1" = 20'-0"



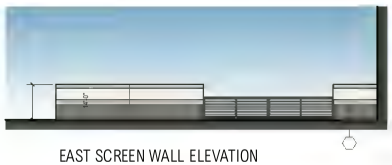
WEST ELEVATION
SCALE: 1" = 20'-0"



SOUTH ELEVATION
SCALE: 1" = 20'-0"



NORTH ELEVATION
SCALE: 1" = 20'-0"



EAST SCREEN WALL ELEVATION
SCALE: 1" = 20'-0"

FINISH SCHEDULE:

1. FIELD COLOR
SHERWIN WILLIAMS -
SW7102 WHITE FLOUR
2. LIGHT ACCENT COLOR
SHERWIN WILLIAMS -
SW9166 DRIFT OF MIST
3. DARK ACCENT COLOR
SHERWIN WILLIAMS -
SW9126 HONED SOAPSTONE
4. DARK ACCENT COLOR
SHERWIN WILLIAMS -
SW9154 PERLE NOIR
5. FORMLINER COLOR
SHERWIN WILLIAMS -
SW7167 POLISHED CONCRETE
FITZGERALD FORMLINER -
17014 COLONIAL STONE FORMLINER
6. ALUMINUM CANOPY COLOR
ALUCOBOND - STEEL CITY SILVER MICA
7. GLASS - PRIMARY WINDOW
GREEN REFLECTIVE GLAZING
CHARCOAL GREY MULLIONS

NOTES:

1. ALL ROOFTOP MECH. EQUIPMENT SHALL BE SCREENED FROM VIEW.

2. PROVIDE GRAFFITI RESISTANT COATING TO A HEIGHT OF 12 FEET ON THE WEST ELEVATION.

KEYNOTES:

1. PAINTED CONCRETE TILT-UP PANELS W/ ACCENT REVEALS AS SHOWN.
2. REFLECTIVE GREEN GLASS IN BLACK ALUMINUM MULLION SYSTEM.
3. BLACK METAL CANOPY.
4. RECESSED ENTRY WITH PRIMARY GLASS ENTRANCE DOORS.
5. PAINTED 9'-0" X 10' DOCK HIGH VERTICAL LIFT METAL TRUCK DOOR ASSEMBLY WITH DOCK BUMPERS. SEE DOOR SCHEDULE.
6. PAINTED 12' X 15' GRADE LEVEL VERTICAL LIFT METAL TRUCK DOOR ASSEMBLY. SEE DOOR SCHEDULE.
7. CONCRETE TILT-UP SCREEN WALL PAINT AND REVEALS AS SHOWN TO MATCH BUILDING.



SIMILAR SITE LIGHTING STYLE
SCALE: N.T.S. 3



SIMILAR ENTRY LIGHTING STYLE
SCALE: N.T.S. 2

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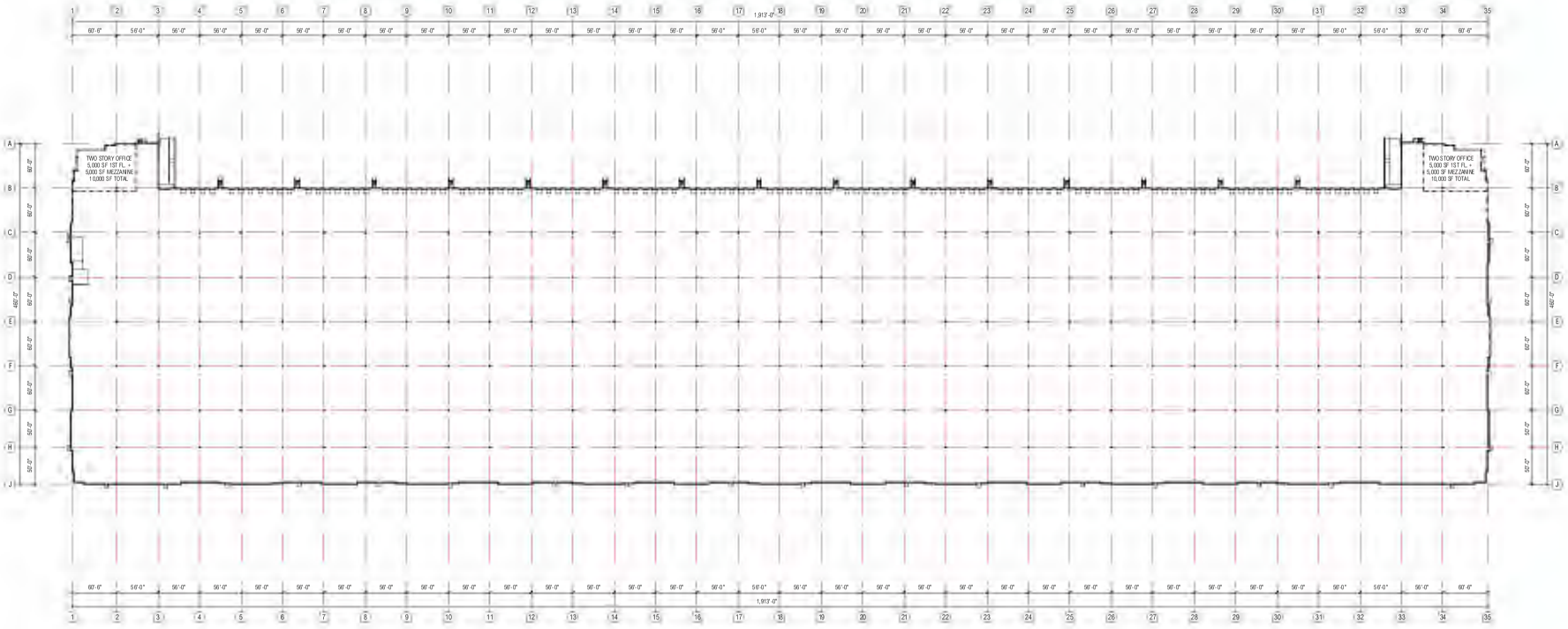
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SHEET TITLE

BUILDING 1
ELEVATIONS
(MODERN CRAFTSMAN STYLE)

SHEET: A3-1P-1



BUILDNG 2 FLOOR PLAN

SCALE: 1" = 60'-0"

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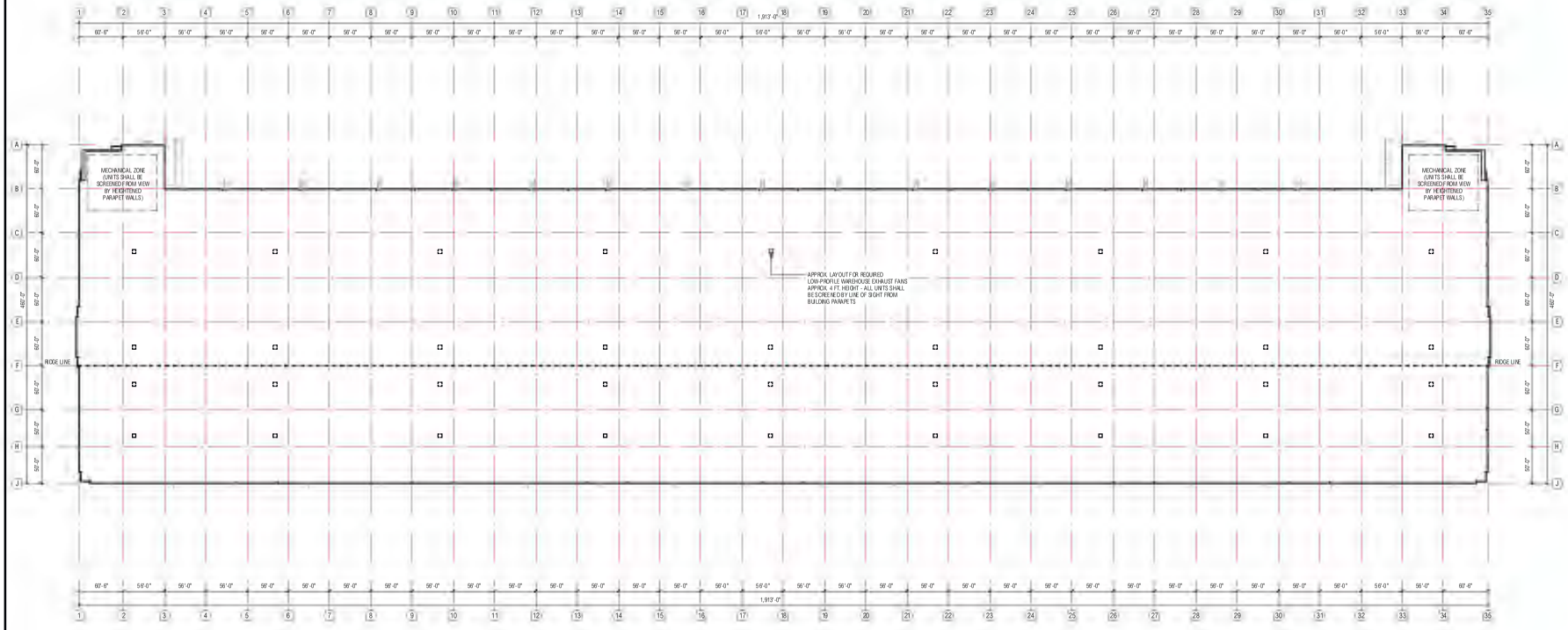
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SD	6/18/24	PLANNING REVISIONS
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SHEET TITLE
BUILDING 2
FLOOR PLAN

SHEET: 2A2-1P



BUILDNG 2 ROOF PLAN

SCALE: 1" = 60'-0"

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SHEET TITLE
BUILDING 2
ROOF PLAN

SHEET: 2A2-2P



NORTH ELEVATION
SCALE: 1" = 20'-0"



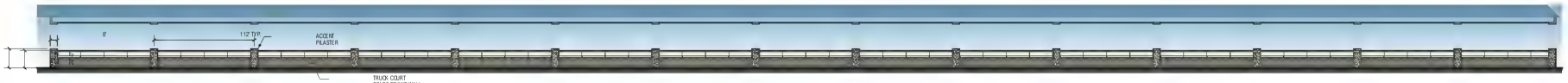
SOUTH ELEVATION
SCALE: 1" = 20'-0"



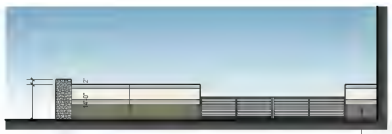
WEST ELEVATION
SCALE: 1" = 60'-0"



EAST ELEVATION
SCALE: 1" = 60'-0"



EAST SCREEN WALL ELEVATION
SCALE: 1" = 60'-0"



NORTH SCREEN WALL ELEVATION
SCALE: 1" = 20'-0"



NORTH SCREEN WALL ELEVATION
SCALE: 1" = 20'-0"



SIMILAR SITE LIGHTING STYLE 3
SCALE: N.T.S.



SIMILAR ENTRY LIGHTING STYLE 2
SCALE: N.T.S.

FINISH SCHEDULE:

1. FIELD COLOR
SHERWIN WILLIAMS -
SW7102 WHITE FLOUR
2. LIGHT ACCENT COLOR
SHERWIN WILLIAMS -
SW9166 DRIFT OF MIST
3. DARK ACCENT COLOR
SHERWIN WILLIAMS -
SW9126 HONED SOAPSTONE
4. DARK ACCENT COLOR
SHERWIN WILLIAMS -
SW9154 PERLE NOIR
5. FORMLINER COLOR
SHERWIN WILLIAMS -
SW/167 POLISHED CONCRETE
FITZGERALD FORMLINER -
17014 COLONIAL STONE FORMLINER
6. ALUMINUM CANOPY COLOR
ALUCOBOND - STEEL CITY SILVER MICA
7. GLASS - PRIMARY WINDOW
GREEN REFLECTIVE GLAZING
CHARCOAL GREY MULLIONS

NOTES:

1. ALL ROOFTOP MECH. EQUIPMENT SHALL BE SCREENED FROM VIEW.

2. PROVIDE GRAFFITI RESISTANT COATING TO A HEIGHT OF 12 FEET ON THE WEST ELEVATION.

KEYNOTES:

1. PAINTED CONCRETE TILT-UP PANELS W/ ACCENT REVEALS AS SHOWN.

2. REFLECTIVE GREEN GLASS IN BLACK ALUMINUM MULLION SYSTEM.

3. BLACK METAL CANOPY.

4. RECESSED ENTRY WITH PRIMARY GLASS ENTRANCE DOORS.

5. PAINTED 9'-0" X 10' DOCK HIGH VERTICAL LIFT METAL TRUCK DOOR ASSEMBLY WITH DOCK BUMPERS. SEE DOOR SCHEDULE.

6. PAINTED 12' X 15' GRADE LEVEL VERTICAL LIFT METAL TRUCK DOOR ASSEMBLY. SEE DOOR SCHEDULE.

7. CONCRETE TILT-UP SCREEN WALL PAINT AND REVEALS AS SHOWN TO MATCH BUILDING.

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SD	6/18/24	PLANNING REVISIONS
SD	08/04/23	SCHEMATIC DESIGN

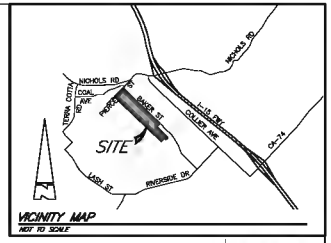
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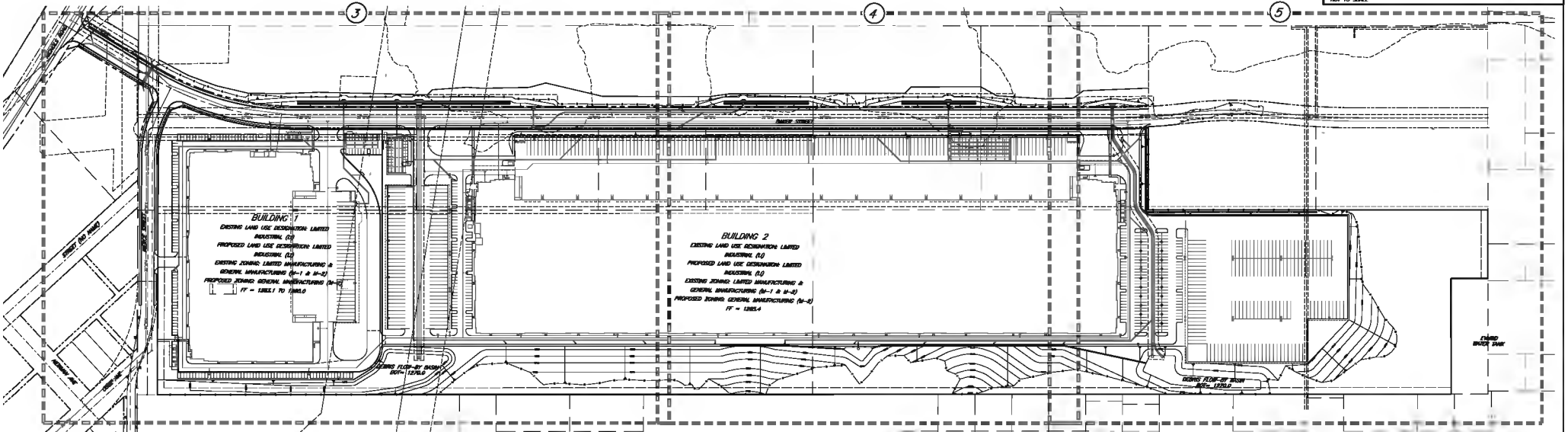
COPYRIGHT
RGA, OFFICE OF ARCHITECTURAL DESIGN

SHEET TITLE
BUILDING 2
ELEVATIONS
(MODERN CRAFTSMAN STYLE)

SHEET: 2A3-1P

BAKER INDUSTRIAL PROJECT
CONCEPTUAL GRADING PLAN
IN THE CITY OF LAKE ELSINORE





GENERAL NOTES:

PREPARED: AUGUST 2023

1. TOTAL PROJECT GROSS ACREAGE IS 69.34 ACRES.
2. ACREAGE SUMMARY

	ACRES±	PERCENT±
A. INDUSTRIAL, NET AREA	59.40 AC	85.65%
B. PARKING LOT	10.41 AC	15.01%
C. PUBLIC STREETS	1.53 AC	2.21%
TOTAL	69.34 AC	100.00%

3. PROPOSED NO. OF PARCELS: 2
4. ESTIMATED RAW EARTHWORK QUANTITIES:

GRADING SUMMARY	
CUT (C.Y.)	849,000
FILL (C.Y.)	849,000
NET QUANTITIES (C.Y.)	14,000

5. EXISTING GENERAL PLAN LAND USE DESIGNATION: LIMITED INDUSTRIAL (LI)
6. PROPOSED GENERAL PLAN LAND USE DESIGNATION: LIMITED INDUSTRIAL (LI)
7. EXISTING ZONING: LIMITED MANUFACTURING (M-1) & GENERAL MANUFACTURING (M-2)
8. PROPOSED ZONING: GENERAL MANUFACTURING (M-2)
9. ADJACENT LAND USE:
   - NORTH:
     - GENERAL PLAN – LIMITED MANUFACTURING (LI)
     - ZONING – GENERAL MANUFACTURING (M-2)
     - EXISTING USE – VACANT
   - SOUTH:
     - GENERAL PLAN – LOW-MEDIUM RESIDENTIAL & HILLSIDE RESIDENTIAL
     - ZONING – SINGLE FAMILY RESIDENTIAL (R1) & HILLSIDE SINGLE FAMILY RESIDENTIAL (HR)
     - EXISTING USE – VACANT
   - EAST:
     - GENERAL PLAN – LIMITED MANUFACTURING (LI) & LOW DENSITY RESIDENTIAL
     - ZONING – LIMITED MANUFACTURING (M-1) & SINGLE FAMILY RESIDENTIAL (R1)
     - EXISTING USE – VACANT
   - WEST:
     - GENERAL PLAN – RESIDENTIAL MIXED USE & LOW-MEDIUM RESIDENTIAL
     - ZONING – RESIDENTIAL MIXED USE (RMU) & SINGLE FAMILY RESIDENTIAL (R1)
     - EXISTING USE – VACANT
10. SOURCE OF TOPOGRAPHY IS AERIAL TOPOGRAPHY FLOWN ON AUGUST 14TH, 2020 BY RMC ENGINEERS.
11. SCHOOL DISTRICT: LAKE ELSINORE UNIFIED SCHOOL DISTRICT
12. STREETS GRADED: 1.0% MINIMUM, 10% MAXIMUM
13. ALL CONC. GUTTERS AND SWALES SHALL HAVE A MINIMUM GRADE OF: 0.35%
14. ALL A.C. PAVING SHALL HAVE A MINIMUM GRADE OF: 1.0%
15. CONCRETE PAVEMENT SHALL BE PROVIDED FOR ALL ROADWAYS THAT HAVE STREET GRADES EXCEEDING 10% OR AS APPROVED BY THE CITY OF CORONA.
16. ALL SLOPES ADJACENT TO STREET R.O.W. TO BE MAINTAINED BY H.O.A.
17. ALL SLOPES SHOWN HEREON ARE 2:1 MAXIMUM UNLESS OTHERWISE NOTED.
18. THE SUBJECT PROPERTY IS WITHIN AN UNMAPPED FLOOD ZONE X.
19. THE SUBJECT PROPERTY IS WITHIN A SPECIAL FIRE HAZARD ZONE.
20. THE SUBJECT PROPERTY IS WITHIN A SANTA ANA RIVER WATERSHED.

LEGAL DESCRIPTION:

PARCEL A: (APN: 378-020-014)

PARCEL 1:

ALL THAT PORTION OF LOT 1, IN BLOCK "A" OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 8, PAGE 177 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST WESTERLY CORNER OF THAT CERTAIN TRACT OF LAND CONVEYED BY CHARLES HUDSON AND DESSIE HUDSON, HUSBAND AND WIFE, TO GREAT COASTAL OIL CORPORATION, A CORPORATION, BY DEED RECORDED ON THE 6TH DAY OF MAY 1936, IN BOOK 275 AT PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY, CALIFORNIA; THENCE SOUTH FORTY-SIX DEGREES FIFTY MINUTES EAST (SOUTH 46° 50' EAST) A DISTANCE OF 838 FEET; THENCE NORTH FORTY-THREE DEGREES TEN MINUTES EAST (NORTH 43° 10' EAST) A DISTANCE OF 300 FEET TO THE TRUE POINT OF BEGINNING; THENCE NORTH FORTY-THREE DEGREES TEN MINUTES EAST (NORTH 43° 10' EAST) A DISTANCE OF 80 FEET; THENCE SOUTH FORTY-SIX DEGREES FIFTY MINUTES EAST (SOUTH 46° 50' EAST) A DISTANCE OF 80 FEET; THENCE SOUTH FORTY-THREE DEGREES TEN MINUTES WEST (SOUTH 43° 10' WEST) A DISTANCE OF 80 FEET; THENCE SOUTH FORTY-SIX DEGREES FIFTY MINUTES EAST (SOUTH 46° 50' EAST) A DISTANCE OF 80 FEET TO THE TRUE POINT OF BEGINNING.

EXCEPTING THEREFROM MINERALS, OIL AND GAS AS RESERVED BY DEED RECORDED MAY 8, 1939 IN BOOK 335 PAGE 344.

PARCEL 2: (APN: 378-020-015 AND 378-020-016)

THE NORTHWEST HALF OF THE SOUTHWEST HALF OF THE FOLLOWING DESCRIBED PROPERTY:

ALL THAT PORTION OF LOTS 1, 2 AND 3, IN BLOCK "A" OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 8 PAGE 177 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE MOST NORTHERLY CORNER OF LOT 50 OF COUNTRY CLUB HEIGHTS UNIT "B", AS SHOWN BY MAP ON FILE IN BOOK 17 PAGES 25 AND 26 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE NORTH 43° 24' EAST ALONG THE SOUTHERLY EXTENSION OF THE MOST WESTERLY LINE AND ALONG THE MOST WESTERLY LINE OF THAT CERTAIN PARCEL OF LAND CONVEYED TO ABE CORLIN AND HENRY C. SCHULTZ, BY DEED RECORDED NOVEMBER 15, 1928 IN BOOK 288, PAGE 373 OF DEEDS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, TO THE MOST NORTHERLY POINT IN SAID MOST WESTERLY LINE, FOR THE POINT OF BEGINNING; THENCE SOUTH 46° 50' EAST, FORMERLY RECORDED SOUTH 47° EAST, 3061.8 FEET; THENCE NORTH 43° 10' EAST, FORMERLY RECORDED NORTH 43° EAST, 1100 FEET TO THE MOST EASTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, BY DEED RECORDED MAY 6, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE NORTH 46° 50' WEST ALONG THE NORTHEASTERLY LINE OF SAID PARCEL SO CONVEYED TO GREAT COASTAL OIL CORPORATION, 3060 FEET TO THE NORTHWESTERLY LINE OF LOT 1 IN BLOCK "A", ABOVE DESCRIBED; THENCE SOUTHWESTERLY ALONG SAID NORTHWESTERLY LINE AND ALONG THE SOUTHWESTERLY PROLONGATION OF SAID NORTHWESTERLY LINE, TO A POINT WHICH BEARS NORTH 46° 50' WEST FROM THE POINT OF BEGINNING, SAID POINT BEING THE MOST WESTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, HEREINABOVE REFERRED TO; THENCE SOUTH 46° 50' EAST, ALONG THE SOUTHWESTERLY LINE OF SAID PARCEL, TO THE POINT OF BEGINNING;

EXCEPTING THEREFROM ALL THAT PORTION THEREOF DESCRIBED AS FOLLOWS:

COMMENCING AT THE MOST WESTERLY CORNER OF THAT CERTAIN TRACT OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, BY DEED RECORDED MAY 6, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE SOUTH 46° 50' EAST, 1218 FEET; THENCE NORTH 43° 10' EAST, 300 FEET FOR THE POINT OF BEGINNING; THENCE NORTH 43° 10' EAST, 30 FEET; THENCE NORTH 46° 50' WEST, 80 FEET; THENCE SOUTH 43° 10' WEST, 30 FEET; THENCE SOUTH 46° 50' EAST, 80 FEET TO THE POINT OF BEGINNING;

ALSO EXCEPTING THEREFROM A STRIP(S) OF LAND 1 ROD WIDE, 4-1/2 FEET ON THE EASTERLY SIDE AND 13 FEET ON THE WESTERLY SIDE OF THE CENTER LINE OF THE PIPELINE OF THE TEMESCAL WATER COMPANY, AS NOW LAID OVER AND ACROSS THE HEREINABOVE DESCRIBED PROPERTY, AS CONVEYED TO THE TEMESCAL WATER COMPANY, A CORPORATION, BY DEED RECORDED MAY 12, 1917, IN BOOK 368 PAGE 96, OF DEEDS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;

ALSO EXCEPTING THEREFROM THE 1/8 PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 6, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

INDEX MAP

SCALE: 1"=100'

PARCEL B: (APN: 378-020-028)

PARCEL 1 OF PARCEL MAP NO. 11385, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, ON FILE IN BOOK 88 PAGE 68 OF PARCEL MAPS, RIVERSIDE COUNTY RECORDS.

EXCEPTING THEREFROM 1/8 PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 6, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL C: (APN: 378-020-037 AND OTHER PROPERTY)

PARCEL 3 OF PARCEL MAP 8585, AS SHOWN BY MAP ON FILE IN BOOK 36, PAGE 29 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THE 1/4TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 6, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

PARCEL D: (APN: 378-020-039)

PARCEL 4 OF PARCEL MAP NO. 11385, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 88, PAGE 68, OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPTING THE 1/4TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 6, 1936 IN BOOK 275, PAGE 344, OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL E: (APN: 378-020-044)

PARCEL 1 :

THE SOUTHWEST ONE-HALF OF THE SOUTHWEST ONE-HALF OF THE FOLLOWING DESCRIBED PROPERTY:

ALL THAT PORTION OF LOTS 1, 2 AND 3 IN BLOCK A OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, AS SHOWN BY MAP ON FILE IN BOOK 8 PAGE 177 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE MOST NORTHERLY CORNER OF LOT 50 OF COUNTRY CLUB HEIGHTS UNIT "B", AS SHOWN BY MAP ON FILE IN BOOK 17 PAGES 25 AND 26 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;

THENCE NORTH 43° 24' EAST, ALONG THE SOUTHERLY EXTENSION OF THE MOST WESTERLY LINE AND ALONG THE MOST WESTERLY LINE OF THAT CERTAIN PARCEL OF LAND CONVEYED TO ABE CORLIN AND HENRY C. SCHULTZ, BY DEED RECORDED NOVEMBER 15, 1928 IN BOOK 288, PAGE 373 OF DEEDS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, TO THE MOST NORTHERLY POINT IN SAID MOST WESTERLY LINE, FOR THE POINT OF BEGINNING; THENCE SOUTH 46° 50' EAST, FORMERLY RECORDED SOUTH 47° EAST, 3061.8 FEET; THENCE NORTH 43° 10' EAST, FORMERLY RECORDED NORTH 43° EAST, 1100 FEET TO THE MOST EASTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, BY DEED RECORDED MAY 6, 1936 IN BOOK 275 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE NORTH 46° 50' WEST ALONG THE NORTHEASTERLY LINE OF SAID PARCEL SO CONVEYED TO GREAT COASTAL OIL CORPORATION, 3060 FEET TO THE NORTHWESTERLY LINE OF LOT 1 IN BLOCK "A", ABOVE DESCRIBED; THENCE SOUTHWESTERLY ALONG SAID NORTHWESTERLY LINE AND ALONG THE SOUTHWESTERLY PROLONGATION OF SAID NORTHWESTERLY LINE, TO A POINT WHICH BEARS NORTH 46° 50' WEST FROM THE POINT OF BEGINNING, SAID POINT BEING THE MOST WESTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, HEREINABOVE REFERRED TO; THENCE SOUTH 46° 50' EAST, ALONG THE SOUTHWESTERLY LINE OF SAID PARCEL, TO THE POINT OF BEGINNING;

EXCEPTING THEREFROM ALL THAT PORTION THEREOF DESCRIBED AS FOLLOWS:

COMMENCING AT THE MOST WESTERLY CORNER OF THAT CERTAIN TRACT OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, 3060 FEET TO THE NORTHWESTERLY LINE OF LOT 1 IN BLOCK A, ABOVE DESCRIBED;

THENCE SOUTHWESTERLY ALONG SAID NORTHWEST LINE AND ALONG THE SOUTHWESTERLY PROLONGATION OF SAID NORTHWESTERLY LINE, TO A POINT WHICH BEARS NORTH 46° 50' WEST FROM THE POINT OF BEGINNING, SAID POINT BEING THE MOST WESTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, HEREINABOVE REFERRED TO;

THENCE SOUTH 46° 50' EAST, ALONG THE SOUTHWESTERLY LINE OF SAID PARCEL, TO THE POINT OF BEGINNING;

EXCEPTING THEREFROM THAT PORTION CONVEYED TO ELSINORE VALLEY MUNICIPAL WATER DISTRICT, A PUBLIC CORPORATION BY DEED RECORDED APRIL 6, 1967 AS INSTRUMENT NO. 39283 OF OFFICIAL RECORDS.

PARCEL B :

AN EASEMENT FOR ROAD PURPOSES, 80 FEET WIDE, OVER AND ACROSS THE EXISTING ROAD, THE CENTER LINE BEING THE NORTHEASTERLY LINE OF THE ABOVE DESCRIBED PROPERTY AND THE NORTHWESTERLY EXTENSION OF SAID LINES AS EXTENDED TO THE SOUTHWESTERLY LINE OF NICHOLS STREET, EXCEPTING THEREFROM THAT PORTION INCLUDED WITH PARCEL C ABOVE.

EXCEPTING THEREFROM 1/4TH INTEREST OF ALL OIL, GAS AND MINERAL RIGHTS THEREOF.

PARCEL F: (APN: 378-020-029)

PARCEL 8 OF PARCEL MAP NO. 11385, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 88, PAGE 68 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPT THE 1/8TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 6, 1936 IN BOOK 275, PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL G: (APN: 378-020-030)

PARCEL 3 OF PARCEL MAP NO. 11385, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 88, PAGE 68, OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPTING THE 1/4TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 6, 1936 IN BOOK 275, PAGE 344, OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL H: (APN: 378-020-018 AND OTHER PROPERTY)

PARCEL 1 OF PARCEL MAP 8585, AS SHOWN BY MAP ON FILE IN BOOK 36, PAGE 29 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THE 1/4TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 6, 1936 IN BOOK 275, PAGE 344, OF OFFICIAL RECORDS, RIVERSIDE COUNTY, CALIFORNIA.

UTILITY CONTACTS:

WATER: ELSINORE VALLEY MUNICIPAL WATER DISTRICT
31315 CHANEY STREET
LAKE ELSINORE, CA 92531
(951) 674-3146

SEWER: ELSINORE VALLEY MUNICIPAL WATER DISTRICT
31315 CHANEY STREET
LAKE ELSINORE, CA 92531
(951) 674-3146

POWER: SOUTHERN CALIFORNIA EDISON CO.
39400 MURRIETA ROAD
MURRIETA, CA 92563
(951) 928-8202
(951) 682-5448

GAS: SOUTHERN CALIFORNIA GAS CO.
1981 W. LUGONIA AVENUE
REDLANDS, CA 92373
(800) 427-2200

PHONE: VERIZON FIOS
40770 CALIFORNIA OAKS ROAD
MURRIETA, CA 92562
(951) 280-2262

CABLE TV: TIME WARNER CABLE
41017 DECKER STREET
LAKE ELSINORE, CA 92532
(888) 811-1546

ASSESSOR PARCEL NO:

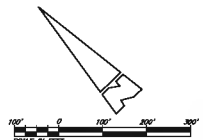
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BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA ZONE PLANE COORDINATE SYSTEM, OCSRS, ZONE 6, BASED LOCALLY ON CONTROL STATIONS "CHPP", "BALL," AND "BLPP" NAD83 (NSRS2011) EPOCH 2010.00 AS SHOWN HEREON. ALL BEARINGS SHOWN ON THIS MAP ARE GRID. QUOTED BEARINGS AND DISTANCES FROM REFERENCE MAPS, OR DEEDS AS SHOWN FOR THAT RECORD REFERENCE. ALL DISTANCES SHOWN ARE GROUND DISTANCES UNLESS SPECIFIED OTHERWISE. GRID DISTANCES MAY BE OBTAINED BY MULTIPLYING THE GROUND DISTANCE BY A COMBINATION FACTOR OF 0.99991489. CALCULATIONS ARE MADE AT 70.1° I.P., OPEN ON, 0.4', NE COR. PARCEL 3 PM 36/85 WITH COORDINATES OF: N: 2200273.6419 (FINAL), E: 6223538.352 FEET (FINAL), USING AN ELEVATION OF 1,261.31 (NAVD 88).

BENCHMARK

BENCH MARK NO. C-45-31 ELEV. = 1,258.45 MSL (1988 DATUM) ADJUSTED BY VERTCON TO 1,258.86 (1988 DATUM) FROM THE INTERSECTION OF LAKESHORE DRIVE AND GRAHAM STREET 40 FEET SOUTHWESTERLY ALONG LAKESHORE AND 40 FEET NORTHWESTERLY TO THE CENTERLINE "SQUARE" IN TOP OF CURB AT BCR.



OWNER/APPLICANT:

RIVERSIDE LEGACY N NICHOLS ROAD, LLC
12220 DOROTHY, SUITE 107
SALISBURY, CA 21665
(617) 877-7637
CONTACT: TRAVIS DAVENPORT

ENGINEER:

KWC ENGINEERS
1880 CHAPMAN AVENUE, SUITE 100
CORONA, CA. 92879 – 3320
(951) 734-9130
ATTN: BRANDON BARNETT, P.E.

SITE ADDRESS:

17711 BAKER STREET
LAKE ELSINORE, CA 92530

LEGEND:

——— (TYP.)	PROPOSED WATER
——— (TYP.)	PROPOSED SEWER
——— (TYP.)	PROPOSED RECLAIMED WATER
——— (TYP.)	PROPOSED STORM DRAIN
——— (TYP.)	EXISTING WATER
——— (TYP.)	EXISTING SEWER
——— (TYP.)	EXISTING RECLAIMED WATER
——— (TYP.)	EXISTING STORM DRAIN
	= EXISTING CONTOUR ELEVATION
—1300—	= PROPOSED SURFACE ELEVATION
1325.5	= PROPOSED PAD ELEVATION
49	= LOT NUMBER
ELEV.	= ELEVATION
FS	= FINISH GRADE
FL	= FLOWLINE
FS	= FINISHED SURFACE
L=	= LENGTH
S=	= SLOPE
MIN.	= MINIMUM
P.L.	= PROPERTY LINE
R/W	= RIGHT OF WAY
GB	= GRADE BREAK
T.C.	= TOP OF CURB
	TOE OF SLOPE (2:1 UNLESS OTHERWISE NOTED)
	TOP OF SLOPE
	HIGH POINT OF FRAMES
	CATCH BASIN

SHEET INDEX

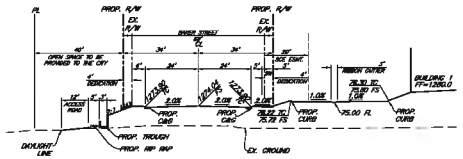
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CONCEPTUAL GRADING PLAN SHEETS	SHEETS 3 – 5
WET UTILITY PLAN SHEET	SHEET 6

CONCEPTUAL GRADING PLAN
BAKER INDUSTRIAL
CITY OF LAKE ELSINORE

PREPARED BY: KWC ENGINEERS

SHEET 1 OF 6 SHEET

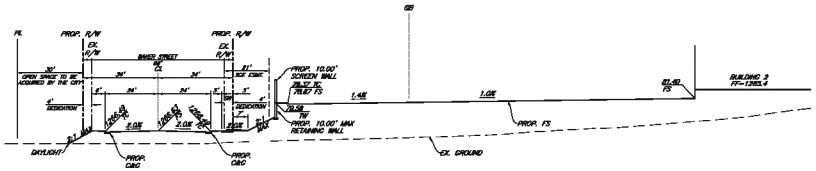
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SECTION A–A

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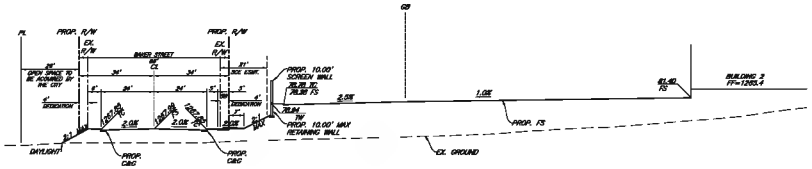
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SECTION B–B

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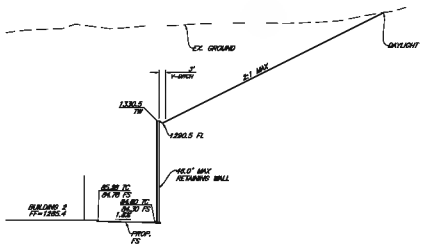
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SECTION C–C

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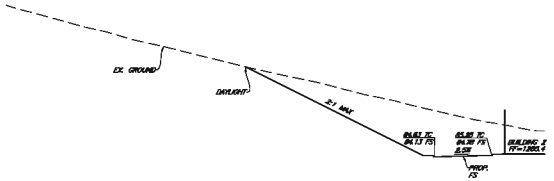
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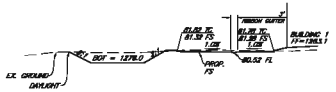
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SECTION E–E

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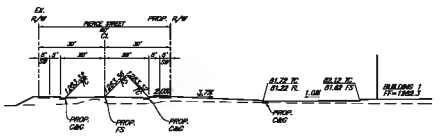
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SECTION F–F

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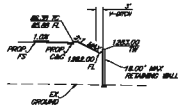
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SECTION G–G

SEE SHEET 3

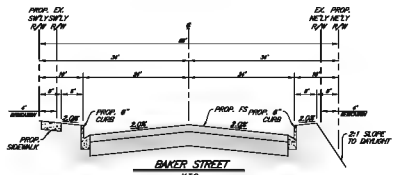
NTS



SECTION H–H

SEE SHEET 3

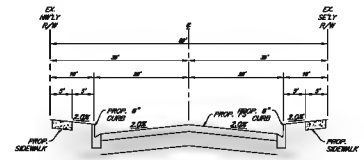
NTS



BAKER STREET

N.T.S.

CITY OF LAKE ELSINORE MODIFIED COLLECTOR STD. NO. 105 MOD.



PIERCE STREET

N.T.S.

CITY OF LAKE ELSINORE LOCAL STREET STD. NO. 107

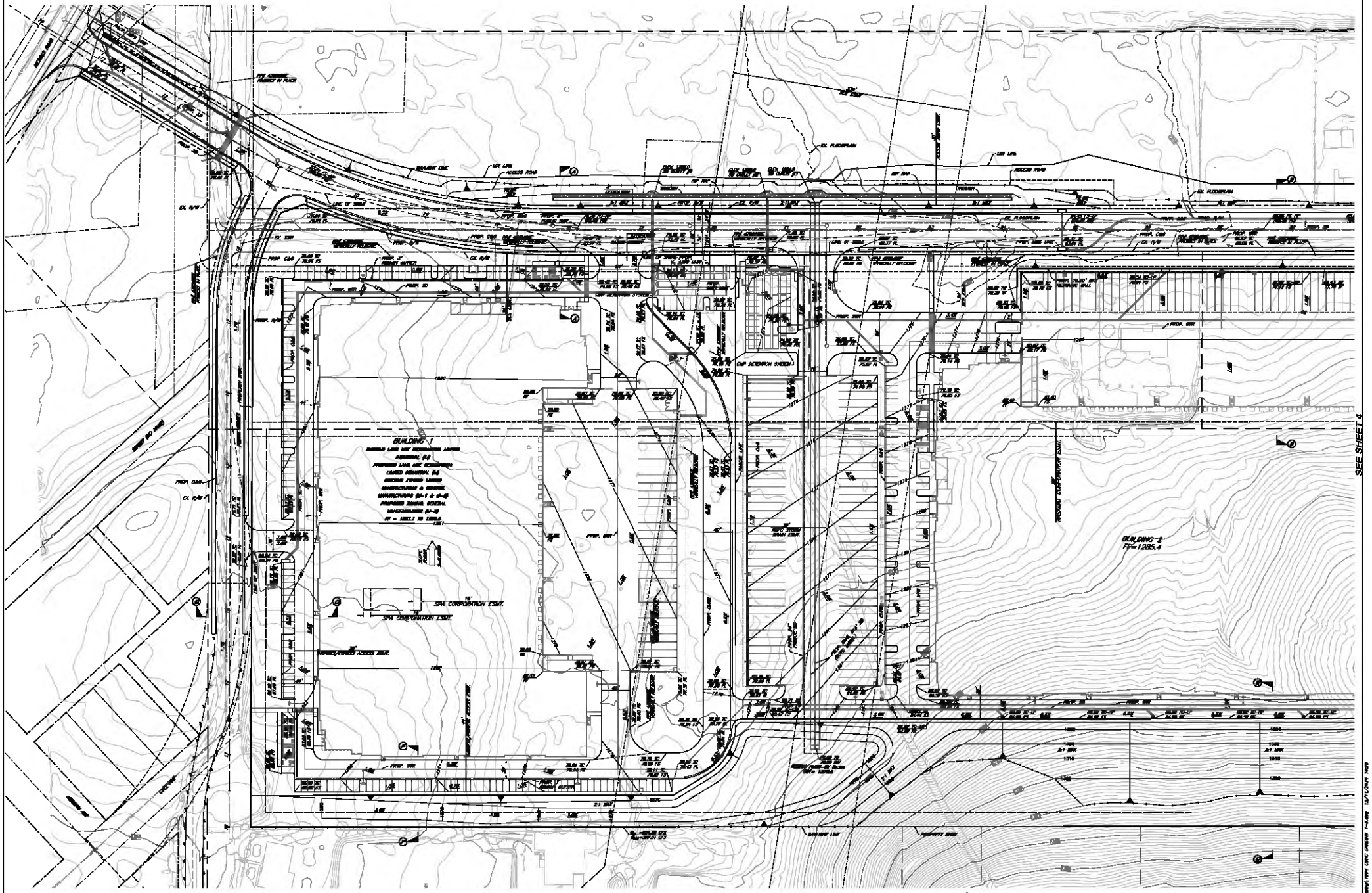
CONCEPTUAL GRADING PLAN
BAKER INDUSTRIAL
CITY OF LAKE ELSINORE

PREPARED BY:

KWC ENGINEERS

SHEET 2 OF 6 SHEET

C:\19\1894\PRELIM\LDX\Conceptual Grading\1894 CONC GRADING 1-3.dwg 12/1/2024 10:28

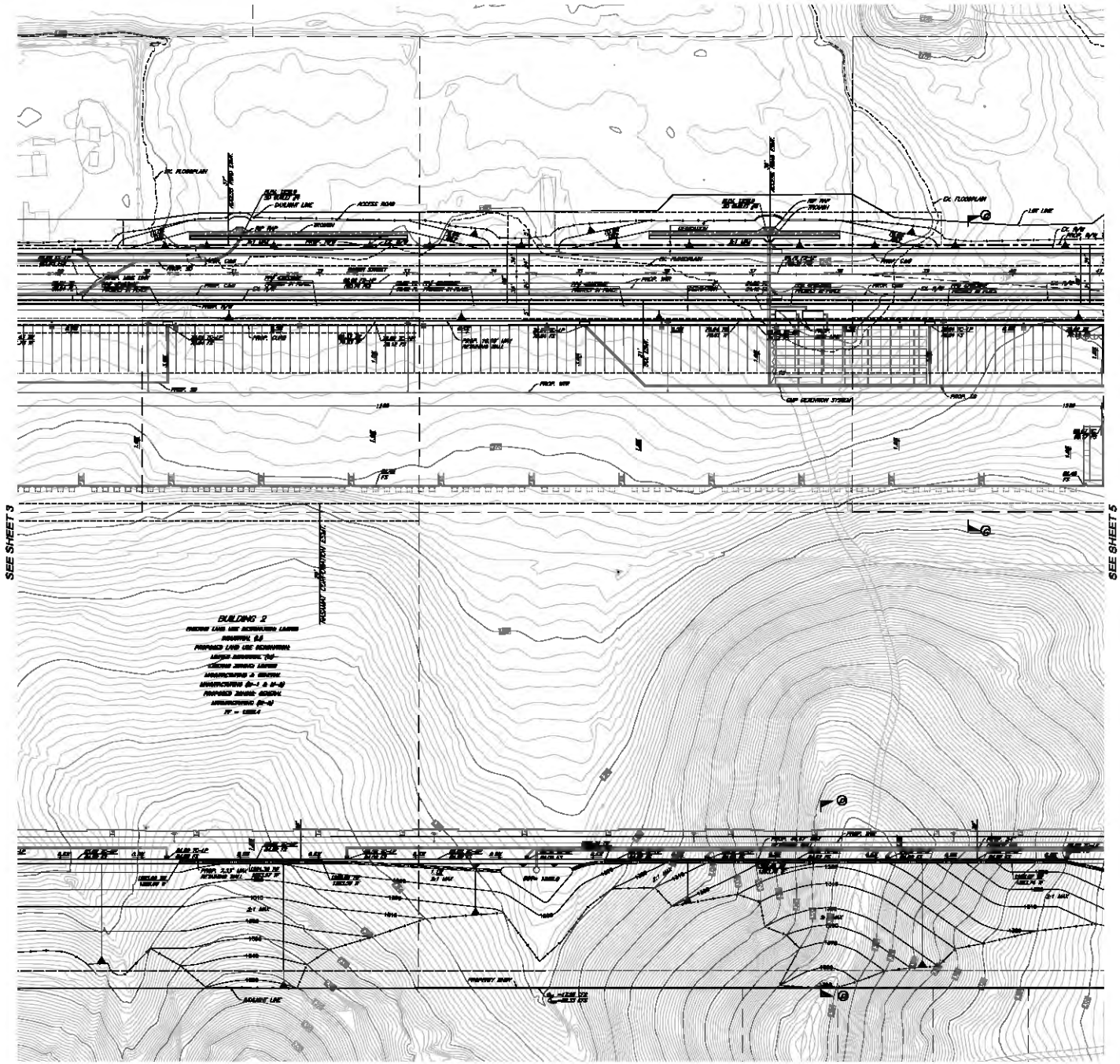


CONCEPTUAL GRADING PLAN
BAKER INDUSTRIAL
CITY OF LAKE ELSINORE

PREPARED BY:

KWC ENGINEERS

SHEET 3 OF 6 SHEET

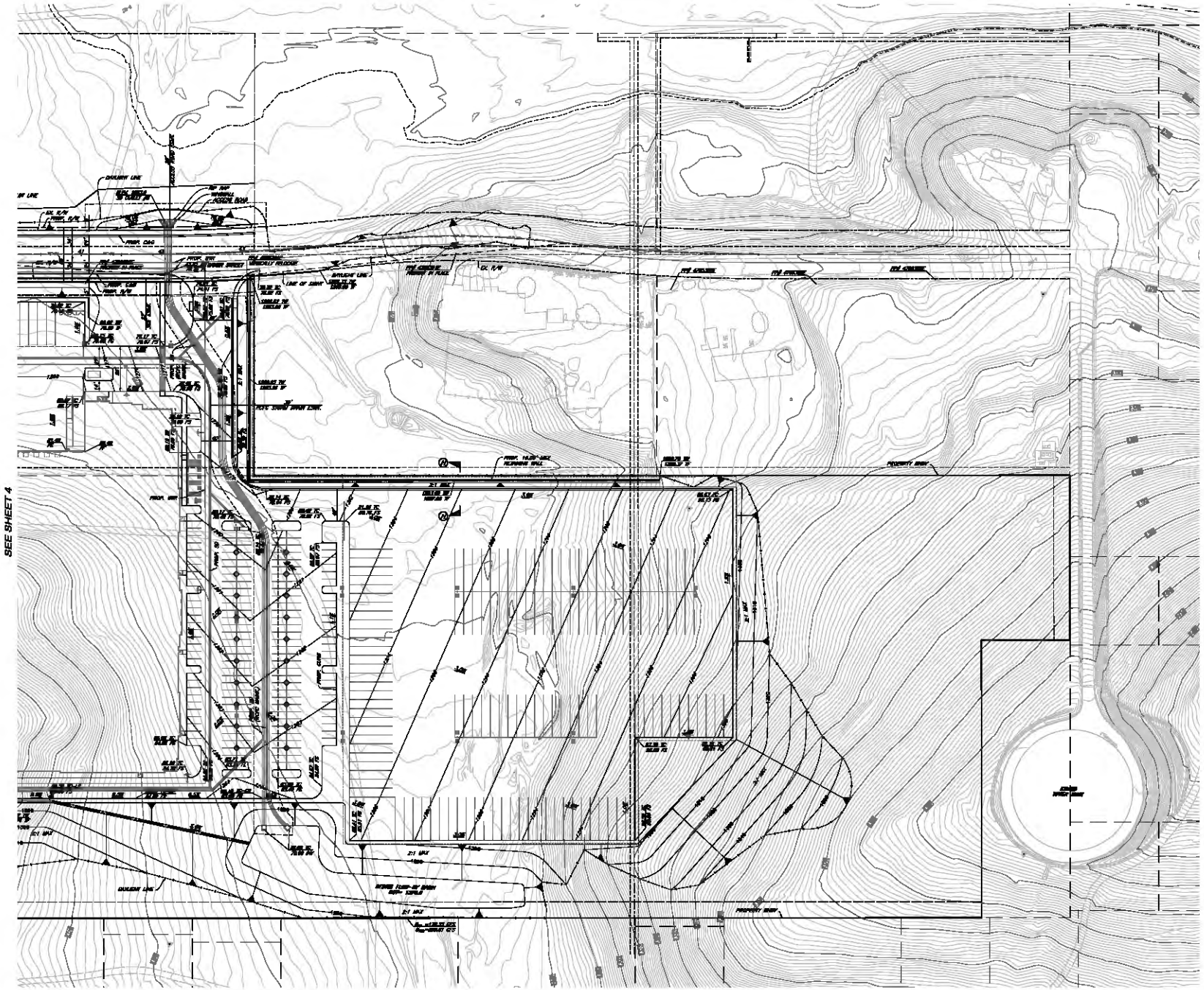


CONCEPTUAL GRADING PLAN
BAKER INDUSTRIAL
CITY OF LAKE ELSINORE

PREPARED BY:

KWC ENGINEERS

SHEET 4 OF 6 SHEET



CONCEPTUAL GRADING PLAN
BAKER INDUSTRIAL
CITY OF LAKE ELSINORE

PREPARED BY:

KWC ENGINEERS

SHEET
5 OF 6
SHEET

TENTATIVE PARCEL MAP NO. 38812

BAKER INDUSTRIAL

CITY OF LAKE ELSINORE

GENERAL NOTES:

PREPARED: AUGUST 2023

1. TOTAL PROJECT GROSS ACREAGE IS 66.53 ACRES.
2. ACREAGE SUMMARY

ITEM		ACREAGE	PERCENT
A.	INDUSTRIAL NET AREA	56.40 AC	83.66%
B.	PARKING LOT	10.61 AC	15.73%
C.	PUBLIC STREETS	0.42 AC	0.63%
	TOTAL	66.53 AC	100.00%

3. PROPOSED NO. OF PARCELS: 2 PARCELS
4. EXISTING GENERAL PLAN LAND USE DESIGNATION: LIMITED INDUSTRIAL (LI)
5. PROPOSED GENERAL PLAN LAND USE DESIGNATION: LIMITED INDUSTRIAL (LI)
6. EXISTING ZONING: LIMITED MANUFACTURING (M-1) & GENERAL MANUFACTURING (M-2)
7. PROPOSED ZONING: GENERAL MANUFACTURING (M-2)
8. ADJACENT LAND USE:
   - NORTH: GENERAL PLAN – LIMITED MANUFACTURING (LI); ZONING – GENERAL MANUFACTURING (M-2); EXISTING USE – VACANT
   - SOUTH: GENERAL PLAN – LOW-MEDIUM RESIDENTIAL & HILLSIDE RESIDENTIAL; ZONING – SINGLE FAMILY RESIDENTIAL (R1) & HILLSIDE SINGLE FAMILY RESIDENTIAL (RH); EXISTING USE – VACANT
   - EAST: GENERAL PLAN – LIMITED MANUFACTURING (LI) & LOW DENSITY RESIDENTIAL; ZONING – LIMITED MANUFACTURING (M-1) & SINGLE FAMILY RESIDENTIAL (R1); EXISTING USE – VACANT
   - WEST: GENERAL PLAN – RESIDENTIAL MIXED USE & LOW-MEDIUM RESIDENTIAL; ZONING – RESIDENTIAL MIXED USE (RMU) & SINGLE FAMILY RESIDENTIAL (R1); EXISTING USE – VACANT
11. SOURCE OF TOPOGRAPHY IS AERIAL TOPOGRAPHY FLOWN ON AUGUST 15TH, 2023 BY KWC ENGINEERS.
12. ALL LOT LINES AND DIMENSIONS ARE APPROXIMATE.
13. ALL EXISTING EASEMENTS AND IRREVOCABLE OFFERS OF DEDICATION THAT AFFECT THE PROPERTY BEING SUBDIVIDED ARE SHOWN ON THIS PARCEL MAP.
14. ALL EXISTING EASEMENTS ARE TO REMAIN IN THEIR DESIGNATED LOCATIONS UNLESS NOTED OTHERWISE.

GENERAL NOTES CONTINUED:

BASIS OF BEARINGS

BENCHMARK

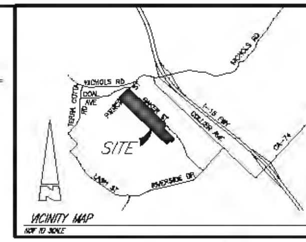
NUMBERED PARCEL:

PARCEL NUMBER	PROPOSED GROSS AREA	PROPOSED NET AREA	LAND USE
1	11.88 AC	11.46 AC	LIMITED INDUSTRIAL
2	54.35 AC	54.14 AC	LIMITED INDUSTRIAL/PARKING LOT

LETTERED LOT:

LOT NUMBER	PROPOSED AREA	LAND USE
LOT "A"	0.18 AC	PUBLIC STREET DEDICATION
LOT "B"	0.24 AC	PUBLIC STREET DEDICATION

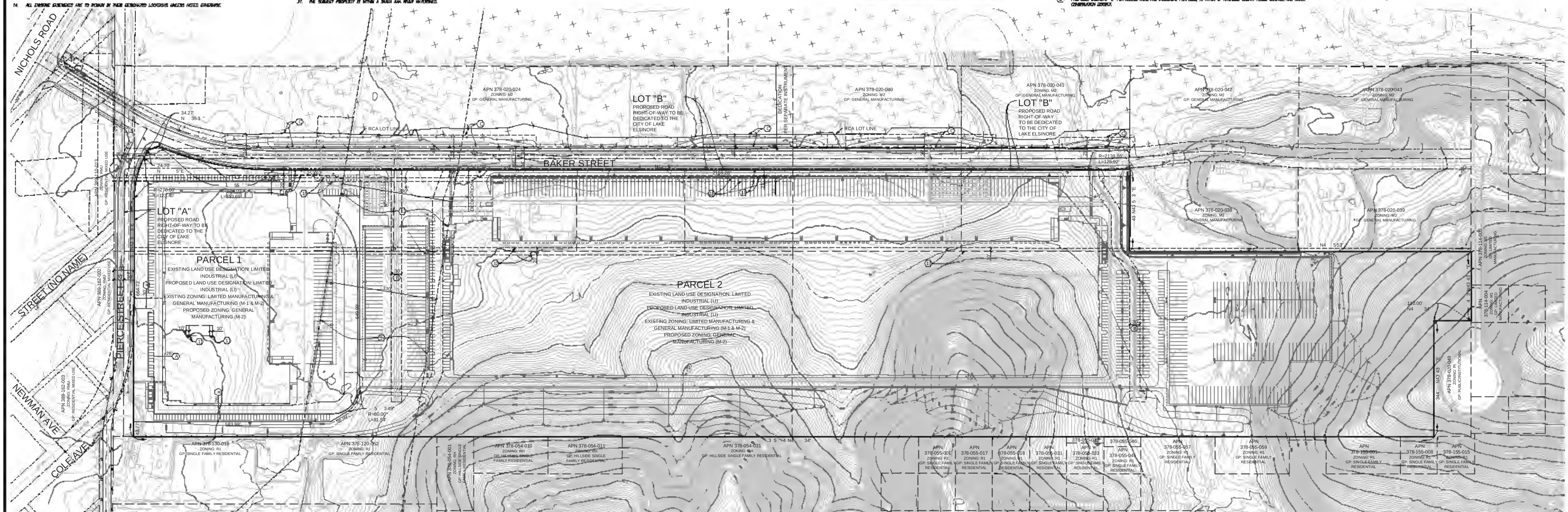
EASEMENTS:



OWNER/APPLICANT:

SITE ADDRESS:

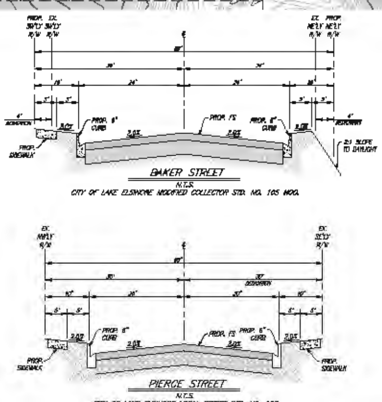
ENGINEER:



LEGAL DESCRIPTION:

UTILITY NOTES:

ASSESSOR PARCEL NO:



LEGEND:

FLOOD ZONE "X"

FLOOD ZONE "AE"

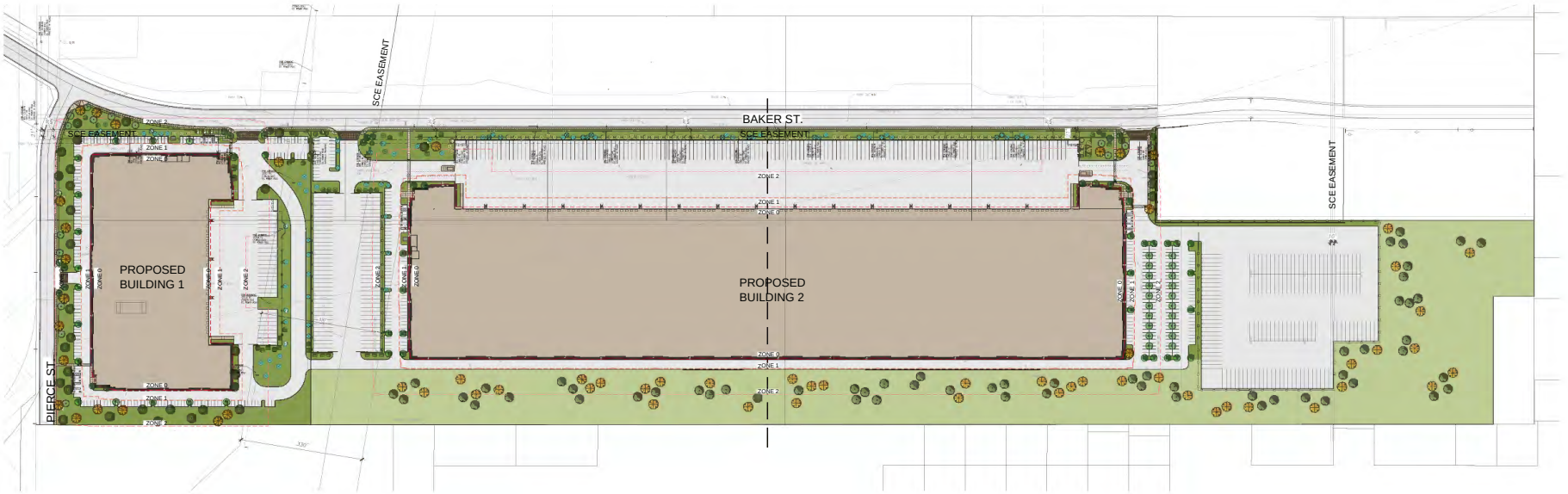
STATEMENT OF PREPARER

SCALE IN FEET

KWC ENGINEERS

TENTATIVE PARCEL MAP NO. 38812
BAKER INDUSTRIAL
CITY OF LAKE ELSINORE

SHEET NO. 1



LANDSCAPE CALCULATIONS

PROJECT TYPE :	NEW AND REHABILITATED LANDSCAPE AND IRRIGATION
ZONING:	INDUSTRIAL
LAKE ELSINORE CITY GUIDELINES	
NEW LANDSCAPE AREA :	268,126 SF
REHABILITATED LANDSCAPE AREA :	609,675 SF
TOTAL LANDSCAPE AREA:	877,801 SF
PROJECT AREA	
GROSS AREA:	65.60 ACRES
BUILDING AREA	23.01 ACRES
PERCENTAGE OF TURF AREA :	0%
NUMBER OF TREES:	458
NUMBER OF PARKING LOT TREES:	191

SCE EASEMENT LAND USE GUIDELINES

Landscape and Irrigation

1. Valves/controllers of any type are not permitted within the SCE ROW. Valves that are adjacent to ROW and are of a metal material may require grounding.
2. Trees and plants within the ROW shall be maintained by the Developer/Owner and must not exceed 15-feet in height at maturity unless otherwise specified in the easement. A list of all proposed trees, shrubs and all items to be planted within the SCE ROW, including max height and growth rate, must be included on plans. In the opinion of SCE, if said trees or plants becomes an interference, they will have the right to trim and or remove at the sole cost of the Developer/Owner.
3. Trees proposed within the ROW or up to 10' outside of the ROW shall be planted with root barriers and no portion of any mature tree will be permitted under or within 10-feet of conductor drip lines and substructures. Note: Plants with mature root systems that do not exceed 24 inches in depth are exempt from this requirement.
4. No environmentally protected plant species or species which attract and support environmentally protected biological species will be allowed within the ROW.
5. Wetlands, sensitive natural habitat, vegetation related natural plant areas, or environmental mitigation within SCE's ROW are not permitted as it creates interference with SCE's ability to access its facilities & add future facilities.

SCE APPROVED PROPOSED PLANT PALETTE (PER SCE RIGHT TREE RIGHT PLACE BROCHURE)

TREES

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE / FORM	HT. X SPRD. X CAL. (MIN.)	WATER USE	DESCRIPTION
	ARBUTUS X 'MARINA'	MARINA STRAWBERRY TREE	24" BOX STD.	8'H X 5'W	M	FLOWERING TREE
	CERCIS CANDENSIS 'FOREST PANSY'	FOREST PANSY RED BUD	24" BOX STD.	8'H X 5'SP X 4"C.	M	FLOWERING TREE
	HETEROMELES ARBUTIFOLIA	TOYON	15 GAL.	1.5'-2' H X 2' SP.	L	SMALL ACCENT TREE
	JUNIPERUS CALIFORNICA	CALIFORNIA JUNIPER	15 GAL.	5'H X 3'SP	L	SMALL ACCENT TREE
	LOPHOSTEMON CONFERTUS	BRISBANE BOX	24" BOX STD.	8'H X 3'SP X 4"C.	M	VERTICAL EVERGREEN
	PINUS ELDARICA	MONDELL PINE	24" BOX STD.	6'H X 3'SP.	L	EVERGREEN SCREEN
	PINUS HALEPENSIS	AFGHAN PINE	24" BOX STD.	6'H X 3'SP.	L	EVERGREEN SCREEN
	PLATANUS RACEMOSA	CALIFORNIA SYCAMORE	36" BOX	10'HT. X 4'SP.	M	DECIDUOUS CANOPY TREE
	QUERCUS AGRIFOLIA	CALIFORNIA LIVE OAK	36" BOX	16' H X 6'SP.	L	EVERGREEN CANOPY TREE
	QUERCUS DUMOSA	SCRUB OAK	24" BOX STD.	6' H X 3' SP.	L	SMALL SCREENING TREE

SCE APPROVED PROPOSED PLANT PALETTE (PER SCE RIGHT TREE RIGHT PLACE BROCHURE)

SHRUBS, GRASSES, & GROUNDCOVERS

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	WATER USE	DESCRIPTION
	CARISSA M. 'GREEN CARPET'	DWARF NATAL PLUM	1 GAL.	30" O.C.	M	EVERGREEN LOW SHRUB
	COTYLEDON ORBICULATA	PIG'S EAR	1 GAL.	18" O.C.	L	SUCCULENT ACCENT
	DIANELLA 'LITTLE REV'	LITTLE REV FLAX LILY	1 GAL.	24" O.C.	L	UPRIGHT ACCENT
	HESPERALOE PARVIFOLIA	RED YUCCA	5 GAL.	36" O.C.	L	UPRIGHT ACCENT
	ECHEVERIA AGAVOIDES 'LIPSTICK'	ECHEVERIA	4" POTS	8" O.C.	L	SMALL SUCCULENT
	HESPERALOE 'BRAKELIGHTS'	BRAKELIGHTS YUCCA	5 GAL.	36" O.C.	L	UPRIGHT ACCENT
	RHAPHIOLEPIS INDICA 'CLARA'	INDIAN HAWTHORN	5 GAL.	36" O.C.	M	EVERGREEN SHRUB
	SALVIA GREGGII	AUTUMN SAGE	5 GAL.	36" O.C.	L	FLOWERING SHRUB
	WESTRINGIA 'WYNYABBIE GEM'	COAST ROSEMARY	5 GAL.	36" O.C.	L	EVERGREEN HEDGE

GRASS/LAND HYDROSEED MIX

	NATIVE GRASSLAND MIX					

WATER USE KEY:
VL = VERY LOW WATER USE, L = LOW WATER USE, M = MODERATE WATER USE, H = HIGH WATER USE. WATER USE STATED IS PER 'WATER USE CLASSIFICATION OF LANDSCAPE SPECIES' (ALSO REFERRED TO AS WUCOLS IV) FOR THE CITY OF LAKE ELSINORE

DEFENSIBLE ZONE LEGEND

ZONE 0 – EMBER RESISTANT ZONE (EXTENDS 5 FEET FROM BUILDINGS AND STRUCTURES)

ZONE 1 – LEAN, CLEAN AND GREEN ZONE (EXTENDS 30 FEET FROM BUILDINGS AND STRUCTURES)

ZONE 2 – REDUCE FUEL ZONE (EXTENDS FROM 30 FEET TO 100 FEET OUT FROM BUILDINGS AND STRUCTURES, OR TO THE PROPERTY LINE.

VICINITY MAP



0 90 180 270

RGA
Office of Architectural Design

CONSULTANT

RLA

PROFESSIONAL SEALS

BAKER / PIERCE STREET DEVELOPMENT

0000 BAKER STREET
CITY OF LAKE ELSINORE, CA

MARK	DATE	DESCRIPTION
CD		
BID		
PC		
DD		
SD	06/01/24	SCHEMATIC DESIGN

RGA PROJECT NO:	23041-00
OWNER PROJECT NO:	00000.00
CAD FILE NAME:	23041-00-A1-3P
DRAWN BY:	RLA
CHK'D BY:	RLA

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RGA, OFFICE OF ARCHITECTURAL DESIGN

SHEET TITLE

PRELIMINARY LANDSCAPE SITE PLAN

SHEET: L1.0

LEGEND

1. ENHANCED CONCRETE PAVING AT DRIVE AISLE ENTRIES
2. P.I.P. CONCRETE STEPS WITH HANDRAILS
3. P.I.P. CONCRETE RAMP WITH HANDRAILS
4. GUARDHOUSE
5. SECURITY GATE
6. AUTO PARKING
7. TRAILER PARKING
8. NATIVE HYDROSEED SLOPE
9. TRANSFORMER
10. GRAVEL BAND
11. PERIMETER FENCE
12. PERIMETER WALL
13. RETAINING WALL

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	JUNIPERUS CALIFORNICA	CALIFORNIA JUNIPER	15 GAL.	9H X 3'SP.	L	SMALL ACCENT TREE
	LOPHOSTEMON CONFERTUS	BRISBANE BOX	24" BOX STD.	8H X 3'SP. X 4'C	M	VERTICAL EVERGREEN
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SHRUBS, GRASSES, & GROUNDCOVERS

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	DIANELLA 'LITTLE REV'	LITTLE REV FLAX LILY	1 GAL.	24" O.C.	L	UPRIGHT ACCENT
	HESPER ALOE PARVIFOLIA	RED YUCCA	5 GAL.	36" O.C.	L	UPRIGHT ACCENT
	ECHEVERIA AGAVOIDES 'LIPSTICK'	ECHEVERIA	4" POTS	8" O.C.	L	SMALL SUCCULENT
	HESPER ALOE 'BRAKELIGHTS'	BRAKELIGHTS YUCCA	5 GAL.	36" O.C.	L	UPRIGHT ACCENT
	RHAPHIOLEPIS INDICA 'CLARA'	INDIAN HAWTHORN	5 GAL.	36" O.C.	M	EVERGREEN SHRUB
	SALVIA GREGGII	AUTUMN SAGE	5 GAL.	36" O.C.	L	FLOWERING SHRUB
	WESTRINGIA 'WYNYABBIE GEM'	COAST ROSEMARY	5 GAL.	36" O.C.	L	EVERGREEN HEDGE

GRASSLAND HYDROSEED MIX

	NATIVE GRASSLAND MIX					

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LANDSCAPE CALCULATIONS

PROJECT TYPE : NEW AND REHABILITATED LANDSCAPE AND IRRIGATION

ZONING: INDUSTRIAL

LAKE ELSINORE CITY GUIDELINES

NEW LANDSCAPE AREA :	268,126 SF
REHABILITATED LANDSCAPE AREA :	609,675 SF
TOTAL LANDSCAPE AREA:	877,801 SF

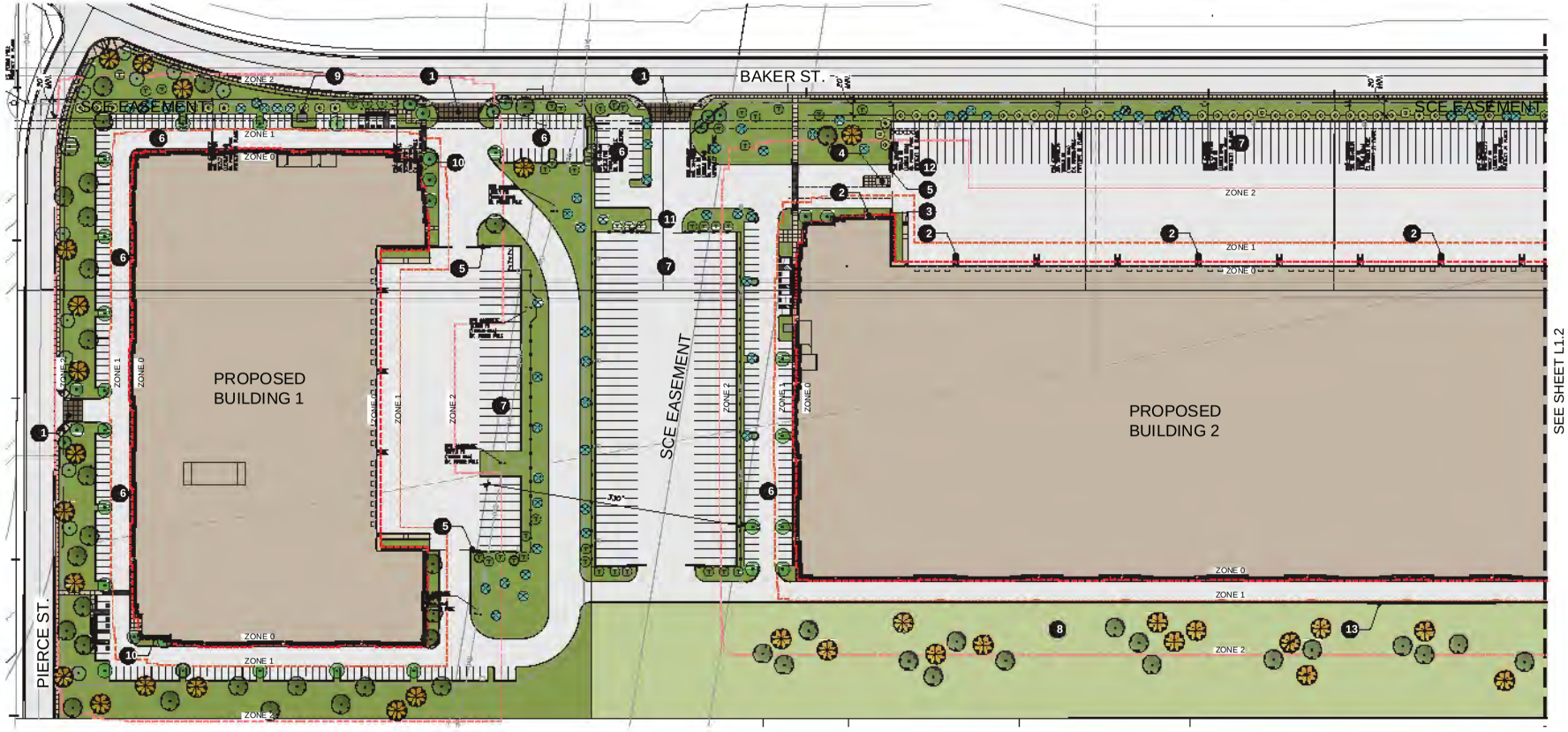
PROJECT AREA

GROSS AREA:	65.60 ACRES
BUILDING AREA	23.01 ACRES
PERCENTAGE OF TURF AREA :	0%
NUMBER OF TREES:	458
NUMBER OF PARKING LOT TREES:	191

SCE EASEMENT LAND USE GUIDELINES

Landscape and Irrigation

1. Valves/controllers of any type are not permitted within the SCE ROW. Valves that are adjacent to ROW and are of a metal material may require grounding.
2. Trees and plants within the ROW shall be maintained by the Developer/Owner and must not exceed 15-feet in height at maturity unless otherwise specified in the easement. A list of all proposed trees, shrubs and all items to be planted within the SCE ROW, including max height and growth rate, must be included on plans. In the opinion of SCE, if said trees or plants becomes an interference, they will have the right to trim and or remove at the sole cost of the Developer/Owner.
3. Trees proposed within the ROW or up to 10' outside of the ROW shall be planted with root barriers and no portion of any mature tree will be permitted under or within 10-feet of conductor sag lines and substructures. Note: Plants with mature root systems that do not exceed 24 inches in depth are exempt from this requirement.
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0 50 100 150

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1211 Village Way, Suite 100
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CONSULTANT

RLA
1801 E. 9th St., Suite 300
Santa Ana, CA 92705
949.851.1854
www.rla-ca.com

PROFESSIONAL SEALS

BAKER / PIERCE STREET DEVELOPMENT
0000 BAKER STREET
CITY OF LAKE ELSINORE, CA

MARK	DATE	DESCRIPTION
CD		
BID		
PC		
DD		
SD	08/24/04	SCHEMATIC DESIGN

RGA PROJECT NO: 230-01-00
OWNER PROJECT NO: 0000.00
CAD FILE NAME: 230-01-00-A1-1P
DRAWN BY: RLA
CHK'D BY: RLA

COPYRIGHT
RGA, OFFICE OF ARCHITECTURAL DESIGN

SHEET TITLE

PRELIMINARY LANDSCAPE PLAN ENLARGEMENT

SHEET: L1.1

LEGEND

1. ENHANCED CONCRETE PAVING AT DRIVE AISLE ENTRIES
2. P.I.P. CONCRETE STEPS WITH HANDRAILS
3. P.I.P. CONCRETE RAMP WITH HANDRAILS
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SCE APPROVED PROPOSED PLANT PALETTE (PER SCE RIGHT TREE RIGHT PLACE BROCHURE)

TREES

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	LOPHOSTEMON CONFERTUS	BRISBANE BOX	24" BOX STD.	8H X 3'SP X 4"C	M	VERTICAL EVERGREEN
	PINUS ELDARICA	MONDELL PINE	24" BOX STD.	6'H X 3'SP.	L	EVERGREEN SCREEN
	PINUS HALEPENSUS	AFGHAN PINE	24" BOX STD.	6'H X 3'SP.	L	EVERGREEN SCREEN
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	DIANELLA 'LITTLE REV'	LITTLE REV FLAX LILY	1 GAL.	24" O.C.	L	UPRIGHT ACCENT
	HESPER ALOE PARVIFOLIA	RED YUCCA	5 GAL.	36" O.C.	L	UPRIGHT ACCENT
	ECHEVERIA AGAVOIDES 'LIPSTICK'	ECHEVERIA	4" POTS	8" O.C.	L	SMALL SUCCULENT
	HESPER ALOE 'BRAKELIGHTS'	BRAKELIGHTS YUCCA	5 GAL.	36" O.C.	L	UPRIGHT ACCENT
	RHAPHIOLEPIS INDICA 'CLARA'	INDIAN HAWTHORN	5 GAL.	36" O.C.	M	EVERGREEN SHRUB
	SALVIA GREGGII	AUTUMN SAGE	5 GAL.	36" O.C.	L	FLOWERING SHRUB
	WESTRINGIA 'WYNYABBIE GEM'	COAST ROSEMARY	5 GAL.	36" O.C.	L	EVERGREEN HEDGE

GRASSLAND HYDROSEED MIX

	NATIVE GRASSLAND MIX					

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PROJECT TYPE : NEW AND REHABILITATED LANDSCAPE AND IRRIGATION

ZONING: INDUSTRIAL

LAKE ELSINORE CITY GUIDELINES

NEW LANDSCAPE AREA :	268,126 SF
REHABILITATED LANDSCAPE AREA :	609,675 SF
TOTAL LANDSCAPE AREA:	877,801 SF

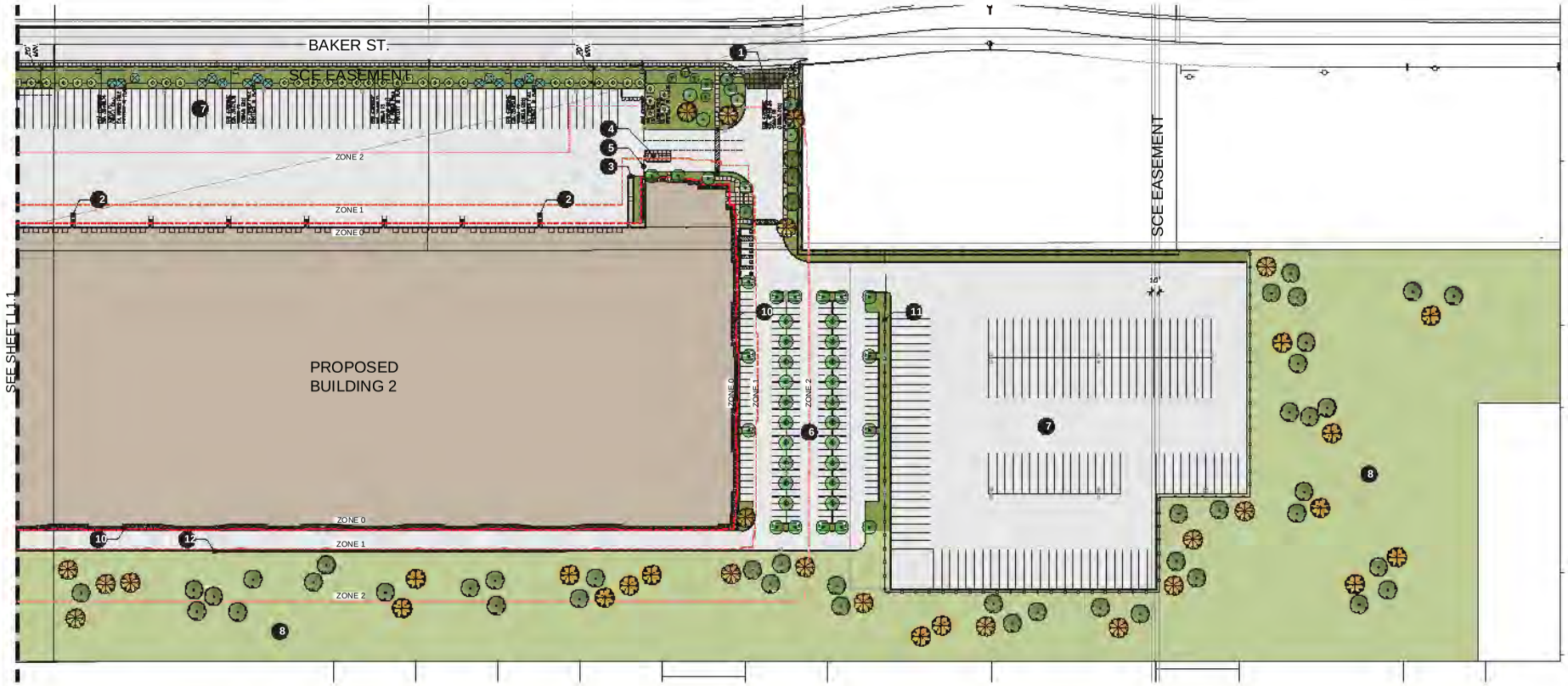
PROJECT AREA

GROSS AREA:	65.60 ACRES
BUILDING AREA	23.01 ACRES
PERCENTAGE OF TURF AREA :	0%
NUMBER OF TREES:	458
NUMBER OF PARKING LOT TREES:	191

SCE EASEMENT LAND USE GUIDELINES

Landscape and Irrigation

1. Valves/controllers of any type are not permitted within the SCE ROW. Valves that are adjacent to ROW and are of a metal material may require grounding.
2. Trees and plants within the ROW shall be maintained by the Developer/Owner and must not exceed 15 feet in height at maturity unless otherwise specified in the easement. A list of all proposed trees, shrubs and all items to be planted within the SCE ROW, including max height and growth rate, must be included on plans. In the opinion of SCE, if said trees or plants becomes an interference, they will have the right to trim and/or remove at the sole cost of the Developer/Owner.
3. Trees proposed within the ROW or up to 10' outside of the ROW shall be planted with root barriers and no portion of any mature tree will be permitted under or within 10 feet of structural help lines and substructures. Note: Plants with mature root systems that do not exceed 24 inches in depth are exempt from this requirement.
4. Non environmentally protected plant species or species which attract and support environmentally protected biological species will be allowed within the ROW.
5. Wetlands, sensitive natural habitat, vegetation treated natural plant areas, or environmental mitigation within SCE's ROW are not permitted as it creates interference with SCE's ability to access its facilities & add future facilities.



RGA

CONSULTANT

RLA

PROFESSIONAL SEALS

BAKER / PIERCE STREET DEVELOPMENT

0000 BAKER STREET
CITY OF LAKE ELSINORE, CA

MARK	DATE	DESCRIPTION
CD		
BID		
PC		
DD		
SD	08/24/24	SCHEMATIC DESIGN

RGA PROJECT NO:	230-41-00
OWNER PROJECT NO:	0000.00
CAD FILE NAME:	230-41-00-A1-1P
DRAWN BY:	RLA
CHK'D BY:	RLA

COPYRIGHT
RGA, OFFICE OF ARCHITECTURAL DESIGN

SHEET TITLE

PRELIMINARY LANDSCAPE PLAN ENLARGEMENT

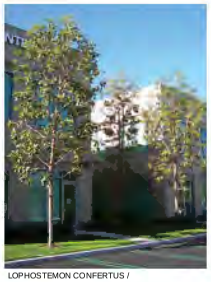
SHEET: L1.2



ARBUTUS MARINA /
MARINA STRAWBERRY TREE



CERCIS CANADENSIS 'FOREST PANSY' /
FOREST PANSY REDBUD



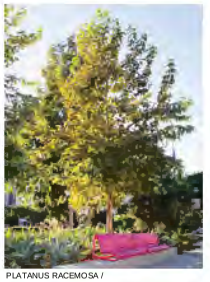
LOPHOSTEMON CONFERTUS /
BRISBANE BOX



PINUS ELDARICA /
AFGHAN PINE



PINUS HALEPENSIS /
ALEPPO PINE



PLATANUS RACEMOSA /
WESTERN SYCAMORE



QUERCUS AGRIFOLIA /
COAST LIVE OAK



HETEROMELES ARBUTIFOLIA /
TOYON



JUNIPERUS CALIFORNICA /
CALIFORNIA JUNIPER



QUERCUS DUMOSA /
SCRUB OAK



CARISSA M. 'GREEN CARPET' /
GREEN CARPET NATAL PLUM



COTYLEDON ORBICULATA /
PIGS EAR



DIANELLA REVOLUTA 'LITTLE REV' /
LITTLE REV FLAX LILY



ECHEVERIA AGAVOIDES 'LIPSTICK' /
LIPSTICK ECHEVERIA



HESPERALOE PARVIFLORA /
RED YUCCA



HESPERALOE 'BRAKELIGHTS' /
BRAKELIGHTS YUCCA



RHAPHIOLEPIS INDICA 'CLARA' /
CLARA INDIAN HAWTHORN



SALVIA GREGGII /
AUTUMN SAGE



WESTRINGIA F. 'WYNYABBIE GEM' /
WYNYABBIE GEM COAST ROSEMARY

RGA
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1231 Alton Parkway, Suite 100
Irvine, CA 92614
T: 949-261-2933
F: 949-261-7922

CONSULTANT

RLA

PROFESSIONAL SEALS

BAKER / PIERCE STREET DEVELOPMENT

0000 BAKER STREET
CITY OF LAKE ELSINORE, CA

CD		
BID		
PC		
DD		
SD	08/24/04	SCHEMATIC DESIGN
MARK	DATE	DESCRIPTION

RGA PROJECT NO:	230-01-00
OWNER PROJECT NO:	0000.00
CAD FILE NAME:	230-01-00-A1-1P
DRAWN BY:	RLA
CHK'D BY:	RLA

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RGA, OFFICE OF ARCHITECTURAL DESIGN

SHEET TITLE

PLANT IMAGERY

SHEET: L2.0

PRELIMINARY DRAINAGE REPORT

Baker Industrial

City of Lake Elsinore, County of Riverside, California



PREPARED FOR:

RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
1505 Bridgeway, Suite 107
Sausalito, CA 94965
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December 2024

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Appendix C: Existing Condition Hydrology Rational Method & Key Map

Appendix D: Proposed Condition Hydrology Rational Method & Key Map

Appendix E: FEMA Flood Insurance Rate Map

Appendix F: Storm Drain Hydraulics WSPG Analysis

Appendix G: Debris Sizing Calculations

Section

1

INTRODUCTION

1.1 PURPOSE OF STUDY

The purpose of this study is to hydrologically model the project site's onsite tributary watersheds to determine the existing and proposed peak runoffs. The hydrologic analysis was prepared using the Rational Method as specified in the Riverside County Hydrology Manual. The flows are used to estimate the size of the proposed drainage facilities that support the proposed project development.

1.2 PROJECT DESCRIPTION

The Baker Industrial project is comprised of 66.23 acres of developed land along Baker Street in the City of Lake Elsinore in Riverside County, California, adjacent to Pierce Street. Appendix A shows a vicinity map of the area illustrating the location of the project.

The Baker Industrial project is generally bounded to the northeast by Baker Street. Bounded on the northwest by Pierce Street. To the southeast and southwest of the site, the area is bounded by undeveloped hills.

The project site existing conditions is generally flat with some hills coming onto the site along the southern boundary. The existing project gross acreage is 66.23 acres. The site's drainage area flows from the south and southwest to the north and northeast to the north side of Baker Street. Two new buildings are proposed, building 1 is 206,982 sf and building 2 is 778,423 sf, landscape areas, driveways, and parking lots.

The proposed buildings will consist of a warehouse and connected office space with the necessary improvements to facilitate business. The offsite drainage areas will be captured with a flow-by basin and a debris basin routed through storm drain before discharging at their historical locations on the north side of baker street. The onsite drainage areas will be captured by CMP Detention System and treated by MWS Units.

Baker Street will be improved on the project frontage. The full width drainage of the street will be captured within the catch basin at the low points of Baker Street. The flows will continue into MWS units within Baker Street.

1.3 FLOODPLAIN MAPPING

The National Flood Insurance Act (1968) established the National Flood Insurance Program, which is based on the minimal requirements for floodplain management and is designed to minimize the flood damage within Other Flood Areas. The Federal Emergency Management Agency (FEMA) is the agency which administrates the National Flood Insurance Program. Other Flood Areas are defined as areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood. Flood Insurance Rate Maps (FIRMs) were developed to identify areas of flood hazards within a community.

According to the Flood Insurance Rate Map (FIRM) catalog, there are FIRMs produced by FEMA for the project site:

MAP Number: 06065C2028G

MAP Revised: August 28, 2008

FEMA FIRM Panel (**Figure 4**) is attached in **Appendix E** shows the floodplain limits and mapped flood zones for the Baker Industrial project area. The project is located mostly within Zone X and a small portion is within Zone AE, which is an area within the flood hazard areas subject to inundation by the 1% annual chance flood.

1.4 DESIGN CRITERIA

The following are design criteria for this project, based on the Riverside County Hydrology Manual.

Protection Levels

1. The 100-year flood shall be contained 1’ below the building pads.

2. The 10-year flood shall be contained within the top of curbs.

1) Loss rates are to be determined for the 2- and 5-year events using an AMC I condition, while an AMC II are used for the 10-year event and 100-year event.

Section

2

HYDROLOGIC DATA AND MODEL DEVELOPMENT

2.1 EXISTING CONDITION MODEL

The project site existing condition consists of undeveloped land and characterized by steep topography, generally decreasing in elevation from the south to the north. Several ravines are present which will convey natural drainage across the project site washing towards the north side of Baker Street.

The site is comprised of four (4) major drainage areas and four (4) offsite drainage areas to describe the existing drainage conditions. Refer to Existing Condition Hydrology Key Map **Figure 2** in **Appendix C** for locations of the drainage sub-areas and peak flows. Hydrologic calculations to evaluate surface water runoff associated with the 10-year and 100-year storm frequency were performed for the on-site drainage areas. The Riverside County Rational Method Hydrologic calculations (as described in the RCHM) were performed using the CivilDesign Hydrology / Hydraulics computer program package 2005 by Bonadiman and Associates, Inc.

Precipitation point values for the 10-year and 100-year durations obtained from Riverside County Flood Control Plate D-4.3, D-4.4, and Plate D-4.6 (see **Appendix B**).

In order to proceed with analysis of the proposed developed condition, it is necessary to first establish the pre-developed peak runoff rates. **Table 1** summarizes the data and results for the 10-year and 100-year storm event for on-site and off-site flows. All calculations can be found in **Appendix C** of the report.

Table 1. Existing Condition Peak Flow Summary

Drainage Area	Area (AC)	Q100 (CFS)	Q10 (CFS)	Q5 (CFS)	Q2 (CFS)
A	168.50	332.50	197.59	132.10	84.23
B	23.93	62.11	37.50	26.23	17.15
C	7.46	19.38	11.95	9.72	6.78
D	217.10	478.84	289.46	199.77	131.16

2.2 PROPOSED CONDITION MODEL

In the proposed condition, the proposed improvements are to add two large industrial/warehouse type buildings, parking area with asphalt pavements, concrete slabs, landscape areas, and improvements to Baker Street. Refer to Appendix B for a preliminary soils report demonstrating soil type and hydrologic group classification. Two new buildings are proposed, building 1 is 206,982 sf and building 2 is 778,423 sf, landscape areas, driveways, and new drainage systems will all drain to Baker Street. Street improvements are proposed for Baker Street.

The developed condition site consists of five (5) major drainage areas and four (4) offsite drainage areas. The project site runoff will be picked up by a system of gutters and inlets that will discharge through a storm drain system that outlets to Baker Street. The offsite flows will discharge in desilting basins to the south of the property and continue as it does in its current existing conditions through proposed dual 48" storm drains and dual 5x4' storm drain box. Offsite drainage area will not comingle with onsite flows. Refer to Proposed Condition Hydrology Key Map **Figure 3** in **Appendix D** for locations of the drainage sub-areas and peak flows. Hydrologic calculations were evaluated for surface water runoff associated with the 10-year and 100-year storm frequency. The proposed condition watershed boundaries were delineated using the project's conceptual grading plan. Hydrologic land cover for the development is considered commercial.

Table 2 summarizes the proposed condition 10 and 100-year rational method results. Proposed condition rational method calculations can be found in **Appendix D** of the report.

Table 2. Proposed Condition Peak Flow Summary

Drainage Area	Area (AC)	Q100 (CFS)	Q10 (CFS)	Q5 (CFS)	Q2 (CFS)
A	165.59	338.79	202.45	136.99	88.07
B	25.98	68.18	41.58	33.75	23.48
C	3.56	6.73	4.15	3.26	2.29
D	175.52	392.28	237.49	110.40	97.47
E	27.48	72.92	45.30	34.51	24.00
F	5.92	11.75	7.27	5.75	4.05

Table 3 summarizes the comparison between the Existing Condition and Proposed Condition Hydrology results.

Table 3. Existing vs. Proposed Condition Peak Flow Summary

	Existing Condition			Proposed Condition			Note	
Drainage Area	Area (Acres)	Q100 (CFS)	Q10 (CFS)	Area (Acres)	Q100 (CFS)	Q10 (CFS)		
A	168.50	332.50	197.59	165.59	338.79	202.45	$\triangle$ Q100 = 6.29 $Q_{Proposed} > Q_{Existing}$	$\triangle$ Q10 = 4.86 $Q_{Proposed} > Q_{Existing}$
B	23.93	62.11	37.50	25.98	68.18	41.58	$\triangle$ Q100 = 6.07 $Q_{Proposed} > Q_{Existing}$	$\triangle$ Q10 = 4.08 $Q_{Proposed} > Q_{Existing}$
C	7.46	19.38	11.95	3.56	6.73	4.15	$\triangle$ Q100 = 12.65 $Q_{Proposed} < Q_{Existing}$	$\triangle$ Q10 = 7.80 $Q_{Proposed} < Q_{Existing}$
D	217.10	478.84	289.46	175.52	392.28	237.49	$\triangle$ Q100 = 86.56 $Q_{Proposed} < Q_{Existing}$	$\triangle$ Q10 = 51.97 $Q_{Proposed} < Q_{Existing}$

Section

3

HYDRAULIC ANALYSIS

3.1 ONSITE DRAINAGE FACILITIES

Preliminary onsite drainage facilities for the project were calculated utilizing the rational method hydrology program and are presented on the Proposed Condition Hydrology Key Maps. The approximate locations of drainage facilities are intended for conceptual purposes only and will be refined in the design review and final engineering process. Pipe sizes are based on the design criteria presented in Section 1.4. RCFC maintained pipes were designed as reinforced concrete pipe and privately maintained pipes were designed as HDPE with a roughness coefficient of 0.013. The proposed onsite storm drain system calculations will be performed in the Final Engineering phase.

3.2 OUTLET ANALYSIS

All six (6) drainage areas will outlet on the north side of Baker Street through wingwall structures and riprap that will be designed per RCFC standards. Each outlet location will have a 15 ft wide access road down from and back up to Baker Street. The outlet velocity shall be at or below the existing condition or to a non-erosive velocity in accordance with RCFCWCD hydraulic manual.

Section

4

DEBRIS BASIN ANALYSIS

4.1 DESIGN CRITERIA

This section determines the debris yield for the undeveloped tributary watershed areas upstream of the development. The corresponding calculated debris yield is then used to determine the size of the debris basin required upstream of the drainage watersheds. Sediment yield must be accounted for when designing drainage facilities to convey runoff from undeveloped (natural) areas. Soil erosion caused by runoff in undeveloped areas increases the amount of sediment yield or load in storm water discharge. In order to accommodate for the increase in discharge volume a debris factor must be accounted for when considering design flows.

The procedures described in the US Army Corps of Engineers Los Angeles District Method for Prediction of Debris Yield were used to calculate the debris yield as shown below.

4.2 DEBRIS YIELD

LOS ANGELES DISTIRCT METHOD FOR PREDICTION OF DEBRIS YIELD

February 1992, updated February 2000

For Watershed areas from 0.1 square mile to 3.0 square miles, use equation 1 as shown on page 15

LOG Dy = 0.65(LOG P) + 0.62(LOG RR) + 0.18(LOG A) + 0.12(FF)

Where:

Dy = Unit Debris Yield (yd^3/mi^2)
P = Maximum 1-Hour Precipitation (inches, taken to two decimal places after the decimal points, times 100)
RR = Relief Ratio (ft/mi) (Highest Watershed Elev-Basin Elev)/Maximum Length
A = Drainage Area (ac)
FF = Non-Dimensional Fire factor

Per the recommendations in the RCHM, typical designs assume 3 to 5 year recovery from a total burn for making estimates of design storm debris production since the probability of a design storm following a 100 percent burn of the entire watershed is extremely remote. Therefore, the fire factor used in the calculations is based on a 4 year recovery period from 100 percent burn.
Refer to **Appendix G** for detailed calculations.

4.3 DEBRIS BULKING

The debris bulking factor of 1.03 and 1.01 were used in this study to be applied to natural drainage areas to increase the clear water flow rate caused by the additional debris.
The following table summarizes the calculated debris volume and bulked flow at each flow-by basin.

Table 4 Proposed Condition Debris Volume and Bulked Flow

Basin	Node	Debris Volume (cy)	Bulking Factor	100-Year Clear Water Flow (cfs)	100-Year Bulked Flow (cfs)
1	104	885	1.03	309.6	318.9
2	403	358	1.01	392.3	396.2

Section

5

CONCLUSIONS

This preliminary drainage study has evaluated the potential effects of runoff on the proposed project. In addition, the report has addressed the methodology used to analyze the existing and proposed conditions, which was based on the Riverside County Hydrology Manual. This section provides a summary discussion that evaluates the potential effects of the proposed project.

- The project is 66.23 acres of developed industrial land.
- Offsite tributary areas will be captured and moved into their original flow location along the north side of Baker Street.
- Baker Street and Pierce Street full width improvements will be captured, treated, and discharged to the north side of Baker Street.
- Onsite tributary areas will be captured, treated, and discharged to the north side of Baker Street.
- Preliminary alignment and pipe sizes of storm drain lines were presented.

All storm water runoff will be carried via gutters, catch basins, or onsite storm drain system that will outlet into the north side of Baker Street. The computed 10-year storm event is contained below the top of curb and the computed 100-year storm event is contained within the street right-of-way.

Section

6

REFERENCES

Riverside County Flood Control and Water Conservation District. Hydrology Manual. April 1978

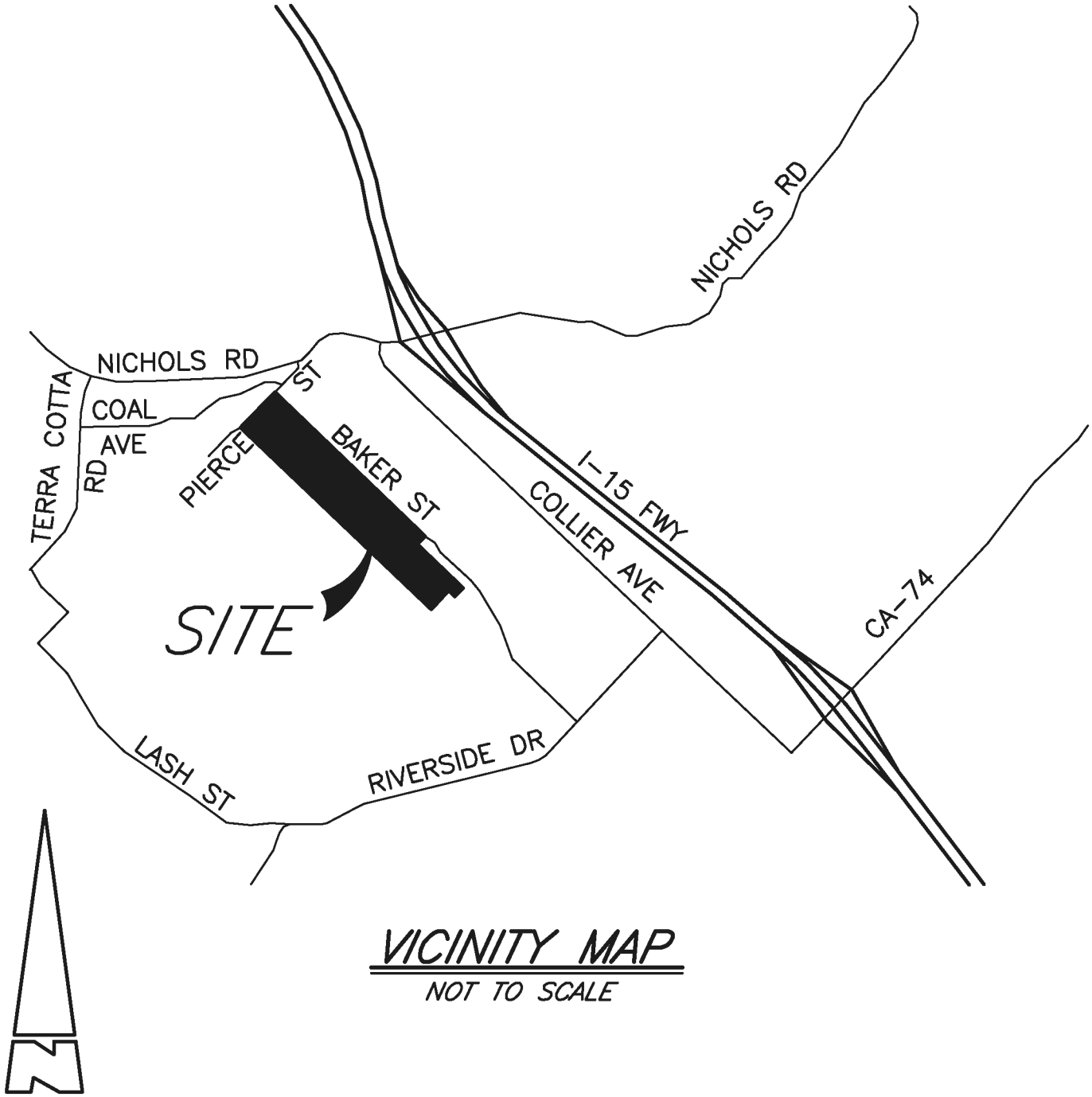
Riverside County Flood Control and Water Conservation District. Increased Runoff Mitigation Workshop. August 24, 1995

State of California – Department of Transportation, Interstate 91 Drainage Plans, December 1, 2008

Appendix

A

VICINITY MAP



VICINITY MAP

NOT TO SCALE

PREPARED BY:

KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

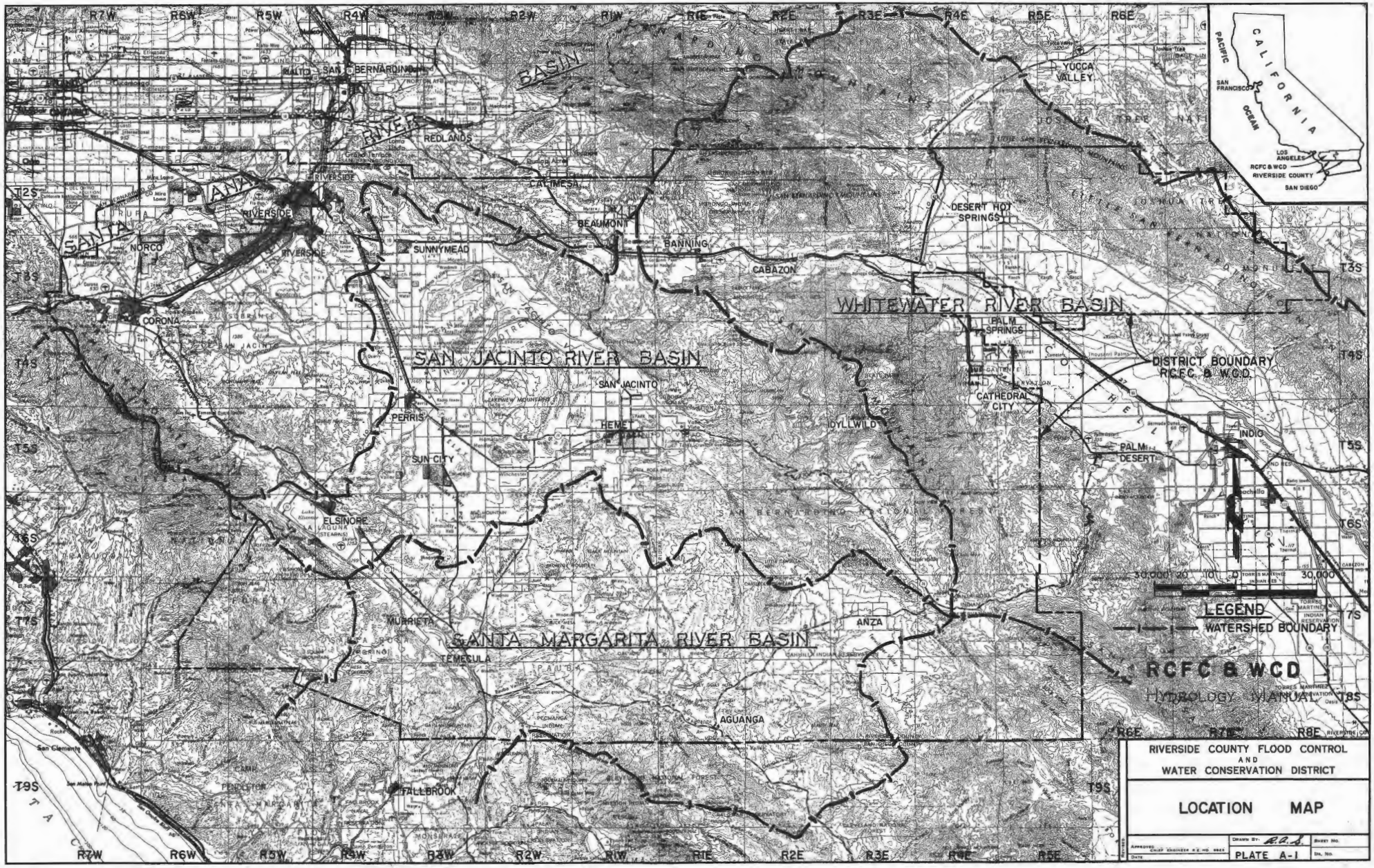
VICINITY MAP
BAKER INDUSTRIAL

DATE	DRAWN BY	CHECKED BY	J.N.
04/28/23	AB	BB	19.1994

Appendix

B

RCFC PRECIPITATION DATA & NRCS SOILS REPORT

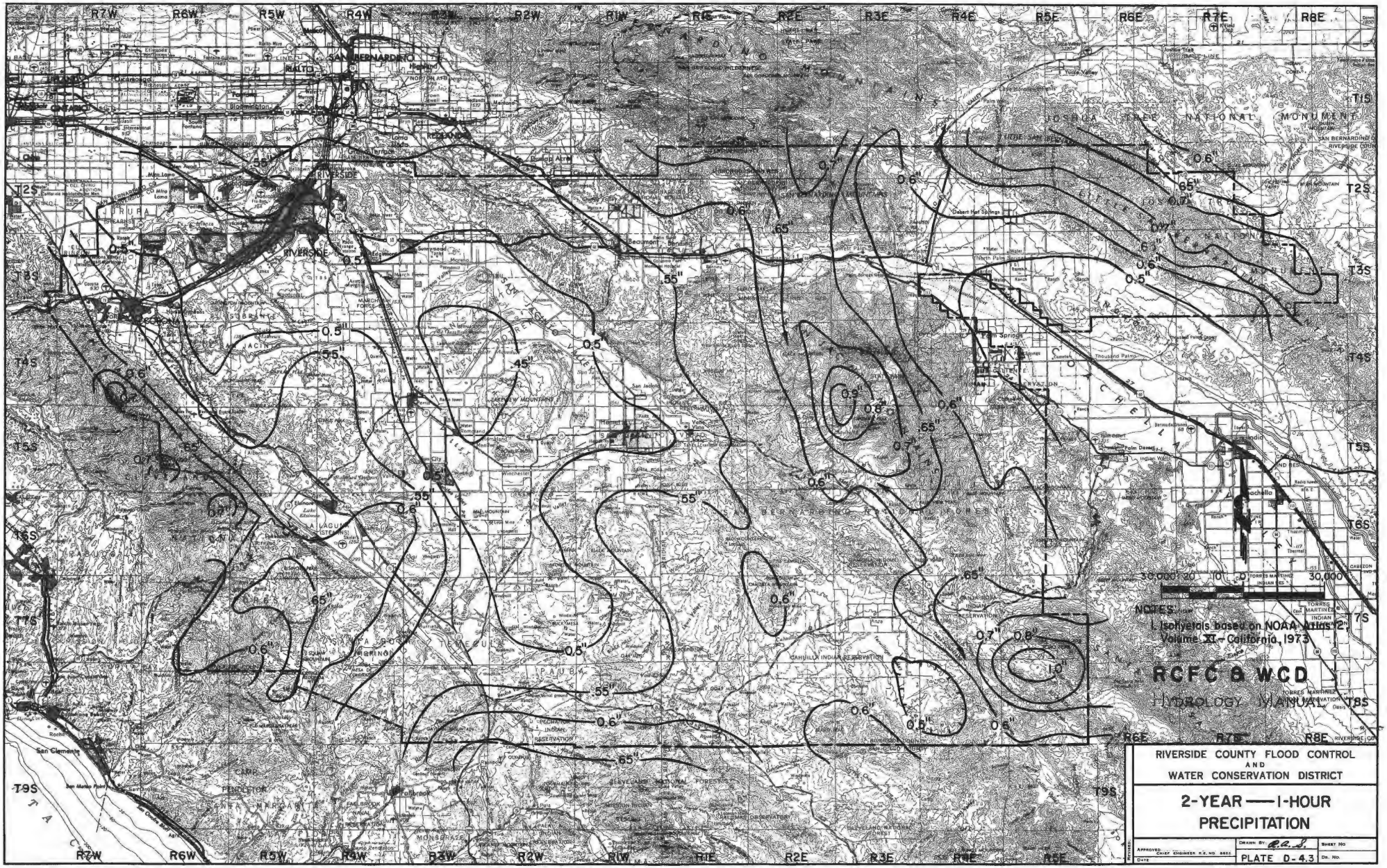


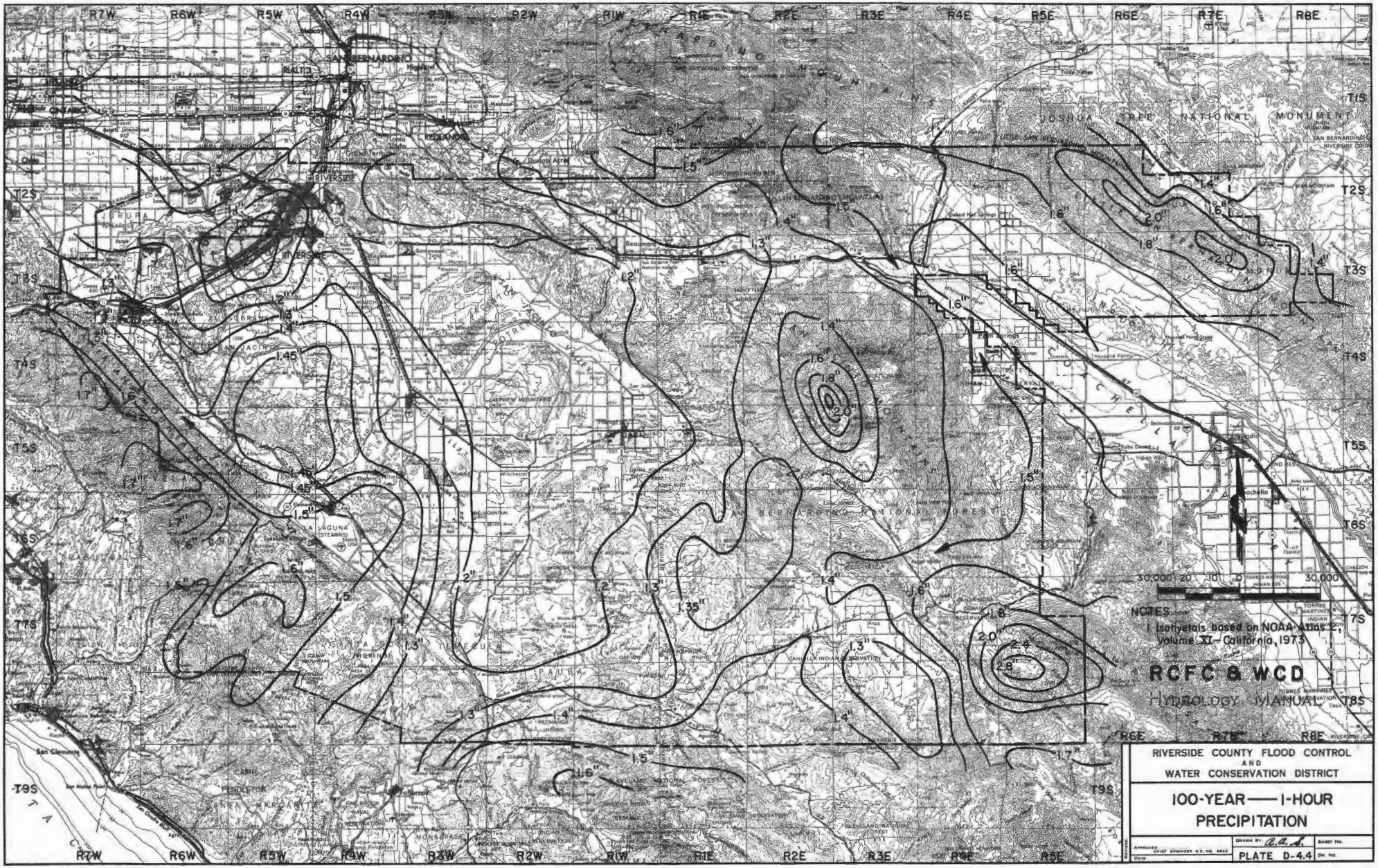
RCFC & WCD
HYDROLOGY MANUAL

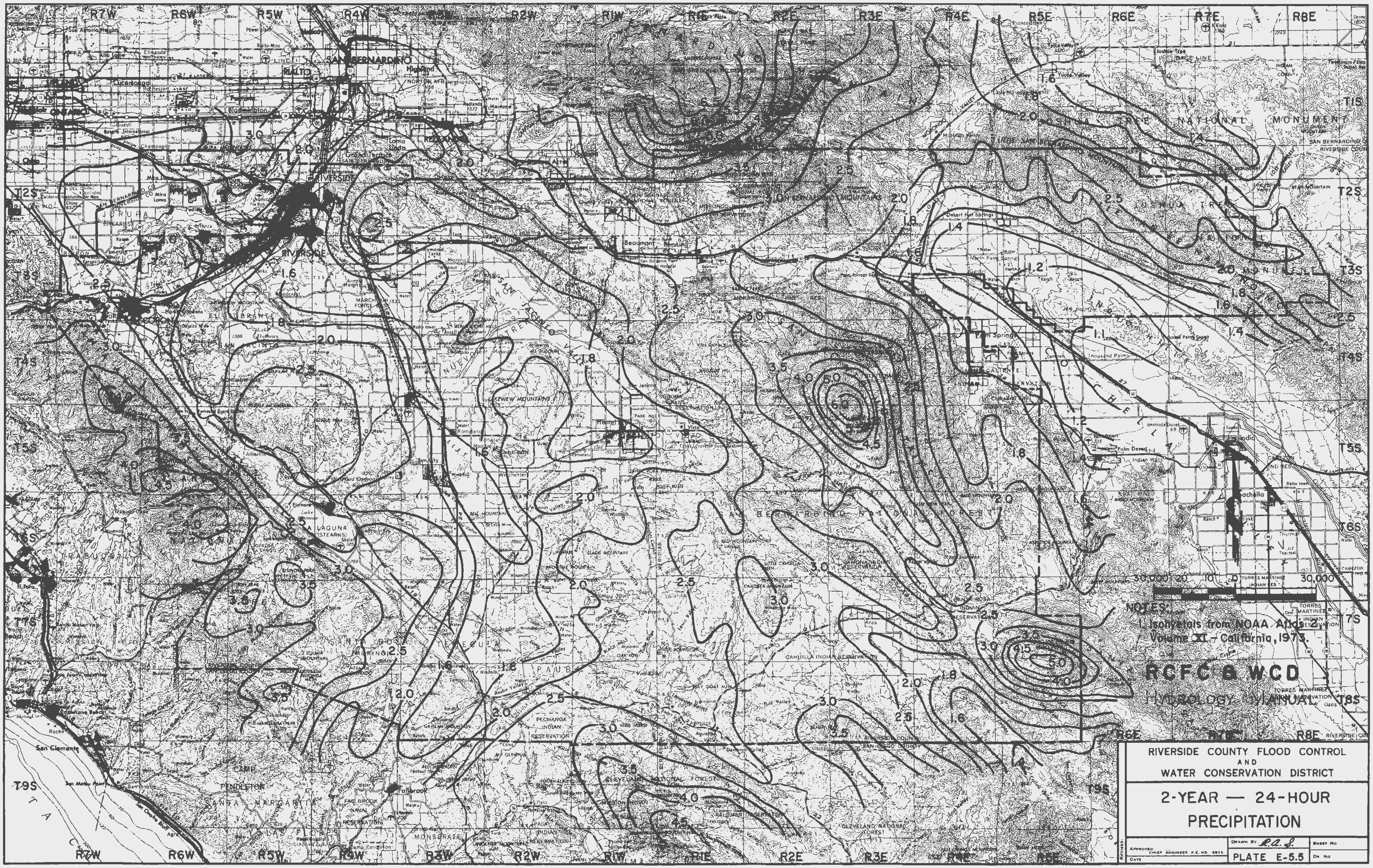
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

LOCATION MAP

PLATE A-1


RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.3
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL


NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.4

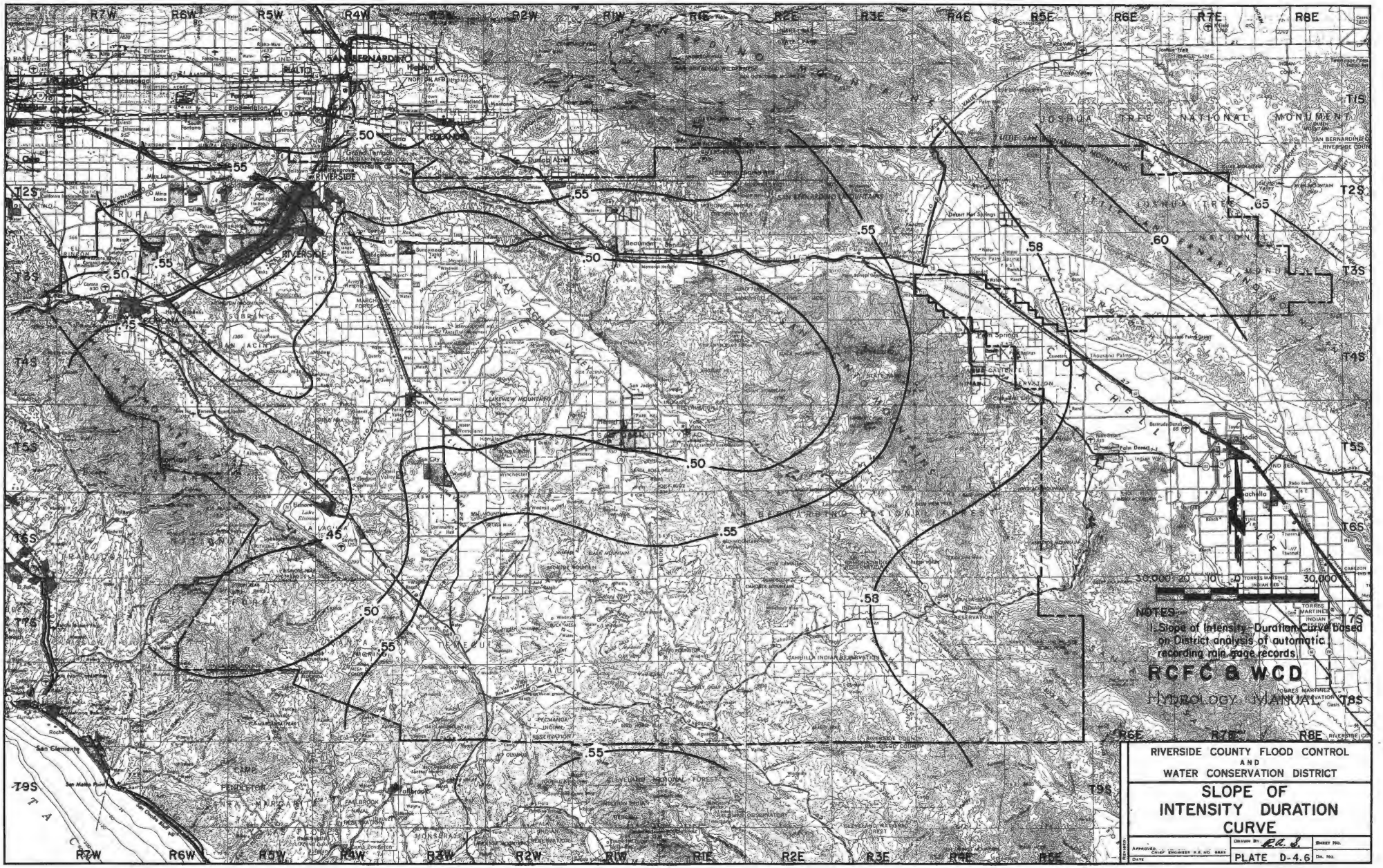


RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2-YEAR — 24-HOUR PRECIPITATION

PLATE E-5.5


R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
R8E
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
SAN BERNARDINO
RIVERSIDE
RIALTO
JOSHUA TREE NATIONAL MONUMENT
SAN JACINTO MOUNTAINS
SAN GABRIEL MOUNTAINS
SANTA ANA MOUNTAINS
PALM SPRINGS
INDIO
COACHELLA
CABAZON
BANNING
PERRIS
CORONA
NORTON AFB
MARCH AFB
SAN JACINTO WILDERNESS
CAHUILLA INDIAN RESERVATION
TORRES MARTINEZ INDIAN RES
SAN JACINTO RIVER
SANTA ANA RIVER
SAN GABRIEL RIVER
30,000 20 10 0 30,000
NOTES:
Isohyetals from NOAA Atlas 2
Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR
PRECIPITATION
APPROVED
CHIEF ENGINEER R.E. NO. 6925
DATE
DRAWN BY
SURVEY No.
PLATE E-5.6
DR. No
REVISED


.50
.55
.45
.58
.60
.65
NOTES
1. Slope of Intensity-Duration Curve based on District analysis of automatic recording rain gage records
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
SLOPE OF INTENSITY DURATION CURVE
PLATE D-4.6

January 31, 2024 Project No. 23160-01

Mr. Trygg Danforth
Ecosystem Investment Partners
5550 Newbury Street, Suite B
Baltimore, Maryland 21209

Subject: ***Preliminary Geotechnical Subsurface Evaluation and Recommendations, Proposed Approximate 65-Acre Industrial Development, Baker Street, Lake Elsinore, California***

In accordance with your request, LGC Geotechnical, Inc. has performed a preliminary geotechnical subsurface evaluation and recommendations for the proposed approximately 65-acre industrial development located on Baker Street in the City of Lake Elsinore, California. The purpose of our study was to evaluate the existing onsite geotechnical conditions and to confirm that the site can be developed from a geotechnical perspective. This report presents the results of our evaluation and geotechnical analysis and provides a summary of our conclusions and recommendations relative to the proposed development of the site.

Should you have any questions regarding this report, please do not hesitate to contact our office. We appreciate this opportunity to be of service.

Sincerely,

LGC Geotechnical, Inc.

Ryan Douglas, GE 3147
Project Engineer

Barry Graham, CEG 2749
Project Geologist

RLD/BPG/BPP/amm

Distribution: (1) Addressee (electronic copy)

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1.0 INTRODUCTION

1.1 Purpose and Scope of Services

This report presents the results of our preliminary geotechnical evaluation for the proposed approximately 65-acre industrial development located along Baker Street in Lake Elsinore, California (Figure 1).

The purpose of our study was to provide a preliminary geotechnical evaluation relative to the proposed industrial development. As part of our scope, we have: 1) reviewed available geotechnical background information including in-house regional geologic maps; 2) performed a subsurface geotechnical evaluation in the area of the proposed development; 3) performed laboratory testing of select soil samples obtained during our subsurface evaluation; 4) incorporated field and laboratory data into our analysis; and 5) prepared this preliminary geotechnical summary report presenting our findings, preliminary conclusions and recommendations for the development of the proposed project.

The findings, conclusions, and recommendations presented herein should be considered preliminary and will need to be confirmed/updated as part of a future 40-scale grading plan review report. Additional fieldwork and laboratory testing may be required. It should be noted that LGC Geotechnical does not provide environmental consulting services and did not address the environmental conditions of the subject site.

1.2 Project Description

The subject property is located on an approximately 65-acre site along the southwest side of Baker Street, in the city of Lake Elsinore, California (Figure 1). Site elevations range from approximately 1,392 in the southwest portion of the site to approximately 1,260 in the northeast portion of the site. The site is mostly undeveloped with one existing structure in the eastern portion of the site. The site is covered by low lying vegetation and manmade (dirt) trails throughout.

The proposed development will include grading and construction of two industrial buildings totaling approximately 1,000,000 square feet, associated drive aisles, retaining walls, and parking areas (RGA, 2023). The proposed grading will include cutting into the hillsides on the southwest portion of the site. The proposed cut slopes will be up to approximately 70 feet tall. Proposed slope inclinations will be at 2:1 (horizontal to vertical) inclinations or flatter. Retaining walls are proposed along all sides of the site. One approximately 45-foot-tall retaining wall is proposed along the southwest portion of the site (KWC, 2024). The proposed industrial buildings are anticipated to be at-grade concrete tilt-up structures with estimated maximum column and wall loads of approximately 150 kips and 10 kips per linear foot, respectively. Please note no structural loads were provided to us at the time of this report.

The preliminary recommendations given in this report are based upon the provided preliminary grading information and the estimated structural loads as indicated above. We understand that the project plans are currently being developed at this time. LGC

Geotechnical should be provided with updated project plans and the actual structural loads when they become available, in order to either confirm or modify the recommendations provided herein. This may include, but is not limited to, additional subsurface field work, laboratory testing, and analysis to provide a design level 40-scale grading plan review geotechnical report.

1.3 Field Evaluation

The field portion of our evaluation included excavation of three large-diameter borings, fourteen small-diameter hollow-stem auger borings, and fourteen exploratory test pits.

Three large-diameter, bucket-auger borings (BA-1, BA-1B, and BA-2,) were excavated on the site by Big Johnny & Pam's Drilling under subcontract to LGC Geotechnical (Sheet 1). The maximum depth of the bucket-auger borings was approximately 100 feet below existing grade. The bucket-auger borings were excavated to evaluate the geologic structure of the underlying bedrock materials and to obtain samples for laboratory testing. Samples were obtained at select locations for laboratory testing. The large-diameter boreholes were surface logged during excavation and downhole logged by an engineering geologist in order to obtain structural geologic information. Borings were subsequently backfilled with cuttings and tamped.

Fourteen exploratory hollow-stem borings (HS-1 through HS-8 and I-1 through I-6) were drilled to depths ranging from approximately 3 to 50 feet below existing grades. An LGC Geotechnical engineer observed the drilling operations, logged the borings, and collected soil samples for laboratory testing. The borings were excavated using a track-mounted CME 75 drill rig equipped with both a 6 and 8-inch-diameter hollow-stem auger. Driven soil samples were collected by means of the Standard Penetration Test (SPT) and Modified California Drive (MCD) sampler generally obtained at 2.5 to 5-foot vertical increments. The MCD is a split-barrel sampler with a tapered cutting tip and lined with a series of 1-inch-tall brass rings. The SPT sampler and MCD sampler were driven using a 140-pound automatic hammer falling 30 inches to advance the sampler a total depth of 18 inches. The raw blow counts for each 6-inch increment of penetration were recorded on the boring logs. Bulk samples were also collected and logged at select depths for laboratory testing. At the completion of drilling, the borings were backfilled with the native soil cuttings and tamped. Some settlement of the backfill soils may occur over time.

Fourteen exploratory test pits (TP-1 through TP-14) were excavated utilizing a standard backhoe with a 3-foot bucket in order to estimate removal depths, geologic materials, and obtain samples for laboratory testing. An engineering geologist observed the operation, logged the geotechnical test pits, and collected the soil samples. Subsequent to logging, the test pits were backfilled with native soils and compacted using a compaction wheel. Some settlement of the backfill soils may occur over time.

Infiltration testing was performed within five of the borings (I-2 through I-6) at depths ranging from approximately 3 to 12 feet below existing grade. Please note that infiltration test I-1 was abandoned due to groundwater that was encountered at a depth of approximately 11 feet, prior to the design depth of the infiltration test being reached. Test well installation consisted of placing a 3-inch diameter perforated PVC pipe in each excavated borehole and backfilling the

annulus with crushed rock including the placement of approximately 2 inches of crushed rock at the bottom of each borehole. Infiltration testing was performed in accordance with guidelines set forth by the County of Riverside (2011). The PVC pipes were removed, and the holes were subsequently backfilled with native soils at the completion of testing.

The approximate locations of our borings and test pits are shown on the Preliminary Geotechnical Map (Sheet 1). Boring and test pit logs are presented in Appendix B.

1.4 Laboratory Testing

Representative bulk and driven samples were retained for laboratory testing during our field evaluation. Laboratory testing included in-situ moisture content and in-situ dry density, grain size analysis, Atterberg Limits, expansion index, laboratory compaction, consolidation, direct shear, R-value, and corrosion testing.

The following is a summary of the laboratory test results.

- Dry density of the samples collected ranged from approximately 87 pounds per cubic foot (pcf) to 125 pcf, with an average of 110 pcf. Field moisture contents ranged from approximately 3 percent to 26 percent, with an average of 15 percent.
- Five fines content and sieve analysis tests indicated fines content (passing No. 200 sieve) ranging from 27 to 73 percent. According to the Unified Soils Classification System (USCS), the tested samples are classified as “coarse-grained” and “fine-grained” soil.
- Five Atterberg Limit (liquid limit and plastic limit) tests were performed. Results indicated Plasticity Index values ranging from 22 to 41.
- Two Expansion Index (EI) tests indicated EI values ranging from 71 to 99, corresponding to “Medium” to “High” expansion potential.
- Laboratory compaction testing of two bulk samples indicated a maximum dry density ranging from 113.5 to 116.5 pcf with an optimum moisture content ranging from 12.0 to 14.0 percent.
- One consolidation test was performed on select samples. The deformation versus vertical stress plot is provided in Appendix C.
- Four direct shear tests were performed on select relatively undisturbed and disturbed samples. The plots are provided in Appendix C.
- One R-value test performed on a representative bulk sample indicates an R-value of less than 5. The R-value plot is provided in Appendix C.
- Corrosion testing indicated soluble sulfate contents less than approximately 0.03 percent, chloride contents ranging from 180 to 220 part per million (ppm), pH values ranging from 6.57 to 7.91 and minimum resistivity values ranging from 735 to 1240 ohm-cm.

A summary of the results is presented in Appendix C. The moisture and dry density test results are presented on the boring logs in Appendix B.



LGC Geotechnical, Inc.

FIGURE 1
Site Location Map

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	23160-01
ENG. / GEOL.	RLD / BPG
SCALE	Not to Scale
DATE	January 2024

2.0 GEOTECHNICAL CONDITIONS

2.1 Regional Geology

Regionally, the site is located on the western edge of the Perris Block within the Peninsular Ranges Geomorphic Province of California. The Peninsular Ranges are characterized by steep, elongated valleys that trend west to northwest. The northwest-trending topography is controlled by the Elsinore fault zone, which extends from the San Gabriel River Valley southeasterly to the United States/Mexico border. The Santa Ana Mountains lie along the western side of the Elsinore fault zone, while the Perris Block is located along the eastern side of the fault zone. The mountainous regions are underlain by Pre-Cretaceous, metasedimentary and metavolcanic rocks and Cretaceous plutonic rocks of the Southern California Batholith. Tertiary and Quaternary rocks are generally comprised of non-marine sediments consisting of sandstone, mudstones, conglomerates, and occasional volcanic units.

The site is not located within a mapped State of California Earthquake Fault-Rupture Hazard Zone per compiled maps released by the CGS (2018), nor a County of Riverside Fault Zone (Riverside County, 2019) and no known active or potentially active faults cross the site.

2.2 Site Specific Geology

Based on our field investigation and review of available geologic maps and reports, the primary bedrock unit underlying the site is the Tertiary Silverado Formation. Surficial units consisting of undocumented artificial fill, topsoil, colluvium, and alluvium overlie the bedrock. A brief description of the geologic units on the site is presented below and their approximate lateral extents are provided on the Preliminary Geotechnical Map (Sheet 1).

2.2.1 Undocumented Artificial Fill (afu)

Few relatively thin zones of undocumented artificial fill were observed in the northern portion of the site. Undocumented fill was not mapped across most of the site apart from an observed trash and soil pit approximately 9 feet in depth, located adjacent an old building pad (see TP-7, Appendix B and Sheet 1 Preliminary Geotechnical Map). The undocumented fill, as observed, consisted of loose, dry, sandy silt with some trash and debris. The undocumented fill is considered potentially compressible and will need to be removed as it is encountered throughout the site to competent formational material. Although the observed undocumented fill was found to be on the order of 9 feet, deeper undocumented fill requiring deeper removals may be encountered during site grading.

2.2.2 Topsoil/Colluvium (Qcol)

A relatively thin veneer of topsoil/colluvium mantles much of the site. Topsoil and colluvium were not mapped across most of the site due to their relatively thin nature (less than 1-2 feet) and variable lateral extent. However, a thicker area of colluvium (up to 15

feet) was mapped in the southeast portion of the site. The topsoil/colluvium, as observed, consists predominantly of red brown-to-light brown, dry to moist, loose to medium dense silty to clayey sand to sandy clay. These soils are typically massive, porous and contain scattered roots and organics. The topsoil/colluvium is considered potentially compressible and will need to be removed to competent formational material in areas of proposed development. The potentially compressible topsoil is estimated to be approximately 1 to 2 feet in thickness in the hillside portions of the site. Topsoil/colluvium soils on the lower portions of the hillsides and on the margins of the onsite drainages can be expected to be up to approximately 15 feet in thickness. However, deeper removals may be encountered during site grading.

2.2.3 Quaternary Alluvium (Map Symbol: Qal)

Quaternary-aged alluvium is present throughout the low-lying areas of the site. The areas underlain by alluvial soils have been mapped on the Preliminary Geotechnical Map (Sheet 1). These soils typically consist of brown, dry to very moist, medium dense silty sand and very stiff silt and clay with varying amounts of sand and gravel. The upper portion of the alluvium is porous and usually contains localized zones of moderate to abundant roots and other organic matter. The upper portion of the alluvium is considered potentially compressible and will need to be removed to competent alluvium or formational material in areas of proposed development. In general, unsuitable alluvial removals are estimated to be up to approximately 8 feet below the surface. However, deeper removals may be encountered during site grading.

2.2.4 Tertiary Silverado Formation (Map Symbol: Tsi)

The Santiago Formation was deposited in a shallow marine and a non-marine environment. Typically, this material consists of sandstone, siltstone, claystone and some cobble conglomerate. The Silverado Formation can also locally include clay, carbonaceous shale, and lignite beds. The majority of the Silverado Formation material encountered during our subsurface investigation of the site consisted of moderately bedded to massive material dipping predominantly to the south (~ 5 to 30 degrees). Minor amounts of what may be Quaternary Pauba formation "fanglomerate" material was encountered at the top of the northeast trending ridgelines but were not differentiated for the purposes of this report.

2.3 Geologic Structure

The Silverado Formation was found to be moderate to massively bedded, generally dipping variably to the south (~ 5 to 30 degrees). Some thicker units of siltstone interbedding were found predominately within LGC-BA-2, dipping moderately into slope (15-30 degrees). Some polished surfaces confined within siltstone beds indicate some internal tectonic shearing within the unit. A continuous clay bed up to ¼" thick was found dipping approximately 20 degrees to the south within boring LGC-BA-1B. In general, bedding was found to be consistent with information found on the regional geologic maps (USGS, 2003).

2.4 Groundwater

Groundwater was encountered at depths ranging from approximately 11 to 45 feet below existing grade. Based on nearby groundwater wells, elevation of the nearby creek bottom approximately 750 feet northeast of the site, and groundwater data gathered during our subsurface evaluation, historic high groundwater is estimated to be approximately 10 feet below existing grade.

Seasonal fluctuations of groundwater elevations should be expected over time. In general, groundwater levels fluctuate with the seasons and local zones of perched groundwater may be present within the near-surface deposits due to local seepage or during rainy seasons. Local perched groundwater conditions or surface seepage may develop once site development is completed and landscape irrigation commences.

2.5 Preliminary Field Infiltration Testing

Estimation of infiltration rates was performed in general accordance with guidelines set forth by the County of Riverside (2011). In general, 3-inch diameter perforated PVC pipes were placed in each borehole to be tested and the annulus was backfilled with gravel, including placement of about 2 inches of gravel at the bottom of the borehole. The infiltration wells were pre-soaked prior to testing. Based on the County of Riverside methodology, the calculated (observed) infiltration rates are provided in Table 1. The observed infiltration rates are considered representative of the site soils where tested. These observed infiltration rates do not include any factor of safety. Observed infiltration rates have been normalized to correct the 3-Dimensional flow that occurs within the field test to 1-Dimensional flow out of the bottom of the boring. The approximate infiltration test locations are shown on the Preliminary Geotechnical Map (Sheet 1) and the infiltration test data is summarized in Table 1. Infiltration test results are provided in Appendix E. Please note that infiltration test I-1 was abandoned due to groundwater that was encountered at a depth of approximately 11 feet, prior to reaching the design depth of the infiltration test.

TABLE 1

Summary of Infiltration Testing

Infiltration Test Location	Infiltration Test Depth Below Existing Grade (ft)	Observed Infiltration Rate* (Inch/Hr.)
I-2	3	0.01
I-3	10	0.02
I-4	3	0.07
I-5	12	0.01
I-6	3	0.14

*Normalized to One-Dimensional Flow, does not include any Factor of Safety.

The tested infiltration rates provided in this report are considered a general representation of the infiltration rates at the location of the infiltration boring. Please note, the testing of infiltration rates is highly dependent upon the materials encountered at the point of testing (i.e., location and depth of testing). Varying subsurface conditions may exist outside of the test locations which could alter the calculated infiltration rates indicated above. Please refer to Section 5.14 for preliminary subsurface water infiltration recommendations.

2.6 Seismicity and Faulting

California is located on the boundary between the Pacific and North American Lithospheric Plates. The average motion along this boundary is on the order of 50-mm/yr. in a right-lateral sense. The majority of the motion is expressed at the surface along the northwest trending San Andreas Fault Zone with lesser amounts of motion accommodated by sub-parallel faults located predominantly west of the San Andreas including the Elsinore, Newport-Inglewood, Rose Canyon, and Coronado Bank Faults. Within Southern California, a large bend in the San Andreas Fault north of the San Gabriel Mountains has resulted in a transfer of a portion of the right-lateral motion between the plates into left-lateral displacement and vertical uplift. Compression south and west of the bend has resulted in folding, left-lateral, reverse thrust faulting, and regional uplift creating the east-west trending Transverse Ranges and several east-west trending faults. Further south within the Los Angeles Basin, "blind thrust" faults are believed to have developed below the surface also as a result of this compression, which have resulted in earthquakes such as the 1994 Northridge event along faults with little to no surface expression.

Prompted by damaging earthquakes in Northern and Southern California, State legislation and policies concerning the classification and land-use criteria associated with faults have been developed. The Alquist-Priolo Earthquake Fault Zoning Act was implemented in 1972 to prevent the construction of urban developments across the trace of active faults. California Geologic Survey Special Publication 42 was created to provide guidance for following and implementing the law requirements. Special Publication 42 was most recently revised in 2018 (CGS, 2018). According to the State Geologist, an "active" fault is defined as one which has had surface displacement within Holocene time (roughly the last 11,700 years). Regulatory Earthquake Fault Zones have been delineated to encompass traces of known, Holocene-active faults to address hazards associated with surface fault rupture within California. Where developments for human occupation are proposed within these zones, the state requires detailed fault evaluations be performed so that engineering-geologists can identify the locations of active faults and recommend setbacks from locations of possible surface fault rupture.

The subject site is not located within a State of California Earthquake Fault-Rupture Hazard Zone (CGS, 2018), nor a County of Riverside Fault or Fault Zone (Riverside County, 2019), and there are no known active or potentially active faults known to cross the site. Therefore, the possibility of damage due to ground rupture is considered low since no active faults are known to cross the site. The closest known active fault zones are the Elsinore (approximately 0.8 miles away) and San Jacinto (approximately 19 miles away) fault zones.

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the Southern California region which may affect the site include ground lurching and shallow

ground rupture, soil liquefaction, dynamic settlement, seiches, and tsunamis. These secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and causative fault and the onsite geology. A discussion of these secondary effects is provided in the following sections.

2.6.1 Liquefaction and Dynamic Settlement

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions coexist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Studies indicate that saturated, loose near-surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential. In general, cohesive soils are not considered susceptible to liquefaction, depending on their plasticity and moisture content (Bray & Sancio, 2006). Effects of liquefaction on level ground include settlement, sand boils, and bearing capacity failures below structures. Dynamic settlement of dry loose sands can occur as the sand particles tend to settle and densify as a result of a seismic event.

Portions of the site, near Baker Street and Pierce Street, are located within a zone of low to moderate liquefaction potential based on the Riverside County liquefaction zones map (County, 2023). The site will ultimately consist of compacted fill over dense sandy and hard clayey materials, which are not considered susceptible to liquefaction. The potential for liquefaction is considered very low.

2.6.2 Lateral Spreading

Lateral spreading is a type of liquefaction-induced ground failure associated with the lateral displacement of surficial blocks of sediment resulting from liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluid mass, gravity plus the earthquake inertial forces may cause the mass to move downslope towards a free face (such as a river channel or an embankment). Lateral spreading may cause large horizontal displacements and such movement typically damages pipelines, utilities, bridges, and structures.

Due to very low potential for liquefaction the potential for lateral spreading is considered very low.

2.7 Rippability

In general, the onsite surficial materials, such as undocumented fill, topsoil, colluvium, and alluvium are anticipated to be easily to moderately rippable utilizing conventional heavy-duty earth moving equipment (Caterpillar D9 or equivalent). Based on our hollow-stem auger borings and bucket auger borings that were located in areas that are proposed to have some of

the deepest cuts throughout the site, we anticipate the bedrock (Silverado Formation) to be moderately difficult to difficult to excavate. Localized areas of the bedrock may be very difficult to excavate but are anticipated to be able to be excavated utilizing a multi-shank ripper (Caterpillar D9) or equivalent method.

2.8 Oversized Material

Oversized material (material larger than 8 inches in maximum dimension) should be expected during site grading. When encountered, these materials will require special handling during grading which may include offsite disposal, crushing/breaking, or incorporating oversized materials into "rock fills" to meet project requirements. See Appendix F for more details.

2.9 Expansive Soil Characteristics

Laboratory test results indicate that site soils should be anticipated to have "Medium" to "High" expansion potential. Final expansion potential of site soils should be determined at the completion of grading.

3.0 ENGINEERING ANALYSES

3.1 Seismic Parameters for Structural Design

The site seismic characteristics were evaluated per the guidelines set forth in Chapter 16, Section 1613 of the 2022 California Building Code (CBC) and applicable portions of ASCE 7-16 which has been adopted by the CBC. Please note that the following seismic parameters are only applicable for code-based acceleration response spectra and are not applicable for where site-specific ground motion procedures are required by ASCE 7-16. Representative site coordinates of latitude 33.6977 degrees north and longitude -117.3599 degrees west were utilized in our analyses. The maximum considered earthquake (MCE) spectral response accelerations (S_{MS} and S_{M1}) and adjusted design spectral response acceleration parameters (S_{DS} and S_{D1}) for Site Class C are provided in Table 2 below. The structural designer should contact the geotechnical consultant if structural conditions (e.g., number of stories, seismically isolated structures, etc.) require site-specific ground motions.

Section 1803.5.12 of the 2022 CBC (per Section 11.8.3 of ASCE 7) states that the maximum considered earthquake geometric mean (MCE_G) Peak Ground Acceleration (PGA) should be used for liquefaction potential. The PGA_M for the site is equal to 1.175g (SEAOC, 2023). The design PGA is equal to 0.783g (2/3 of PGA_M). The design PGA is applicable for retaining wall design.

A deaggregation of the PGA based on a 2,475-year average return period (MCE) indicates that an earthquake magnitude of 6.70 at a distance of 3.57 km from the site would contribute the most to this ground motion. A deaggregation of the PGA based on a 475-year average return period (Design Earthquake) indicates that an earthquake magnitude of 6.62 at a distance of 5.79 km from the site would contribute the most to this ground motion (USGS, 2014).

TABLE 2

Structural Seismic Design Parameters

Selected Parameters from 2022 CBC, Section 1613 - Earthquake Loads	Seismic Design Values	Notes/Exceptions
Distance to applicable faults classifies the site as a "Near-Fault" site.		Section 11.4.1 of ASCE 7
Site Class	C	Chapter 20 of ASCE 7
Ss (Risk-Targeted Spectral Acceleration for Short Periods)	2.306g	From SEAOC, 2023
S_1 (Risk-Targeted Spectral Accelerations for 1-Second Periods)	0.822g	From SEAOC, 2023
F_a (per Table 1613.2.3(1))	1.200	For Simplified Design Procedure of Section 12.14 of ASCE 7, F_a shall be taken as 1.4 (Section 12.14.8.1)
F_v (per Table 1613.2.3(2))	1.400	-
S_{MS} for Site Class C [Note: $S_{MS} = F_a S_S$]	2.767g	-
S_{M1} for Site Class C [Note: $S_{M1} = F_v S_1$]	1.151g	-
S_{DS} for Site Class C [Note: $S_{DS} = (^2/_3) S_{MS}$]	1.845g	-
S_{D1} for Site Class C [Note: $S_{D1} = (^2/_3) S_{M1}$]	0.767g	-
C_{RS} (Mapped Risk Coefficient at 0.2 sec)	0.896	ASCE 7 Chapter 22
C_{R1}(Mapped Risk Coefficient at 1 sec)	0.892	ASCE 7 Chapter 22

3.2 Soil Shear Strength Parameters

The soil shear strength parameters utilized in our slope stability analysis are primarily based on laboratory testing of the onsite materials. The shear strength of the along clay bedding was estimated from Atterberg Limits tests from clay materials obtained during downhole logging from our recent field evaluation (Stark, 2012). Where appropriate, soil shear strength parameters were increased for seismic loading conditions. Laboratory test results are provided in Appendix C.

TABLE 3

Soil Shear Strength Parameters

Soil Type	Static		Pseudo Static	
	ϕ (Degrees)	Cohesion (psf)	ϕ (Degrees)	Cohesion (psf)
Artificial Fill	32	100	32	200
Silverado Formation – Across Bedding	33	350	34	600
Silverado Formation – Clay Beds	18	100	18	200

3.3 Slope Stability Analyses

Slope stability analysis was performed for Cross Sections A-A,' B-B' and C-C.' This slope stability analysis was performed along a typical section of the relatively large slope and retaining wall combination in the western portion of the site (A-A'), the largest retaining wall height with an ascending slope behind it (B-B') and the largest cut slope within the southern portion of the site (C-C').

Slope stability analysis was performed using the computer program GEOSTASE, version 4.30.31 (Gregory Geotechnical Software, 2019). Potential block and rotational failure modes were analyzed using Janbu's Simplified Method and Bishop's Modified Method, respectively.

A minimum factor of safety of 1.5 is typically required for static loading conditions. Seismic slope stability analysis was performed in accordance with Special Publication 117A (CGS, 2008). Special Publication 117A requires a "screening" slope stability calculation based on modified horizontal seismic coefficient (Kh) derived from site-specific seismic parameters (i.e., Design PGA, earthquake magnitude and distance) based on a 15-cm threshold. If the resulting calculated factor of safety is equal to or greater than 1.0, the analysis passes the screening calculation and no further analysis is required. If the calculated factor of safety is less than 1.0, a displacement analysis is required in order to assess estimated slope movement during a seismic event. Based on the design peak ground acceleration of 0.783g, a horizontal seismic coefficient (Kh) of 0.261 was determined for a 15-cm threshold, see Appendix D.

Based on our slope stability analysis the site should be considered stable. Although, the slope stability analysis for Section B-B' indicated a single row of tieback anchors for the taller portions of the proposed soil nail retaining wall would be necessary to globally stabilize the slope and to construct the soil nail retaining wall. For this reason, we recommend the retaining wall at Cross Section B-B' be constructed as a soil nail retaining wall with one row of tiebacks anchors at the top of the retaining wall. Refer to Appendix D for preliminary results and Section 5.3 for preliminary tieback recommendations. Preliminary soil nail retaining wall recommendations are provided in Section 5.8. Updated design level analysis and recommendations should be provided during a 40-scale grading plan review evaluation. Preliminary slope stability analysis is provided in Appendix D.

3.4 Surficial Stability Analysis

A general surficial slope stability analysis was performed for the maximum proposed 2:1 (horizontal to vertical) cut slopes assuming a zone of saturation of 4-feet-deep parallel to the slope surface. The analysis indicated a surficial factor of safety greater than 1.5. Refer to Appendix D.

4.0 CONCLUSIONS

Based on the results of our geotechnical evaluation, it is our opinion that the proposed site development is feasible from a geotechnical standpoint, provided the following conclusions and recommendations are incorporated into the site design, grading, and construction.

The following is a summary of the primary geotechnical factors which may affect future development of the site.

- The near-surface loose and compressible soils are not suitable for the planned improvements in their present condition (refer to Section 5.1).
- Groundwater was encountered at depths ranging from approximately 11 to 45 feet below existing grade. Based on nearby groundwater wells and elevation of the nearby creek bottom approximately 750 feet northeast of the site, historic high groundwater should be expected to be found at approximately 10 feet below existing grade.
- The subject site is not located within a State of California Fault Rupture Hazard Zone and there are no known active or potentially active faults onsite (CGS, 2018). The possibility of damage due to ground rupture is considered low since no active faults are known to cross the site.
- The main seismic hazard that may affect the site is from ground shaking from one of the active regional faults. The subject site will likely experience strong seismic ground shaking during its design life.
- The site is located in a mapped zone for low to moderate liquefaction potential (County, 2023). However, due to the site ultimately consisting of compacted fill over dense/hard native materials, the potential for liquefaction is considered very low.
- It should be noted that the site contains clayey soils with high fines content and expansion potential that are not suitable for backfill of retaining walls. Therefore, select grading and stockpiling or import of select sandy soils meeting project requirements will be required.
- Site soils should be considered to have “Medium” to “High” expansion potential. Mitigation measures are required for foundations and site improvements like concrete flatwork to minimize the impacts of expansive soils.
- Pre-soaking of the subgrade for at-grade building slabs and flatwork will be required due to site expansive soils. The duration of this process varies greatly based on the chosen method and is also dependent on factors such as soil type and weather conditions. Time duration for presoaking should be accounted for in the construction schedule (typically, two to three weeks for high expansion). Additional time at the completion of presoaking may be necessary for the surface soils of the pad to dry back sufficiently to be capable of supporting trenching equipment.
- Preliminary rippability analysis suggest the onsite surficial materials, such as undocumented fill, topsoil, colluvium, and alluvium are anticipated to be easily to moderately rippable utilizing conventional heavy-duty earth moving equipment (Caterpillar D9 or equivalent). We anticipate the bedrock (Silverado Formation) to be moderately difficult to difficult to excavate. Localized areas of the bedrock may be very difficult to excavate but are anticipated to be able to be excavated utilizing a multi-shank ripper (Caterpillar D9) or equivalent method.
- From a geotechnical perspective, the existing onsite soils are considered suitable material for use as general fill (with the exception for retaining wall backfill), provided that they are relatively free

from rocks (larger than 8 inches in maximum dimension), construction debris, and significant organic material. Moisture conditioning of site soils will be required to obtain the required compaction.

- Oversized materials (greater than 8-inches in maximum dimension) should be anticipated to be generated during grading. These materials will require special handling during grading which may include offsite disposal, crushing/breaking, and/or specialty placement in deep fills to meet project requirements.
- Design cut and fill slopes are anticipated to be both grossly and surficially stable, as long as they are constructed in accordance with our geotechnical recommendations contained herein and are properly landscaped and maintained. Detailed slope stability analysis and recommendations should be provided in a future 40-scale grading plan review report.

Please note that the conclusions and recommendations contained herein are based on preliminary subsurface conditions, which have been interpreted from a limited number of subsurface excavations. These conclusions and recommendations should be verified during site grading and adjusted according to the actual exposed field conditions.

5.0 PRELIMINARY RECOMMENDATIONS

The following recommendations are to be considered preliminary and should be confirmed upon completion of grading and earthwork operations. In addition, they should be considered minimal from a geotechnical viewpoint, as there may be more restrictive requirements from the architect, structural engineer, building codes, governing agencies, or the owner.

It should be noted that the following geotechnical recommendations are intended to provide sufficient information to develop the site in general accordance with the 2022 CBC requirements. With regard to the possible occurrence of potentially catastrophic geotechnical hazards such as seismic shaking, earthquake-induced landslides, liquefaction, etc. the following geotechnical recommendations should provide adequate protection for the proposed development to the extent required to reduce seismic risk to an "acceptable level." The "acceptable level" of risk is defined by the California Code of Regulations as "that level that provides reasonable protection of the public safety, though it does not necessarily ensure continued structural integrity and functionality of the project" [Section 3721(a)]. Therefore, repair and remedial work of the proposed improvements may be required after a significant seismic event. With regards to the potential for less significant geologic hazards to the proposed development such as expansive soils, fill settlement, groundwater seepage, etc., the recommendations contained herein are intended as a reasonable protection against potential damaging effects. It should be understood, however, that our recommendations are intended to maintain the structural integrity of the proposed development and structures given the site geotechnical conditions but cannot preclude the potential for some cosmetic distress or nuisance issues to develop as a result of the site geotechnical conditions.

The geotechnical recommendations contained herein must be confirmed to be suitable or modified based on the actual conditions encountered during grading and construction.

5.1 Site Earthwork

We anticipate that earthwork at the site will consist of required earthwork removals, fill placement, subgrade preparation, precise grading, and construction of the proposed improvements.

We recommend that earthwork onsite be performed in accordance with the following recommendations, the 2022 CBC, the City of Lake Elsinore Grading Requirements, and the General Earthwork and Grading Specifications for Rough Grading included in Appendix F. In case of conflict, the following recommendations shall supersede all previous recommendations and those included as part of Appendix F. The following recommendations should be considered preliminary and may be revised based upon future evaluation and review of the project plans and/or based on the actual conditions encountered during site grading/construction.

5.1.1 Site Preparation

Prior to grading of areas to receive structural fill or engineered improvements, the areas should be cleared of existing building structures, asphalt, surface obstructions, vegetation,

topsoil, and demolition debris. Vegetation, trash, and debris should be removed and properly disposed of off-site. Holes resulting from the removal of buried obstructions, which extend below proposed finish grades, should be replaced with suitable compacted fill material. Any abandoned sewer or storm drain lines should be completely removed and replaced with properly placed compacted fill. Deeper demolition may be required in order to remove existing foundations. We recommend the trenches associated with demolition which extend below the remedial grading depth be backfilled and properly compacted prior to the demolition contractor leaving the site.

If cesspools or septic systems are encountered, they should be removed in their entirety. The resulting excavation should be backfilled with properly compacted fill soils. As an alternative, cesspools or septic systems can be backfilled with lean sand-cement slurry. Any encountered wells should be properly abandoned in accordance with regulatory requirements. At the conclusion of the clearing operations, a representative of LGC Geotechnical should observe and accept the site prior to further grading.

5.1.2 Remedial Grading

In order to provide a relatively uniform bearing condition for the planned improvements, we recommend the site soils be temporarily removed and recompacted as fill. Existing undocumented artificial fill, residual soils, topsoil, unsuitable portions of colluvial and old alluvial fan deposits, and weathered bedrock within the zone of influence of the proposed structures shall be removed to suitable, competent native materials prior to placement of fill to design grades. These unsuitable soils that are removed will then be placed as compacted fill once a suitable bottom is encountered. Updated remedial grading recommendations should be provided in the future 40-scale grading plan review report.

Building Areas: For preliminary planning purposes, estimated removal and recompaction depths range from approximately 5 to 9 feet below existing grade; however, deeper removal and recompaction may be required during grading. Preliminary estimated depths of temporary removal and recompaction are depicted on the Preliminary Geotechnical Map (Sheet 1). We recommend a minimum removal and recompaction depth of 5 feet below existing grade in design fill conditions for areas not identified on the Preliminary Geotechnical Map within the building influence.

Pavement and Hardscape Areas: Within pavement and hardscape areas, temporary removal and recompaction should extend to a depth of at least 2 feet below existing grade or 2 feet below the bottom of the pavement section, whichever is deeper. Pavement areas encountering undocumented fill materials may require deeper removal and recompaction and should be determined based on the conditions exposed during grading. In general, the envelope for removal and recompaction should extend laterally a minimum lateral distance of 2 feet beyond the edges of the proposed pavement or hardscape improvements.

It should be noted that over-excavation is recommended in design cut areas (see Section 5.1.3). In addition, local conditions may be encountered during excavation that could

require additional removals beyond the above-noted minimum in order to obtain an acceptable subgrade. The actual depths and lateral extents of grading will be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Removal areas should be accurately staked in the field by the Project Surveyor. Please note that perched groundwater may be encountered at localized areas during grading.

5.1.3 Over-Excavation of Pads and Streets

In order to provide a uniform fill blanket beneath proposed structures, it is recommended that design cut, and cut/fill transition pads be over-excavated a minimum of 4 feet below ultimate finish pad grade, or a minimum of 2-feet below planned footings, whichever is greater. A maximum 2:1 differential fill thickness, up to a maximum over-excavation depth of 15 feet, underneath the industrial buildings should be maintained in order to reduce the potential for future differential settlement. Over-excavation should extend laterally a minimum of 5 feet beyond proposed building footprints. The bottom of the over-excavation should be graded to flow towards deeper fill areas. The over-excavated material should then be replaced by compacted fill material to design grade.

It may be desirable to over-excavate the parts of the site where deeper utilities are planned in the building and street areas and replace the excavated material with compacted fill during mass grading rather than facing potentially difficult excavation during excavation for utility placement with lighter equipment.

As a minimum, streets in design cut should be over-excavated a minimum of 2 feet below subgrade elevations. Scattered zones of oversize materials should be anticipated in utility trenches within design cut areas.

Over-excavations/undercuts must be confirmed and mapped by the geotechnical consultant prior to subsequent fill placement. The actual depth and lateral extents of over-excavation should be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Over-excavation areas should be accurately staked in the field by the Project Surveyor. Please note that some estimated removals in the existing alluvial areas of the site may extend deeper than the recommended over-excavation in order to remove unsuitable materials (see Removals Section 5.1.2). Updated overexcavation recommendations should be provided in the future 40-scale grading plan review report.

5.1.4 Temporary Excavations

Temporary excavations should be performed in accordance with project plans, specifications, and all Occupational Safety and Health Administration (OSHA) requirements. Temporary excavations should be laid back or shored in accordance with OSHA requirements before personnel or equipment are allowed to enter. Temporary excavations on the order of 30 feet or less should be sloped back to 1:1 or flatter or be properly shored. Temporary excavations greater than approximately 30 feet should be

sloped back to 1.5:1 or flatter. Conditions should be regularly evaluated during construction to verify conditions are as anticipated. The contractor shall be responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination with the geotechnical consultant should be maintained to facilitate construction while providing safe excavations. Excavation safety is the sole responsibility of the contractor.

Vehicular traffic, stockpiles, and equipment storage should be set back from the perimeter of excavations a distance equivalent to a 1:1 projection from the bottom of the excavation. Once an excavation has been initiated, it should be backfilled as soon as practical. Prolonged exposure of temporary excavations may result in some localized instability. Excavations should be planned so that they are not initiated without sufficient time to shore/fill them prior to weekends, holidays, or forecasted rain.

It should be noted that any excavation that extends below a 1:1 (horizontal to vertical) projection of an existing foundation will remove existing support of the structure foundation. If requested, temporary shoring parameters will be provided.

5.1.5 Removal Bottoms and Subgrade Preparation

In general, removal bottom areas and any areas to receive compacted fill should be scarified to a minimum depth of 6 inches, brought to a near-optimum moisture condition (generally within optimum and 4 percent above optimum moisture content), and re-compacted per project recommendations.

Removal bottoms and areas to receive fill should be observed and accepted by the geotechnical consultant prior to subsequent fill placement.

5.1.6 Material for Fill

From a geotechnical perspective, the onsite soils are generally considered suitable for use as general compacted fill, provided they are relatively free of organic materials and construction debris and any oversized material (8 inches in greatest dimension).

From a geotechnical viewpoint, any required import soils for general fill (not retaining wall backfill) should consist of clean, soils of Low expansion potential (expansion index 50 or less based on ASTM D4829) or less and no particles larger than 6 inches in greatest dimension. Source samples of planned importation should be provided to the geotechnical consultant for laboratory testing a minimum of 3 working days prior to any planned importation for required laboratory testing.

Retaining wall backfill should consist of sandy soils with a maximum of 35 percent fines (passing the No. 200 sieve) per American Society for Testing and Materials (ASTM) Test Method D1140 (or ASTM D6913/D422) and a "Very Low" expansion potential (EI of 20 or less per ASTM D4829). Soils should also be screened of organic materials, construction debris, and any material greater than 3 inches in maximum dimension. The site contains

soils that are not suitable for retaining wall backfill due to their clay content and expansion potential; therefore, import and/or select grading and stockpiling of select sandy soils will be required by the contractor for obtaining suitable backfill soil. Refer to Figures 2A and 2B.

Aggregate base (crushed aggregate base or crushed miscellaneous base) should conform to the latest requirements of Section 200-2 of the Standard Specifications for Public Works Construction ("Greenbook") for untreated base materials (except processed miscellaneous base) or Caltrans Class 2 aggregate base.

5.1.7 Fill Placement and Compaction

Material to be placed as fill should be brought to a near-optimum moisture condition (generally within optimum and 4 percent above optimum moisture content) and recompacted to at least 90 percent relative compaction (per American Society for Testing and Materials [ASTM] Test Method D1557). Soils will require significant moisture conditioning (either adding water or drying back) in order to achieve adequate compaction. Soils are present that will require additional moisture in order to achieve the required compaction. Drying and/or mixing the very moist soils may also be required prior to reusing the materials in compacted fills.

The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts not exceeding 8 inches in compacted thickness. Each lift should be thoroughly compacted and accepted prior to subsequent lifts. Generally, placement and compaction of fill should be performed in accordance with local grading ordinances and under the observation and testing performed by the geotechnical consultant. Any encountered oversized material as previously defined must be appropriately handled (Appendix F).

Fill placed on any slopes greater than 5:1 (horizontal to vertical) should be properly keyed and benched into firm and competent soils as it is placed in lifts. During backfill of excavations, the fill should be properly benched into firm and competent soils of temporary backcut slopes as it is placed in lifts.

Aggregate base material should be compacted to a minimum of 95 percent relative compaction at or slightly above optimum moisture content per ASTM D1557. Subgrade below aggregate base should be compacted to a minimum of 90 percent relative compaction per ASTM D1557 at near-optimum moisture content (generally within optimum and 4 percent above optimum moisture content).

If gap-graded ¾-inch rock is used for backfill (around storm drain storage chambers, retaining wall backfill, etc.) it will require compaction. Rock shall be placed in thin lifts (typically not exceeding 6 inches) and mechanically compacted with observation by geotechnical consultant. Backfill rock shall meet the requirements of ASTM D2321. Gap-graded rock is required to be wrapped in filter fabric (Mirafi 140N or approved alternative) or at the very minimum to be vertically separated from the trench backfill with filter fabric to prevent the migration of fines into the rock backfill.

5.1.7.1 Oversized Placement

The "rock blanket fill" method for placement of oversized rock greater than 8 inches and up to 36 inches may be performed within sufficiently deep areas that are laterally extensive, generally deeper than 10 feet below finish grades, and in areas that will not conflict with proposed improvements (e.g., building foundations, underground utilities, etc.).

The total thickness of any single rock blanket layer shall not exceed 36 inches. Rock fill blankets may consist of a mixture of native soils (fines, sand, gravel) and rock to a maximum dimension of 36 inches. In general, rock blankets shall not exceed approximately 50 percent particles greater than 8 inches and shall contain approximately 50 percent or more material that is less than 8 inches in diameter, on a volumetric basis. This may require select grading or temporary stockpiling of materials. During placement and compaction, the rock blanket shall be heavily watered and repeatedly worked with dozers and pneumatic compaction equipment (or approved equivalent) so that the resulting fill is comprised of a mixture of the various particle sizes (not gap graded), is without significant voids, and forms a dense, compact fill matrix. A relatively large amount of water must be provided continuously during these operations.

Upon the completion of a 3-foot rock blanket, the surface should be generally level, compacted, moisture conditioned, and accepted by LGC Geotechnical prior to the placement of the next rock blanket or rock windrow.

The contractor shall periodically excavate test pits within the recently completed rock blanket at various random locations selected by the geotechnical consultant. These test pits will be used to either pass or fail the rock blanket fill.

Additional recommendations for construction of rock blankets will be provided by LGC Geotechnical based on observed field conditions. The construction of a rock blanket fill shall be continuously observed by LGC Geotechnical.

Disposal of oversized rock (greater than 36 inches in diameter) within sufficiently deep fill areas shall be performed using the windrow method. Windrowing of oversized rock shall be done in accordance with the "Oversize and Disposal Detail" in Appendix F.

5.1.8 Trench and Retaining Wall Backfill and Compaction

Bedding material used within the pipe zone should conform to the requirements of the current Greenbook and the pipe manufacturer. Where applicable, sand having a sand equivalent (SE) of 20 or greater (per Caltrans Test Method [CTM] 217) may be used to bed and shade the pipes within the bedding zone. Sand backfill should be densified by jetting or flooding and then tamped to ensure adequate compaction. Bedding sand should be from a natural source, manufactured sand from recycled material is not suitable for jetting. The onsite soils may generally be considered suitable as trench backfill (zone

defined as 12 inches above the pipe to subgrade), provided the soils are screened of rocks greater than 6 inches in maximum dimension, construction debris and organic material. Trench backfill should be compacted in uniform lifts (as outlined above in Section "Material for Fill") by mechanical means to at least 90 percent relative compaction (per ASTM D1557). If gap-graded rock is used for trench backfill, refer to above Section 5.1.7.

Retaining wall backfill should consist of sandy soils as outlined in preceding Section 5.1.6. The limits of select sandy backfill should extend at minimum ½ the height of the retaining wall or the width of the heel (if applicable), whichever is greater (Figures 2A and 2B). Retaining wall backfill soils should be compacted in relatively uniform thin lifts to at least 90 percent relative compaction (per ASTM D1557). Jetting or flooding of retaining wall backfill materials should not be permitted.

In backfill areas where mechanical compaction of soil backfill is impractical due to space constraints, flowable fill such as sand-cement slurry may be substituted for compacted backfill. The slurry should contain about one sack of cement per cubic yard. When set, such a mix typically has the consistency of compacted soil. Sand cement slurry placed near the surface within landscape areas should be evaluated for potential impacts on planned improvements.

A representative from LGC Geotechnical should observe, probe, and test the backfill to verify compliance with the project recommendations.

5.1.9 Preliminary Shrinkage and Bulking

Volumetric changes in earth quantities will occur when excavated onsite earth materials are replaced as properly compacted fill. The following is an estimate of shrinkage and bulking factors for the various geologic units found onsite. These preliminary estimates are based on in-place densities of the various materials and on the estimated average degree of relative compaction achieved during grading.

TABLE 4

Estimated Shrinkage and Bulking

Soil Type	Allowance	Estimated Range
Topsoil/Colluvium/Undocumented Fill	Shrinkage	10% to 20%
Alluvium	Shrinkage	5% to 15%
Silverado Formation	Bulking	0% to 10%

Subsidence due to earthwork equipment is expected to be on the order of 0.1 feet. It should be stressed that these values are only estimates and that actual shrinkage factors are extremely difficult to predict. The effective shrinkage of onsite soils will depend primarily on the type of compaction equipment and method of compaction used onsite by

the contractor. Additionally, the onsite geology is complex; the above estimates are generalized groupings of similar lithologies and should be expected to vary across the site and with depth. The above shrinkage estimates are intended as an aid for others in determining preliminary earthwork quantities. However, these estimates should be used with some caution since they are not absolute values. Contingencies should be made for balancing earthwork quantities based on actual shrinkage and subsidence that occurs during grading. Shrinkage and bulking are also expected to vary with accuracy of the topographic survey and survey accuracy during rough grading.

Updated shrink and bulk estimations should be provided in a future 40-scale grading plan review report.

5.2 Slope Stability

Global slope stability for the site has been evaluated utilizing critical cross sections throughout the site, refer to Appendix D. At this time, design cut slopes are recommended to remain as cut slopes without stabilization keyways except for the southern slope adjacent to the truck trailer parking lot, refer to Cross Section C-C' (Sheet 2). One row of global stabilization tiebacks are proposed for the 45-foot-tall soil nail retaining wall (refer to Cross Section B-B'). Preliminary recommendations for construction of slopes and mitigation systems are presented below.

5.2.1 Fill Slopes

Design fill slopes at the site are anticipated to be both grossly and surficially stable as designed provided they are constructed in accordance with the Standard Earthwork and Grading Specifications (Appendix F) and proper irrigation, landscaping and maintenance is implemented (refer to Section 5.2.4). Fill slopes should be constructed with a maximum slope ratio of 2:1 (horizontal to vertical). Slope faces should also be compacted to minimum project recommendations. This may require overbuilding of the slope face and trimming back to design grades. To improve surficial stability, vegetation specified by the landscape architect should be established on the slope face as soon as it is practical, refer to Section 5.2.4.

5.2.2 Cut Slopes

Cut slopes should be constructed with a maximum slope ratio of 2:1 (horizontal to vertical). All cut slopes should be observed by the engineering geologist during grading. The cut slope near Cross Sections B-B' and C-C' were found to have adverse geologic conditions and the cut slope near Cross Section A-A' was found to have favorable geologic conditions. In general, cut slopes are not anticipated to require stabilization keyways. However, this should be confirmed during a 40-scale grading plan review and in the field during grading.

Modifications to the recommendations presented herein may be necessary and should be based upon conditions exposed in the field at the time of grading. It should be

understood that graded cut slopes with bedrock at the surface may be difficult to plant and may also be prone to surficial stability and erosional issues. Fill over cut slopes should be constructed in accordance with the Standard Earthwork and Grading Specifications included in Appendix F. Recommendations for keyway design and construction can be provided during a 40-scale grading plan review evaluation, if necessary.

5.2.3 Existing Native Slopes

Natural slopes will be left in their existing condition above portions of the site. These slopes will be subject to "natural" phenomena such as erosion, sloughing and surficial instabilities. It is impossible to predict where or when this may happen. Should erosion or slippage occur, it should be promptly repaired. Paramount in reducing the potential for either erosion or slippage is to properly maintain these slopes (refer to Section 5.2.4).

5.2.4 Slope Maintenance Guidelines

We recommend that graded slopes be properly landscaped with deep-rooted drought-tolerant, slope stabilizing vegetation as soon as possible to minimize the potential for erosion and/or other instabilities. Slopes should not be allowed to be bare of vegetation. Landscape vegetation should not be "trimmed" to root structures leaving no protection of the slopes.

Irrigation at the site should be kept at the minimum level to support plant growth, overwatering must be avoided. Future landowners/property managers should be made aware that even though the site has been developed in accordance with the local standard of practice that includes a subdrain system, improper maintenance and particularly significant overwatering or poor surface drainage could possibly lead to a buildup in localized groundwater levels. This may result in nuisance type water-related issues to foundations, flatwork, walls, landscaping improvements, etc., and in extreme cases a decrease in the stability of slopes. To help reduce the potential for excessive erosion of graded slopes we recommend that protective measures be implemented in accordance with the latest City of Lake Elsinore grading ordinances and other governing codes. Design of surface drainage provisions are within the purview of the project civil engineer.

Subdrains and v-ditches must be properly maintained, and their outlets kept free draining and clear of any potential obstructions. Routine maintenance should be performed, especially prior to and during the rainy season. Failure to properly maintain these elements may result in slope failures, slumps, excessive erosion, localized saturated zones, nuisance type water issues, etc.

Any future trenches excavated on a slope face for utility or irrigation lines and/or for any purpose should be properly backfilled and compacted to the slope face. Observation/testing and acceptance by the geotechnical consultant during trench

backfill are recommended.

A program for the elimination of burrowing animals in both native and graded slope areas must be established and properly maintained to protect slope stability by reducing the potential for surface water to penetrate into the soil. Continuous erosion control, rodent control, and maintenance are essential to the long-term stability of all slopes.

5.3 Preliminary Tieback Anchor Retaining Wall Design for Slope Stability Mitigation

The tieback array as modeled is recommended to be spaced horizontally across the top of the proposed soil nail retaining wall near Cross Section B-B' (refer to Appendix D). Preliminary tieback anchor design parameters are shown below, corresponding to the slope stability analysis Cross Section B-B.' Waler reaction walls for the tieback anchor system should be assumed. Design of the waler reaction walls should be determined during our future 40-scale geotechnical evaluation, and by the tieback anchor system designer.

Summary of preliminary Tieback Anchor Design Parameters:

- Design Load: 300 kips
- Center to Center Horizontal Spacing: 5 feet
- Unbonded Length: 50 feet
- Allowable Bond Stress: 30 psi (with post-grouting)
- Approximate Angle from Horizontal: 30 degrees
- Bonded Length: 35 feet
- Tieback Anchor Diameter: 8 inches

In general, the obtained capacity of post-grouted tieback anchors is primarily a function of construction methods and experience of the specialty contractor along with local site conditions. The capacity of tieback anchors may ultimately be determined through a performance specification. It is the contractor's responsibility to obtain the required pullout capacity, which may require extensive post grouting and/or field modifications.

The design PGA applicable for tieback anchor design per the 2022 CBC is provided in Section 3.1. Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. Typically, a tieback anchor wall is provided with a composite drainage mat (e.g., Miradrain, etc.) installed between the temporary facing and the excavation and collected at the wall bottom and properly outletted to a suitable discharge point per the project civil engineer.

5.3.1 Testing of Tieback Anchors

Tiebacks should be tested to a minimum of 1.33 times the design load and meet the requirements of the Post Tensioning Institute Manual for soil anchors (PTI, 2014). The first two or three anchors, as determined by the engineer, should be performance tested. Thereafter, a minimum of 2 percent of remaining anchors should be performance tested. In addition, extended creep tests should be performed on at least two anchors per the PTI

manual. Tieback anchor testing should be performed by the contractor and observed by LGC Geotechnical. Project plans should clearly indicate required tieback testing criteria, including required loading increments and acceptance criteria.

The contractor shall provide all necessary test equipment, including an independent fixed reference point (i.e., tripod) for placement of the dial gauge for measuring anchor deflections during tensioning. Dial gauge measuring anchor deflections should read to 0.001-inch and have sufficient travel distance required for the entire test. A minimum of two working days prior to testing, the contractor shall supply current (i.e., within the last 9 months) calibration records from an approved testing laboratory of the hydraulic jack and gauges to be used for anchor tensioning/testing. Calibration certificates and graphs should be available at the job site.

5.4 Foundation Recommendations

Provided that the remedial grading recommendations provided herein are implemented, the site may be considered suitable for support of the structure using a conventional foundation system designed to resist the impacts of expansive soils. Please note that the following foundation recommendations are preliminary and must be confirmed by LGC Geotechnical at the completion of grading.

5.4.1 Preliminary Foundation Design Parameters

In consideration of site expansive soils, the following preliminary recommendations may be used:

- Minimum Footing Depth: 24 inches below lowest adjacent grade.
- Minimum Slab Thickness: 7 inches (Structural conditions may govern)
- Minimum Slab Reinforcement: No. 4 bars at maximum 18-inches on-center each way (Structural conditions may govern)
- Slab Subgrade Options:
    - Moisture-condition (presoak) slab subgrade to 140% of optimum moisture content to a minimum depth of 24 inches prior to trenching.
    - Alternatively, the upper 3 feet of the building pad could be constructed with non-expansive soils (soils with an EI less than 20).

Slab thickness and reinforcement should ultimately be determined by the structural engineer.

For elastic design of a foundation supporting sustained concentrated loads, a modulus of vertical subgrade reaction (k) of 100 pounds per cubic inch (pounds per square inch per inch of deflection) may be used. This value is for a 1-foot by 1-foot square loaded area and should be adjusted by the structural designer for the area of the proposed foundation using the following formula:

$k = 100[(B+1)/2B]^2$
k = modulus of vertical subgrade reaction, pounds per cubic inch (pci)
B = foundation width (feet)

It is recommended that moisture content of the subgrade soils below slabs be maintained up to the time of concrete placement. The recommended moisture content of the slab subgrade soils should be approximately 140% percent of optimum moisture content to a depth of approximately 24 inches. Pre-soaking of the subgrade for building slabs will be required due to site expansive soils. The duration of this process varies greatly based on the chosen method and is also dependent on factors such as soil type and weather conditions. Time duration for presoaking from completion of rough grading to trenching of foundations should be accounted for in the construction schedule (typically 2 to 3 weeks). The subgrade moisture condition of the building pad soils should be maintained at the recommended moisture content up to the time of concrete placement. This moisture content should be maintained around the immediate perimeter of the slab during construction and up to occupancy of the building structures. Additional time at the completion of presoaking may be necessary for the surface soils of the pad to dry back sufficiently to be capable of supporting trenching equipment.

Alternatively, the upper 3 feet of the building pad could be constructed with non-expansive soils (soils with and EI less than 20). The subgrade below the non-expansive building pad backfill should be kept at above optimum moisture content prior to placing non expansive building pad soils.

5.4.2 Slab Underlayment Guidelines

The following recommendations are for informational purposes only, as they are unrelated to the geotechnical performance of the foundation. The following recommendations may be superseded by the foundation engineer and/or owner. Some post-construction moisture migration should be expected below the foundation. In general, interior floor slabs with moisture sensitive floor coverings should be underlain by a minimum 10 mil thick polyolefin material vapor retarder, which has a water vapor transmission rate (permeance) of less than 0.03 perms. The need for sand and/or the sand thickness (above and/or below the vapor retarder) should be specified by the structural engineer, architect or concrete contactor. The selection and thickness of sand is not a geotechnical engineering issue and is therefore outside our purview.

5.4.3 Shallow Foundation Maintenance

The geotechnical parameters provided herein assume that if the areas adjacent to the foundation are planted and irrigated, these areas will be designed with proper drainage and adequately maintained so that ponding, which causes significant moisture changes below the foundation, does not occur. Our recommendations do not account for excessive irrigation and/or incorrect landscape design. Plants should only be provided with sufficient irrigation for life and not overwatered to saturate subgrade soils. Sunken

planters placed adjacent to the foundation should either be designed with an efficient drainage system or liners to prevent moisture infiltration below the foundation. Some lifting of the perimeter foundation beam should be expected even with properly constructed planters.

In addition to the factors mentioned above, roots that extend near the vicinity of foundations can cause distress to foundations. Trees/large shrubs should not be planted closer to the foundations than a distance equal to half the mature height of the tree or 20 feet, whichever is more conservative unless specifically provided with root barriers to prevent root growth below the building foundation.

5.5 Foundation Setback from Slopes

Foundations should have adequate setback from top and bottom of slopes. Per the 2022 CBC, the minimum top-of-slope setback is H/3, with a maximum required setback of 40 feet, where H is the total height of the slope. This distance is measured horizontally from the outside bottom edge of the footing to the slope face. The minimum bottom-of-slope setback is H/2, with a maximum required setback of 15 feet. Refer to Chapter 18 of the 2022 CBC.

5.6 Soil Bearing and Lateral Resistance

Provided our earthwork recommendations are implemented, the following minimum footing widths and embedments for isolated spread and continuous wall footings are recommended for the corresponding allowable soil bearing pressures.

TABLE 5

Allowable Soil Bearing Pressures

Allowable Static Bearing Pressure (psf)	Minimum Footing Width (feet)	Minimum Footing Embedment* (feet)
3,500	4	2
3,000	3	2
2,500	2	2
1,500	1	2

*Refers to minimum depth to the bottom of the footing below lowest adjacent finish grade.

These allowable bearing pressures are applicable for level (ground slope equal to or flatter than 5 horizontal feet to 1-foot vertical) conditions only. Bearing values indicated above are for total dead loads and live loads. The above vertical bearing may be increased by one-third for short durations of loading which will include the effect of wind or seismic loading. The increase of bearing capacity is based on a reduced factor of safety (seismic factor of safety equal to

three-fourths of the static factor of safety) for short duration loading. For any bearing pressure less than 1,500 psf, a minimum footing width of 1 feet and embedment depth of 2 feet below lowest adjacent grade should be used.

Soil settlement is a function of footing dimensions and applied soil bearing pressure. In utilizing the above-mentioned allowable bearing capacity, assumed structural loads, and provided our earthwork recommendations are implemented, foundation settlement due to structural loads is anticipated to be on the order of 1-inch. Differential settlement should be anticipated between nearby columns or walls where a large differential loading condition exists. Settlement estimates should be evaluated by LGC Geotechnical when foundation plans are available.

Resistance to lateral loads can be provided by friction acting at the base of foundations and by passive earth pressure. For concrete/soil frictional resistance, an allowable coefficient of friction of 0.30 may be assumed with dead-load forces. For slabs constructed over a moisture retarder, the allowable friction coefficient should be provided by the manufacturer. An allowable passive lateral earth pressure of 250 psf per foot of depth (or pcf) to a maximum of 2,500 psf may be used for the sides of footings poured against properly compacted fill. Allowable passive pressure may be increased to 340 pcf (maximum of 3,400 psf) for short duration seismic loading. These passive pressure values are applicable for level (ground slope equal to or flatter than 5H:1V) conditions. Frictional resistance and passive pressure may be used in combination without reduction. We recommend that the upper foot of passive resistance be neglected if finished grade will not be covered with concrete or asphalt. The provided allowable passive pressures are based on a factor of safety of 1.5 and 1.1 for static and seismic loading conditions, respectively.

5.7 Lateral Earth Pressures for Retaining Walls

Lateral earth pressures for approved native sandy soils or import soil meeting indicated project recommendations are provided below. Lateral earth pressures are provided as equivalent fluid unit weights, in psf per foot of depth (or pcf). These values do not contain an appreciable factor of safety, so the retaining wall designer should apply the applicable factors of safety and/or load factors during design. A soil unit weight of 125 pcf may be assumed for calculating the actual weight of soil over the wall footing.

The following lateral earth pressures are presented in Table 6 for approved select granular soils a maximum of 35 percent fines (passing the No. 200 sieve per ASTM D1140) and an Expansion Index of 20 or less per ASTM D4829. The retaining wall designer should clearly indicate on the retaining wall plans the required select sandy soil backfill.

TABLE 6

Lateral Earth Pressures – Approved Select Sandy Material

Conditions	Equivalent Fluid Unit Weight (pcf)	
	Level Backfill	2:1 Backfill Sloping Upwards
	Sandy Backfill	Sandy Backfill
Active	35	55
At-Rest	55	80

If the wall can yield enough to mobilize the full shear strength of the soil, it can be designed for "active" pressure. If the wall cannot yield under the applied load, the earth pressure will be higher. This would include 90-degree corners of retaining walls. Such walls should be designed for "at-rest." The equivalent fluid pressure values assume free-draining conditions. If conditions other than those assumed above are anticipated, the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical consultant.

Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. To reduce, but not eliminate, saturation of near-surface (upper approximate 1-foot) soils in front of the retaining walls, the perforated subdrain pipe should be located as low as possible behind the retaining wall. The outlet pipe should be sloped to drain to a suitable outlet. In general, we do not recommend retaining wall outlet pipes be connected to area drains. Typical retaining wall drainage is illustrated in Figure 2A & 2B. It should be noted that the recommended subdrain does not provide protection against seepage through the face of the wall and/or efflorescence. Efflorescence is generally a white crystalline powder (discoloration) that results when water containing soluble salts migrates over a period of time through the face of a retaining wall and evaporates. If such seepage or efflorescence is undesirable, retaining walls should be waterproofed to reduce this potential.

Surcharge loading effects from any adjacent structures should be evaluated by the basement/retaining wall designer. The amount of surcharge loading on a proposed retaining wall structure is primarily a function of the distance, magnitude and lateral extents of the surcharge loading and should be evaluated on a case-by-case basis. In addition to the recommended lateral earth pressure, retaining walls adjacent to streets should be designed to resist vehicular traffic if applicable. Uniform surcharges may be estimated using the applicable coefficient of lateral earth pressure using a rectangular distribution. A factor of 0.5 and 0.3 may be used for at-rest and active conditions, respectively for a level backfill. The vertical traffic surcharge may be determined by the structural designer. The structural designer should contact the geotechnical consultant for any required geotechnical input in estimating any applicable surcharge loads.

If required, the retaining wall designer may use a seismic lateral earth pressure increment of 15

pcf for a level backfill condition and 25 pcf for a sloping condition (up to an inclination of a 2:1). This increment should be applied in addition to the provided static lateral earth pressure using a triangular distribution with the resultant acting at H/3 in relation to the base of the retaining structure (where H is the retained height). For the restrained, at-rest condition, the seismic increment may be added to the applicable active lateral earth pressure (in lieu of the at-rest lateral earth pressure) when analyzing short duration seismic loading. Per Section 1803.5.12 of the 2022 CBC, the seismic lateral earth pressure is applicable to structures assigned to Seismic Design Category D through F for retaining wall structures supporting more than 6 feet of backfill height. The provided seismic lateral earth pressure should not be used for retaining walls exceeding 15 feet in height. If a retaining wall greater than 15 feet in height is proposed, the retaining wall designer should contact the geotechnical consultant for specific seismic lateral earth pressure increments based on the configuration of the planned retaining wall structures. Seismic lateral earth pressure recommendations for tieback anchor wall system and soil nail wall system are provided in Sections 5.3 and 5.8, respectively. This seismic lateral earth pressure is estimated using the procedure outlined by the Structural Engineers Association of California (Lew, et al, 2010) and the Federal Highway Administration (FHWA, 2011).

Soil bearing and lateral resistance (friction coefficient and passive resistance) are provided in Section 5.6. Earthwork considerations (temporary backcuts, backfill, compaction, etc.) for retaining walls are provided in Section 5.1 (Site Earthwork) and the subsequent earthwork related sub-sections.

5.8 Preliminary Soil Nail Wall Design Parameters

The proposed cut condition retaining wall along the southwestern edge of the subject site (Cross Section B-B') may be constructed as a top-down construction soil nail retaining wall up to approximately 45-feet in height. The following preliminary geotechnical parameters may be used for preliminary design of a soil nail wall. Updated global slope stability analysis should be performed once soil nail wall plans are in development to verify geologic stability is acceptable. One row of tieback anchors is proposed at the top of the soil nail retaining wall for global stability. Updated recommendations should be provided during a 40-scale grading plan review.

- Soil Friction Angle: 33 degrees
- Soil Cohesion: 350 pounds per square foot (psf)
- Soil Unit Weight: 120 pounds per cubic foot (pcf)
- Preliminary allowable Bond Stress: 7.5 psi (gravity grouting)

In general, the obtained capacity of gravity grouted soil nails is primarily a function of construction methods and experience of the specialty contractor along with local site conditions. The capacity of soil nails may ultimately be determined through a performance specification. It is the contractor's responsibility to obtain the required pullout capacity, which may require extensive post grouting and/or field modifications.

The design PGA applicable for soil nail wall design per the 2022 CBC is provided in Section 3.1. Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. Typically, a nail wall is provided with a composite drainage mat (e.g., Miradrain, etc.) installed between the temporary facing and the excavation and collected at the wall

bottom and properly outletted to a suitable discharge point per the project civil engineer.

Field pullout testing should be performed during construction to verify the estimated pullout resistance used in the design. Ultimately, it is the contractor's responsibility to obtain the required pullout capacity, which may require alternate construction techniques. Soil nail testing should be performed by the contractor and observed by LGC Geotechnical. Project plans should clearly indicate required soil nail testing criteria, including required loading increments and acceptance criteria.

The contractor shall provide all necessary test equipment, including an independent fixed reference point (i.e., tripod) for placement of the dial gauge for measuring anchor deflections during tensioning. Dial gauge measuring anchor deflections should read to 0.001-inch and have sufficient travel distance required for the entire test. A minimum of two working days prior to testing, the contractor shall supply current (i.e., within the last 9 months) calibration records from an approved testing laboratory of the hydraulic jack and gauges to be used for anchor tensioning/testing. Calibration certificates and graphs should be available at the job site.

5.9 Control of Surface Water and Drainage Control

From a geotechnical perspective, we recommend that compacted finished grade soils adjacent to proposed structures be sloped away from the proposed structures and towards an approved drainage device or unobstructed swale. Drainage swales, wherever feasible, should not be constructed within 5 feet of buildings. Where lot and building geometry necessitates that the drainage swales be routed closer than 5 feet to structural foundations, we recommend the use of area drains together with drainage swales. Drainage swales used in conjunction with area drains should be designed by the project civil engineer so that a properly constructed and maintained system will prevent ponding within 5 feet of the foundation. Code compliance of grades is not the purview of the geotechnical consultant.

Planters with open bottoms adjacent to buildings should be avoided. Planters should not be designed adjacent to buildings unless provisions for drainage, such as catch basins, liners, and/or area drains, are made. Overwatering must be avoided.

5.10 Preliminary Asphalt Concrete Pavement Sections

The following preliminary minimum asphalt concrete (AC) pavement sections are provided in Table 7 based on an assumed R-value of 5 and assumed Traffic Indices of 5.0, 6.0 and 7.0. These recommendations must be confirmed with R-value testing of representative near-surface soils at the completion of earthwork and after underground utilities have been installed and backfilled. Determination of the Traffic Index (TI) is not the purview of the geotechnical consultant. Final pavement sections should be confirmed by the project civil/transportation engineer or City Engineer based upon the final design Traffic Index. We are not responsible for selecting a design Traffic Index. If requested, LGC Geotechnical will provide sections for alternate TI values.

TABLE 7

Preliminary Asphalt Concrete Paving Section Options

Assumed Traffic Index	5.0	6.0	7.0
R-Value Subgrade	5	5	5
AC Thickness	4.0 inches	5.0 inches	6.0 inches
Aggregate Base Thickness	7.5 inches	9.5 inches	12.0 inches

It is common practice to only place the asphalt base course prior to the start of construction. The asphalt capping course often is not placed until after the industrial building construction is complete. Construction traffic including concrete trucks and delivery trucks can exceed the design limits of an asphalt base course only, increasing the potential for pavement distress. We recommend the full asphalt concrete section (base course and capping course) be placed prior to the street being subject to construction traffic or the base course thickness be increased to the recommended full asphalt concrete section.

The thicknesses shown are for minimum thicknesses. Increasing the thickness of any or all of the above layers will reduce the likelihood of the pavement/pavers experiencing distress during its service life. The above recommendations are based on the assumption that proper maintenance and irrigation of the areas adjacent to the roadway will occur throughout the design life of the pavement/pavers. Failure to maintain a proper maintenance and/or irrigation program may jeopardize the integrity of the pavement/pavers.

Earthwork recommendations regarding aggregate base and subgrade are provided in the previous section "Site Earthwork" and the related sub-sections of this report.

5.11 Preliminary Portland Cement Concrete Pavement Sections

The provided preliminary Portland Cement concrete (PCC) section options are based on the guidelines of the American Concrete Institute (ACI 330.2R-17). For the final design section, we recommend a traffic study be performed as LGC Geotechnical does not perform traffic engineering. Traffic study should include the design vehicle (number of axles and load per axle) and estimated number of daily repetitions/trips. LGC Geotechnical does not perform traffic engineering and determination of traffic loading is not the purview of the geotechnical consultant. The concrete should have a minimum compressive strength of 4,000 psi and a minimum flexural strength of 550 psi at the time the pavement is subjected to traffic. Steel reinforcement is not required (ACI, 2017). The provided pavement sections assume that edge restraints like a curb and gutter will be provided. To reduce the potential (but not eliminate) for cracking, paving should provide control joints at regular intervals in each direction not exceeding the maximum values provided below. Decreasing the spacing of these joints will further reduce, but not eliminate the potential for unsightly cracking.

The primary input for anticipated loadings over the lifetime of the concrete pavement is based on the Average Daily Truck Traffic (ADTT). Truck loading is defined one 16-kip axle and two 32-kip tandem axles. Other factor to be considered are potentially the use of industrial vehicles (e.g., lift trucks, mobile cranes, gantry cranes, reach stackers, etc.). Static loads from containers and

temporary structures stored on the pavement. If semi-trailers are to be disconnected from the tractors from dolly jacks the design should consider concentrated loads imposed on the concrete pavement. These loads typically exceed the axle loads of the semi-trailer combination and are applied to smaller contact areas, especially if applied near joint locations. If these irregular loadings are confined to specific areas of the site the pavement section required thickness can be economized. These and other factors (e.g., traffic patterns, irregular loading, doweled vs un-doweled joints, etc.) outlined in ACI, 2017 should be addressed for the final design.

TABLE 8

Preliminary Portland Cement Concrete Pavement Section Options

No. of Trucks per day design lane	Concrete Thickness* (inch)	Aggregate Base Thickness (inch)	Maximum Joint Spacing Thickness (inch)
≤ 10	5.5	4.0	12
50	6.5	4.0	14
100	7.0	4.0	15
300	7.5	4.0	15

*Minimum concrete compressive strength and Modulus of Rupture as indicated above.

The thicknesses shown are for minimum thicknesses. Increasing the thickness of any or all of the above layers will reduce the likelihood of the pavement/pavers experiencing distress during its service life. The above recommendations are based on the assumption that proper maintenance and irrigation of the areas adjacent to the roadway will occur throughout the design life of the pavement/pavers. Failure to maintain a proper maintenance and/or irrigation program may jeopardize the integrity of the pavement/pavers.

Earthwork recommendations regarding aggregate base and subgrade are provided in the previous section "Site Earthwork" and the related sub-sections of this report.

5.12 Soil Corrosivity

Although not corrosion engineers (LGC Geotechnical is not a corrosion consultant), several governing agencies in Southern California require the geotechnical consultant to determine the corrosion potential of soils to buried concrete and metal facilities. We therefore present the results of our testing with regard to corrosion for the use of the client and other consultants, as they determine necessary.

Corrosion testing indicated soluble sulfate content less than approximately 0.03 percent, chloride contents ranging from 180 to 220 parts per million (ppm), pH values from 6.6 to 7.9, and minimum resistivity values ranging from 735 to 1,240 ohm-centimeters. Based on Caltrans Corrosion Guidelines (2021), soils are considered corrosive if the pH is 5.5 or less, or the chloride concentration is 500 ppm or greater, or the sulfate concentration is 1,500 ppm (0.15 percent) or

greater.

Based on laboratory sulfate test results, the near surface soils are designated to a class "S0" per ACI 318, Table 19.3.1.1 with respect to sulfates. Concrete in direct contact with the onsite soils can be designed according to ACI 318, Table 19.3.2.1 using the "S0" sulfate classification.

Laboratory testing may need to be performed at the completion of grading by the project corrosion engineer to further evaluate the as-graded soil corrosivity characteristics. Accordingly, revision of the corrosion potential may be needed, should future test results differ substantially from the conditions reported herein. The client and/or other members of the development team should consider this during the design and planning phase of the project and formulate an appropriate course of action.

5.13 Nonstructural Concrete Flatwork

Nonstructural concrete (such as flatwork, sidewalks, etc.) has a potential for cracking due to changes in soil volume related to soil-moisture fluctuations. To reduce the potential for excessive cracking and lifting, concrete should be designed in accordance with the minimum guidelines outlined below. These guidelines will reduce the potential for irregular cracking and promote cracking along construction joints but will not eliminate all cracking or lifting. Thickening the concrete and/or adding additional reinforcement will further reduce cosmetic distress.

Nonstructural and non-vehicular concrete flatwork placed on compacted subgrade should be a minimum 4-inches in thickness with crack control joints spaced 8 feet apart for flatwork slabs/patios and 6 feet apart for flatwork sidewalks. Crack control joints should be sawcut or deep open tool joint to a minimum of 1/3 the concrete thickness. Reinforcement should consist of No. 3 bars spaced at 24 inches on center, both ways. Flatwork edges should be thickened to 8 inches by 8 inches where flatwork is adjacent to landscaping or unpaved areas. The compacted subgrade below the nonstructural and non-vehicular concrete flatwork should be presoaked to a depth of 12 inches prior to placing concrete.

To reduce the potential for nonstructural concrete flatwork to separate from entryways and doorways, the owner may elect to install dowels to tie these two elements together.

5.14 Subsurface Water Infiltration

Recent regulatory changes have occurred that mandate that storm water be infiltrated below grade rather than collected in a conventional storm drain system. Typically, a combination of methods are implemented to reduce surface water runoff and increase infiltration including; permeable pavements/pavers for roadways and walkways, directing surface water runoff to grass-lined swales, retention areas, and/or drywells, etc.

It should be noted that collecting and concentrating surface water for the purpose of intentional infiltration below grade, conflicts with the geotechnical engineering objective of directing surface water away from slopes, structures and other improvements. The geotechnical stability and

integrity of a site is reliant upon appropriately handling surface water. In general, the vast majority of geotechnical distress issues are directly related to improper drainage. In general, distress in the form of movement of improvements could occur as a result of soil saturation and loss of soil support, expansion, internal soil erosion, collapse and/or settlement.

The results of our filed infiltration testing indicated the observed 1-D infiltration rate for I-2 through I-6 (not including required factors of safety for design) ranged from approximately 0.01 to 0.14 inches per hour. The design infiltration rate is thereby equal to the Observed Infiltration Rate divided by the design factor of safety. The design factor of safety must be a minimum of 3.0 but may be increased at the discretion of the design engineer (Riverside County, 2011). Per the Riverside County infiltration guidelines (2011), infiltration of stormwater is not required when the factored infiltration rate (measured infiltration rate with safety factors applied) is less than 0.3 inches per hour in the vicinity of the BMPs.

Based on the results of field infiltration testing indicating extremely low infiltration rates, anticipated subsurface conditions consisting of compacted fill over dense native materials, and presence of shallow groundwater, we strongly recommend against the intentional infiltration of stormwater into the subsurface soils.

5.15 Geotechnical Plan Review

When available, the rough grading, precise grading, retaining wall, and foundation plans should be reviewed by LGC Geotechnical in order to update and/or verify our geotechnical recommendations. Updated recommendations and/or additional fieldwork may be necessary. A more detailed 40-scale grading plan review geotechnical evaluation and report should be performed once the rough grading plans are further in development.

5.16 Geotechnical Observation and Testing During Construction

The recommendations provided in this report are based on limited subsurface observations and geotechnical analysis. The interpolated subsurface conditions should be checked in the field during grading by a representative of LGC Geotechnical. Geotechnical observation and testing is required per Section 1705 of the 2022 California Building Code (CBC).

Geotechnical observation and/or testing should be performed by LGC Geotechnical at the following stages:

- During grading (key excavations, removal bottoms, remedial grading, fill placement, etc.);
- Geologic mapping of cut slopes;
- During retaining wall backfill and compaction;
- During utility trench backfill and compaction;
- During precise grading;
- After presoaking building pads and other concrete-flatwork subgrades, and prior to placement of aggregate base or concrete;
- Preparation of pavement subgrade and placement of aggregate base;

- After building and wall footing excavation and prior to placing reinforcement and/or concrete; and
- When any unusual soil conditions are encountered during any grading or construction operation subsequent to issuance of this report.

6.0 LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is based on data obtained from limited observations of the site, which have been extrapolated to characterize the site. While the scope of services performed is considered suitable to adequately characterize the site geotechnical conditions relative to the proposed development, no practical evaluation can completely eliminate uncertainty regarding the anticipated geotechnical conditions in connection with a subject site. Variations may exist and conditions not observed or described in this report may be encountered during grading and construction.

The findings of this report are valid as of the present date. However, changes in the conditions of a site can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. The findings and conclusions presented in this report can be relied upon only if LGC Geotechnical has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site. This report is intended exclusively for use by the client, any use of or reliance on this report by a third party shall be at such party's sole risk.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and modification.

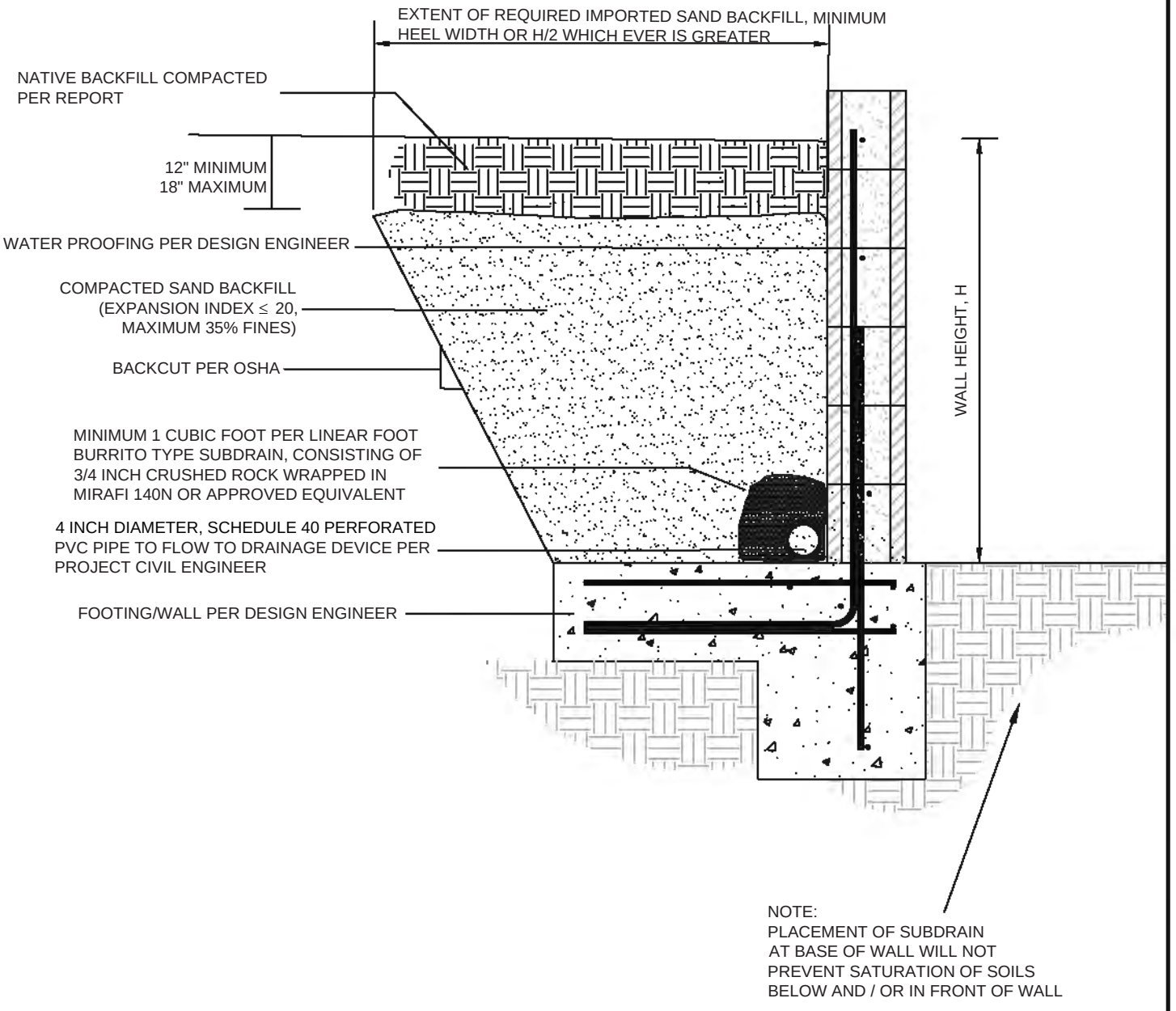
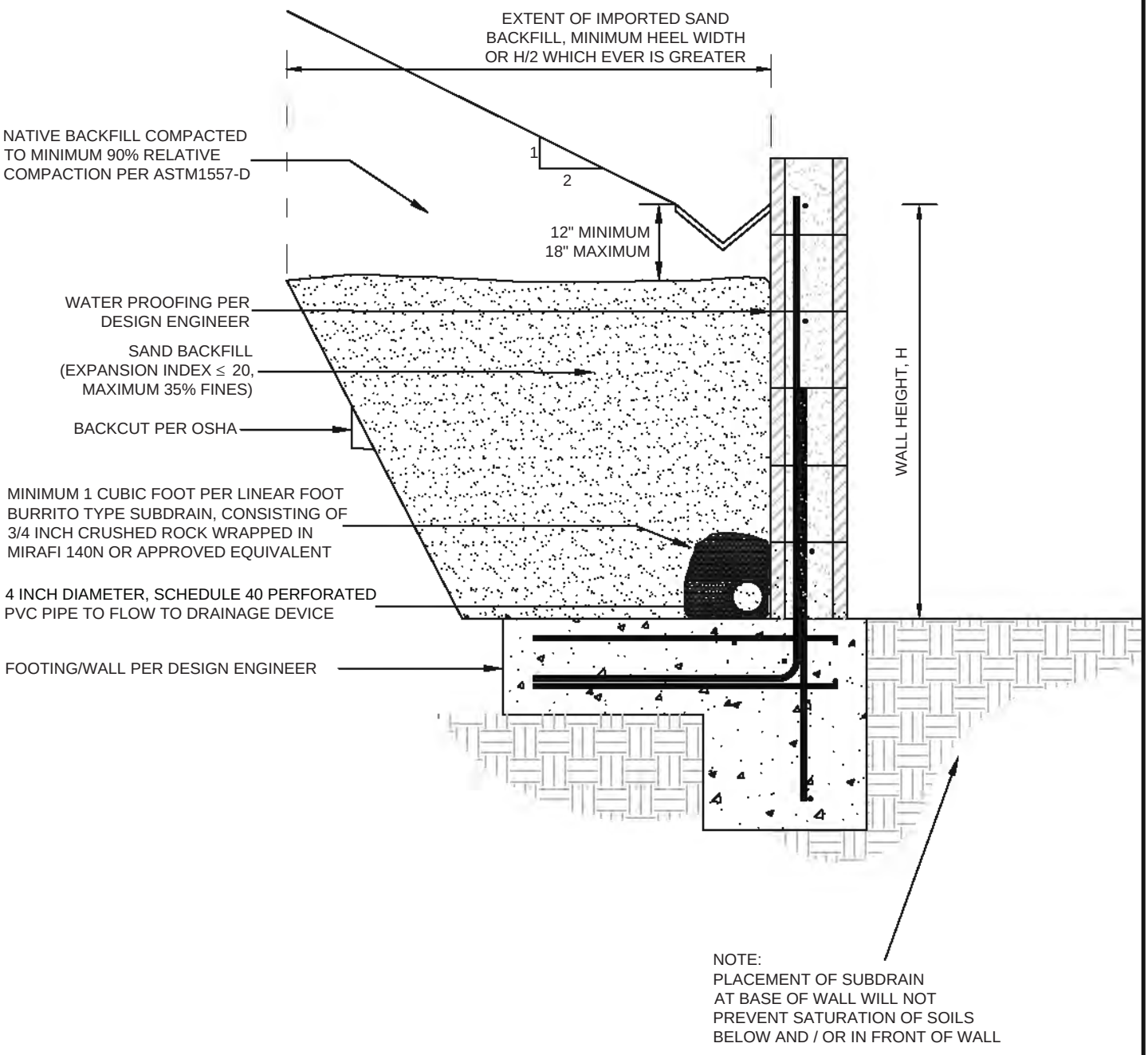


FIGURE 2A
Retaining Wall Backfill Detail (Level Condition)

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	23160-01
ENG. / GEOL.	RLD / BPG
SCALE	Not to Scale
DATE	January 2024



LGC Geotechnical, Inc.	**FIGURE 2B** ***Retaining Wall Backfill Detail*** ***2:1 Backfill***	*PROJECT NAME*	*EIP - Lake Elsinore*
		PROJECT NO.	*23160-01*
		ENG. / GEOL.	*RLD / BPG*
		SCALE	*Not to Scale*
		DATE	*January 2024*

Appendix A
References

APPENDIX A

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Appendix B
Boring and Test Pit Logs

Geotechnical Boring Log Borehole HS-1

Date: 9/25/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~1282' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1280	0							@ 0' - Dry vegetation/Topsoil: cobbles and gravels	
								@ 2.5' to TD - Tertiary Silverado Formation (Tsi)	
			R-1	10 24 50/5"	112.3	13.0	ML	@ 2.5' - Sandy SILT: yellowish brown, moist, hard	
	5		R-2	25 50/4"	104.6	18.8	SC	@ 5' - Clayey SAND: yellowish brown, very moist, very dense	
1275			R-3	25 50/3"	115.9	10.4	SM	@ 7.5' - Silty SAND: yellowish brown, moist, very dense	
	10		R-4	25 50/4"	112.1	10.2	SM/ML	@ 10' - Silty SAND/Sandy SILT: yellowish brown, moist, very dense/hard	
1270									
	15		SPT-1	11 22 34				@ 15' - No Recovery	
1265								Total Depth = 16.5' Groundwater Not Encountered Backfilled with Cuttings on 9/25/2023	
	20								
1260									
	25								
1255									
	30								

B-1

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-2

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1266' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1265	0							**@ 0 to 10' - Alluvium (Qal)**	
			R-1	28 16 16				@ 0' - Dry vegetation/Topsoil: cobbles and gravels @ 2.5' - No Recovery	
1260	5		R-2	10 12 13		23.3	CL	@ 5' - Sandy CLAY: grayish brown, very moist, very stiff	
			R-3	8 10 14	92.8	23.4	CH	@ 7.5' - Sandy FAT CLAY: reddish brown, very moist, very stiff	AL CN
1255	10		R-4	8 17 42	106.7	20.0	SC	**@ 10' to TD - Tertiary Silverado Formation (Tsi)** @ 10' - Clayey SAND: light yellowish brown, very moist, hard	
1250	15		R-5	17 27 29	99.8	23.6	CL	@ 15' - CLAY with Sand: pale brown, very moist, hard	
1245	20	▽	SPT-1	14 50/5"		15.1		@ 20' - CLAY: gray, moist, hard	
1240	25		R-6	36 50/4"	105.2	21.4	SM	@ 25' - Silty SAND: light olive, wet, very dense	
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-2

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1266' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1235	30		SPT-2	16 23 50/5"		17.0	CL	@ 30' - Sandy CLAY: gray, wet, hard	
1230	35		R-7	12 15 50/5"	108.1	18.9	SM	@ 35' - Silty SAND: gray, wet, very dense	
1225	40		SPT-3	16 29 50/5"		20.7	ML	@ 40' - Sandy SILT: gray, wet, hard	
1220	45		R-8	24 50/4"	104.7	22.7	SM	@ 45' - Silty SAND: gray, wet, very dense	
1215	50		SPT-4	26 50/5"		25.2		@ 50' - Silty SAND: dark gray, wet, very dense	
1210	55							Total Depth = 50.9' Groundwater Encountered at Approximately 23' Backfilled with Cuttings on 9/25/2023	
	60								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-3

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1266' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1265	0							**@ 0 to 7.5' - Alluvium (Qal)**	
			R-1	7 12 22				@ 0' - Vegetation/Topsoil @ 2.5' - No Recovery	
	5	B-1	R-2	7 11 13	105.7	16.7	CL	@ 5' - Sandy CLAY: yellowish brown, moist, very stiff	
1260								**@ 7.5' to TD - Tertiary Silverado Formation (Tsi)**	
			R-3	20 50/5"	123.8	8.2	SM	@ 7.5' - Silty SAND: light brown, moist, very dense	
	10		R-4	23 50/5"	115.6	11.7		@ 10' - Silty SAND: light reddish brown, moist, very dense	
1255									
	15		R-5	50/3"		13.9		@ 15' - Silty SAND: yellowish brown, very moist, very dense	
1250									
	20		SPT-1	8 13 20		17.0	SC	@ 20' - Clayey SAND: light yellowish brown, very moist, dense	
1245									
								Total Depth = 21.5' Groundwater Not Encountered Backfilled with Cuttings on 9/25/2023	
1240	25								
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-4

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1275' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@ 0 to 5' - Alluvium (Qal)**	
								@ 0' - Vegetation/Topsoil	
			R-1	8 11 13	108.1	8.0	CL	@ 2.5' - Sandy CLAY: reddish brown, slightly moist, very stiff	
1270	5	B-1	R-2	50/4"	88.6	10.0	CL	**@ 5' to TD - Tertiary Silverado Formation (Tsi)** @ 5' - Sandy CLAY: light brown, slightly moist, hard, weathered	
			R-3	26 50/6"	113.2	9.0	SC	@ 7.5' - Clayey SAND: light brown, moist, very dense	
1265	10		R-4	25 50/5"	106.2	7.9	SM	@ 10' - Silty SAND: light yellowish brown, moist, very dense	
1260	15		R-5	24 50/5"	111.7	15.9	ML	@ 15' - Sandy SILT: olive brown, very moist, hard	
1255	20		R-6	32 50/4"	102.0	10.2	SM	@ 20' - Silty SAND: yellowish brown, moist, very dense	
1250	25							Total Depth = 20.8' Groundwater Not Encountered Backfilled with Cuttings on 9/25/2023	
1245	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-5

Date: 9/26/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1277' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@ 0 to 7.5' - Alluvium (Qal)**	
1275								@ 0' - SILT with SAND: brown, dry, vegetation/topsoil	
			R-1	6 12 22	121.7	10.0	SC	@ 2.5' - Clayey SAND: pale brown, moist, medium dense	
	5		R-2	12 15 17	107.1	2.7	SP-SM/CL	@ 5' - SAND with Silt to Sandy CLAY: light brown, dry, medium dense/very stiff	
1270								**@ 7.5' to TD - Tertiary Silverado Formation (Tsi)**	
			R-3	26 50/5"	113.4	11.9	SM	@ 7.5' - Silty SAND: yellowish gray, moist, very dense	
	10		R-4	28 50/5"	114.6	10.1	SC	@ 10' - Clayey SAND: yellowish brown, moist, very dense	
1265									
	15		SPT-1	22 32 34		10.9		@ 15' - Clayey SAND: light brown, moist, very dense	
1260									
	20		R-5	28 50/3"	121.5	12.4	CL	@ 20' - Sandy CLAY: light gray, moist, hard	
1255									
	25		SPT-2	14 30 36		12.7	ML	@ 25' - SILT: grayish brown, moist, hard	
1250									
	30								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-5

Date: 9/26/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~1277' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1245	30		R-6	10 50/5"	119.1	14.4	CL	@ 30' - Sandy CLAY: grayish olive, moist, hard	
1240	35		SPT-3	13 24 50/5"		12.4	SC	@ 35' - Clayey SAND: olive gray, moist, very dense	
1235	40		R-7	42 50/5"	115.7	14.1	SM	@ 40' - Silty SAND: light gray, very moist, very dense	
1230	45	▽	SPT-4	50/3"		14.1	SC	@ 45' - Clayey SAND: yellowish gray, very moist, very dense	
1225	50		R-8	50/5"				@ 50' - No Recovery	
1220	55							Total Depth = 50.4' Groundwater Encountered at Approximately 45' Backfilled with Cuttings on 9/26/2023	
	60								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-6

Date: 9/26/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~1281' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1280	0							**@ 0 to 2.5' - Alluvium (Qal)**	CR EI #200 RV
								@ 0' - Sandy SILT: pale brown, dry	
								@ 2.5' to TD - Tertiary Silverado Formation (Tsi)	
			R-1	5 11 18	97.1	20.2	SM	@ 2.5' - Silty SAND: olive brown, very moist, medium dense, weathered	
	5	B-1	R-2	9 13 27	103.7	20.1	ML	@ 5' - Sandy SILT: grayish brown, very moist, hard	
1275			R-3	22 50/5"	104.3	19.5		@ 7.5' - Sandy SILT: grayish brown, very moist, hard	
	10		R-4	22 44 50/4"	113.2	14.5	SM	@ 10' - Silty SAND: grayish brown, very moist, very dense	
1270									
	15		R-5	15 23 50/6"	93.6	25.4		@ 15' - Silty SAND: brown, very moist, very dense	
1265									
	20		SPT-1	11 21 34		22.3		@ 20' - Silty SAND: brown, very moist, very dense	
1260									
								Total Depth = 21.5' Groundwater Not Encountered Backfilled with Cuttings on 9/26/2023	
1255	25								
	30								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-7

Date: 9/26/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1295' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0						**@ 0 to 2.5' - Alluvium (Qal)**	MD
							@ 0' - Silty SAND: dark brown, dry, vegetation/topsoil	
							@ 2.5' to TD - Tertiary Silverado Formation (Tsi)	
		R-1	4 13 10	108.8	12.6	SC	@ 2.5' - Clayey SAND: gray, moist, medium dense, weathered	
1290	5	R-2	9 27 50/4"	101.0	17.8	CL	@ 5' - Sandy CLAY: light yellowish gray, moist, hard	
		R-3	25 50/4"	110.0	13.3	ML	@ 7.5' - Sandy SILT: light yellowish gray, moist, hard	
1285	10	R-4	30 50/5"	108.0	16.4	SM	@ 10' - Silty SAND: grayish yellow, very moist, very dense	
1280	15	SPT-1	10 18 30		14.7	CL	@ 15' - Sandy CLAY: gray, moist, hard	
1275	20	R-5	47 50/5"	114.5	7.1	SM	@ 20' - Silty SAND: gray, slightly moist, very dense	
1270	25						Total Depth = 20.9' Groundwater Not Encountered Backfilled with Cuttings on 9/26/2023	
	30							

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-8

Date: 9/26/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1282' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1280	0		R-1	8 8 15	112.5	15.1	CL	**@ 0 to 15' - Colluvium (Qcol)** @ 0' - Silty SAND: brown, dry, vegetation/topsoil, cobbles and gravels visible on surface @ 2.5' - Sandy CLAY: dark brown, moist, very stiff	
1275	5	B-1	R-2	8 11 15	111.6	15.3		@ 5' - Sandy CLAY: brown, moist, very stiff	
1270	10		R-3	7 14 19	105.4	19.0		@ 7.5' - Sandy CLAY: brown, very moist, very stiff	
			R-4	7 12 16	101.1	22.9		@ 10' - Sandy CLAY: grayish brown, very moist, very stiff	
1265	15		R-5	10 20 29	109.8	15.0	CL	**@ 15' to TD - Tertiary Silverado Formation (Tsi)** @ 15' - CLAY with Sand: dark brown, moist, hard	-#200 DS
1260	20							Total Depth = 16.5' Groundwater Not Encountered Backfilled with Cuttings on 9/26/2023	
1255	25								
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-1

Date: 9/25/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0							**@ 0' to TD - Alluvium (Qal)**	
								@ 0' - Vegetation/topsoil	
	5	B-1	SPT-1	8 4 6		13.0	SC	@ 5' - Clayey SAND: dark brown, moist, medium dense	
1255									
	10		SPT-2	7 11 16		17.3	CL	@ 10' - Sandy CLAY: yellowish brown, moist, hard	
1250								Total Depth = 12' Groundwater Encountered at Approximately 11', percolation test could not be run Backfilled with Cuttings on 9/25/2023	
	15								
1245									
	20								
1240									
	25								
1235									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-2

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~1263' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@ 0' to TD - Alluvium (Qal)**	
								@ 0' - Vegetation/topsoil	
1260									
	5							Total Depth = 3'	
								Groundwater Not Encountered	
1255								3" Perforated Pipe with Filter Sock and Gravel installed	
								Pipe Removed and Backfilled with Cuttings on 9/27/2023	
	10								
1250									
	15								
1245									
	20								
1240									
	25								
1235									
	30								

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-3

Date: 9/25/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1262' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0							**@ 0' to TD - Alluvium (Qal)** @ 0' - SILT: dry, vegetation/topsoil	
1255	5		SPT-1	4 5 7		16.0	CL	@ 8' - Sandy CLAY: brown, moist, stiff	
1250	10							Total Depth = 10' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/27/2023	
1245	15								
1240	20								
1235	25								
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
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EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-4

Date: 9/25/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0		B-1					**@ 0' to TD - Alluvium (Qal)** @ 0' - SILT: brown, dry, vegetation/topsoil	
1255	5							Total Depth = 3' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/27/2023	
1250	10								
1245	15								
1240	20								
1235	25								
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-5

Date: 9/26/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0							**@ 0' to TD - Alluvium (Qal)**	
								@ 0' - Silty SAND: brown, dry, vegetation/topsoil	
	5	B-1	SPT-1	6 12 8		12.2	SP-SC	@ 5' - SAND with Clay: grayish brown, moist, medium dense	
1255									
	10		SPT-2	5 5 8		16.1	CL	@ 10' - Sandy CLAY: grayish brown, moist, very stiff	
1250								Total Depth = 12' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/28/2023	
	15								
1245									
	20								
1240									
	25								
1235									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-6

Date: 9/26/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@ 0' to TD - Alluvium (Qal)**	
1260								@ 0' - Silty SAND: brown, dry, topsoil	
	5							Total Depth = 3'	
1255								Groundwater Not Encountered	
	10							3" Perforated Pipe with Filter Sock and Gravel installed	
1250								Pipe Removed and Backfilled with Cuttings on 9/28/2023	
	15								
1245									
	20								
1240									
	25								
1235									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log LGC-BA-1

Date : 9/28/23 Page 1 of 3 | **Drilling Company :** Big Johnny's

Project Name : Baker St. - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" | **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							SM	**Quaternary Pauba Formation (Fanglomerate) - Qpf** @ 0-5' - Silty SANDSTONE: light to medium brown, dry to slightly moist, weathered, many cobbles to 6"diameter, some angular, some sub-rounded, metamorphic origin	
1380	5			R-1	12/10"	117.0	11.1		**Tertiary Silverado Formation - Tsi** @ 5' - Silty SANDSTONE: gray to olive green, slightly moist, dense, fine grained, oxidation staining throughout, mostly sub-horizontal, few vertical caliche stringers to 15' deep	
1375	10	B-1		R-2	16/12"	120.9	10.9		@ 10' - Silty SANDSTONE: gray to olive, slightly moist, dense to very dense, fine grained, some mottled dry white chalky Silt, caliche staining	
1370	15								@ 15' - increase in coarse Sand & gravel, massive, less staining, very dense	
1365	20		GB: @22' N60E, 8SE	R-3	12/10"	124.4	5.3		@ 20' - Silty SANDSTONE: gray to olive green, some brown & white mottling, slightly moist, very dense @ 22' - 1" thick red brown Sandy gravel lense, general bedding attitude around hole, hard white indurated, Silty SANDSTONE layer above, non-continous	
1360	25								@ 26-29' - Few infilled joints, white chalky infill	
1355	30									

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SAMPLE TYPES:

B	BULK SAMPLE
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RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1

Date : 9/28/23 Page 2 of 4 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" | **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30			R-4	13	121.3	10.7	SM	@ 30' - SANDSTONE: gray, olive, white & black mottled, slightly moist to dry, very dense, medium to coarse grained	
			GB@31' N10E, 5W						@ 33' - 6-8" diameter white oval shaped concretionary nodule, laying on side(sub-horizontal), hard	
1350	35								@ 35' - Very dense, indurated	
1345	40			R-5	14	120.6	10.7		@ 40' - SANDSTONE: olive green to gray/white, slightly moist, very dense	
1340	45									
1335	50			R-6	22	111.6	16.5	ML	@ 50' - Clayey SILTSTONE: dark gray, slightly moist, very stiff, some fine sand, some polished surfaces	
			@ 52' B: N60E, 20 NW	G-1 @ 52'			15.2	MH	@ 52' to 54' - Very stiff to hard SILT/CLAYSTONE zone, with fine bedding attitude at upper transition, internally sheared with some polished surfaces, bedding attitudes	AL
			GB @54': N55E, 3-5 NW						@ 54' - Transitions to Clayey SAND, with fine undulatory sand beds, GB Attitude	
1330	55								@ 57' - Grades to massive SANDSTONE, olive green to gray/white, slightly moist, very dense, indistinct contact	
1325	60									

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CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1

Date : 9/28/23 Page 3 of 3

Project Name : Baker St - Lake Elsinore

Project Number : 23160-01

Elevation of Top of Hole : ~ 1385 ' MSL

Hole Location : See Geotechnical Map

Drilling Company : Big Johnny's

Type of Rig : Bucket Auger

Drop : 30" **Hole Diameter :** 24"

Drive Weight : 0'-25' - 3300 lbs.
25'-50' - 2200 lbs.
50'-80' - 1100 lbs.
80'-100' - 2200 lbs.

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
36	60			R-7	17	119.5	6.0	SM	@ 60' - SANDSTONE: gray to olive green, slightly moist, dense to very dense	DS +#200
									@ 62' - Concretionary nodule, white, hard, oval shaped, 6-8" (laying flat), subhorizontal, massive SANDSTONE below	
31	65									
	70			R-8	27	113.2	14.0		@ 70' - SANDSTONE: gray to olive green, slightly moist, very dense, fine to medium grained	
26									**Total Depth = 71'** **Backfilled with Cuttings on 9/28/2023**	
	75									
21										
	80									
16										
	85									
11										
	90									

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CR	CORROSION
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CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 1 of 4

Drilling Company : Big Johnny's

Project Name : Baker St. - Lake Elsinore

Type of Rig : Bucket Auger

Project Number : 23160-01

Drop : 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL

Drive Weight : 0'-25' - 3300 lbs.
25'-50' - 2200 lbs.
50'-80' - 1100 lbs.
80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1380	5	See Geotechnical Boring log LGC-BA-1 for Graphic Log							**Tertiary Santiago Formation (Tsi)** SANDSTONE: gray to olive green and white, slightly moist, medium grained, dense, thickly bedded to massive, primary logging begins at approximately 33', see Geotechnical Boring Log LGC-BA-1 for more information	
1375	10									
1370	15									
1365	20									
1360	25									
1355	30									

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
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TEST TYPES:

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RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 2 of 4 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30								@ 33' - concretionary layer continuous around hole, concretions up to 8"	
1350	35		@36' B: N60E 9SE						@ 36' - finer grained SANDSTONE, distinct red/brown stained contact with coarser sandstone above, bedding attitude	
1345	40								@ 43' to 44' - SILTSTONE rip-up clast, ~1' thick and 1' wide, clayey and very dense, sandstone above & below	
1340	45		@47' B: N70E 20NW						@ 47 to 48.5' - faint zone of crossbedding, general bedding attitude taken	
			@48.5' C: N48E 12SE						@ 48.5' - SILTSTONE: dark gray, slightly moist, very stiff, fine gravel and cobble bed at contact with sandstone above, Siltstone is internally sheared, weathered, some polished surfaces, coarsens to 56'	
1335	50									
1330	55								@ 56' - SANDSTONE: gray to olive green, slightly moist, very dense, thickly bedded to massive	
1325	60									

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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MD	MAXIMUM DENSITY
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CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 3 of 4 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	60									
1323									@ 62' to 64' - concretionary nodules around hole, erratic, 3"-8" in size	
	65		@66.5' GB: N15E 9NW						@ 66.5' - general bedding attitude on fine gravel bed, continuous, 1"-2" thick	
1318										
	70		@69.5' B: N20E 10SE						@ 69.5' - Well defined transition to Sandy SILTSTONE, medium brown, rip up clast just above contact, general bedding attitude, coarsens to white to light brown sandstone by 72'	
1313			@72' B: N51W 9N						@ 72' - Another well defined transition to Sandy SILTSTONE, gray brown, coarsens to silty SANDSTONE by 75'	
	75									
1308			@77.5' CB: N40E 20SE						@ 77.5' - Claybed, 1/8-1/4" thick in Silty SANDSTONE, continuous around hole, dark gray, slightly plastic	
	80			R-9	20	118.9	93.9	20	@ 79' - medium gray SANDSTONE to clayey SANDSTONE, some $\frac{1}{4}$" white coarse sandstone inclusions, red oxide stains throughout @ 80' - Clayey SANDSTONE: grayish brown, slightly moist to dry, very dense/stiff	
1303										
	85								@ 86' - Zone of crossbedding visible to 90', small scale, barely discernable	
1298										
	90								@ 90' - white to light brown coarse sandstone, generally massive	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
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TEST TYPES:

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CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 4 of 4

Drilling Company : Big Johnny's

Project Name : Baker St - Lake Elsinore

Type of Rig : Bucket Auger

Project Number : 23160-01

Drop : 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL

Drive Weight : 0'-25' - 3300 lbs.
25'-50' - 2200 lbs.
50'-80' - 1100 lbs.
80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1293	90									
	95									
1288									@97.5' - End Visual Log	
	100								**Total Depth = 100'** **Backfilled with Cuttings on 1/09/2024**	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
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CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-2

Date : 9/29/23 Page 1 of 3 | **Drilling Company :** Big Johnny's

Project Name : Baker St. - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" | **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1338 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0								**Quaternary Colluvium - Qcol** @ 0-2.5' - Clayey SAND: dark gray, dry/desiccated, roots	
1335									**Teritary Silverado Formation - Tsi** @ 2.5' - Highly weathered SILTSTONE, fractured,soft to medium stiff, slightly moist to dry, caliche stringers throughout	
	5			R-1	6	100.5	5.4		@ 5' - Silty Fine SANDSTONE to Sandy SILTSTONE: mottled gray, olive, white, reddish brown, slightly moist, dense to medium dense, very weathered	
1330									@ 8' - SILTSTONE: gray to reddish brown, dry to slightly moist, very stiff, highly weathered/fractured	
	10		GB: N80E, 19SE	R-2	8	121.6	4.9		@ 10' - Silty SANDSTONE: yellow brown to light olive green, slightly moist, dense, less weathered, medium to coarse grained Gradational contact to medium grained SANDSTONE: some gypsum or caliche lined joints(fine white powder) to 13', moderately well-cemented	
1325										
	15									
1320									@ 18' - 6-8" SILTSTONE rip up clasts	
	20			R-3	8	123.9	7.8		@ 20' - Interbedded SANDSTONE/SILTSTONE: olive green to gray and yellow brown, slightly moist, dense to very dense, gypsium filled joints	
1315			@ 23' GB: N75E, 17SW						@ 23' - General bedding attitude, along aligned rip up clasts, gradation to finer grained Sand	
	25									
1310			@ 27' B: N55W, 30SW @ 28' GB: N45W 28SW						@ 27' - Bedding attitude on indurated SANDSTONE bed @ 28' - SILTSTONE, dark gray, very stiff, slightly weathered/jointed, FeO staining, general bedding attitude	
	30									

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-2

Date : 9/28/23 Page 2 of 3 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1338 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30			R-4	10	108.5	16.4	SC-ML	@ 30' - SANDSTONE: gray, olive, white, black mottled, slightly moist to dry, very dense, medium to coarse grained, Clayey	
1305									@ 32' - SANDSTONE, less stiff, massive	
	35								@ 35' - Pisolitic Zone, very stiff SILTSTONE to 36'	
1300										
	40	B-1	GB @39' N45W, 30SW	R-5	8	87.2	24.1	SC	@ 39' - Some internal polished surfaces, general bedding attitude @ 40' - Clayey SANDSTONE: olive gray to dark gray, slightly moist, very stiff to stiff, polished surfaces, fractured	
			CB @42' N28W, 15SW	GB-1 @ 42'				CH	@ 42' - Clay Bed: dark gray, slightly moist, slightly plastic, around hole, pinches and swells from 1-3" thick	AL
1295									@ 44' - CLAY bed: dark gray, slightly moist, approximately 1" thick around hole, very stiff to hard below	
	45		CB @44' N50W, 26SW	GB-2 @ 44'					@ 45' - very hard drilling	
1290										
	50			R-6	31	111.6	6.4	SM	@ 50' - Silty SANDSTONE: light brown to olive gray, slightly moist, hard	DS #200
1285									@ 55' - Silty SANDSTONE: very dense, massive	
	55								@ 56' - Transtion from SANDSTONE to SILTSTONE, bedding attitude	
1280			@ 56' B: N70W, 31S J: N20E, S75 J: N20W, 79S J: N45W, 50N						@ 57' - Joints along polished surfaces, belled out along jointing on north side of hole up to 18", unsafe below, SILTSTONE to 60', very stiff to hard	
	60									

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-2

Date : 9/28/23 Page 3 of 3

Drilling Company : Big Johnny's

Project Name : Baker St - Lake Elsinore

Type of Rig : Bucket Auger

Project Number : 23160-01

Drop : 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1338 ' MSL

Drive Weight : 0'-25' - 3300 lbs.
25'-50' - 2200 lbs.
50'-80' - 1100 lbs.
80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	60			R-7	17	102.4	19.8	ML	@ 60' - Clayey SILTSTONE: dark gray, slightly moist, very stiff, fractured	
1275										
	65									
1270										
	70			R-8	27	100.1	15.9	SM-ML	@ 70' - Sandy SILTSTONE: light brown to gray brown, dry to slightly moist, very stiff	
1265										
	75									
1260										
	80			R-8	27	120.3	13.7		@ 80' - Sandy SILTSTONE: olive green to gray, dry to slightly moist, very stiff	
1255									**Total Depth = 80'** **Backfilled with Cuttings on 9/29/2023**	
	85									
1250										
	90									

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

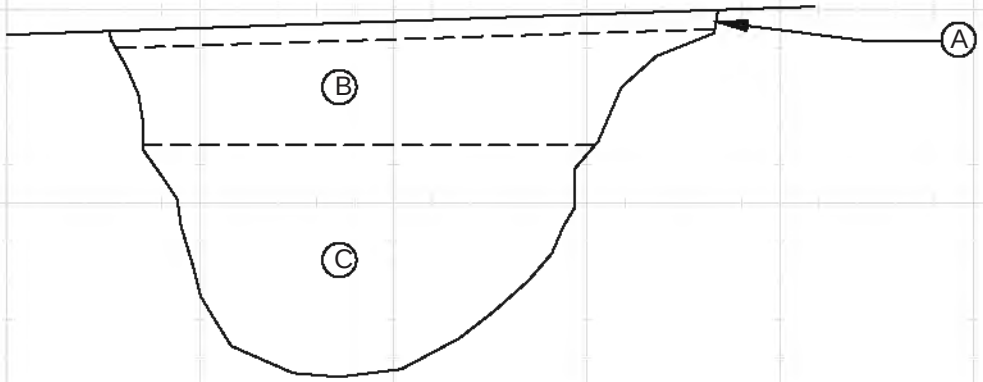
DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-1	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: light brown, dry, loose to medium dense, dead vegetation, desiccated	Qal				
	B	@ 0.5' to 3.5' - Silty CLAY: dark brown, dry to slightly moist, med dense					
		Tertiary Silverado Formation (Tsi)					
@ 4' GB: S50E 20SW	C	@ 3.5' to T.D. - Interbedded SILTSTONE and SANDSTONE, gray and mottled light brown, dry, medium dense to dense, general bedding attitude taken	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1274 ' MSL Surface Slope: 2 deg. Trend: S34W



Total Depth: 9.5'
Groundwater: None
Backfilled: 9/26/2023

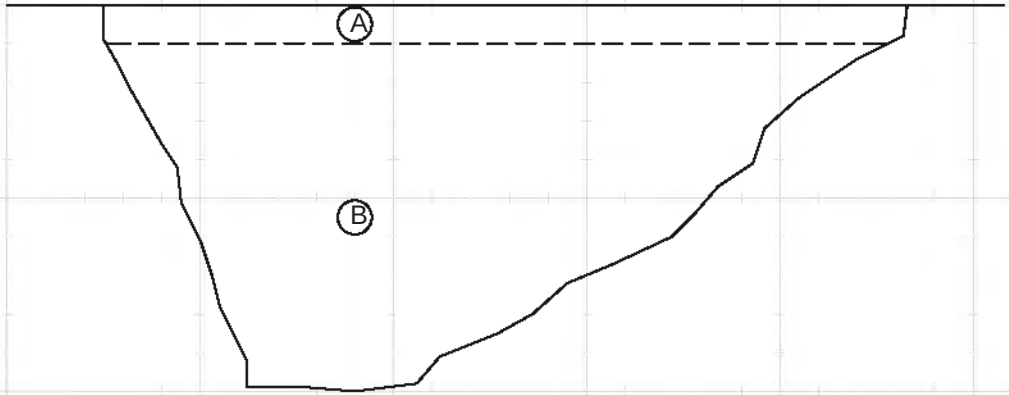
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Last Edited: 10/11/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-2	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A B	Quaternary Young Alluvial Channel Deposits (Qal) @ 0' to 1' - SILT: light brown to gray, dry, loose to medium dense, dead vegetation, @ 1' to T.D. - Clayey SAND: brownish gray overall, dry and indurated to 3.5', then slightly moist and medium dense from 3.5' to 10'.	Qal				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1268 ' MSL Surface Slope: 0 deg. Trend: E-W



Total Depth: 10'
Groundwater: None
Backfilled: 9/26/2023

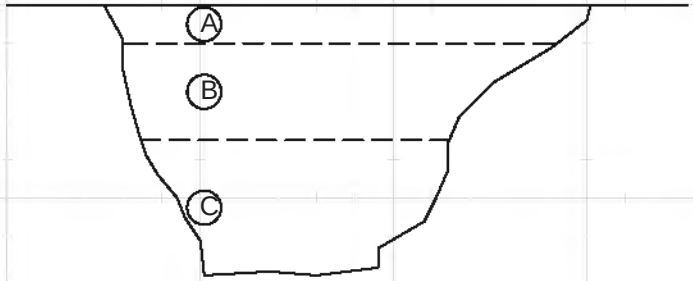
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Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-3	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Artificial Fill, Undocumented (afu)					
	A	@ 0' to 1' - SILT: dark brown to gray, loose, moist, vegetation at surface	afu		B-1 @ 0'-5'		
	B	@ 1' to 3.5' - Sandy CLAY: dark brown, moist, medium dense					
		Quaternary Young Alluvial Channel Deposits (Qal)					
	C	@ 3.5' to T.D. - Silty SAND: gray to brown, dry, very dense, indurated	Qal				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1270 ' MSL Surface Slope: 0 deg. Trend: N45E



Total Depth: 7'
Groundwater: None
Backfilled: 9/26/2023

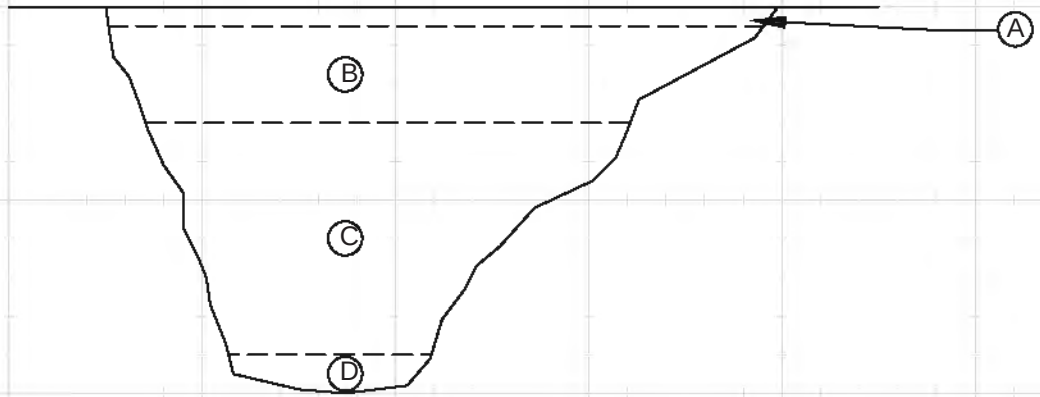
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Last Edited: 10/12/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-4	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: dark gray to brown, dry, loose to medium dense, dead vegetation at surface	Qal				
	B	@ 0.5' to 3' - Sandy CLAY: dark brown, gray, dense, slightly moist					
		Tertiary Silverado Formation (Tsi)					
	C	@ 3' to 9'- SANDSTONE: white to light brown with red mottle, dry, dense	Tsi				
	D	@ 9' to T.D. - SILTSTONE: olive gray, dry, medium dense to dense					

GRAPHICAL REPRESENTATION BELOW: Elevation : 1274 ' MSL Surface Slope: 0 deg. Trend: S75E



Total Depth: 10'
Groundwater: None
Backfilled: 9/26/2023

scale : 1 in = 5 ft

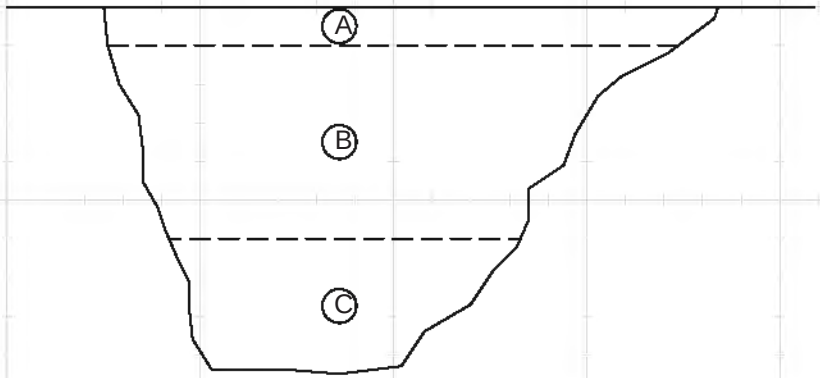
Last Edited: 10/12/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-5
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:
Equipment: Backhoe	Location: See Geotechnical Map	

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Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 1' - SILT: dark brown and gray, slightly moist to dry, loose	Qal		B-1 @ 0'-9.5'		
	B	@ 1' to 6' - SILT/CLAY: dark brown, slightly moist dense					
		Tertiary Silverado Formation (Tsi)					
	C	@ 6' to T.D. - SILTSTONE: gray, mottled, slightly moist, medium dense to dense, weathered	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1271 ' MSL Surface Slope: 0 deg. Trend: S55E



Total Depth: 9.5'
Groundwater: None
Backfilled: 9/26/2023

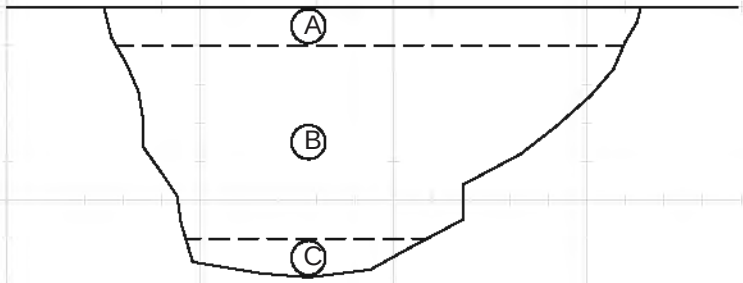
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Last Edited: 10/12/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-6
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:
Equipment: Backhoe	Location: See Geotechnical Map	

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary young alluvial channel deposits (Qal)					
	A	@ 0' to 1' - SILT: light brown, dry, medium dense, some 1" to 6" cobbles (subrounded to angular)	Qal				
	B	@ 1' to 6' - Silty SAND: dark reddish brown, dry, dense to very dense, indurated					
		Tertiary Silverado Formation (Tsi)					
	C	@ 6' to T.D. - SANDSTONE: white, dry, dense, some iron oxide	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1289 ' MSL Surface Slope: 0 deg. Trend: E-W



Total Depth: 7'
Groundwater: None
Backfilled: 9/26/2023

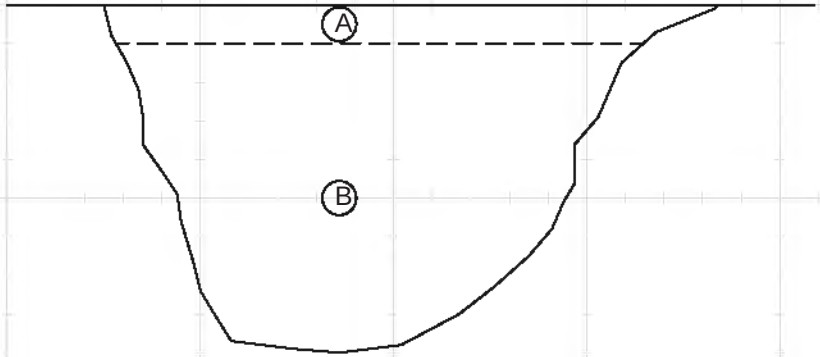
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Last Edited: 10/13/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-7	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A B	Artificial Fill, Undocumented (afu) @ 0' to 1' - SILT: light grayish brown, loose, dry, dead grass, some trash, rounded cobbles 2"-6" in diameter @ 1' to 9' - SILT: grayish brown, dry, trash (roof tiles) random rounded cobbles (some are nested, creating voids), krotovina, medium dense, tan sandy layer from 3'-4' than back to brown gray silt	afu				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1270 ' MSL Surface Slope: 0 deg. Trend: S50E



Total Depth: 9'
Groundwater: None
Backfilled: 9/26/2023

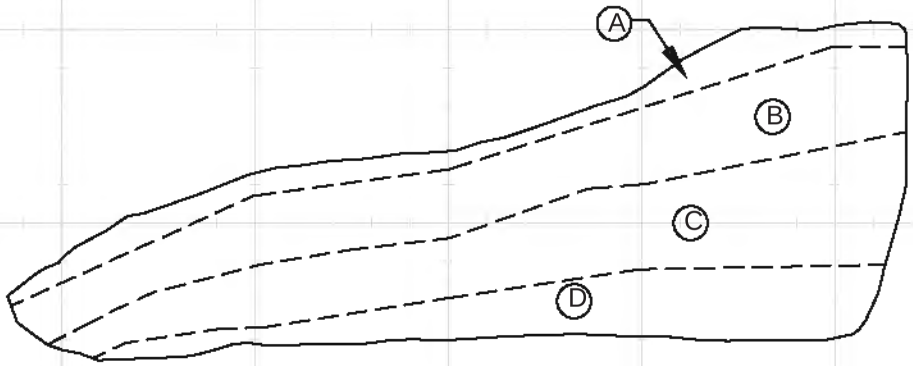
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Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-8	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)	Qal				
	A	@ 0' to 0.5 - SILT: light brown to gray, dry, loose, dry grass, some 2"-3" sub rounded cobbles					
	B	@ 0.5' to 4' - Sandy CLAY/Clayey SAND: dark brown, slightly moist to dry, dense					
		Tertiary Silverado Formation (Tsi)	Tsi				
	C	@ 4' to 6' - SANDSTONE: white, slightly moist, medium dense, some iron oxide					
B:S75E 25S	D	@ 6' to 8' - SILTSTONE: mottled gray, medium dense to dense, dry to slightly moist, heavily weathered					

GRAPHICAL REPRESENTATION BELOW: Elevation : 1313 ' MSL Surface Slope: 35 deg. Trend: S34W



Total Depth: 8'
Groundwater: None
Backfilled: 9/26/2023

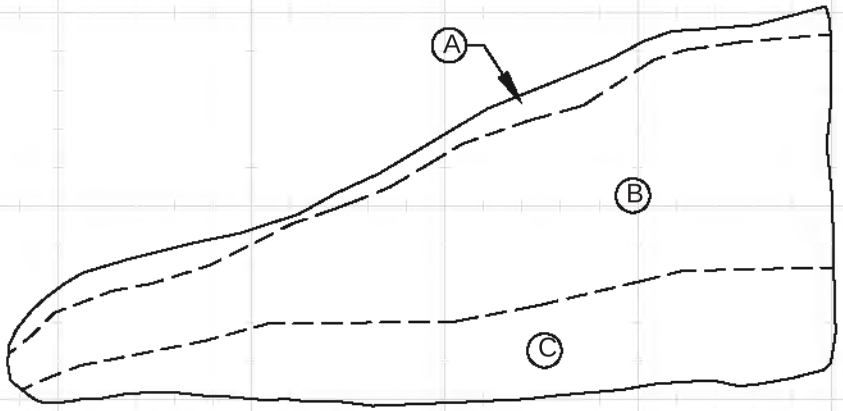
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Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-9	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: gray, loose, dry, dead grass	Qal				
	B	@ 0.5' to 5' - Sandy CLAY/Clayey SAND: brown to dark brown, dry, very dense, indurated					
		Tertiary Silverado Formation (Tsi)					
S35E 50SW	C	@ 5' to 9' - mottled SANDSTONE and SILTSTONE: gray overall, dry, dense, some rip up clasts of siltstone within sandstone areas, contact blends with unit B, intact contact between sandstone and siltstone beds in rear of trench, attitude taken	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1311 ' MSL Surface Slope: 25 deg. Trend: S46W



Total Depth: 9'
Groundwater: None
Backfilled: 9/26/2023

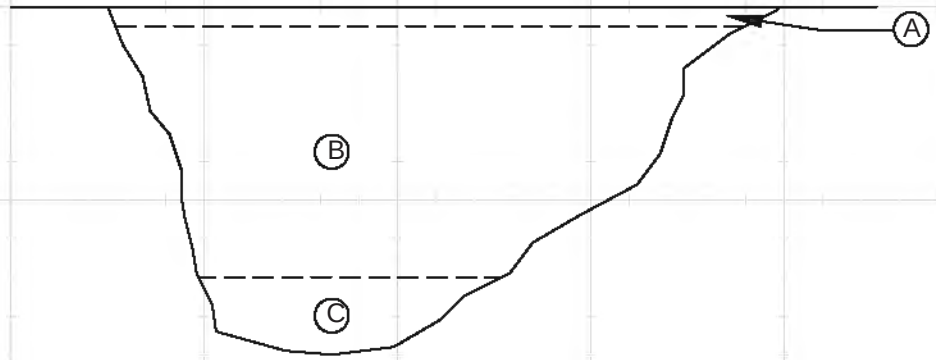
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-10	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: light gray, dry, loose to medium dense, dead grass	Qal				
	B	@ 0.5' to 7' - Clayey SAND: brownish gray, slightly moist, dense, indurated, 2" to 3" subrounded cobbles					
	C	@ 7' to 9' - SAND with trace CLAY, brownish gray, slightly moist, medium dense, 2" to 3" subrounded cobbles					

GRAPHICAL REPRESENTATION BELOW: Elevation : 1291 ' MSL Surface Slope: 0 deg. Trend: N-S



Total Depth: 9'
Groundwater: None
Backfilled: 9/26/2023

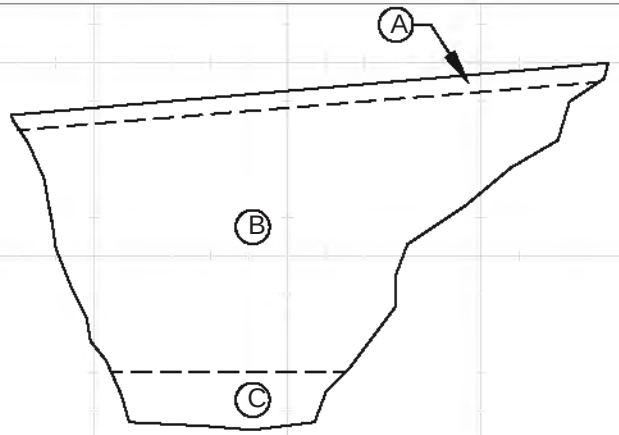
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-11
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:
Equipment: Backhoe	Location: See Geotechnical Map	

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: light gray overall, dry, medium dense	Qal				
	B	@ 0.5' to 8' - Clayey SAND/Sandy CLAY: dark brownish gray, dry, dense, rootlets, indurated					
	C	@ 8' to 9' - Clayey SAND: olive gray, slightly moist, medium dense to dense					

GRAPHICAL REPRESENTATION BELOW: Elevation : 1273 ' MSL Surface Slope: 5 deg. Trend: N60W



Total Depth: 9.5'
Groundwater: None
Backfilled: 9/26/2023

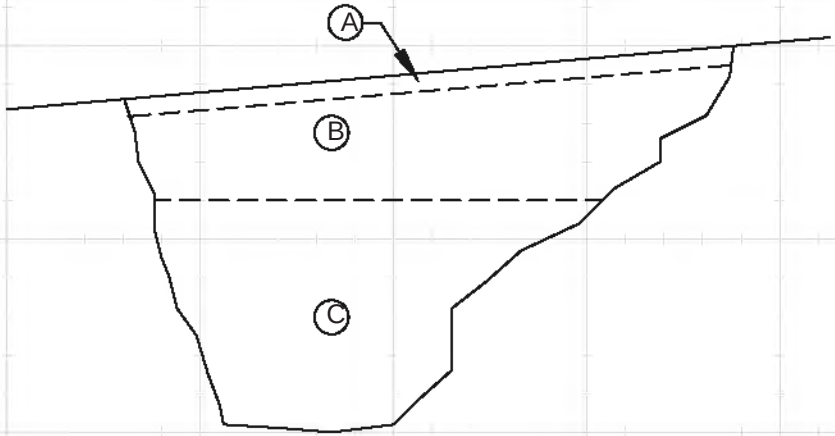
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-12	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Colluvium (Qcol)					
	A	@ 0' to 0.5' - SILT and Sandy CLAY: brownish gray, dry, medium dense to dense, dead grass, rounded 2"-3" cobbles	Qcol				
	B	@ 0.5' to 4' - Clayey SAND: light brown, dry, dense, cracked/desiccated			B-1 @ 4'-10'		
		Tertiary Silverado Formation (Tsi)					
	C	@ 4' to 10' - SANDSTONE: white, dense, dry, some minor root fractures, krotovina, some iron oxide	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1310 ' MSL Surface Slope: 5 deg. Trend: N50W



Total Depth: 10'
Groundwater: None
Backfilled: 9/26/2023

scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-13
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:
Equipment: Backhoe	Location: See Geotechnical Map	

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A	Quaternary Colluvium (Qcol) @ 0' to 4' - Clayey SAND: brownish gray, dry, medium dense, 2"-1' rounded clasts, some angular clasts as well	Qcol				
	B	Tertiary Silverado Formation (Tsi) @ 4' to 9' - Clayey SAND: olive gray to light brown, around 7' changes to heavily fractured claystone/siltstone, contact is undulatory, both units oxidized and very mottled, rip up clasts of siltstone present in clayey sand, all units dense and slightly moist	Tsi		B-1 @ 4' - 9'		

GRAPHICAL REPRESENTATION BELOW: Elevation : 1304 ' MSL Surface Slope: 25 deg. Trend: S15E



Total Depth: 9'
Groundwater: None
Backfilled: 9/26/2023

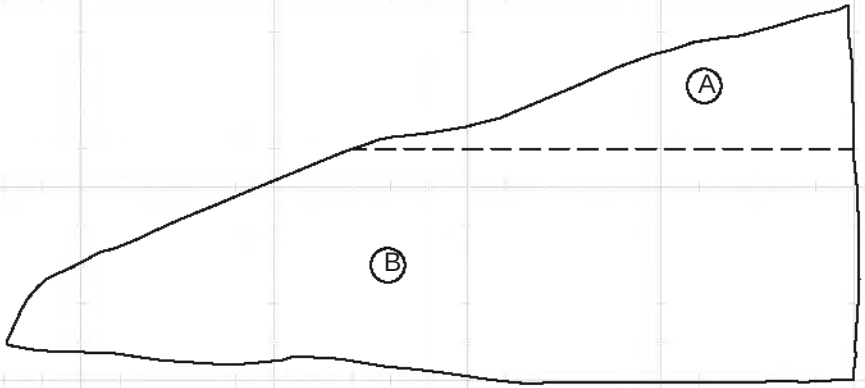
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Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-14	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A	Quaternary Colluvium (Qcol) @ 0' to 4' - Clayey SAND: grayish brown, medium dense, dry, 2"-3" cobbles	Qcol				
N69E 5SE	B	Tertiary Silverado Formation (Tsi) @ 4' to 10' - SILTSTONE: gray overall with red and black mottle, dense, dry to slightly moist, red banding seems to vaguely outline bedding, bands are not continuous, some sandy patches with gray and red mottle, general bedding attitude	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1333 ' MSL Surface Slope: 25 deg. Trend: S10E



Total Depth: 10'
Groundwater: None
Backfilled: 9/26/2023

scale : 1 in = 5 ft

Last Edited: 10/25/2023

Appendix C
Laboratory Test Results

APPENDIX C

Laboratory Testing Procedures and Test Results

The laboratory testing program was formulated towards providing data relating to the relevant engineering properties of the soils with respect to residential construction. Samples considered representative of site conditions were tested in general accordance with American Society for Testing and Materials (ASTM) procedure and/or California Test Methods (CTM), where applicable. The following summary is a brief outline of the test type and a table summarizing the test results.

Moisture and Density Determination Tests: Moisture content (ASTM D2216) and dry density determinations (ASTM D2937) were performed on relatively undisturbed samples obtained from the test borings and/or trenches. The results of these tests are presented in the boring logs. Where applicable, only moisture content was determined from undisturbed or disturbed samples.

Expansion Index: The expansion potential of selected samples was evaluated by the Expansion Index Test, Standard ASTM D4829. Specimens are molded under a given compactive energy to approximately the optimum moisture content and approximately 50 percent saturation or approximately 90 percent relative compaction. The prepared 1-inch-thick by 4-inch-diameter specimens are loaded to an equivalent 144 psf surcharge and are inundated with tap water until volumetric equilibrium is reached. The results of these tests are presented in the table below.

Sample Location	Expansion Index	Expansion Potential*
HS-6 @ 0-5 feet	99	High
TP-3 @ 0-5 feet	71	Medium

* ASTM D4829

Grain Size Distibution/Fines Content: Representative samples were dried, weighed and soaked in water until individual soil particles were separated (per ASTM D421) and then washed on a No. 200 sieve (ASTM D1140). Where applicable, the portion retained on the No. 200 sieve and dried and then sieved on a U.S. Standard brass sieve set in accordance with ASTM D6913 (sieve).

Sample Location	Description	% Passing # 200 Sieve
HS-6 @ 0-5 feet	Sandy Silt	51
HS-8 @ 15 feet	Clay with Sand	73
TP-3 @ 0-5 feet	Sandy Clay	59
BA-1 @ 60 feet	Silty/Clayey Sand	27
BA-2 @ 50 feet	Silty Sand	44

Laboratory Testing Procedures and Test Results

Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined in accordance with ASTM Test Method D4318 for engineering classification of fine-grained material and presented in the table below. The USCS soil classification indicated in the table below is based on the portion of sample passing the No. 40 sieve and may not necessarily be representative of the entire sample. The plot is provided in this Appendix.

Sample Location	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	USCS Soil Classification
HS-2, R-3 @ 7.5 ft	62	30	32	CH
TP-11, B-1 @ 0-5 ft	41	19	22	CL
BA-1, GB-1 @ 52 ft	53	31	22	MH
BA-2, GB-1 @ 42 ft	74	33	41	CH
BA-1B, GB-1 @ 77.5'	62	30	32	CH

Direct Shear: Four direct shear tests were performed on remolded and relatively undisturbed samples, which was soaked for a minimum of 24 hours prior to testing. The samples were tested under various normal loads using a motor-driven, strain-controlled, direct-shear testing apparatus (ASTM D3080). The plot is provided in this Appendix.

Consolidation: One consolidation test was performed per ASTM D2435. A sample (2.4 inches in diameter and 1 inch in height) was placed in a consolidometer and increasing loads were applied. The sample was allowed to consolidate under "double drainage" and total deformation for each loading step was recorded. The percent consolidation for each load step was recorded as the ration of the amount of vertical compression to the original sample height. The consolidation pressure curves are provided in this Appendix.

Maximum Density Tests: The maximum dry density and optimum moisture content of typical materials were determined in accordance with ASTM D1557. The results of these tests are presented in the table below:

Sample Location	Sample Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
HS-7 @ 0-5 feet	Grayish Brown Sandy Clay	113.5	14.0
TP-3 @ 0-5 feet	Grayish Brown Sandy Clay	116.5	12.0

Laboratory Testing Procedures and Test Results

R-value Test: R-value test was performed in general accordance with California Test Method 301. The plot is included in the Appendix.

Sample Location	R-value
HS-6 @ 0-5 ft	<5

Chloride Content: Chloride content was tested in accordance with Caltrans Test Method (CTM) 422. The results are presented below.

Sample Location	Chloride Content, ppm
HS-6 @ 0-5 feet	180
TP-3 @ 0-5 feet	220

Soluble Sulfates: The soluble sulfate contents of selected samples were determined by standard geochemical methods (CTM 417). The soluble sulfate content is used to determine the appropriate cement type and maximum water-cement ratios. The test results are presented in the table below.

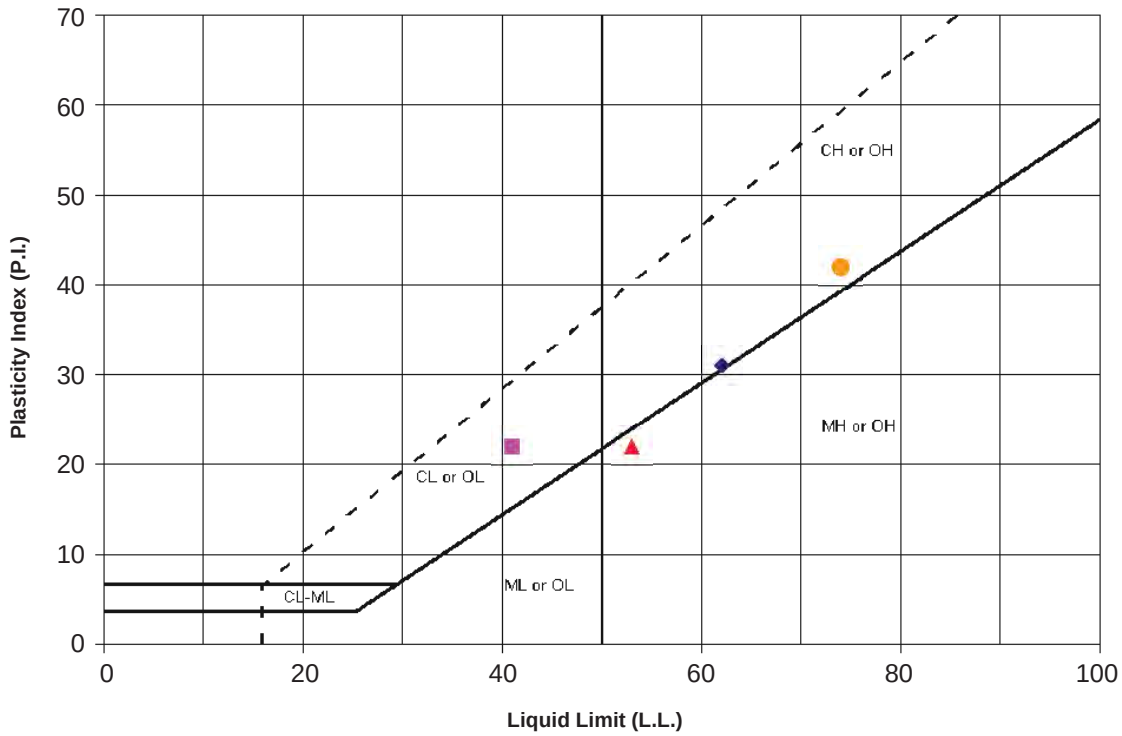
Sample Location	Sulfate Content (ppm)	Sulfate Exposure Class *
HS-6 @ 0-5 feet	86	S0
TP-3 @ 0-5 feet	226	S0

*Based on ACI 318R-14, Table 19.3.1.1

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed in general accordance with CTM 643 and standard geochemical methods. The results are presented in the table below.

Sample Location	pH	Minimum Resistivity (ohms-cm)
HS-6 @ 0-5 feet	7.91	735
TP-3 @ 0-5 feet	6.57	1240

PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS



Symbol	Location.:	Sample No.:	Depth (ft)	Passing No. 200 Sieve (%)	Liquid Limit (%) LL	Plastic Limit (%) PL	Plasticity Index (%) PI	USCS
◆	HS-2	R-3	7.5'	-	62	30	32	CH
■	TP-11	B-1	0-5'	-	41	19	22	CL
▲	BA-1	GB-1	52'	-	53	31	22	MH
●	BA-2	GB-1	42'	-	74	33	41	CH

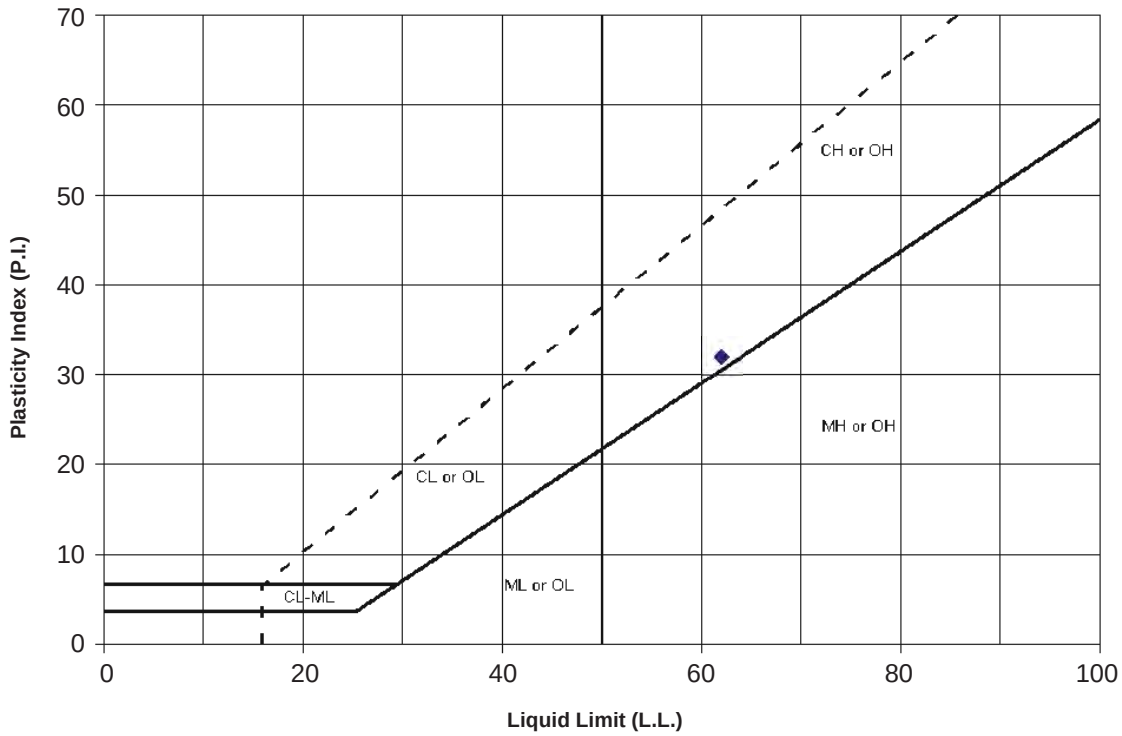
LGC Geotechnical, Inc.

ATTERBERG LIMITS
(ASTM D 4318)

Project Number: 23160-01
Date: Oct-23

EIP Lake Elsinore

PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS



Symbol	Location.:	Sample No.:	Depth (ft)	Passing No. 200 Sieve (%)	Liquid Limit (%) LL	Plastic Limit (%) PL	Plasticity Index (%) PI	USCS
◆	BA-1B	GB-1	77.5'	-	62	30	32	CH

LGC Geotechnical, Inc.

ATTERBERG LIMITS
(ASTM D 4318)

Project Number: 23160-01
Date: Jan-24

Baker St, Lake Elsinore

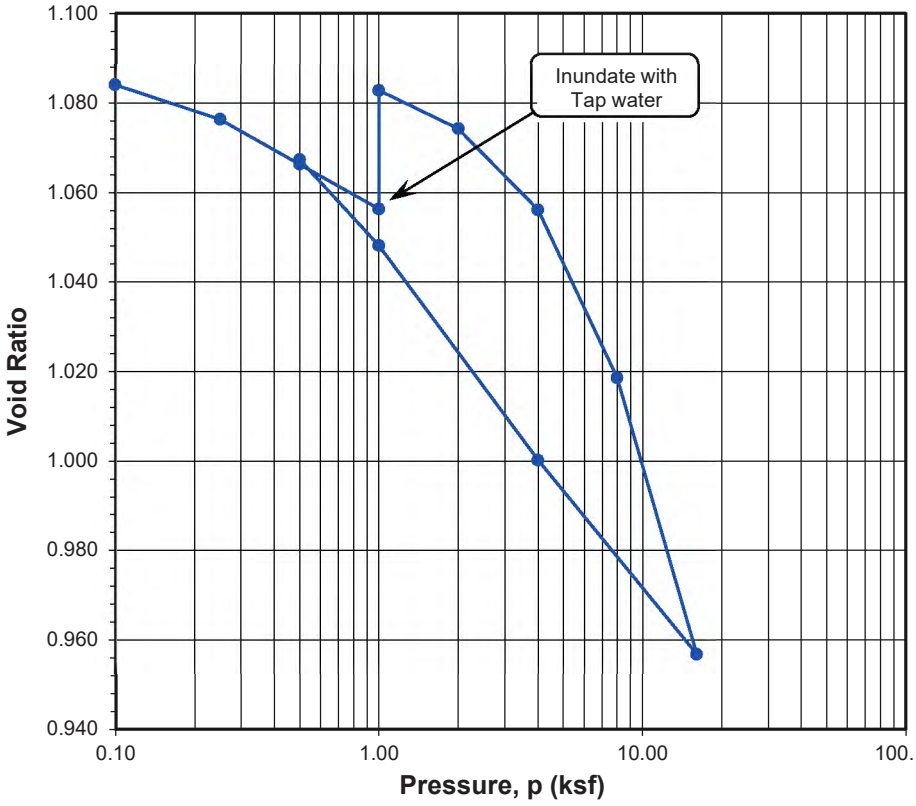
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name: EIP Lake Elsinore
Project No.: 23160-01
Boring No.: HS-2
Sample No.: R-3
Soil Identification: Yellowish brown lean clay (CL)

Tested By: GB/JD Date: 10/11/23
Checked By: J. Ward Date: 10/20/23
Depth (ft.): 7.5
Sample Type: Ring

Sample Diameter (in.):	2.415
Sample Thickness (in.):	1.000
Weight of Sample + ring (g):	178.31
Weight of Ring (g):	45.07
Height after consol. (in.):	0.9913
Before Test	
Wt. of Wet Sample+Cont. (g):	155.80
Wt. of Dry Sample+Cont. (g):	129.30
Weight of Container (g):	57.87
Initial Moisture Content (%)	37.1
Initial Dry Density (pcf)	80.8
Initial Saturation (%):	92
Initial Vertical Reading (in.)	0.0781
After Test	
Wt. of Wet Sample+Cont. (g):	236.81
Wt. of Dry Sample+Cont. (g):	199.10
Weight of Container (g):	57.18
Final Moisture Content (%)	38.94
Final Dry Density (pcf):	81.3
Final Saturation (%):	98
Final Vertical Reading (in.)	0.0905
Specific Gravity (assumed):	2.70
Water Density (pcf):	62.43

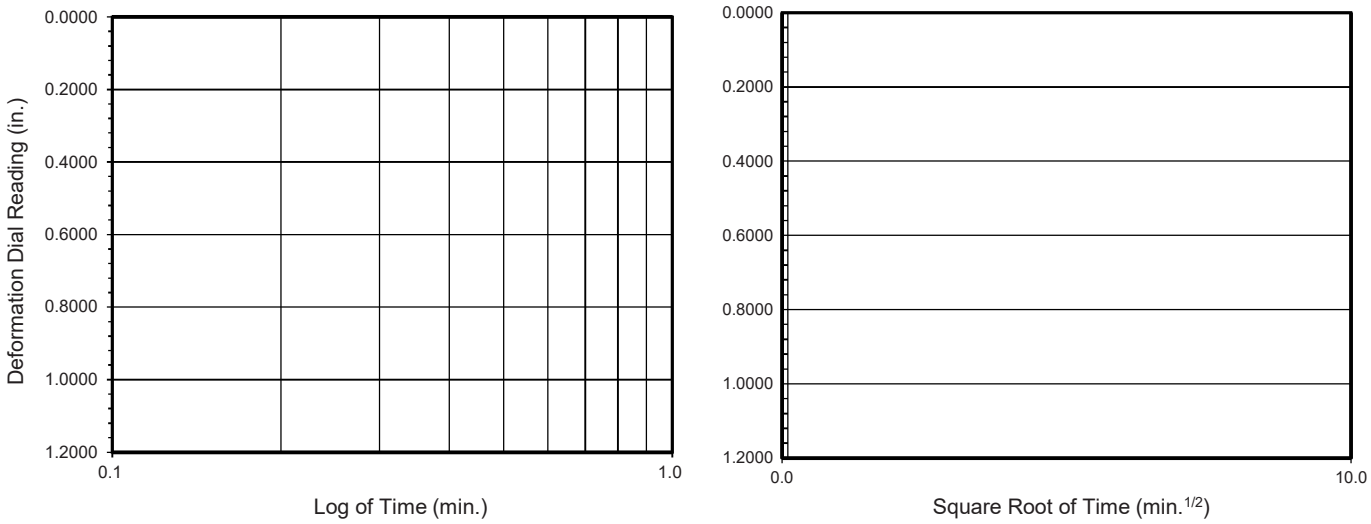


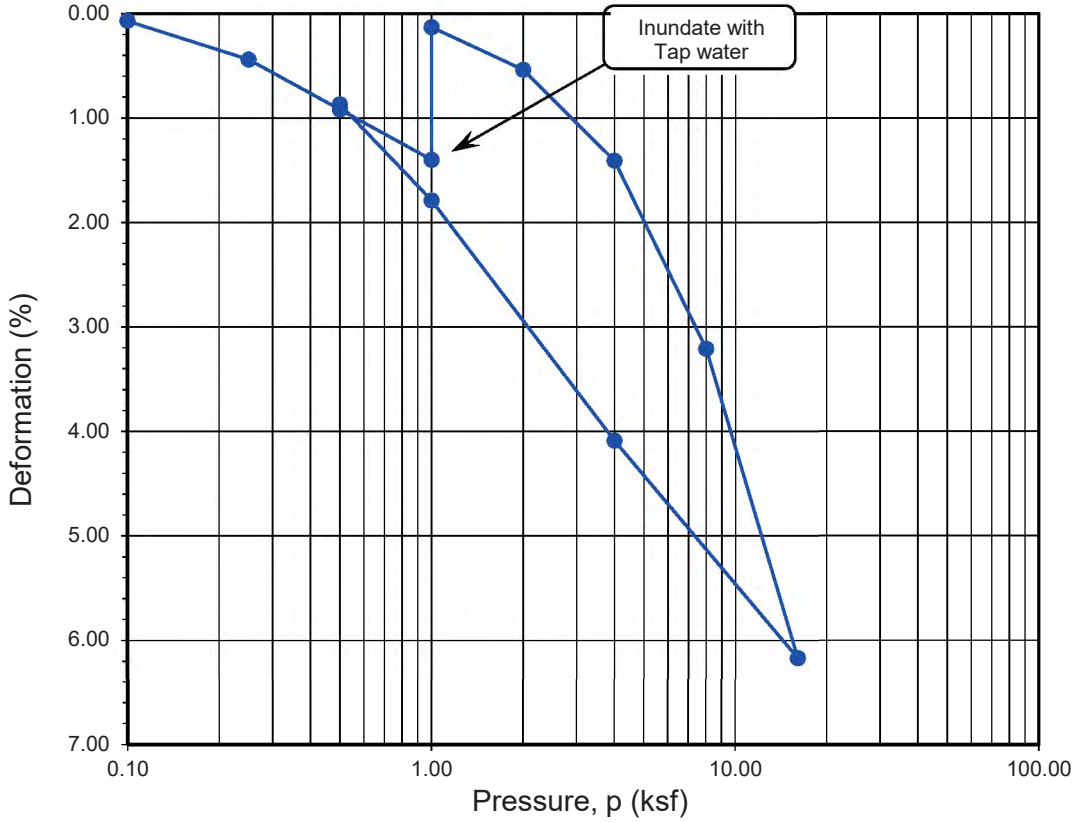
Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.10	0.0788	0.9993	0.00	0.07	1.084	0.07
0.25	0.0829	0.9952	0.04	0.48	1.076	0.44
0.50	0.0882	0.9899	0.09	1.01	1.066	0.92
1.00	0.0937	0.9844	0.16	1.56	1.056	1.40
1.00	0.0810	0.9971	0.16	0.29	1.083	0.13
2.00	0.0859	0.9922	0.24	0.78	1.074	0.54
4.00	0.0955	0.9826	0.33	1.74	1.056	1.41
8.00	0.1147	0.9634	0.45	3.66	1.019	3.21
16.00	0.1455	0.9326	0.57	6.74	0.957	6.17
4.00	0.1237	0.9544	0.47	4.56	1.000	4.09
1.00	0.1000	0.9781	0.40	2.19	1.048	1.79
0.50	0.0905	0.9876	0.37	1.24	1.067	0.87

Time Readings

Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)

Time Readings





Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-2	**R-3**	**7.5**	**37.1**	**38.9**	**80.8**	**81.3**	**1.086**	**1.067**	**92**	**98**

Soil Identification: Yellowish brown lean clay (CL)

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 23160-01

EIP Lake Elsinore

10-23

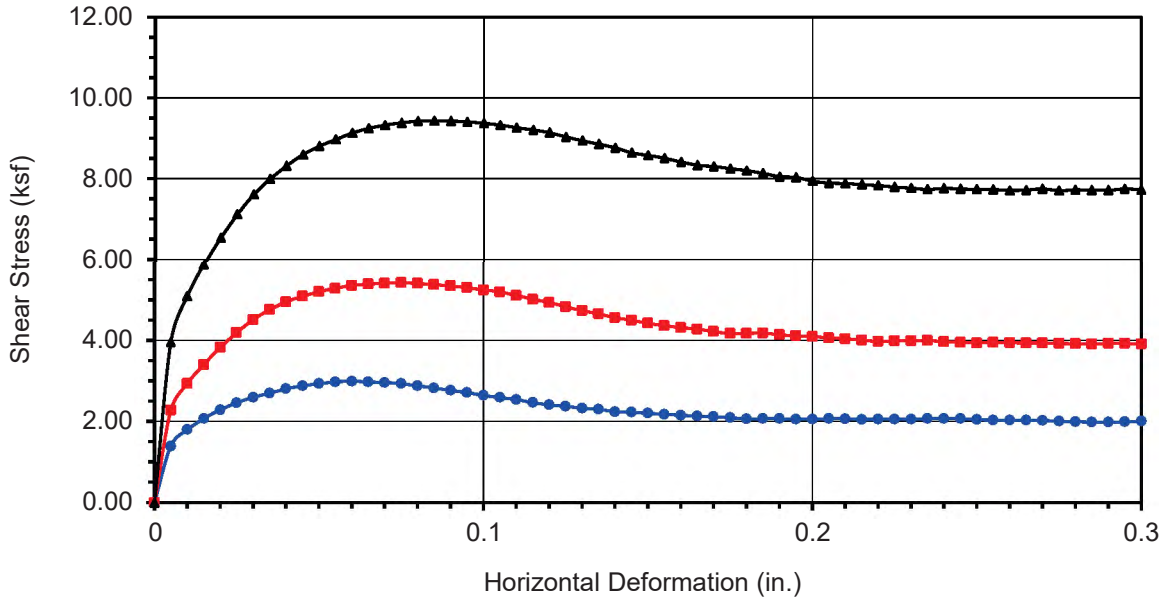
DIRECT SHEAR TEST

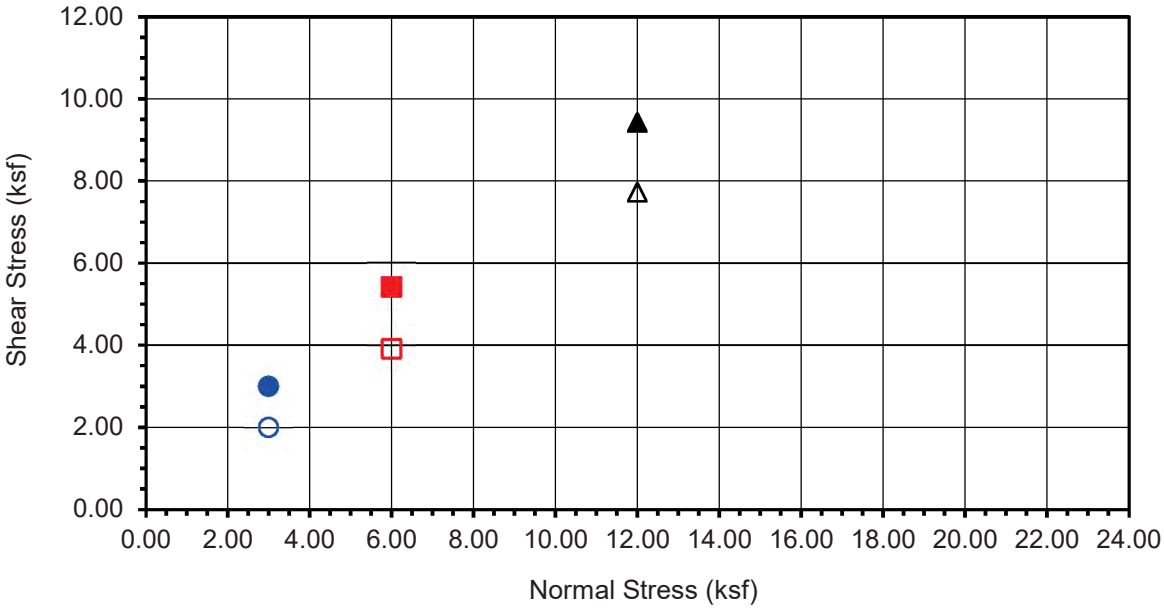
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/17/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	BA-1	Sample Type:	Ring		
Sample No.:	R-7	Depth (ft.):	60.0		

Soil Identification: Olive gray silty, clayey sand (SC-SM)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	199.94	202.18	207.73
Weight of Ring(gm):	44.67	45.19	44.54
Before Shearing			
Weight of Wet Sample+Cont.(gm):	198.81	198.81	198.81
Weight of Dry Sample+Cont.(gm):	187.08	187.08	187.08
Weight of Container(gm):	38.30	38.30	38.30
Vertical Rdg.(in): Initial	0.2501	0.2473	0.0000
Vertical Rdg.(in): Final	0.2607	0.2660	-0.0308
After Shearing			
Weight of Wet Sample+Cont.(gm):	201.66	225.21	224.54
Weight of Dry Sample+Cont.(gm):	180.76	204.98	205.31
Weight of Container(gm):	39.72	61.47	58.54
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**BA-1**
Sample No.	**R-7**
Depth (ft)	**60**

Sample Type:

Ring

Soil Identification:

Olive gray silty, clayey sand (SC-SM)

Normal Stress (kip/ft²)	3.000	6.000	12.000
Peak Shear Stress (kip/ft²)	● 2.993	■ 5.423	▲ 9.434
Shear Stress @ End of Test (ksf)	○ 2.009	□ 3.914	△ 7.727
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	7.88	7.88	7.88
Dry Density (pcf)	119.7	121.0	125.8
Saturation (%)	52.1	54.2	62.6
Soil Height Before Shearing (in.)	0.9894	0.9813	0.9692
Final Moisture Content (%)	14.8	14.1	13.1

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

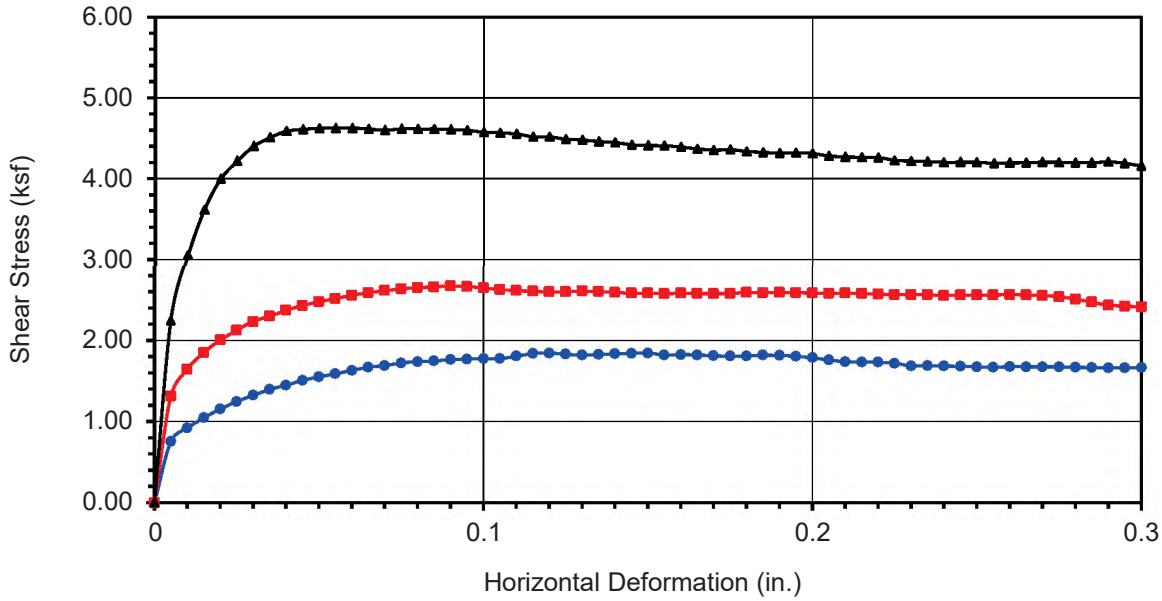
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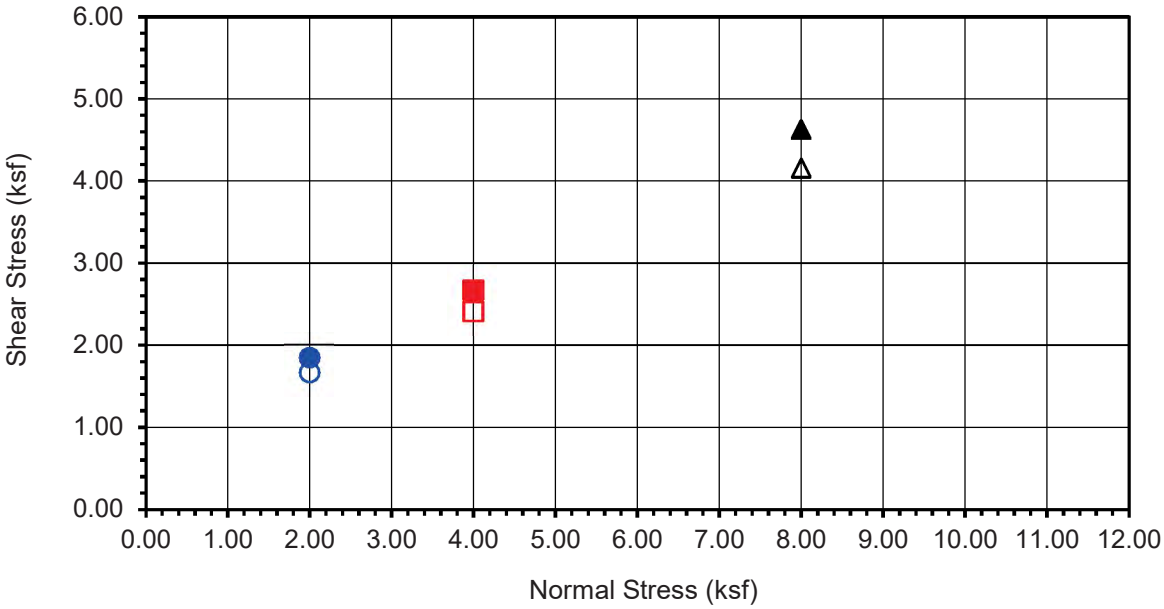
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/18/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	BA-2	Sample Type:	Ring		
Sample No.:	R-6	Depth (ft.):	50.0		

Soil Identification: Olive lean clay with sand (CL)s

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	187.72	196.06	200.28
Weight of Ring(gm):	43.30	45.54	45.73
Before Shearing			
Weight of Wet Sample+Cont.(gm):	158.08	158.08	158.08
Weight of Dry Sample+Cont.(gm):	149.98	149.98	149.98
Weight of Container(gm):	60.38	60.38	60.38
Vertical Rdg.(in): Initial	0.0000	0.2446	0.2771
Vertical Rdg.(in): Final	-0.0124	0.2644	0.3048
After Shearing			
Weight of Wet Sample+Cont.(gm):	223.40	220.51	191.08
Weight of Dry Sample+Cont.(gm):	202.49	198.99	169.49
Weight of Container(gm):	72.44	64.76	36.58
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**BA-2**
Sample No.	**R-6**
Depth (ft)	**50**

Sample Type:

Ring

Soil Identification:

Olive lean clay with sand (CL)s

Normal Stress (kip/ft²)	2.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 1.845	■ 2.672	▲ 4.628
Shear Stress @ End of Test (ksf)	○ 1.666	□ 2.414	△ 4.159
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	9.04	9.04	9.04
Dry Density (pcf)	110.2	114.8	117.9
Saturation (%)	46.0	52.1	56.8
Soil Height Before Shearing (in.)	0.9876	0.9802	0.9723
Final Moisture Content (%)	16.1	16.0	16.2

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

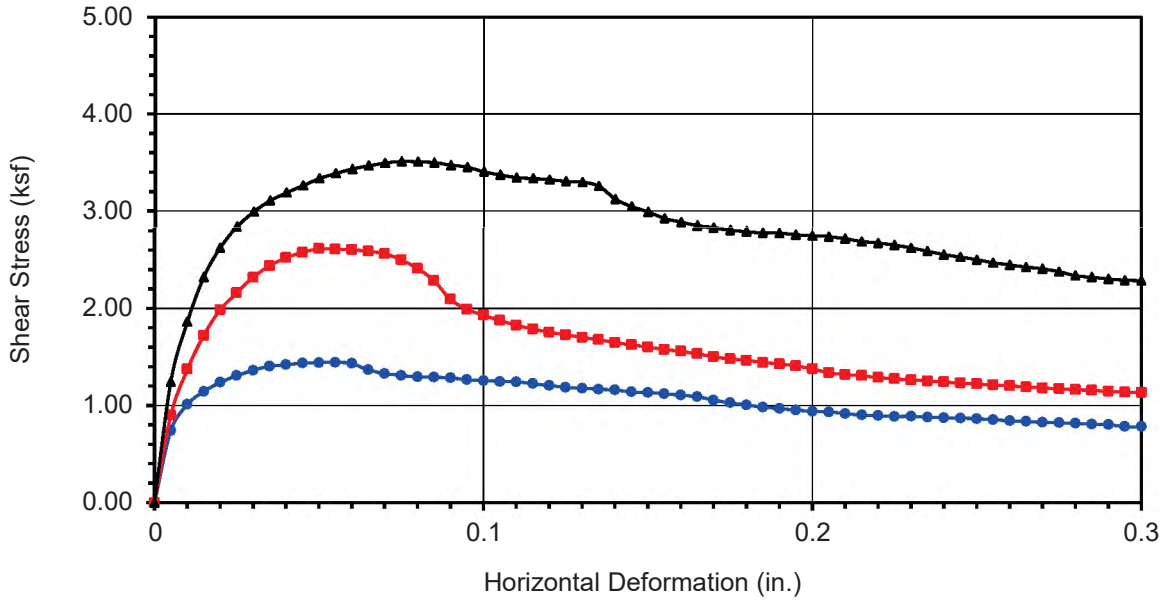
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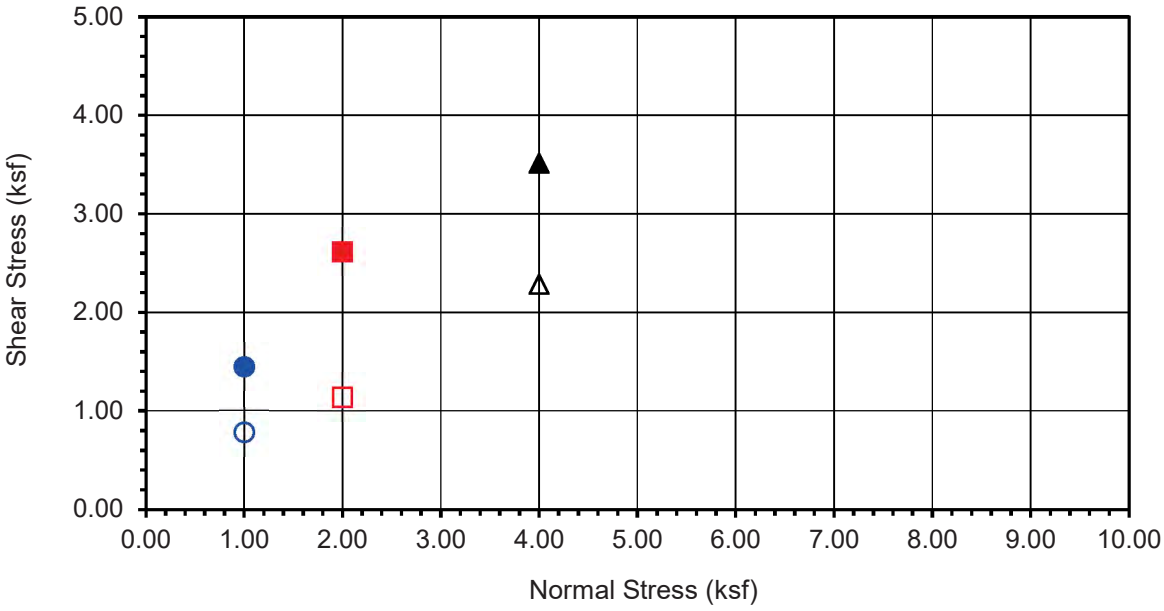
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/17/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	HS-8	Sample Type:	Ring		
Sample No.:	R-5	Depth (ft.):	15.0		

Soil Identification: Strong brown lean clay (CL)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	191.30	193.56	199.29
Weight of Ring(gm):	45.11	43.65	46.57
Before Shearing			
Weight of Wet Sample+Cont.(gm):	171.02	171.02	171.02
Weight of Dry Sample+Cont.(gm):	148.22	148.22	148.22
Weight of Container(gm):	38.48	38.48	38.48
Vertical Rdg.(in): Initial	0.0000	0.2387	0.2494
Vertical Rdg.(in): Final	0.0079	0.2342	0.2566
After Shearing			
Weight of Wet Sample+Cont.(gm):	206.19	217.29	222.68
Weight of Dry Sample+Cont.(gm):	175.08	187.36	192.76
Weight of Container(gm):	55.99	64.16	68.09
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**HS-8**
Sample No.	**R-5**
Depth (ft)	**15**
Sample Type:	
Ring	
Soil Identification:	
Strong brown lean clay (CL)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.446	■ 2.616	▲ 3.512
Shear Stress @ End of Test (ksf)	○ 0.783	□ 1.135	△ 2.286
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	20.78	20.78	20.78
Dry Density (pcf)	100.7	103.2	105.2
Saturation (%)	83.2	88.6	93.0
Soil Height Before Shearing (in.)	1.0079	1.0045	0.9928
Final Moisture Content (%)	26.1	24.3	24.0

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

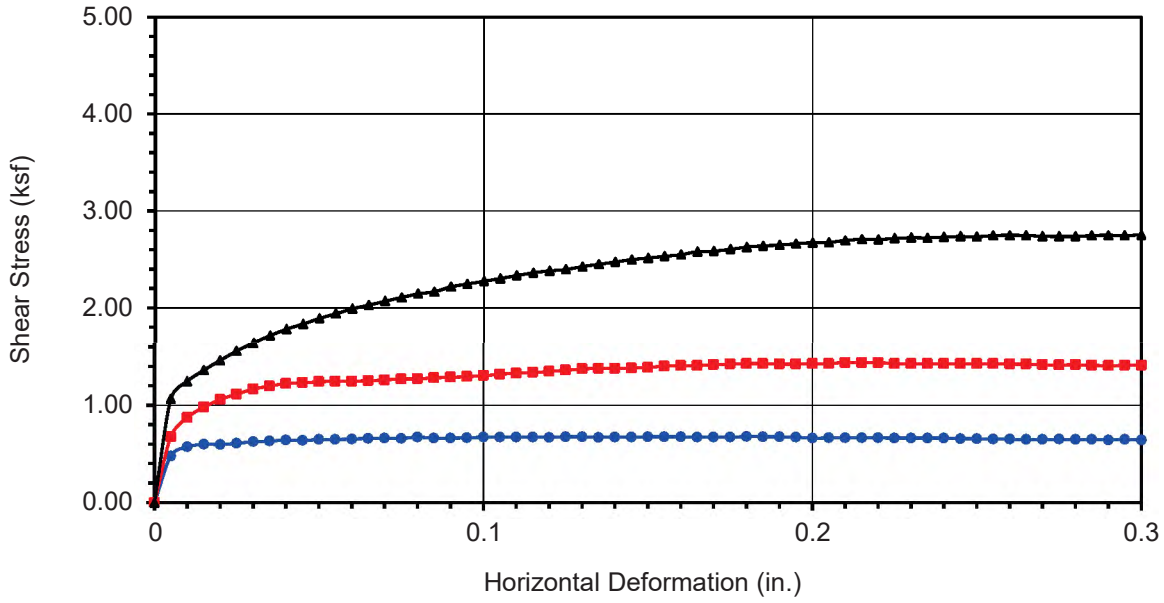
DIRECT SHEAR TEST

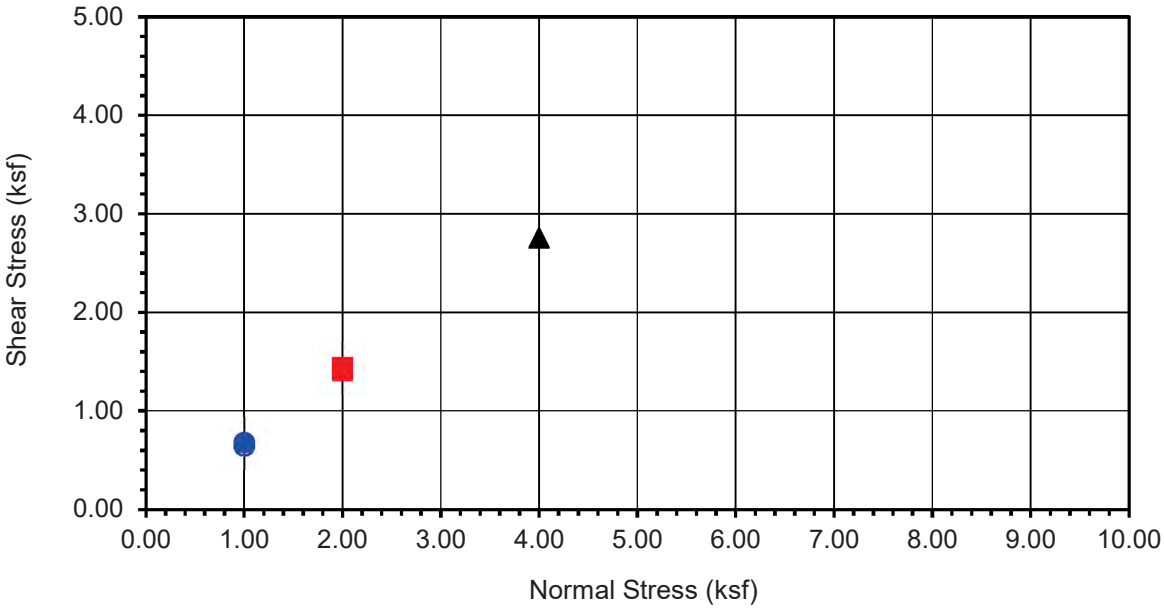
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/16/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	TP-3	Sample Type:	90% Remold		
Sample No.:	B-1	Depth (ft.):	0-5		

Soil Identification: Grayish brown sandy lean clay s(CL)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	187.13	187.27	186.75
Weight of Ring(gm):	45.47	45.31	44.53
Before Shearing			
Weight of Wet Sample+Cont.(gm):	167.70	167.70	167.70
Weight of Dry Sample+Cont.(gm):	155.43	155.43	155.43
Weight of Container(gm):	55.15	55.15	55.15
Vertical Rdg.(in): Initial	0.2666	0.2294	0.0000
Vertical Rdg.(in): Final	0.2597	0.2287	-0.0232
After Shearing			
Weight of Wet Sample+Cont.(gm):	211.00	208.20	209.21
Weight of Dry Sample+Cont.(gm):	184.84	184.00	187.16
Weight of Container(gm):	59.18	59.15	61.49
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**TP-3**
Sample No.	**B-1**
Depth (ft)	**0-5**
Sample Type: 90% Remold	
Soil Identification: Grayish brown sandy lean clay s(CL)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 0.679	■ 1.440	▲ 2.754
Shear Stress @ End of Test (ksf)	○ 0.644	□ 1.412	△ 2.754
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	12.24	12.24	12.24
Dry Density (pcf)	105.0	105.2	105.4
Saturation (%)	54.5	54.8	55.1
Soil Height Before Shearing (in.)	1.0069	1.0007	0.9768
Final Moisture Content (%)	20.8	19.4	17.5

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

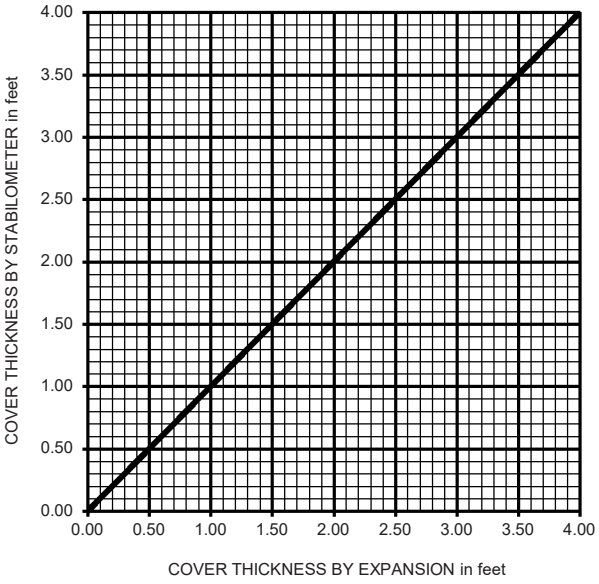
R-VALUE TEST RESULTS
DOT CA Test 301

PROJECT NAME:	EIP Lake Elsinore	PROJECT NUMBER:	23160-01
BORING NUMBER:	HS-6	DEPTH (FT.):	0-5
SAMPLE NUMBER:	B-1	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Olive brown lean clay (CL)	DATE COMPLETED:	10/12/2023

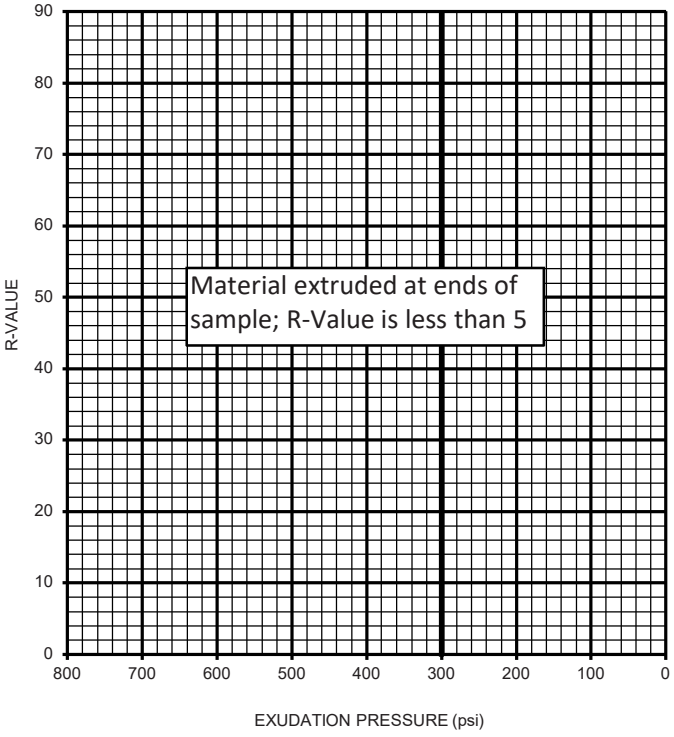
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %			
HEIGHT OF SAMPLE, Inches			
DRY DENSITY, pcf			
COMPACTOR PRESSURE, psi			
EXUDATION PRESSURE, psi			
EXPANSION, Inches x 10exp-4			
STABILITY Ph 2,000 lbs (160 psi)			
TURNS DISPLACEMENT			
R-VALUE UNCORRECTED	N/A	N/A	N/A
R-VALUE CORRECTED	N/A	N/A	N/A

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.	N/A	N/A	N/A
EXPANSION PRESSURE THICKNESS, ft.	N/A	N/A	N/A

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	N/A
R-VALUE BY EXUDATION:	N/A
EQUILIBRIUM R-VALUE:	< 5

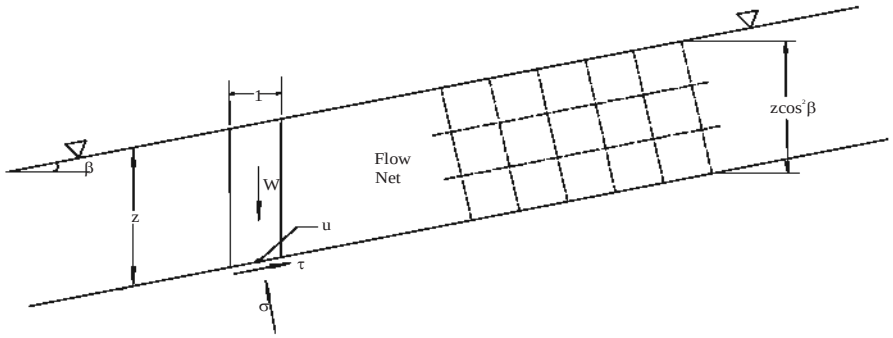
Appendix D
Slope Stability Analysis

Summary of Slope Stability Analysis

Cross-Section	Factor of Safety	Description
A-A'	2.13	Static (Rotational)
	1.37	Seismic - 117A (Rotational)
B-B'	1.94	Static (Block)
	1.05	Seismic - 117A (Block)
	1.76	Static (Rotational)
	1.22	Seismic - 117A (Rotational)
C-C'	1.92	Static (Block)
	1.04	Seismic-117A (Block)

MANUFACTURED 3H:1V FILL SLOPE

INFINITE SLOPE CONDITION



ASSUMPTION

Depth of Saturation (ft), z (and steady seepage parallel to slope face)	4

SOIL PARAMETERS

Angle of Internal Friction, ϕ	33
Cohesion (psf), c	350
Saturated Unit Weight of Soil (pcf), γ_{sat}	120
Unit Weight of Water (pcf), γ_w	62.4
Slope Angle (2H:1V), β	26.6

CALCULATIONS

Normal Stress Along Failure Plane

$$\sigma = \gamma_{sat} * z * \cos^2 \beta \qquad \sigma = 383.766 \text{ lb/ft}^2$$

Shear Stress Along Failure Plane

$$\tau_d = \gamma_{sat} * z * \sin \beta * \cos \beta \qquad \tau_d = 192.176 \text{ lb/ft}^2$$

Pore Pressure Along Failure Plane

$$u = \gamma_w * z * \cos^2 \beta \qquad u = 199.558 \text{ lb/ft}^2$$

Resisting Shear Stress Along Failure Plane

$$\tau_r = c + (\sigma - u) \tan \phi \qquad \tau_r = 469.626 \text{ lb/ft}^2$$

FACTOR OF SAFETY

$$\mathbf{FS} = \frac{\tau_r}{\tau_d}$$

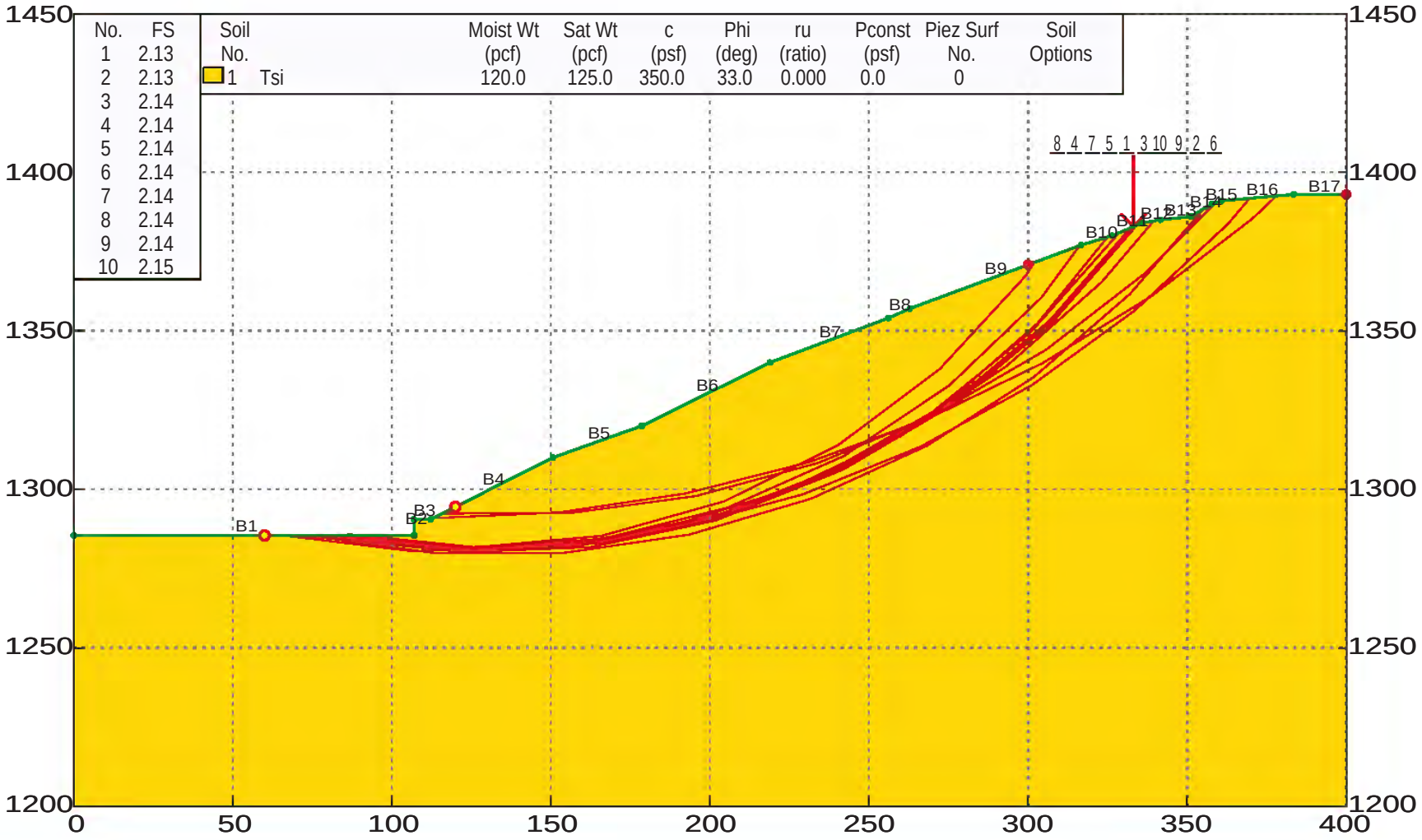
FS = 2.44

LGC Geotechnical, Inc.	SURFICIAL STABILITY	Project Name : Project Number : Designed/Checked : Date:	Baker Street 23160-01 RLD November 2023

EIP - Lake Elsinore
Section A-A' - Rotational (Static)

LGC Geotechnical / BPP

\Section A - Static - Rotational.gsd



GEOSTASE FS = 2.13

Simplified Bishop Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Static - Rotational.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Static - Rotational.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section A-A' - Rotational (Static)

BOUNDARY DATA

17 Surface Boundaries

17 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1285.400	107.000	1285.400	1
2	107.000	1285.400	107.000	1290.500	1
3	107.000	1290.500	112.200	1290.500	1
4	112.200	1290.500	150.600	1310.000	1
5	150.600	1310.000	178.600	1320.000	1
6	178.600	1320.000	218.900	1340.000	1
7	218.900	1340.000	256.100	1354.000	1
8	256.100	1354.000	262.800	1357.000	1
9	262.800	1357.000	316.600	1377.000	1
10	316.600	1377.000	326.400	1380.000	1
11	326.400	1380.000	336.000	1384.000	1
12	336.000	1384.000	341.600	1385.000	1
13	341.600	1385.000	351.100	1386.000	1
14	351.100	1386.000	357.700	1390.000	1
15	357.700	1390.000	360.800	1391.000	1
16	360.800	1391.000	383.500	1393.000	1
17	383.500	1393.000	400.000	1393.000	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1200.000(ft)

MOHR-COULOMB SOIL PARAMETERS

1 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 Tsi	120.0	125.0	350.00	33.00	0.000	0.0	0	0

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load Stress No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress Deflection (psf) (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000 0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 60.00(ft)
and X = 120.00(ft)

Each Surface Enters within a Range Between X = 300.00(ft)
and X = 400.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1200.00(ft)

Specified Maximum Radius = 10000.000(ft)

40.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 4.084 FS Min = 2.130 FS Ave = 2.805

Standard Deviation = 0.455 Coefficient of Variation = 16.22 %

Critical Surface is Sequence Number 432 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 131.553149(ft) ; Y = 1532.002283(ft); and Radius = 250.795106(ft)

Circular Trial Failure Surface Generated With 8 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	85.886	1285.400
2	125.673	1281.276
3	165.609	1283.530
4	204.679	1292.105
5	241.889	1306.782
6	276.292	1327.188
7	307.014	1352.805
8	333.113	1382.797

Factor Of Safety For The Critical or Specified Surface = 2.130

Table 1 - Geometry Data on the 53 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	5.28	0.27	88.53	1285.13	1285.40	-5.92	0.00	5.31
2	5.28	0.82	93.80	1284.58	1285.40	-5.92	0.00	5.31
3	5.28	1.37	99.08	1284.03	1285.40	-5.92	0.00	5.31
4	5.28	1.91	104.36	1283.49	1285.40	-5.92	0.00	5.31
5	2.60	7.42	108.30	1283.08	1290.50	-5.92	0.00	

2.61							
6	2.60	7.69	110.90	1282.81	1290.50	-5.92	0.00
2.61							
7	4.49	9.20	114.45	1282.44	1291.64	-5.92	26.92
4.51							
8	4.49	11.95	118.94	1281.97	1293.92	-5.92	26.92
4.51							
9	4.49	14.69	123.43	1281.51	1296.20	-5.92	26.92
4.51							
10	4.99	17.19	128.17	1281.42	1298.61	3.23	26.92
4.99							
11	4.99	19.44	133.15	1281.70	1301.14	3.23	26.92
4.99							
12	4.99	21.69	138.14	1281.98	1303.67	3.23	26.92
4.99							
13	4.99	23.94	143.12	1282.26	1306.20	3.23	26.92
4.99							
14	4.99	26.19	148.11	1282.54	1308.73	3.23	26.92
4.99							
15	5.00	28.07	153.10	1282.82	1310.89	3.23	19.65
5.01							
16	5.00	29.57	158.10	1283.11	1312.68	3.23	19.65
5.01							
17	5.00	31.08	163.11	1283.39	1314.47	3.23	19.65
5.01							
18	4.33	32.13	167.77	1284.01	1316.13	12.38	19.65
4.43							
19	4.33	32.72	172.10	1284.96	1317.68	12.38	19.65
4.43							
20	4.33	33.32	176.43	1285.91	1319.23	12.38	19.65
4.43							
21	5.22	34.34	181.21	1286.95	1321.29	12.38	26.39
5.34							
22	5.22	35.78	186.42	1288.10	1323.88	12.38	26.39
5.34							
23	5.22	37.23	191.64	1289.24	1326.47	12.38	26.39
5.34							
24	5.22	38.67	196.86	1290.39	1329.06	12.38	26.39
5.34							
25	5.22	40.12	202.07	1291.53	1331.65	12.38	26.39
5.34							
26	4.74	41.08	207.05	1293.04	1334.12	21.53	26.39
5.10							
27	4.74	41.56	211.79	1294.91	1336.47	21.53	26.39
5.10							
28	4.74	42.04	216.53	1296.78	1338.82	21.53	26.39
5.10							
29	2.90	42.26	220.35	1298.29	1340.55	21.53	20.62
3.12							
30	2.90	42.21	223.25	1299.43	1341.64	21.53	20.62

3.12							
31	5.73	42.13	227.56	1301.13	1343.26	21.53	20.62
6.16							
32	5.73	42.03	233.29	1303.39	1345.42	21.53	20.62
6.16							
33	5.73	41.92	239.02	1305.65	1347.57	21.53	20.62
6.16							
34	4.74	41.36	244.26	1308.19	1349.54	30.67	20.62
5.51							
35	4.74	40.33	248.99	1311.00	1351.33	30.67	20.62
5.51							
36	4.74	39.30	253.73	1313.81	1353.11	30.67	20.62
5.51							
37	3.35	38.55	257.78	1316.20	1354.75	30.67	24.12
3.89							
38	3.35	38.06	261.12	1318.19	1356.25	30.67	24.12
3.89							
39	4.50	37.32	265.05	1320.52	1357.84	30.67	20.39
5.23							
40	4.50	36.32	269.55	1323.19	1359.51	30.67	20.39
5.23							
41	4.50	35.33	274.04	1325.85	1361.18	30.67	20.39
5.23							
42	4.61	33.76	278.60	1329.11	1362.87	39.82	20.39
6.00							
43	5.22	31.49	283.51	1333.21	1364.70	39.82	20.39
6.80							
44	5.22	29.08	288.73	1337.56	1366.64	39.82	20.39
6.80							
45	5.22	26.66	293.96	1341.92	1368.58	39.82	20.39
6.80							
46	5.22	24.25	299.18	1346.27	1370.52	39.82	20.39
6.80							
47	5.22	21.84	304.40	1350.63	1372.47	39.82	20.39
6.80							
48	4.79	18.77	309.41	1355.56	1374.33	48.97	20.39
7.30							
49	4.79	15.04	314.20	1361.07	1376.11	48.97	20.39
7.30							
50	4.90	11.11	319.05	1366.64	1377.75	48.97	17.02
7.46							
51	4.90	6.98	323.95	1372.27	1379.25	48.97	17.02
7.46							
52	3.36	3.69	328.08	1377.01	1380.70	48.97	22.62
5.11							
53	3.36	1.23	331.43	1380.87	1382.10	48.97	22.62
5.11							

Table 2 - Force Data On The 53 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	173.3	0.0	0.0	0.0	0.0	0.0
2	519.8	0.0	0.0	0.0	0.0	0.0
3	866.4	0.0	0.0	0.0	0.0	0.0
4	1212.9	0.0	0.0	0.0	0.0	0.0
5	2316.0	0.0	0.0	0.0	0.0	0.0
6	2400.1	0.0	0.0	0.0	0.0	0.0
7	4958.2	0.0	0.0	0.0	0.0	0.0
8	6438.1	0.0	0.0	0.0	0.0	0.0
9	7917.9	0.0	0.0	0.0	0.0	0.0
10	10284.4	0.0	0.0	0.0	0.0	0.0
11	11630.6	0.0	0.0	0.0	0.0	0.0
12	12976.9	0.0	0.0	0.0	0.0	0.0
13	14323.1	0.0	0.0	0.0	0.0	0.0
14	15669.4	0.0	0.0	0.0	0.0	0.0
15	16851.8	0.0	0.0	0.0	0.0	0.0
16	17755.0	0.0	0.0	0.0	0.0	0.0
17	18658.2	0.0	0.0	0.0	0.0	0.0
18	16694.9	0.0	0.0	0.0	0.0	0.0
19	17004.7	0.0	0.0	0.0	0.0	0.0
20	17314.5	0.0	0.0	0.0	0.0	0.0
21	21493.9	0.0	0.0	0.0	0.0	0.0
22	22397.6	0.0	0.0	0.0	0.0	0.0
23	23301.2	0.0	0.0	0.0	0.0	0.0
24	24204.9	0.0	0.0	0.0	0.0	0.0
25	25108.6	0.0	0.0	0.0	0.0	0.0
26	23366.9	0.0	0.0	0.0	0.0	0.0
27	23641.5	0.0	0.0	0.0	0.0	0.0
28	23916.1	0.0	0.0	0.0	0.0	0.0
29	14706.3	0.0	0.0	0.0	0.0	0.0
30	14688.1	0.0	0.0	0.0	0.0	0.0
31	28966.6	0.0	0.0	0.0	0.0	0.0
32	28895.3	0.0	0.0	0.0	0.0	0.0
33	28824.0	0.0	0.0	0.0	0.0	0.0
34	23508.1	0.0	0.0	0.0	0.0	0.0
35	22924.4	0.0	0.0	0.0	0.0	0.0
36	22340.6	0.0	0.0	0.0	0.0	0.0
37	15495.2	0.0	0.0	0.0	0.0	0.0
38	15299.4	0.0	0.0	0.0	0.0	0.0
39	20139.8	0.0	0.0	0.0	0.0	0.0
40	19602.4	0.0	0.0	0.0	0.0	0.0
41	19065.0	0.0	0.0	0.0	0.0	0.0
42	18667.6	0.0	0.0	0.0	0.0	0.0
43	19736.8	0.0	0.0	0.0	0.0	0.0

44	18224.3	0.0	0.0	0.0	0.0	0.0
45	16711.8	0.0	0.0	0.0	0.0	0.0
46	15199.2	0.0	0.0	0.0	0.0	0.0
47	13686.7	0.0	0.0	0.0	0.0	0.0
48	10795.1	0.0	0.0	0.0	0.0	0.0
49	8651.8	0.0	0.0	0.0	0.0	0.0
50	6534.8	0.0	0.0	0.0	0.0	0.0
51	4105.8	0.0	0.0	0.0	0.0	0.0
52	1485.4	0.0	0.0	0.0	0.0	0.0
53	495.1	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 792146.76(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 792146.76(lbs)

TOTAL AREA OF SLIDING MASS = 6601.22(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 53 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	350.00	33.00	
2	1	350.00	33.00	
3	1	350.00	33.00	
4	1	350.00	33.00	
5	1	350.00	33.00	
6	1	350.00	33.00	
7	1	350.00	33.00	
8	1	350.00	33.00	
9	1	350.00	33.00	
10	1	350.00	33.00	
11	1	350.00	33.00	
12	1	350.00	33.00	
13	1	350.00	33.00	
14	1	350.00	33.00	
15	1	350.00	33.00	
16	1	350.00	33.00	
17	1	350.00	33.00	
18	1	350.00	33.00	
19	1	350.00	33.00	
20	1	350.00	33.00	
21	1	350.00	33.00	
22	1	350.00	33.00	
23	1	350.00	33.00	
24	1	350.00	33.00	
25	1	350.00	33.00	
26	1	350.00	33.00	
27	1	350.00	33.00	
28	1	350.00	33.00	

29	1	350.00	33.00
30	1	350.00	33.00
31	1	350.00	33.00
32	1	350.00	33.00
33	1	350.00	33.00
34	1	350.00	33.00
35	1	350.00	33.00
36	1	350.00	33.00
37	1	350.00	33.00
38	1	350.00	33.00
39	1	350.00	33.00
40	1	350.00	33.00
41	1	350.00	33.00
42	1	350.00	33.00
43	1	350.00	33.00
44	1	350.00	33.00
45	1	350.00	33.00
46	1	350.00	33.00
47	1	350.00	33.00
48	1	350.00	33.00
49	1	350.00	33.00
50	1	350.00	33.00
51	1	350.00	33.00
52	1	350.00	33.00
53	1	350.00	33.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 53 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-5.92	88.53	5.31	51.49	383.44	180.01
1	-5.92	88.53	5.31	51.49	383.44	180.01
2	-5.92	93.80	5.31	119.29	427.47	200.68
2	-5.92	93.80	5.31	119.29	427.47	

200.68
   3   -5.92   99.08   5.31   187.09   471.50
221.35
   3   -5.92   99.08   5.31   187.09   471.50
221.35
   4   -5.92   104.36   5.31   254.88   515.52
242.02
   4   -5.92   104.36   5.31   254.88   515.52
242.02
   5   -5.92   108.30   2.61   937.46   958.79
450.12
   5   -5.92   108.30   2.61   937.46   958.79
450.12
   6   -5.92   110.90   2.61   970.85   980.48
460.30
   6   -5.92   110.90   2.61   970.85   980.48
460.30
   7   -5.92   114.45   4.51   1157.69   1101.81
517.26
   7   -5.92   114.45   4.51   1157.69   1101.81
517.26
   8   -5.92   118.94   4.51   1497.97   1322.79
621.00
   8   -5.92   118.94   4.51   1497.97   1322.79
621.00
   9   -5.92   123.43   4.51   1838.25   1543.77
724.75
   9   -5.92   123.43   4.51   1838.25   1543.77
724.75
  10   3.23   128.17   4.99   2018.84   1661.05
779.80
  10   3.23   128.17   4.99   2018.84   1661.05
779.80
  11   3.23   133.15   4.99   2284.31   1833.45
860.74
  11   3.23   133.15   4.99   2284.31   1833.45
860.74
  12   3.23   138.14   4.99   2549.77   2005.84
941.67
  12   3.23   138.14   4.99   2549.77   2005.84
941.67
  13   3.23   143.12   4.99   2815.24   2178.24
1022.60
  13   3.23   143.12   4.99   2815.24   2178.24
1022.60
  14   3.23   148.11   4.99   3080.70   2350.63
1103.54
  14   3.23   148.11   4.99   3080.70   2350.63
1103.54
  15   3.23   153.10   5.01   3302.17   2494.45

1171.06					
15	3.23	153.10	5.01	3302.17	2494.45
1171.06					
16	3.23	158.10	5.01	3479.65	2609.71
1225.16					
16	3.23	158.10	5.01	3479.65	2609.71
1225.16					
17	3.23	163.11	5.01	3657.12	2724.96
1279.27					
17	3.23	163.11	5.01	3657.12	2724.96
1279.27					
18	12.38	167.77	4.43	3579.69	2674.68
1255.66					
18	12.38	167.77	4.43	3579.69	2674.68
1255.66					
19	12.38	172.10	4.43	3646.74	2718.22
1276.11					
19	12.38	172.10	4.43	3646.74	2718.22
1276.11					
20	12.38	176.43	4.43	3713.79	2761.76
1296.55					
20	12.38	176.43	4.43	3713.79	2761.76
1296.55					
21	12.38	181.21	5.34	3828.51	2836.26
1331.52					
21	12.38	181.21	5.34	3828.51	2836.26
1331.52					
22	12.38	186.42	5.34	3990.90	2941.72
1381.03					
22	12.38	186.42	5.34	3990.90	2941.72
1381.03					
23	12.38	191.64	5.34	4153.28	3047.17
1430.54					
23	12.38	191.64	5.34	4153.28	3047.17
1430.54					
24	12.38	196.86	5.34	4315.67	3152.63
1480.04					
24	12.38	196.86	5.34	4315.67	3152.63
1480.04					
25	12.38	202.07	5.34	4478.05	3258.08
1529.55					
25	12.38	202.07	5.34	4478.05	3258.08
1529.55					
26	21.53	207.05	5.10	4342.23	3169.88
1488.14					
26	21.53	207.05	5.10	4342.23	3169.88
1488.14					
27	21.53	211.79	5.10	4393.94	3203.46
1503.90					
27	21.53	211.79	5.10	4393.94	3203.46

1503.90					
28	21.53	216.53	5.10	4445.64	3237.03
1519.67					
28	21.53	216.53	5.10	4445.64	3237.03
1519.67					
29	21.53	220.35	3.12	4468.68	3252.00
1526.69					
29	21.53	220.35	3.12	4468.68	3252.00
1526.69					
30	21.53	223.25	3.12	4463.06	3248.35
1524.98					
30	21.53	223.25	3.12	4463.06	3248.35
1524.98					
31	21.53	227.56	6.16	4454.70	3242.91
1522.43					
31	21.53	227.56	6.16	4454.70	3242.91
1522.43					
32	21.53	233.29	6.16	4443.59	3235.70
1519.04					
32	21.53	233.29	6.16	4443.59	3235.70
1519.04					
33	21.53	239.02	6.16	4432.48	3228.49
1515.66					
33	21.53	239.02	6.16	4432.48	3228.49
1515.66					
34	30.67	244.26	5.51	4119.88	3025.48
1420.35					
34	30.67	244.26	5.51	4119.88	3025.48
1420.35					
35	30.67	248.99	5.51	4015.52	2957.71
1388.54					
35	30.67	248.99	5.51	4015.52	2957.71
1388.54					
36	30.67	253.73	5.51	3911.16	2889.94
1356.72					
36	30.67	253.73	5.51	3911.16	2889.94
1356.72					
37	30.67	257.78	3.89	3834.24	2839.98
1333.27					
37	30.67	257.78	3.89	3834.24	2839.98
1333.27					
38	30.67	261.12	3.89	3784.74	2807.84
1318.18					
38	30.67	261.12	3.89	3784.74	2807.84
1318.18					
39	30.67	265.05	5.23	3709.41	2758.92
1295.21					
39	30.67	265.05	5.23	3709.41	2758.92
1295.21					
40	30.67	269.55	5.23	3608.22	2693.21

1264.36					
40	30.67	269.55	5.23	3608.22	2693.21
1264.36					
41	30.67	274.04	5.23	3507.03	2627.49
1233.51					
41	30.67	274.04	5.23	3507.03	2627.49
1233.51					
42	39.82	278.60	6.00	3120.77	2376.65
1115.75					
42	39.82	278.60	6.00	3120.77	2376.65
1115.75					
43	39.82	283.51	6.80	2903.49	2235.55
1049.51					
43	39.82	283.51	6.80	2903.49	2235.55
1049.51					
44	39.82	288.73	6.80	2672.60	2085.61
979.12					
44	39.82	288.73	6.80	2672.60	2085.61
979.12					
45	39.82	293.96	6.80	2441.72	1935.67
908.73					
45	39.82	293.96	6.80	2441.72	1935.67
908.73					
46	39.82	299.18	6.80	2210.84	1785.74
838.34					
46	39.82	299.18	6.80	2210.84	1785.74
838.34					
47	39.82	304.40	6.80	1979.96	1635.80
767.95					
47	39.82	304.40	6.80	1979.96	1635.80
767.95					
48	48.97	309.41	7.30	1527.80	1342.16
630.10					
48	48.97	309.41	7.30	1527.80	1342.16
630.10					
49	48.97	314.20	7.30	1196.70	1127.15
529.15					
49	48.97	314.20	7.30	1196.70	1127.15
529.15					
50	48.97	319.05	7.46	847.63	900.46
422.73					
50	48.97	319.05	7.46	847.63	900.46
422.73					
51	48.97	323.95	7.46	480.57	662.09
310.83					
51	48.97	323.95	7.46	480.57	662.09
310.83					
52	48.97	328.08	5.11	187.82	471.97
221.57					
52	48.97	328.08	5.11	187.82	471.97

221.57
  53   48.97   331.43   5.11   109.23   70.94
33.30
  53   48.97   331.43   5.11   109.23   70.94
33.30

Table 4 - Base Force Data on the   53 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.92	88.53	5.31	273.27	2034.84	955.28
1	-5.92	88.53	5.31	273.27	2034.84	955.28
2	-5.92	93.80	5.31	633.05	2268.49	1064.97
2	-5.92	93.80	5.31	633.05	2268.49	1064.97
3	-5.92	99.08	5.31	992.84	2502.14	1174.66
3	-5.92	99.08	5.31	992.84	2502.14	1174.66
4	-5.92	104.36	5.31	1352.62	2735.79	1284.35
4	-5.92	104.36	5.31	1352.62	2735.79	1284.35
5	-5.92	108.30	2.61	2450.45	2506.22	1176.58
5	-5.92	108.30	2.61	2450.45	2506.22	1176.58
6	-5.92	110.90	2.61	2537.74	2562.91	1203.19
6	-5.92	110.90	2.61	2537.74	2562.91	1203.19
7	-5.92	114.45	4.51	5226.95	4974.66	2335.42
7	-5.92	114.45	4.51	5226.95	4974.66	2335.42
8	-5.92	118.94	4.51	6763.30	5972.38	2803.81
8	-5.92	118.94	4.51	6763.30	5972.38	2803.81
9	-5.92	123.43	4.51	8299.66	6970.10	

3272.21					
9	-5.92	123.43	4.51	8299.66	6970.10
3272.21					
10	3.23	128.17	4.99	10080.87	8294.28
3893.86					
10	3.23	128.17	4.99	10080.87	8294.28
3893.86					
11	3.23	133.15	4.99	11406.43	9155.11
4297.99					
11	3.23	133.15	4.99	11406.43	9155.11
4297.99					
12	3.23	138.14	4.99	12732.00	10015.94
4702.12					
12	3.23	138.14	4.99	12732.00	10015.94
4702.12					
13	3.23	143.12	4.99	14057.57	10876.78
5106.25					
13	3.23	143.12	4.99	14057.57	10876.78
5106.25					
14	3.23	148.11	4.99	15383.13	11737.61
5510.38					
14	3.23	148.11	4.99	15383.13	11737.61
5510.38					
15	3.23	153.10	5.01	16547.25	12499.77
5868.18					
15	3.23	153.10	5.01	16547.25	12499.77
5868.18					
16	3.23	158.10	5.01	17436.59	13077.31
6139.32					
16	3.23	158.10	5.01	17436.59	13077.31
6139.32					
17	3.23	163.11	5.01	18325.92	13654.85
6410.45					
17	3.23	163.11	5.01	18325.92	13654.85
6410.45					
18	12.38	167.77	4.43	15869.97	11857.74
5566.78					
18	12.38	167.77	4.43	15869.97	11857.74
5566.78					
19	12.38	172.10	4.43	16167.23	12050.79
5657.40					
19	12.38	172.10	4.43	16167.23	12050.79
5657.40					
20	12.38	176.43	4.43	16464.49	12243.83
5748.03					
20	12.38	176.43	4.43	16464.49	12243.83
5748.03					
21	12.38	181.21	5.34	20444.24	15145.64
7110.33					
21	12.38	181.21	5.34	20444.24	15145.64

7110.33					
22	12.38	186.42	5.34	21311.37	15708.77
7374.69					
22	12.38	186.42	5.34	21311.37	15708.77
7374.69					
23	12.38	191.64	5.34	22178.51	16271.89
7639.06					
23	12.38	191.64	5.34	22178.51	16271.89
7639.06					
24	12.38	196.86	5.34	23045.65	16835.02
7903.42					
24	12.38	196.86	5.34	23045.65	16835.02
7903.42					
25	12.38	202.07	5.34	23912.78	17398.14
8167.79					
25	12.38	202.07	5.34	23912.78	17398.14
8167.79					
26	21.53	207.05	5.10	22126.54	16152.62
7583.07					
26	21.53	207.05	5.10	22126.54	16152.62
7583.07					
27	21.53	211.79	5.10	22390.01	16323.73
7663.39					
27	21.53	211.79	5.10	22390.01	16323.73
7663.39					
28	21.53	216.53	5.10	22653.49	16494.83
7743.72					
28	21.53	216.53	5.10	22653.49	16494.83
7743.72					
29	21.53	220.35	3.12	13930.88	10137.93
4759.38					
29	21.53	220.35	3.12	13930.88	10137.93
4759.38					
30	21.53	223.25	3.12	13913.35	10126.54
4754.04					
30	21.53	223.25	3.12	13913.35	10126.54
4754.04					
31	21.53	227.56	6.16	27438.14	19974.32
9377.21					
31	21.53	227.56	6.16	27438.14	19974.32
9377.21					
32	21.53	233.29	6.16	27369.72	19929.89
9356.35					
32	21.53	233.29	6.16	27369.72	19929.89
9356.35					
33	21.53	239.02	6.16	27301.31	19885.46
9335.49					
33	21.53	239.02	6.16	27301.31	19885.46
9335.49					
34	30.67	244.26	5.51	22690.37	16662.93

7822.64					
34	30.67	244.26	5.51	22690.37	16662.93
7822.64					
35	30.67	248.99	5.51	22115.61	16289.68
7647.41					
35	30.67	248.99	5.51	22115.61	16289.68
7647.41					
36	30.67	253.73	5.51	21540.84	15916.42
7472.18					
36	30.67	253.73	5.51	21540.84	15916.42
7472.18					
37	30.67	257.78	3.89	14934.29	11061.69
5193.06					
37	30.67	257.78	3.89	14934.29	11061.69
5193.06					
38	30.67	261.12	3.89	14741.52	10936.50
5134.29					
38	30.67	261.12	3.89	14741.52	10936.50
5134.29					
39	30.67	265.05	5.23	19397.03	14426.78
6772.85					
39	30.67	265.05	5.23	19397.03	14426.78
6772.85					
40	30.67	269.55	5.23	18867.92	14083.17
6611.53					
40	30.67	269.55	5.23	18867.92	14083.17
6611.53					
41	30.67	274.04	5.23	18338.81	13739.56
6450.22					
41	30.67	274.04	5.23	18338.81	13739.56
6450.22					
42	39.82	278.60	6.00	18721.89	14257.83
6693.53					
42	39.82	278.60	6.00	18721.89	14257.83
6693.53					
43	39.82	283.51	6.80	19744.21	15202.10
7136.83					
43	39.82	283.51	6.80	19744.21	15202.10
7136.83					
44	39.82	288.73	6.80	18174.17	14182.51
6658.17					
44	39.82	288.73	6.80	18174.17	14182.51
6658.17					
45	39.82	293.96	6.80	16604.14	13162.91
6179.51					
45	39.82	293.96	6.80	16604.14	13162.91
6179.51					
46	39.82	299.18	6.80	15034.10	12143.32
5700.84					
46	39.82	299.18	6.80	15034.10	12143.32

```
5700.84
  47      39.82     304.40       6.80        13464.06        11123.72
5222.18
  47      39.82     304.40       6.80        13464.06        11123.72
5222.18
  48      48.97     309.41       7.30        11155.26         9799.85
4600.67
  48      48.97     309.41       7.30        11155.26         9799.85
4600.67
  49      48.97     314.20       7.30         8737.75         8229.90
3863.64
  49      48.97     314.20       7.30         8737.75         8229.90
3863.64
  50      48.97     319.05       7.46         6327.02         6721.35
3155.43
  50      48.97     319.05       7.46         6327.02         6721.35
3155.43
  51      48.97     323.95       7.46         3587.19         4942.08
2320.13
  51      48.97     323.95       7.46         3587.19         4942.08
2320.13
  52      48.97     328.08       5.11          960.32         2413.23
1132.92
  52      48.97     328.08       5.11          960.32         2413.23
1132.92
  53      48.97     331.43       5.11          558.51          362.70
170.28
  53      48.97     331.43       5.11          558.51          362.70
170.28

     SUM OF MOMENTS =  -0.956843E+00 (ft/lbs);Imbalance (Fraction of Total Weight)
=  -0.1207912E-05

     Sum of the Resisting Forces =  594034.52 (lbs)

     Average Available Shear Strength =   2123.39(psf)

     Sum of the Driving Forces =   278877.47 (lbs)

     Average Mobilized Shear Stress =     996.85(psf)

     Total length of the failure surface =     279.76(ft)


     Factor of Safety Balance Check: FS =  2.13009

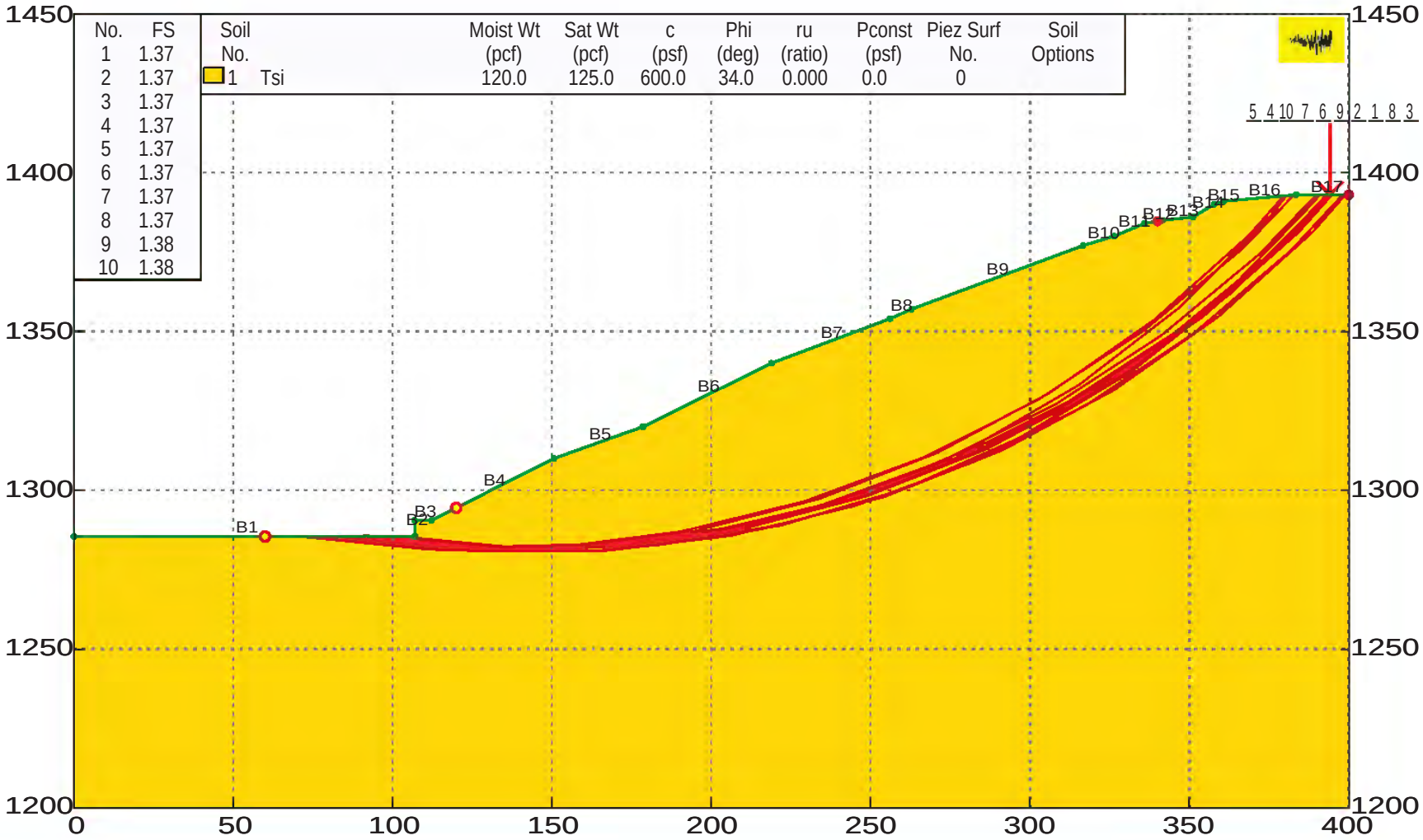

           CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop
                     Method. This Method Is Valid Only If The Failure Surface
                     Approximates A Circular Arc.
```

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section A-A' - Rotational (Seismic (117A))

LGC Geotechnical / BPP

\Section A - Seismic (117A)- Rotational.gsd



GEOSTASE FS = 1.37

Simplified Bishop Method

kh = 0.26000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Seismic (117A)- Rotational.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Seismic (117A)- Rotational.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section A-A' - Rotational (Seismic (117A))

BOUNDARY DATA

17 Surface Boundaries

17 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1285.400	107.000	1285.400	1
2	107.000	1285.400	107.000	1290.500	1
3	107.000	1290.500	112.200	1290.500	1
4	112.200	1290.500	150.600	1310.000	1
5	150.600	1310.000	178.600	1320.000	1
6	178.600	1320.000	218.900	1340.000	1
7	218.900	1340.000	256.100	1354.000	1
8	256.100	1354.000	262.800	1357.000	1
9	262.800	1357.000	316.600	1377.000	1
10	316.600	1377.000	326.400	1380.000	1
11	326.400	1380.000	336.000	1384.000	1
12	336.000	1384.000	341.600	1385.000	1
13	341.600	1385.000	351.100	1386.000	1
14	351.100	1386.000	357.700	1390.000	1
15	357.700	1390.000	360.800	1391.000	1
16	360.800	1391.000	383.500	1393.000	1
17	383.500	1393.000	400.000	1393.000	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1200.000(ft)

MOHR-COULOMB SOIL PARAMETERS

1 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 Tsi	120.0	125.0	600.00	34.00	0.000	0.0	0	0

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load Stress No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Load Stress (psf)	BND No. Deflection (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000	0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 60.00(ft)
and X = 120.00(ft)

Each Surface Enters within a Range Between X = 340.00(ft)
and X = 400.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1200.00(ft)

Specified Maximum Radius = 10000.000(ft)

40.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 3.071 FS Min = 1.368 FS Ave = 1.776
Standard Deviation = 0.299 Coefficient of Variation = 16.84 %

Critical Surface is Sequence Number 513 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 141.933613(ft) ; Y = 1624.295962(ft); and Radius = 342.739199(ft)

Circular Trial Failure Surface Generated With 10 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	90.751	1285.400
2	130.583	1281.745
3	170.571	1282.755
4	210.168	1288.418
5	248.836	1298.655
6	286.047	1313.327
7	321.296	1332.236
8	354.102	1355.122
9	384.018	1381.674
10	394.115	1393.000

Factor Of Safety For The Critical or Specified Surface = 1.368

Table 1 - Geometry Data on the 70 Slices

Slice	Width	Height	X-Cntr	Y-Cntr-Base	Y-Cntr-Top	Alpha	Beta	Base

Length No.	(ft)	(ft)	(ft)	(ft)	(ft)	(deg)	(deg)	(ft)
1	5.42	0.25	93.46	1285.15	1285.40	-5.24	0.00	5.44
2	5.42	0.75	98.88	1284.65	1285.40	-5.24	0.00	5.44
3	5.42	1.24	104.29	1284.16	1285.40	-5.24	0.00	5.44
4	2.60	6.71	108.30	1283.79	1290.50	-5.24	0.00	2.61
5	2.60	6.95	110.90	1283.55	1290.50	-5.24	0.00	2.61
6	4.60	8.45	114.50	1283.22	1291.67	-5.24	26.92	4.62
7	4.60	11.20	119.09	1282.80	1294.00	-5.24	26.92	4.62
8	4.60	13.96	123.69	1282.38	1296.33	-5.24	26.92	4.62
9	4.60	16.71	128.29	1281.96	1298.67	-5.24	26.92	4.62
10	5.00	19.30	133.09	1281.81	1301.11	1.45	26.92	5.01
11	5.00	21.71	138.09	1281.93	1303.65	1.45	26.92	5.01
12	5.00	24.13	143.09	1282.06	1306.19	1.45	26.92	5.01
13	5.00	26.54	148.10	1282.19	1308.73	1.45	26.92	5.01
14	4.99	28.58	153.10	1282.31	1310.89	1.45	19.65	4.99
15	4.99	30.23	158.09	1282.44	1312.67	1.45	19.65	4.99
16	4.99	31.89	163.08	1282.57	1314.46	1.45	19.65	4.99
17	4.99	33.55	168.07	1282.69	1316.24	1.45	19.65	4.99
18	4.01	34.81	172.58	1283.04	1317.85	8.14	19.65	4.06
19	4.01	35.67	176.59	1283.62	1319.28	8.14	19.65	4.06
20	5.26	37.03	181.23	1284.28	1321.31	8.14	26.39	5.31
21	5.26	38.88	186.49	1285.03	1323.92	8.14	26.39	5.31
22	5.26	40.74	191.75	1285.78	1326.53	8.14	26.39	5.31
23	5.26	42.60	197.01	1286.54	1329.14	8.14	26.39	5.31

24	5.26	44.46	202.28	1287.29	1331.75	8.14	26.39 5.31
25	5.26	46.32	207.54	1288.04	1334.36	8.14	26.39 5.31
26	4.37	47.75	212.35	1289.00	1336.75	14.83	26.39 4.52
27	4.37	48.77	216.72	1290.15	1338.92	14.83	26.39 4.52
28	2.90	49.43	220.35	1291.11	1340.55	14.83	20.62 3.00
29	2.90	49.76	223.25	1291.88	1341.64	14.83	20.62 3.00
30	4.83	50.19	227.11	1292.90	1343.09	14.83	20.62 4.99
31	4.83	50.73	231.94	1294.18	1344.91	14.83	20.62 4.99
32	4.83	51.26	236.77	1295.46	1346.72	14.83	20.62 4.99
33	4.83	51.80	241.59	1296.74	1348.54	14.83	20.62 4.99
34	4.83	52.34	246.42	1298.02	1350.36	14.83	20.62 4.99
35	3.63	52.58	250.65	1299.37	1351.95	21.52	20.62 3.90
36	3.63	52.51	254.28	1300.80	1353.32	21.52	20.62 3.90
37	3.35	52.57	257.78	1302.18	1354.75	21.52	24.12 3.60
38	3.35	52.75	261.12	1303.50	1356.25	21.52	24.12 3.60
39	4.52	52.79	265.06	1305.05	1357.84	21.52	20.39 4.86
40	4.53	52.69	269.59	1306.84	1359.52	21.52	20.39 4.86
41	4.52	52.58	274.11	1308.62	1361.21	21.52	20.39 4.86
42	4.52	52.48	278.64	1310.41	1362.89	21.52	20.39 4.86
43	2.57	52.40	282.19	1311.81	1364.21	21.52	20.39 2.77
44	2.57	52.34	284.76	1312.82	1365.16	21.52	20.39 2.77
45	5.09	51.90	288.59	1314.69	1366.59	28.21	20.39 5.78
46	5.09	51.06	293.69	1317.42	1368.48	28.21	20.39 5.78
47	5.09	50.22	298.78	1320.16	1370.37	28.21	20.39 5.78
48	5.09	49.38	303.87	1322.89	1372.27	28.21	20.39 5.78

49	5.09	48.54	308.96	1325.62	1374.16	28.21	20.39
5.78							
50	5.09	47.70	314.05	1328.35	1376.05	28.21	20.39
5.78							
51	4.70	46.74	318.95	1330.98	1377.72	28.21	17.02
5.33							
52	2.55	45.70	322.57	1333.13	1378.83	34.90	17.02
3.11							
53	2.55	44.70	325.12	1334.91	1379.61	34.90	17.02
3.11							
54	4.80	43.53	328.80	1337.47	1381.00	34.90	22.62
5.85							
55	4.80	42.18	333.60	1340.82	1383.00	34.90	22.62
5.85							
56	2.80	40.78	337.40	1343.47	1384.25	34.90	10.12
3.41							
57	2.80	39.33	340.20	1345.42	1384.75	34.90	10.12
3.41							
58	4.75	37.19	343.98	1348.06	1385.25	34.90	6.01
5.79							
59	4.75	34.38	348.73	1351.37	1385.75	34.90	6.01
5.79							
60	3.00	32.84	352.60	1354.07	1386.91	34.90	31.22
3.66							
61	3.60	32.19	355.90	1356.72	1388.91	41.59	31.22
4.81							
62	3.10	30.81	359.25	1359.69	1390.50	41.59	17.88
4.14							
63	4.54	28.12	363.07	1363.08	1391.20	41.59	5.04
6.07							
64	4.54	24.49	367.61	1367.11	1391.60	41.59	5.04
6.07							
65	4.54	20.86	372.15	1371.14	1392.00	41.59	5.04
6.07							
66	4.54	17.23	376.69	1375.17	1392.40	41.59	5.04
6.07							
67	4.54	13.60	381.23	1379.20	1392.80	41.59	5.04
6.07							
68	0.52	11.56	383.76	1381.44	1393.00	41.59	0.00
0.69							
69	5.05	8.49	386.54	1384.51	1393.00	48.28	0.00
7.59							
70	5.05	2.83	391.59	1390.17	1393.00	48.28	0.00
7.59							

Table 2 - Force Data On The 70 Slices (Excluding Reinforcement)

	Ubeta	Ualpha	Earthquake

Slice No.	Weight (lbs)	Force Top (lbs)	Force Bot (lbs)	Force Hor (lbs)	Force Ver (lbs)	Distributed Load (lbs)
1	161.5	0.0	0.0	42.0	0.0	0.0
2	484.6	0.0	0.0	126.0	0.0	0.0
3	807.6	0.0	0.0	210.0	0.0	0.0
4	2093.6	0.0	0.0	544.3	0.0	0.0
5	2168.1	0.0	0.0	563.7	0.0	0.0
6	4658.0	0.0	0.0	1211.1	0.0	0.0
7	6177.7	0.0	0.0	1606.2	0.0	0.0
8	7697.4	0.0	0.0	2001.3	0.0	0.0
9	9217.1	0.0	0.0	2396.5	0.0	0.0
10	11588.4	0.0	0.0	3013.0	0.0	0.0
11	13038.4	0.0	0.0	3390.0	0.0	0.0
12	14488.4	0.0	0.0	3767.0	0.0	0.0
13	15938.5	0.0	0.0	4144.0	0.0	0.0
14	17121.6	0.0	0.0	4451.6	0.0	0.0
15	18114.3	0.0	0.0	4709.7	0.0	0.0
16	19106.9	0.0	0.0	4967.8	0.0	0.0
17	20099.6	0.0	0.0	5225.9	0.0	0.0
18	16768.7	0.0	0.0	4359.9	0.0	0.0
19	17182.9	0.0	0.0	4467.6	0.0	0.0
20	23376.5	0.0	0.0	6077.9	0.0	0.0
21	24550.1	0.0	0.0	6383.0	0.0	0.0
22	25723.6	0.0	0.0	6688.1	0.0	0.0
23	26897.1	0.0	0.0	6993.2	0.0	0.0
24	28070.6	0.0	0.0	7298.3	0.0	0.0
25	29244.1	0.0	0.0	7603.5	0.0	0.0
26	25019.9	0.0	0.0	6505.2	0.0	0.0
27	25549.6	0.0	0.0	6642.9	0.0	0.0
28	17202.5	0.0	0.0	4472.6	0.0	0.0
29	17315.1	0.0	0.0	4501.9	0.0	0.0
30	29071.1	0.0	0.0	7558.5	0.0	0.0
31	29383.2	0.0	0.0	7639.6	0.0	0.0
32	29695.2	0.0	0.0	7720.8	0.0	0.0
33	30007.2	0.0	0.0	7801.9	0.0	0.0
34	30319.3	0.0	0.0	7883.0	0.0	0.0
35	22917.1	0.0	0.0	5958.4	0.0	0.0
36	22888.7	0.0	0.0	5951.1	0.0	0.0
37	21133.3	0.0	0.0	5494.6	0.0	0.0
38	21205.3	0.0	0.0	5513.4	0.0	0.0
39	28663.8	0.0	0.0	7452.6	0.0	0.0
40	28608.4	0.0	0.0	7438.2	0.0	0.0
41	28553.0	0.0	0.0	7423.8	0.0	0.0
42	28497.6	0.0	0.0	7409.4	0.0	0.0
43	16183.8	0.0	0.0	4207.8	0.0	0.0
44	16165.9	0.0	0.0	4203.1	0.0	0.0
45	31710.8	0.0	0.0	8244.8	0.0	0.0
46	31198.4	0.0	0.0	8111.6	0.0	0.0

47	30686.0	0.0	0.0	7978.4	0.0	0.0
48	30173.7	0.0	0.0	7845.2	0.0	0.0
49	29661.3	0.0	0.0	7711.9	0.0	0.0
50	29148.9	0.0	0.0	7578.7	0.0	0.0
51	26341.6	0.0	0.0	6848.8	0.0	0.0
52	13995.3	0.0	0.0	3638.8	0.0	0.0
53	13689.4	0.0	0.0	3559.2	0.0	0.0
54	25073.0	0.0	0.0	6519.0	0.0	0.0
55	24296.2	0.0	0.0	6317.0	0.0	0.0
56	13702.1	0.0	0.0	3562.5	0.0	0.0
57	13213.7	0.0	0.0	3435.6	0.0	0.0
58	21200.0	0.0	0.0	5512.0	0.0	0.0
59	19596.2	0.0	0.0	5095.0	0.0	0.0
60	11828.7	0.0	0.0	3075.5	0.0	0.0
61	13898.7	0.0	0.0	3613.7	0.0	0.0
62	11461.0	0.0	0.0	2979.8	0.0	0.0
63	15319.0	0.0	0.0	3982.9	0.0	0.0
64	13341.6	0.0	0.0	3468.8	0.0	0.0
65	11364.2	0.0	0.0	2954.7	0.0	0.0
66	9386.8	0.0	0.0	2440.6	0.0	0.0
67	7409.4	0.0	0.0	1926.5	0.0	0.0
68	718.4	0.0	0.0	186.8	0.0	0.0
69	5146.2	0.0	0.0	1338.0	0.0	0.0
70	1715.4	0.0	0.0	446.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1278431.25(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1278431.25(lbs)

TOTAL AREA OF SLIDING MASS = 10653.59(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 70 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	600.00	34.00	
2	1	600.00	34.00	
3	1	600.00	34.00	
4	1	600.00	34.00	
5	1	600.00	34.00	
6	1	600.00	34.00	
7	1	600.00	34.00	
8	1	600.00	34.00	
9	1	600.00	34.00	
10	1	600.00	34.00	
11	1	600.00	34.00	
12	1	600.00	34.00	
13	1	600.00	34.00	
14	1	600.00	34.00	

15	1	600.00	34.00
16	1	600.00	34.00
17	1	600.00	34.00
18	1	600.00	34.00
19	1	600.00	34.00
20	1	600.00	34.00
21	1	600.00	34.00
22	1	600.00	34.00
23	1	600.00	34.00
24	1	600.00	34.00
25	1	600.00	34.00
26	1	600.00	34.00
27	1	600.00	34.00
28	1	600.00	34.00
29	1	600.00	34.00
30	1	600.00	34.00
31	1	600.00	34.00
32	1	600.00	34.00
33	1	600.00	34.00
34	1	600.00	34.00
35	1	600.00	34.00
36	1	600.00	34.00
37	1	600.00	34.00
38	1	600.00	34.00
39	1	600.00	34.00
40	1	600.00	34.00
41	1	600.00	34.00
42	1	600.00	34.00
43	1	600.00	34.00
44	1	600.00	34.00
45	1	600.00	34.00
46	1	600.00	34.00
47	1	600.00	34.00
48	1	600.00	34.00
49	1	600.00	34.00
50	1	600.00	34.00
51	1	600.00	34.00
52	1	600.00	34.00
53	1	600.00	34.00
54	1	600.00	34.00
55	1	600.00	34.00
56	1	600.00	34.00
57	1	600.00	34.00
58	1	600.00	34.00
59	1	600.00	34.00
60	1	600.00	34.00
61	1	600.00	34.00
62	1	600.00	34.00
63	1	600.00	34.00
64	1	600.00	34.00

65	1	600.00	34.00
66	1	600.00	34.00
67	1	600.00	34.00
68	1	600.00	34.00
69	1	600.00	34.00
70	1	600.00	34.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 70 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-5.24	93.46	5.44	71.47	648.21	473.97
1	-5.24	93.46	5.44	71.47	648.21	473.97
2	-5.24	98.88	5.44	133.81	690.26	504.72
2	-5.24	98.88	5.44	133.81	690.26	504.72
3	-5.24	104.29	5.44	196.16	732.31	535.47
3	-5.24	104.29	5.44	196.16	732.31	535.47
4	-5.24	108.30	2.61	882.02	1194.93	873.74
4	-5.24	108.30	2.61	882.02	1194.93	873.74
5	-5.24	110.90	2.61	911.95	1215.12	888.50
5	-5.24	110.90	2.61	911.95	1215.12	888.50
6	-5.24	114.50	4.62	1099.73	1341.78	981.12
6	-5.24	114.50	4.62	1099.73	1341.78	981.12
7	-5.24	119.09	4.62	1445.38	1574.92	1151.59

7	-5.24	119.09	4.62	1445.38	1574.92
1151.59					
8	-5.24	123.69	4.62	1791.03	1808.06
1322.07					
8	-5.24	123.69	4.62	1791.03	1808.06
1322.07					
9	-5.24	128.29	4.62	2136.67	2041.21
1492.54					
9	-5.24	128.29	4.62	2136.67	2041.21
1492.54					
10	1.45	133.09	5.01	2277.95	2136.50
1562.22					
10	1.45	133.09	5.01	2277.95	2136.50
1562.22					
11	1.45	138.09	5.01	2564.30	2329.64
1703.45					
11	1.45	138.09	5.01	2564.30	2329.64
1703.45					
12	1.45	143.09	5.01	2850.65	2522.79
1844.68					
12	1.45	143.09	5.01	2850.65	2522.79
1844.68					
13	1.45	148.10	5.01	3137.00	2715.93
1985.91					
13	1.45	148.10	5.01	3137.00	2715.93
1985.91					
14	1.45	153.10	4.99	3378.42	2878.77
2104.97					
14	1.45	153.10	4.99	3378.42	2878.77
2104.97					
15	1.45	158.09	4.99	3574.90	3011.30
2201.88					
15	1.45	158.09	4.99	3574.90	3011.30
2201.88					
16	1.45	163.08	4.99	3771.39	3143.83
2298.79					
16	1.45	163.08	4.99	3771.39	3143.83
2298.79					
17	1.45	168.07	4.99	3967.88	3276.37
2395.70					
17	1.45	168.07	4.99	3967.88	3276.37
2395.70					
18	8.14	172.58	4.06	3856.35	3201.14
2340.69					
18	8.14	172.58	4.06	3856.35	3201.14
2340.69					
19	8.14	176.59	4.06	3952.99	3266.32
2388.36					
19	8.14	176.59	4.06	3952.99	3266.32
2388.36					

20	8.14	181.23	5.31	4105.78	3369.38
2463.71					
20	8.14	181.23	5.31	4105.78	3369.38
2463.71					
21	8.14	186.49	5.31	4314.71	3510.31
2566.76					
21	8.14	186.49	5.31	4314.71	3510.31
2566.76					
22	8.14	191.75	5.31	4523.65	3651.24
2669.81					
22	8.14	191.75	5.31	4523.65	3651.24
2669.81					
23	8.14	197.01	5.31	4732.58	3792.17
2772.85					
23	8.14	197.01	5.31	4732.58	3792.17
2772.85					
24	8.14	202.28	5.31	4941.51	3933.09
2875.90					
24	8.14	202.28	5.31	4941.51	3933.09
2875.90					
25	8.14	207.54	5.31	5150.45	4074.02
2978.95					
25	8.14	207.54	5.31	5150.45	4074.02
2978.95					
26	14.83	212.35	4.52	4994.82	3969.05
2902.19					
26	14.83	212.35	4.52	4994.82	3969.05
2902.19					
27	14.83	216.72	4.52	5102.64	4041.78
2955.37					
27	14.83	216.72	4.52	5102.64	4041.78
2955.37					
28	14.83	220.35	3.00	5173.81	4089.78
2990.47					
28	14.83	220.35	3.00	5173.81	4089.78
2990.47					
29	14.83	223.25	3.00	5208.33	4113.07
3007.50					
29	14.83	223.25	3.00	5208.33	4113.07
3007.50					
30	14.83	227.11	4.99	5254.32	4144.09
3030.18					
30	14.83	227.11	4.99	5254.32	4144.09
3030.18					
31	14.83	231.94	4.99	5311.78	4182.84
3058.52					
31	14.83	231.94	4.99	5311.78	4182.84
3058.52					
32	14.83	236.77	4.99	5369.24	4221.60
3086.86					

32	14.83	236.77	4.99	5369.24	4221.60
3086.86					
33	14.83	241.59	4.99	5426.70	4260.35
3115.20					
33	14.83	241.59	4.99	5426.70	4260.35
3115.20					
34	14.83	246.42	4.99	5484.16	4299.11
3143.54					
34	14.83	246.42	4.99	5484.16	4299.11
3143.54					
35	21.52	250.65	3.90	5179.38	4093.53
2993.22					
35	21.52	250.65	3.90	5179.38	4093.53
2993.22					
36	21.52	254.28	3.90	5172.78	4089.08
2989.96					
36	21.52	254.28	3.90	5172.78	4089.08
2989.96					
37	21.52	257.78	3.60	5178.54	4092.97
2992.80					
37	21.52	257.78	3.60	5178.54	4092.97
2992.80					
38	21.52	261.12	3.60	5196.66	4105.19
3001.74					
38	21.52	261.12	3.60	5196.66	4105.19
3001.74					
39	21.52	265.06	4.86	5200.55	4107.82
3003.66					
39	21.52	265.06	4.86	5200.55	4107.82
3003.66					
40	21.52	269.59	4.86	5190.23	4100.85
2998.57					
40	21.52	269.59	4.86	5190.23	4100.85
2998.57					
41	21.52	274.11	4.86	5179.90	4093.89
2993.48					
41	21.52	274.11	4.86	5179.90	4093.89
2993.48					
42	21.52	278.64	4.86	5169.58	4086.93
2988.38					
42	21.52	278.64	4.86	5169.58	4086.93
2988.38					
43	21.52	282.19	2.77	5161.48	4081.46
2984.39					
43	21.52	282.19	2.77	5161.48	4081.46
2984.39					
44	21.52	284.76	2.77	5155.61	4077.50
2981.49					
44	21.52	284.76	2.77	5155.61	4077.50
2981.49					

45	28.21	288.59	5.78	4788.98	3830.21
2800.67					
45	28.21	288.59	5.78	4788.98	3830.21
2800.67					
46	28.21	293.69	5.78	4708.69	3776.05
2761.07					
46	28.21	293.69	5.78	4708.69	3776.05
2761.07					
47	28.21	298.78	5.78	4628.41	3721.90
2721.47					
47	28.21	298.78	5.78	4628.41	3721.90
2721.47					
48	28.21	303.87	5.78	4548.12	3667.75
2681.88					
48	28.21	303.87	5.78	4548.12	3667.75
2681.88					
49	28.21	308.96	5.78	4467.83	3613.59
2642.28					
49	28.21	308.96	5.78	4467.83	3613.59
2642.28					
50	28.21	314.05	5.78	4387.55	3559.44
2602.68					
50	28.21	314.05	5.78	4387.55	3559.44
2602.68					
51	28.21	318.95	5.33	4295.63	3497.44
2557.35					
51	28.21	318.95	5.33	4295.63	3497.44
2557.35					
52	34.90	322.57	3.11	3904.81	3233.83
2364.60					
52	34.90	322.57	3.11	3904.81	3233.83
2364.60					
53	34.90	325.12	3.11	3814.63	3173.00
2320.12					
53	34.90	325.12	3.11	3814.63	3173.00
2320.12					
54	34.90	328.80	5.85	3708.68	3101.54
2267.86					
54	34.90	328.80	5.85	3708.68	3101.54
2267.86					
55	34.90	333.60	5.85	3586.95	3019.43
2207.82					
55	34.90	333.60	5.85	3586.95	3019.43
2207.82					
56	34.90	337.40	3.41	3460.49	2934.13
2145.46					
56	34.90	337.40	3.41	3460.49	2934.13
2145.46					
57	34.90	340.20	3.41	3329.31	2845.65
2080.76					

57	34.90	340.20	3.41	3329.31	2845.65	2080.76
58	34.90	343.98	5.79	3136.73	2715.75	1985.77
58	34.90	343.98	5.79	3136.73	2715.75	1985.77
59	34.90	348.73	5.79	2882.76	2544.44	1860.51
59	34.90	348.73	5.79	2882.76	2544.44	1860.51
60	34.90	352.60	3.66	2743.36	2450.42	1791.76
60	34.90	352.60	3.66	2743.36	2450.42	1791.76
61	41.59	355.90	4.81	2459.30	2258.82	1651.66
61	41.59	355.90	4.81	2459.30	2258.82	1651.66
62	41.59	359.25	4.14	2342.43	2179.99	1594.02
62	41.59	359.25	4.14	2342.43	2179.99	1594.02
63	41.59	363.07	6.07	2114.92	2026.53	1481.81
63	41.59	363.07	6.07	2114.92	2026.53	1481.81
64	41.59	367.61	6.07	1808.02	1819.52	1330.45
64	41.59	367.61	6.07	1808.02	1819.52	1330.45
65	41.59	372.15	6.07	1501.11	1612.51	1179.08
65	41.59	372.15	6.07	1501.11	1612.51	1179.08
66	41.59	376.69	6.07	1194.20	1405.50	1027.71
66	41.59	376.69	6.07	1194.20	1405.50	1027.71
67	41.59	381.23	6.07	887.29	1198.49	876.34
67	41.59	381.23	6.07	887.29	1198.49	876.34
68	41.59	383.76	0.69	714.40	1081.87	791.07
68	41.59	383.76	0.69	714.40	1081.87	791.07
69	48.28	386.54	7.59	358.33	841.70	615.45
69	48.28	386.54	7.59	358.33	841.70	615.45

70	48.28	391.59	7.59	222.12	149.82
109.55					
70	48.28	391.59	7.59	222.12	149.82
109.55					

Table 4 - Base Force Data on the 70 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.24	93.46	5.44	388.72	3525.70	2578.01
1	-5.24	93.46	5.44	388.72	3525.70	2578.01
2	-5.24	98.88	5.44	727.84	3754.44	2745.27
2	-5.24	98.88	5.44	727.84	3754.44	2745.27
3	-5.24	104.29	5.44	1066.95	3983.17	2912.52
3	-5.24	104.29	5.44	1066.95	3983.17	2912.52
4	-5.24	108.30	2.61	2302.89	3119.87	2281.27
4	-5.24	108.30	2.61	2302.89	3119.87	2281.27
5	-5.24	110.90	2.61	2381.02	3172.58	2319.81
5	-5.24	110.90	2.61	2381.02	3172.58	2319.81
6	-5.24	114.50	4.62	5075.45	6192.53	4528.01
6	-5.24	114.50	4.62	5075.45	6192.53	4528.01
7	-5.24	119.09	4.62	6670.66	7268.51	5314.78
7	-5.24	119.09	4.62	6670.66	7268.51	5314.78
8	-5.24	123.69	4.62	8265.87	8344.50	6101.55
8	-5.24	123.69	4.62	8265.87	8344.50	6101.55
9	-5.24	128.29	4.62	9861.09	9420.48	6888.31

9	-5.24	128.29	4.62	9861.09	9420.48
6888.31					
10	1.45	133.09	5.01	11402.86	10694.77
7820.08					
10	1.45	133.09	5.01	11402.86	10694.77
7820.08					
11	1.45	138.09	5.01	12836.25	11661.61
8527.04					
11	1.45	138.09	5.01	12836.25	11661.61
8527.04					
12	1.45	143.09	5.01	14269.64	12628.44
9234.00					
12	1.45	143.09	5.01	14269.64	12628.44
9234.00					
13	1.45	148.10	5.01	15703.03	13595.28
9940.95					
13	1.45	148.10	5.01	15703.03	13595.28
9940.95					
14	1.45	153.10	4.99	16872.66	14377.30
10512.77					
14	1.45	153.10	4.99	16872.66	14377.30
10512.77					
15	1.45	158.09	4.99	17853.96	15039.20
10996.75					
15	1.45	158.09	4.99	17853.96	15039.20
10996.75					
16	1.45	163.08	4.99	18835.27	15701.10
11480.74					
16	1.45	163.08	4.99	18835.27	15701.10
11480.74					
17	1.45	168.07	4.99	19816.57	16362.99
11964.72					
17	1.45	168.07	4.99	19816.57	16362.99
11964.72					
18	8.14	172.58	4.06	15639.53	12982.32
9492.75					
18	8.14	172.58	4.06	15639.53	12982.32
9492.75					
19	8.14	176.59	4.06	16031.46	13246.67
9686.05					
19	8.14	176.59	4.06	16031.46	13246.67
9686.05					
20	8.14	181.23	5.31	21821.48	17907.67
13094.20					
20	8.14	181.23	5.31	21821.48	17907.67
13094.20					
21	8.14	186.49	5.31	22931.93	18656.67
13641.87					
21	8.14	186.49	5.31	22931.93	18656.67
13641.87					

22	8.14	191.75	5.31	24042.38	19405.68
14189.55					
22	8.14	191.75	5.31	24042.38	19405.68
14189.55					
23	8.14	197.01	5.31	25152.83	20154.69
14737.23					
23	8.14	197.01	5.31	25152.83	20154.69
14737.23					
24	8.14	202.28	5.31	26263.28	20903.70
15284.91					
24	8.14	202.28	5.31	26263.28	20903.70
15284.91					
25	8.14	207.54	5.31	27373.73	21652.71
15832.59					
25	8.14	207.54	5.31	27373.73	21652.71
15832.59					
26	14.83	212.35	4.52	22559.18	17926.27
13107.80					
26	14.83	212.35	4.52	22559.18	17926.27
13107.80					
27	14.83	216.72	4.52	23046.17	18254.75
13347.98					
27	14.83	216.72	4.52	23046.17	18254.75
13347.98					
28	14.83	220.35	3.00	15520.99	12268.99
8971.16					
28	14.83	220.35	3.00	15520.99	12268.99
8971.16					
29	14.83	223.25	3.00	15624.54	12338.84
9022.23					
29	14.83	223.25	3.00	15624.54	12338.84
9022.23					
30	14.83	227.11	4.99	26237.09	20693.20
15130.99					
30	14.83	227.11	4.99	26237.09	20693.20
15130.99					
31	14.83	231.94	4.99	26524.00	20886.72
15272.50					
31	14.83	231.94	4.99	26524.00	20886.72
15272.50					
32	14.83	236.77	4.99	26810.92	21080.25
15414.01					
32	14.83	236.77	4.99	26810.92	21080.25
15414.01					
33	14.83	241.59	4.99	27097.83	21273.78
15555.52					
33	14.83	241.59	4.99	27097.83	21273.78
15555.52					
34	14.83	246.42	4.99	27384.75	21467.30
15697.02					

34	14.83	246.42	4.99	27384.75	21467.30
15697.02					
35	21.52	250.65	3.90	20222.11	15982.59
11686.57					
35	21.52	250.65	3.90	20222.11	15982.59
11686.57					
36	21.52	254.28	3.90	20196.35	15965.22
11673.86					
36	21.52	254.28	3.90	20196.35	15965.22
11673.86					
37	21.52	257.78	3.60	18647.99	14738.83
10777.12					
37	21.52	257.78	3.60	18647.99	14738.83
10777.12					
38	21.52	261.12	3.60	18713.23	14782.84
10809.30					
38	21.52	261.12	3.60	18713.23	14782.84
10809.30					
39	21.52	265.06	4.86	25295.77	19980.65
14609.97					
39	21.52	265.06	4.86	25295.77	19980.65
14609.97					
40	21.52	269.59	4.86	25245.56	19946.78
14585.20					
40	21.52	269.59	4.86	25245.56	19946.78
14585.20					
41	21.52	274.11	4.86	25195.34	19912.90
14560.44					
41	21.52	274.11	4.86	25195.34	19912.90
14560.44					
42	21.52	278.64	4.86	25145.12	19879.03
14535.67					
42	21.52	278.64	4.86	25145.12	19879.03
14535.67					
43	21.52	282.19	2.77	14279.36	11291.46
8256.39					
43	21.52	282.19	2.77	14279.36	11291.46
8256.39					
44	21.52	284.76	2.77	14263.11	11280.51
8248.37					
44	21.52	284.76	2.77	14263.11	11280.51
8248.37					
45	28.21	288.59	5.78	27672.94	22132.71
16183.57					
45	28.21	288.59	5.78	27672.94	22132.71
16183.57					
46	28.21	293.69	5.78	27209.01	21819.79
15954.76					
46	28.21	293.69	5.78	27209.01	21819.79
15954.76					

47	28.21	298.78	5.78	26745.08	21506.87
15725.95					
47	28.21	298.78	5.78	26745.08	21506.87
15725.95					
48	28.21	303.87	5.78	26281.15	21193.94
15497.14					
48	28.21	303.87	5.78	26281.15	21193.94
15497.14					
49	28.21	308.96	5.78	25817.23	20881.02
15268.33					
49	28.21	308.96	5.78	25817.23	20881.02
15268.33					
50	28.21	314.05	5.78	25353.30	20568.10
15039.52					
50	28.21	314.05	5.78	25353.30	20568.10
15039.52					
51	28.21	318.95	5.33	22892.28	18638.56
13628.63					
51	28.21	318.95	5.33	22892.28	18638.56
13628.63					
52	34.90	322.57	3.11	12149.89	10062.11
7357.48					
52	34.90	322.57	3.11	12149.89	10062.11
7357.48					
53	34.90	325.12	3.11	11869.29	9872.85
7219.09					
53	34.90	325.12	3.11	11869.29	9872.85
7219.09					
54	34.90	328.80	5.85	21705.48	18152.10
13272.93					
54	34.90	328.80	5.85	21705.48	18152.10
13272.93					
55	34.90	333.60	5.85	20993.05	17671.56
12921.55					
55	34.90	333.60	5.85	20993.05	17671.56
12921.55					
56	34.90	337.40	3.41	11814.22	10017.21
7324.64					
56	34.90	337.40	3.41	11814.22	10017.21
7324.64					
57	34.90	340.20	3.41	11366.35	9715.12
7103.75					
57	34.90	340.20	3.41	11366.35	9715.12
7103.75					
58	34.90	343.98	5.79	18166.85	15728.69
11500.91					
58	34.90	343.98	5.79	18166.85	15728.69
11500.91					
59	34.90	348.73	5.79	16695.92	14736.53
10775.44					

59	34.90	348.73	5.79	16695.92	14736.53
10775.44					
60	34.90	352.60	3.66	10041.76	8969.48
6558.54					
60	34.90	352.60	3.66	10041.76	8969.48
6558.54					
61	41.59	355.90	4.81	11831.04	10866.58
7945.71					
61	41.59	355.90	4.81	11831.04	10866.58
7945.71					
62	41.59	359.25	4.14	9709.21	9035.91
6607.11					
62	41.59	359.25	4.14	9709.21	9035.91
6607.11					
63	41.59	363.07	6.07	12838.28	12301.73
8995.10					
63	41.59	363.07	6.07	12838.28	12301.73
8995.10					
64	41.59	367.61	6.07	10975.25	11045.09
8076.24					
64	41.59	367.61	6.07	10975.25	11045.09
8076.24					
65	41.59	372.15	6.07	9112.21	9788.46
7157.38					
65	41.59	372.15	6.07	9112.21	9788.46
7157.38					
66	41.59	376.69	6.07	7249.18	8531.83
6238.53					
66	41.59	376.69	6.07	7249.18	8531.83
6238.53					
67	41.59	381.23	6.07	5386.15	7275.20
5319.67					
67	41.59	381.23	6.07	5386.15	7275.20
5319.67					
68	41.59	383.76	0.69	494.85	749.39
547.96					
68	41.59	383.76	0.69	494.85	749.39
547.96					
69	48.28	386.54	7.59	2718.53	6385.64
4669.22					
69	48.28	386.54	7.59	2718.53	6385.64
4669.22					
70	48.28	391.59	7.59	1685.13	1136.63
831.11					
70	48.28	391.59	7.59	1685.13	1136.63
831.11					

SUM OF MOMENTS = 0.290472E+01 (ft/lbs);Imbalance (Fraction of Total Weight) = 0.2272097E-05

Sum of the Resisting Forces = 972486.56 (lbs)

Average Available Shear Strength = 2901.44(psf)

Sum of the Driving Forces = 711088.12 (lbs)

Average Mobilized Shear Stress = 2121.55(psf)

Total length of the failure surface = 335.17(ft)

Factor of Safety Balance Check: FS = 1.36760

CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.49891(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 1330.136(ft)

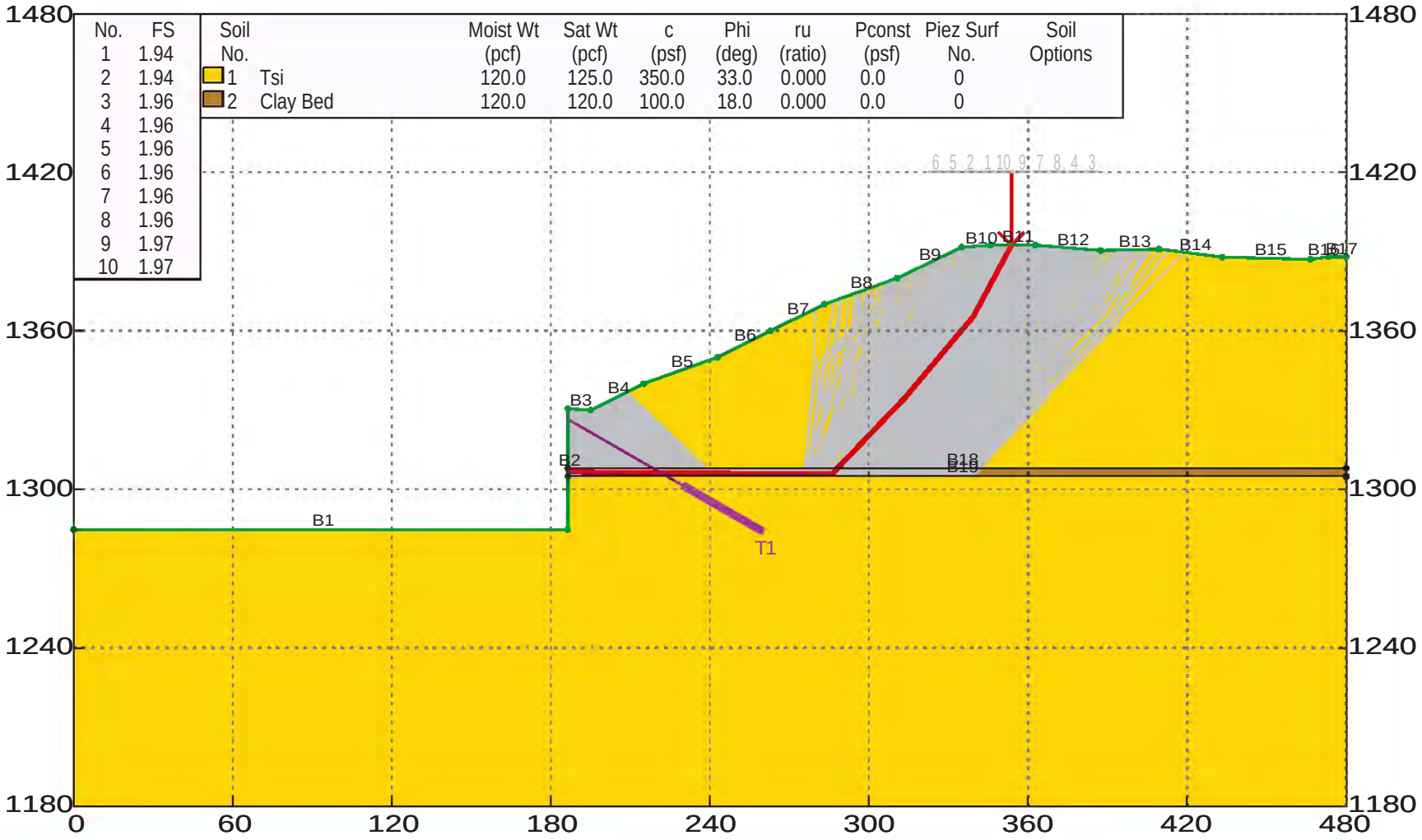
Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Block (Static)

LGC Geotechnical / BPP

\Section B - Static - Block - Tieback.gsd



GEOSTASE FS = 1.94

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Block - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Block - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Block (Static)

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface Option	Water Pressure Constant (psf)
1 Tsi	120.0	125.0	350.00	33.00	0.000	0	0.0
2 Clay Bed	120.0	120.0	100.00	18.00	0.000	0	0.0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

EARTHQUAKE DATA HAS BEEN SUPPRESSED

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of
Non-Circular Zone Search = 40.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	186.50	1306.40	240.00	1306.40	3.00
2	275.00	1306.40	340.00	1306.40	3.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 263

Number of Trial Surfaces With Valid FS = 737

Percentage of Trial Surfaces With Non-Converged and/or

Non-Valid FS Solutions of the Total Attempted = 26.3 %

Statistical Data On All Valid FS Values:
FS Max = 8.492 FS Min = 1.943 FS Ave = 2.720
Standard Deviation = 0.581 Coefficient of Variation = 21.35 %

Critical Surface is Sequence Number 193 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	221.46	1306.26

Factor Of Safety For The Critical or Specified Surface = 1.943

Table 1 - Geometry Data on the 38 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	3.45	23.49	188.13	1306.91	1330.40	-5.02	-3.33	3.46
2	3.45	23.59	191.58	1306.61	1330.20	-5.02	-3.33	3.46
3	1.70	23.60	194.15	1306.45	1330.05	-0.40	-3.33	1.70
4	5.00	24.82	197.50	1306.43	1331.25	-0.40	26.57	5.00
5	5.00	27.36	202.50	1306.39	1333.75	-0.40	26.57	5.00
6	5.00	29.89	207.50	1306.36	1336.25	-0.40	26.57	5.00
7	5.00	32.43	212.50	1306.32	1338.75	-0.40	26.57	5.00
8	4.65	34.55	217.32	1306.29	1340.83	-0.40	19.72	4.65
9	4.65	36.24	221.98	1306.26	1342.50	-0.40	19.72	4.65

10	4.65	37.94	226.62	1306.22	1344.17	-0.40	19.72
4.65							
11	4.65	39.64	231.27	1306.19	1345.83	-0.40	19.72
4.65							
12	4.65	41.34	235.93	1306.16	1347.50	-0.40	19.72
4.65							
13	4.65	43.04	240.57	1306.13	1349.17	-0.40	19.72
4.65							
14	4.95	45.14	245.38	1306.09	1351.24	-0.40	26.57
4.95							
15	4.95	47.65	250.32	1306.06	1353.71	-0.40	26.57
4.95							
16	4.95	50.16	255.28	1306.03	1356.19	-0.40	26.57
4.95							
17	4.95	52.67	260.23	1305.99	1358.66	-0.40	26.57
4.95							
18	5.10	55.21	265.25	1305.96	1361.16	-0.40	26.34
5.10							
19	5.10	57.77	270.35	1305.92	1363.69	-0.40	26.34
5.10							
20	5.10	60.33	275.45	1305.89	1366.21	-0.40	26.34
5.10							
21	5.10	62.89	280.55	1305.85	1368.74	-0.40	26.34
5.10							
22	2.93	64.70	284.56	1305.82	1370.53	-0.40	19.80
2.93							
23	1.99	64.55	287.02	1306.86	1371.41	46.35	19.80
2.88							
24	4.52	62.32	290.27	1310.27	1372.58	46.35	19.80
6.54							
25	4.52	59.21	294.79	1315.00	1374.21	46.35	19.80
6.54							
26	4.52	56.10	299.31	1319.74	1375.83	46.35	19.80
6.54							
27	4.52	52.99	303.82	1324.47	1377.46	46.35	19.80
6.54							
28	4.52	49.88	308.34	1329.21	1379.09	46.35	19.80
6.54							
29	3.04	47.47	312.12	1333.16	1380.63	46.35	25.71
4.40							
30	5.32	44.72	316.29	1337.92	1382.64	50.00	25.71
8.27							
31	5.32	40.94	321.61	1344.26	1385.20	50.00	25.71
8.27							
32	5.32	37.17	326.93	1350.60	1387.76	50.00	25.71
8.27							
33	5.32	33.39	332.24	1356.93	1390.32	50.00	25.71
8.27							
34	4.45	29.01	337.12	1362.75	1391.76	50.00	4.20
6.92							

35	3.23	23.62	340.96	1368.43	1392.04	61.96	4.20
6.86							
36	3.23	17.79	344.19	1374.49	1392.28	61.96	4.20
6.86							
37	3.96	11.16	347.78	1381.24	1392.40	61.96	0.00
8.43							
38	3.96	3.72	351.74	1388.68	1392.40	61.96	0.00
8.43							

Table 2 - Force Data On The 38 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	9727.8	0.0	0.0	0.0	0.0	0.0
2	9770.2	0.0	0.0	0.0	0.0	0.0
3	4809.6	0.0	0.0	0.0	0.0	0.0
4	14895.0	0.0	0.0	0.0	0.0	0.0
5	16415.7	0.0	0.0	0.0	0.0	0.0
6	17936.4	0.0	0.0	0.0	0.0	0.0
7	19457.1	0.0	0.0	0.0	0.0	0.0
8	19276.2	0.0	0.0	0.0	0.0	0.0
9	20224.1	0.0	0.0	0.0	0.0	0.0
10	21172.0	0.0	0.0	0.0	0.0	0.0
11	22119.9	0.0	0.0	0.0	0.0	0.0
12	23067.9	0.0	0.0	0.0	0.0	0.0
13	24015.8	0.0	0.0	0.0	0.0	0.0
14	26814.9	0.0	0.0	0.0	0.0	0.0
15	28305.4	0.0	0.0	0.0	0.0	0.0
16	29795.8	0.0	0.0	0.0	0.0	0.0
17	31286.3	0.0	0.0	0.0	0.0	0.0
18	33785.6	0.0	0.0	0.0	0.0	0.0
19	35352.4	0.0	0.0	0.0	0.0	0.0
20	36919.3	0.0	0.0	0.0	0.0	0.0
21	38486.1	0.0	0.0	0.0	0.0	0.0
22	22711.3	0.0	0.0	0.0	0.0	0.0
23	15417.5	0.0	0.0	0.0	0.0	0.0
24	33776.9	0.0	0.0	0.0	0.0	0.0
25	32092.0	0.0	0.0	0.0	0.0	0.0
26	30407.2	0.0	0.0	0.0	0.0	0.0
27	28722.3	0.0	0.0	0.0	0.0	0.0
28	27037.4	0.0	0.0	0.0	0.0	0.0
29	17295.9	0.0	0.0	0.0	0.0	0.0
30	28526.1	0.0	0.0	0.0	0.0	0.0
31	26117.1	0.0	0.0	0.0	0.0	0.0
32	23708.1	0.0	0.0	0.0	0.0	0.0

33	21299.2	0.0	0.0	0.0	0.0	0.0
34	15481.0	0.0	0.0	0.0	0.0	0.0
35	9144.8	0.0	0.0	0.0	0.0	0.0
36	6890.3	0.0	0.0	0.0	0.0	0.0
37	5308.5	0.0	0.0	0.0	0.0	0.0
38	1769.5	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 829338.52(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 829338.52(lbs)

TOTAL AREA OF SLIDING MASS = 6911.15(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 38 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	2	100.00	18.00	
2	2	100.00	18.00	
3	2	100.00	18.00	
4	2	100.00	18.00	
5	2	100.00	18.00	
6	2	100.00	18.00	
7	2	100.00	18.00	
8	2	100.00	18.00	
9	2	100.00	18.00	
10	2	100.00	18.00	
11	2	100.00	18.00	
12	2	100.00	18.00	
13	2	100.00	18.00	
14	2	100.00	18.00	
15	2	100.00	18.00	
16	2	100.00	18.00	
17	2	100.00	18.00	
18	2	100.00	18.00	
19	2	100.00	18.00	
20	2	100.00	18.00	
21	2	100.00	18.00	
22	2	100.00	18.00	
23	2	100.00	18.00	
24	1	350.00	33.00	
25	1	350.00	33.00	
26	1	350.00	33.00	
27	1	350.00	33.00	
28	1	350.00	33.00	
29	1	350.00	33.00	
30	1	350.00	33.00	
31	1	350.00	33.00	
32	1	350.00	33.00	

33	1	350.00	33.00
34	1	350.00	33.00
35	1	350.00	33.00
36	1	350.00	33.00
37	1	350.00	33.00
38	1	350.00	33.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 38 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-5.02	188.13	3.46	2869.29	1032.29	530.27
1	-5.02	188.13	3.46	2869.29	1032.29	530.27
2	-5.02	191.58	3.46	2881.79	1036.35	532.36
2	-5.02	191.58	3.46	2881.79	1036.35	532.36
3	-0.40	194.15	1.70	2836.06	1021.49	524.73
3	-0.40	194.15	1.70	2836.06	1021.49	524.73
4	-0.40	197.50	5.00	2983.10	1069.27	549.27
4	-0.40	197.50	5.00	2983.10	1069.27	549.27
5	-0.40	202.50	5.00	3287.62	1168.21	600.10
5	-0.40	202.50	5.00	3287.62	1168.21	600.10
6	-0.40	207.50	5.00	3592.14	1267.16	650.92
6	-0.40	207.50	5.00	3592.14	1267.16	650.92
7	-0.40	212.50	5.00	3896.66	1366.10	701.75

7	-0.40	212.50	5.00	3896.66	1366.10	701.75
8	-0.40	217.32	4.65	4150.98	1448.73	744.20
8	-0.40	217.32	4.65	4150.98	1448.73	744.20
9	-0.40	221.98	4.65	10814.74	3613.92	1856.43
9	-0.40	221.98	4.65	10814.74	3613.92	1856.43
10	-0.40	226.62	4.65	4559.19	1581.37	812.33
10	-0.40	226.62	4.65	4559.19	1581.37	812.33
11	-0.40	231.27	4.65	4763.30	1647.69	846.40
11	-0.40	231.27	4.65	4763.30	1647.69	846.40
12	-0.40	235.93	4.65	4967.40	1714.01	880.47
12	-0.40	235.93	4.65	4967.40	1714.01	880.47
13	-0.40	240.57	4.65	5171.51	1780.33	914.53
13	-0.40	240.57	4.65	5171.51	1780.33	914.53
14	-0.40	245.38	4.95	5424.30	1862.46	956.73
14	-0.40	245.38	4.95	5424.30	1862.46	956.73
15	-0.40	250.32	4.95	5725.78	1960.42	1007.05
15	-0.40	250.32	4.95	5725.78	1960.42	1007.05
16	-0.40	255.28	4.95	6027.25	2058.37	1057.36
16	-0.40	255.28	4.95	6027.25	2058.37	1057.36
17	-0.40	260.23	4.95	6328.73	2156.33	1107.68
17	-0.40	260.23	4.95	6328.73	2156.33	1107.68
18	-0.40	265.25	5.10	6633.27	2255.28	1158.51
18	-0.40	265.25	5.10	6633.27	2255.28	1158.51
19	-0.40	270.35	5.10	6940.88	2355.23	1209.86
19	-0.40	270.35	5.10	6940.88	2355.23	1209.86

20	-0.40	275.45	5.10	7248.49	2455.18
1261.20					
20	-0.40	275.45	5.10	7248.49	2455.18
1261.20					
21	-0.40	280.55	5.10	7556.10	2555.12
1312.54					
21	-0.40	280.55	5.10	7556.10	2555.12
1312.54					
22	-0.40	284.56	2.93	7774.38	2626.05
1348.97					
22	-0.40	284.56	2.93	7774.38	2626.05
1348.97					
23	46.35	287.02	2.88	6465.18	2200.67
1130.46					
23	46.35	287.02	2.88	6465.18	2200.67
1130.46					
24	46.35	290.27	6.54	5278.25	3777.74
1940.58					
24	46.35	290.27	6.54	5278.25	3777.74
1940.58					
25	46.35	294.79	6.54	5007.59	3601.96
1850.29					
25	46.35	294.79	6.54	5007.59	3601.96
1850.29					
26	46.35	299.31	6.54	4736.92	3426.19
1760.00					
26	46.35	299.31	6.54	4736.92	3426.19
1760.00					
27	46.35	303.82	6.54	4466.25	3250.42
1669.70					
27	46.35	303.82	6.54	4466.25	3250.42
1669.70					
28	46.35	308.34	6.54	4195.58	3074.64
1579.41					
28	46.35	308.34	6.54	4195.58	3074.64
1579.41					
29	46.35	312.12	4.40	3985.33	2938.10
1509.27					
29	46.35	312.12	4.40	3985.33	2938.10
1509.27					
30	50.00	316.29	8.27	3590.65	2681.80
1377.61					
30	50.00	316.29	8.27	3590.65	2681.80
1377.61					
31	50.00	321.61	8.27	3273.74	2475.99
1271.89					
31	50.00	321.61	8.27	3273.74	2475.99
1271.89					
32	50.00	326.93	8.27	2956.83	2270.19
1166.17					

32	50.00	326.93	8.27	2956.83	2270.19	1166.17
33	50.00	332.24	8.27	2639.92	2064.38	1060.45
33	50.00	332.24	8.27	2639.92	2064.38	1060.45
34	50.00	337.12	6.92	2272.79	1825.97	937.98
34	50.00	337.12	6.92	2272.79	1825.97	937.98
35	61.96	340.96	6.86	1471.90	1305.86	670.81
35	61.96	340.96	6.86	1471.90	1305.86	670.81
36	61.96	344.19	6.86	1055.37	1035.37	531.86
36	61.96	344.19	6.86	1055.37	1035.37	531.86
37	61.96	347.78	8.43	580.92	727.25	373.58
37	61.96	347.78	8.43	580.92	727.25	373.58
38	61.96	351.74	8.43	48.54	381.52	195.98
38	61.96	351.74	8.43	48.54	381.52	195.98

Table 4 - Base Force Data on the 38 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.02	188.13	3.46	9939.74	3576.04	1836.97
1	-5.02	188.13	3.46	9939.74	3576.04	1836.97
2	-5.02	191.58	3.46	9983.05	3590.11	1844.20
2	-5.02	191.58	3.46	9983.05	3590.11	1844.20
3	-0.40	194.15	1.70	4816.35	1734.75	891.12
3	-0.40	194.15	1.70	4816.35	1734.75	891.12

4	-0.40	197.50	5.00	14915.84	5346.46
2746.42					
4	-0.40	197.50	5.00	14915.84	5346.46
2746.42					
5	-0.40	202.50	5.00	16438.48	5841.20
3000.56					
5	-0.40	202.50	5.00	16438.48	5841.20
3000.56					
6	-0.40	207.50	5.00	17961.13	6335.94
3254.70					
6	-0.40	207.50	5.00	17961.13	6335.94
3254.70					
7	-0.40	212.50	5.00	19483.77	6830.67
3508.84					
7	-0.40	212.50	5.00	19483.77	6830.67
3508.84					
8	-0.40	217.32	4.65	19302.50	6736.77
3460.61					
8	-0.40	217.32	4.65	19302.50	6736.77
3460.61					
9	-0.40	221.98	4.65	50289.76	16805.14
8632.62					
9	-0.40	221.98	4.65	50289.76	16805.14
8632.62					
10	-0.40	226.62	4.65	21200.73	7353.55
3777.44					
10	-0.40	226.62	4.65	21200.73	7353.55
3777.44					
11	-0.40	231.27	4.65	22149.85	7661.93
3935.85					
11	-0.40	231.27	4.65	22149.85	7661.93
3935.85					
12	-0.40	235.93	4.65	23098.97	7970.32
4094.27					
12	-0.40	235.93	4.65	23098.97	7970.32
4094.27					
13	-0.40	240.57	4.65	24048.09	8278.71
4252.68					
13	-0.40	240.57	4.65	24048.09	8278.71
4252.68					
14	-0.40	245.38	4.95	26850.93	9219.41
4735.91					
14	-0.40	245.38	4.95	26850.93	9219.41
4735.91					
15	-0.40	250.32	4.95	28343.27	9704.30
4984.99					
15	-0.40	250.32	4.95	28343.27	9704.30
4984.99					
16	-0.40	255.28	4.95	29835.62	10189.19
5234.08					

16	-0.40	255.28	4.95	29835.62	10189.19 5234.08
17	-0.40	260.23	4.95	31327.96	10674.08 5483.16
17	-0.40	260.23	4.95	31327.96	10674.08 5483.16
18	-0.40	265.25	5.10	33830.49	11502.21 5908.56
18	-0.40	265.25	5.10	33830.49	11502.21 5908.56
19	-0.40	270.35	5.10	35399.33	12011.95 6170.41
19	-0.40	270.35	5.10	35399.33	12011.95 6170.41
20	-0.40	275.45	5.10	36968.18	12521.70 6432.26
20	-0.40	275.45	5.10	36968.18	12521.70 6432.26
21	-0.40	280.55	5.10	38537.02	13031.45 6694.11
21	-0.40	280.55	5.10	38537.02	13031.45 6694.11
22	-0.40	284.56	2.93	22741.25	7681.60 3945.95
22	-0.40	284.56	2.93	22741.25	7681.60 3945.95
23	46.35	287.02	2.88	18640.57	6345.01 3259.36
23	46.35	287.02	2.88	18640.57	6345.01 3259.36
24	46.35	290.27	6.54	34538.67	24719.93 12698.36
24	46.35	290.27	6.54	34538.67	24719.93 12698.36
25	46.35	294.79	6.54	32767.54	23569.74 12107.52
25	46.35	294.79	6.54	32767.54	23569.74 12107.52
26	46.35	299.31	6.54	30996.40	22419.55 11516.68
26	46.35	299.31	6.54	30996.40	22419.55 11516.68
27	46.35	303.82	6.54	29225.26	21269.36 10925.84
27	46.35	303.82	6.54	29225.26	21269.36 10925.84
28	46.35	308.34	6.54	27454.13	20119.17 10335.00
28	46.35	308.34	6.54	27454.13	20119.17 10335.00

29	46.35	312.12	4.40	17530.97	12924.35 6639.10
29	46.35	312.12	4.40	17530.97	12924.35 6639.10
30	50.00	316.29	8.27	29696.72	22179.97 11393.61
30	50.00	316.29	8.27	29696.72	22179.97 11393.61
31	50.00	321.61	8.27	27075.69	20477.86 10519.25
31	50.00	321.61	8.27	27075.69	20477.86 10519.25
32	50.00	326.93	8.27	24454.66	18775.74 9644.90
32	50.00	326.93	8.27	24454.66	18775.74 9644.90
33	50.00	332.24	8.27	21833.63	17073.63 8770.54
33	50.00	332.24	8.27	21833.63	17073.63 8770.54
34	50.00	337.12	6.92	15722.57	12631.56 6488.70
34	50.00	337.12	6.92	15722.57	12631.56 6488.70
35	61.96	340.96	6.86	10104.30	8964.49 4604.96
35	61.96	340.96	6.86	10104.30	8964.49 4604.96
36	61.96	344.19	6.86	7244.91	7107.58 3651.08
36	61.96	344.19	6.86	7244.91	7107.58 3651.08
37	61.96	347.78	8.43	4897.77	6131.53 3149.70
37	61.96	347.78	8.43	4897.77	6131.53 3149.70
38	61.96	351.74	8.43	409.27	3216.66 1652.37
38	61.96	351.74	8.43	409.27	3216.66 1652.37

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 38 Slices (Only Applicable Slices Listed)

Slice	Horiz Force	Vert Force	Result Force	Inclin(deg)	Moment@Base Cntr

No.	(lbs)	(lbs)	(lbs)		(ft/lbs)
9	51961.5	30000.0	60000.0	30.00	0.153442E+05

Sum of the Resisting Forces = 345774.51 (lbs)

Average Available Shear Strength = 1644.62(psf)

Sum of the Driving Forces = 192023.48 (lbs)

Average Mobilized Shear Stress = 913.33(psf)

Total length of the failure surface = 210.25(ft)

Factor of Safety Balance Check: FS = 1.80069

Janbu's Correction Factor (fo) = 1.0790

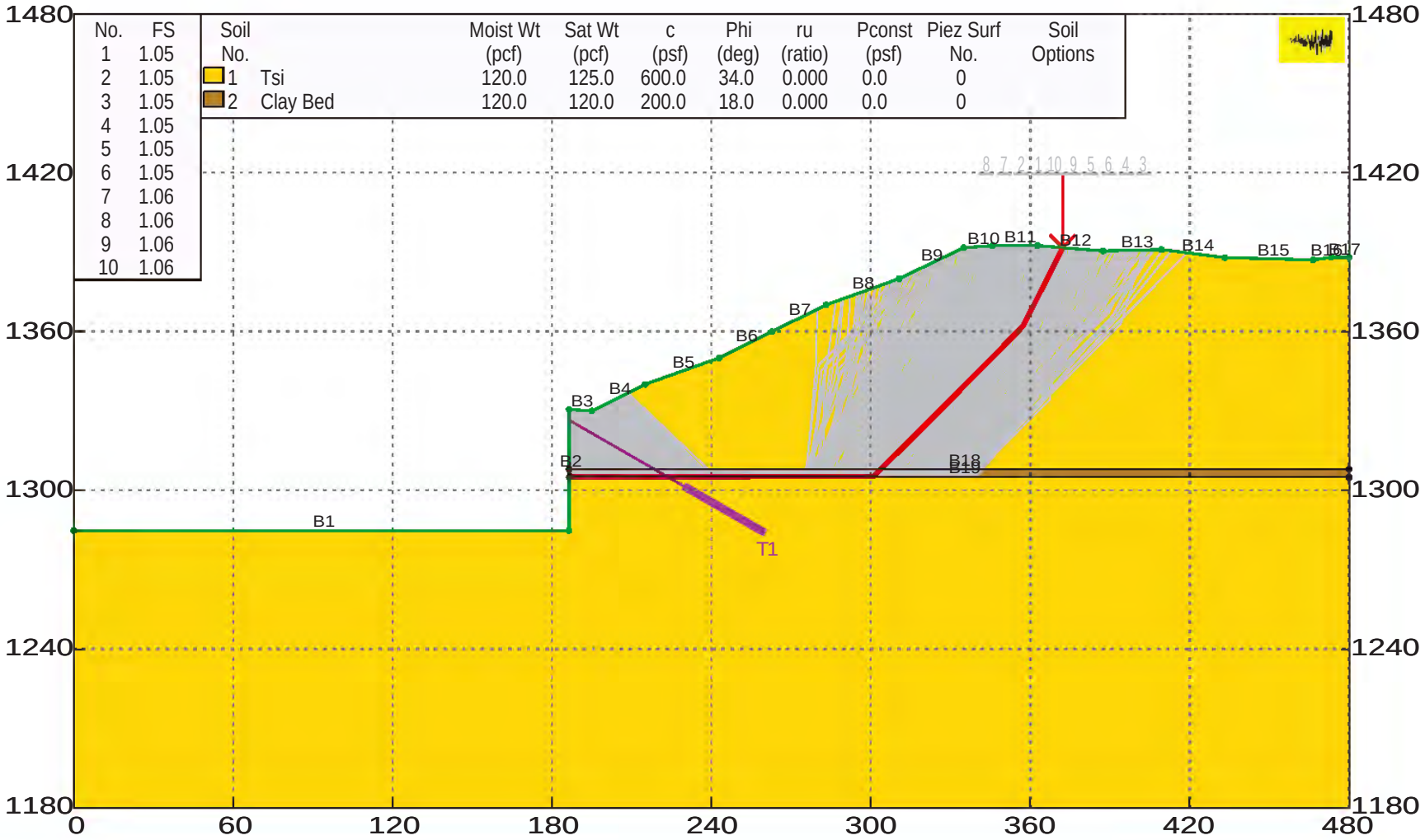
Janub's FS Corrected = 1.94290

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Block (Seismic (117A))

LGC Geotechnical / BPP

\Section B - Seismic (117A) - Block - Tieback.gsd



GEOSTASE FS = 1.05

Simplified Janbu (Corrected) Method

kh = 0.26000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** GEOSTASE(R) ***

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SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Block - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Block - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Block (Seismic (117A))

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface Option	Water Pressure Constant (psf)
1 Tsi	120.0	125.0	600.00	34.00	0.000	0	0.0
2 Clay Bed	120.0	120.0	200.00	18.00	0.000	0	0.0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of
Non-Circular Zone Search = 40.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	186.50	1306.40	240.00	1306.40	3.00
2	275.00	1306.40	340.00	1306.40	3.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 105

Number of Trial Surfaces With Valid FS = 895

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 10.5 %

Statistical Data On All Valid FS Values:
FS Max = 4.074 FS Min = 1.047 FS Ave = 1.525
Standard Deviation = 0.367 Coefficient of Variation = 24.08 %

Critical Surface is Sequence Number 333 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	223.49	1305.09

Factor Of Safety For The Critical or Specified Surface = 1.047

Table 1 - Geometry Data on the 42 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	1.13	25.00	186.96	1305.47	1330.47	-39.23	-3.33	1.46
2	3.74	25.31	189.40	1305.02	1330.33	0.12	-3.33	3.74
3	3.74	25.09	193.13	1305.02	1330.11	0.12	-3.33	3.74
4	5.00	26.22	197.50	1305.03	1331.25	0.12	26.57	5.00
5	5.00	28.71	202.50	1305.04	1333.75	0.12	26.57	5.00
6	5.00	31.20	207.50	1305.05	1336.25	0.12	26.57	5.00
7	5.00	33.69	212.50	1305.06	1338.75	0.12	26.57	5.00
8	4.65	35.76	217.32	1305.07	1340.83	0.12	19.72	4.65
9	4.65	37.42	221.98	1305.08	1342.50	0.12	19.72	4.65
10	4.65	39.07	226.62	1305.09	1344.17	0.12	19.72	4.65

11	4.65	40.73	231.27	1305.10	1345.83	0.12	19.72
4.65							
12	4.65	42.39	235.93	1305.11	1347.50	0.12	19.72
4.65							
13	4.65	44.04	240.57	1305.12	1349.17	0.12	19.72
4.65							
14	4.95	46.10	245.38	1305.13	1351.24	0.12	26.57
4.95							
15	4.95	48.57	250.32	1305.14	1353.71	0.12	26.57
4.95							
16	4.95	51.03	255.28	1305.15	1356.19	0.12	26.57
4.95							
17	4.95	53.50	260.23	1305.16	1358.66	0.12	26.57
4.95							
18	5.10	55.99	265.25	1305.17	1361.16	0.12	26.34
5.10							
19	5.10	58.50	270.35	1305.19	1363.69	0.12	26.34
5.10							
20	5.10	61.02	275.45	1305.20	1366.21	0.12	26.34
5.10							
21	5.10	63.53	280.55	1305.21	1368.74	0.12	26.34
5.10							
22	4.50	65.59	285.35	1305.22	1370.81	0.12	19.80
4.50							
23	4.50	67.20	289.85	1305.23	1372.43	0.12	19.80
4.50							
24	4.50	68.81	294.35	1305.24	1374.05	0.12	19.80
4.50							
25	4.50	70.43	298.85	1305.25	1375.67	0.12	19.80
4.50							
26	2.64	70.38	302.42	1306.57	1376.96	45.06	19.80
3.74							
27	3.43	68.43	305.46	1309.62	1378.05	45.06	19.80
4.85							
28	3.43	66.23	308.89	1313.05	1379.28	45.06	19.80
4.85							
29	4.69	63.91	312.94	1317.12	1381.03	45.06	25.71
6.64							
30	4.69	61.47	317.63	1321.82	1383.29	45.06	25.71
6.64							
31	4.69	59.03	322.32	1326.52	1385.54	45.06	25.71
6.64							
32	4.69	56.59	327.01	1331.21	1387.80	45.06	25.71
6.64							
33	2.77	54.62	330.74	1334.97	1389.60	45.52	25.71
3.96							
34	2.77	53.14	333.51	1337.80	1390.93	45.52	25.71
3.96							
35	5.45	49.82	337.62	1341.98	1391.80	45.52	4.20
7.78							

36	5.45	44.67	343.08	1347.53	1392.20	45.52	4.20
7.78							
37	5.79	39.14	348.70	1353.26	1392.40	45.52	0.00
8.27							
38	5.79	33.25	354.49	1359.15	1392.40	45.52	0.00
8.27							
39	2.66	27.64	358.71	1364.76	1392.40	63.38	0.00
5.93							
40	2.66	22.34	361.37	1370.06	1392.40	63.38	0.00
5.93							
41	4.74	14.76	365.07	1377.44	1392.21	63.38	-4.63
10.58							
42	4.74	4.92	369.81	1386.90	1391.82	63.38	-4.63
10.58							

Table 2 - Force Data On The 42 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	3385.2	0.0	0.0	880.1	0.0	0.0
2	11346.4	0.0	0.0	2950.1	0.0	0.0
3	11245.5	0.0	0.0	2923.8	0.0	0.0
4	15730.7	0.0	0.0	4090.0	0.0	0.0
5	17224.4	0.0	0.0	4478.4	0.0	0.0
6	18718.1	0.0	0.0	4866.7	0.0	0.0
7	20211.8	0.0	0.0	5255.1	0.0	0.0
8	19953.8	0.0	0.0	5188.0	0.0	0.0
9	20878.4	0.0	0.0	5428.4	0.0	0.0
10	21802.9	0.0	0.0	5668.8	0.0	0.0
11	22727.5	0.0	0.0	5909.1	0.0	0.0
12	23652.0	0.0	0.0	6149.5	0.0	0.0
13	24576.6	0.0	0.0	6389.9	0.0	0.0
14	27386.2	0.0	0.0	7120.4	0.0	0.0
15	28850.2	0.0	0.0	7501.0	0.0	0.0
16	30314.2	0.0	0.0	7881.7	0.0	0.0
17	31778.1	0.0	0.0	8262.3	0.0	0.0
18	34264.6	0.0	0.0	8908.8	0.0	0.0
19	35803.4	0.0	0.0	9308.9	0.0	0.0
20	37342.1	0.0	0.0	9708.9	0.0	0.0
21	38880.8	0.0	0.0	10109.0	0.0	0.0
22	35421.9	0.0	0.0	9209.7	0.0	0.0
23	36291.6	0.0	0.0	9435.8	0.0	0.0
24	37161.4	0.0	0.0	9662.0	0.0	0.0
25	38031.2	0.0	0.0	9888.1	0.0	0.0
26	22336.3	0.0	0.0	5807.4	0.0	0.0

27	28144.3	0.0	0.0	7317.5	0.0	0.0
28	27239.3	0.0	0.0	7082.2	0.0	0.0
29	35961.6	0.0	0.0	9350.0	0.0	0.0
30	34588.2	0.0	0.0	8992.9	0.0	0.0
31	33214.7	0.0	0.0	8635.8	0.0	0.0
32	31841.2	0.0	0.0	8278.7	0.0	0.0
33	18169.6	0.0	0.0	4724.1	0.0	0.0
34	17674.6	0.0	0.0	4595.4	0.0	0.0
35	32579.8	0.0	0.0	8470.8	0.0	0.0
36	29211.7	0.0	0.0	7595.0	0.0	0.0
37	27201.0	0.0	0.0	7072.3	0.0	0.0
38	23102.8	0.0	0.0	6006.7	0.0	0.0
39	8820.6	0.0	0.0	2293.4	0.0	0.0
40	7127.8	0.0	0.0	1853.2	0.0	0.0
41	8399.6	0.0	0.0	2183.9	0.0	0.0
42	2799.9	0.0	0.0	728.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1031391.96(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1031391.96(lbs)

TOTAL AREA OF SLIDING MASS = 8594.93(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 42 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	2	200.00	18.00	
2	2	200.00	18.00	
3	2	200.00	18.00	
4	2	200.00	18.00	
5	2	200.00	18.00	
6	2	200.00	18.00	
7	2	200.00	18.00	
8	2	200.00	18.00	
9	2	200.00	18.00	
10	2	200.00	18.00	
11	2	200.00	18.00	
12	2	200.00	18.00	
13	2	200.00	18.00	
14	2	200.00	18.00	
15	2	200.00	18.00	
16	2	200.00	18.00	
17	2	200.00	18.00	
18	2	200.00	18.00	
19	2	200.00	18.00	
20	2	200.00	18.00	
21	2	200.00	18.00	
22	2	200.00	18.00	

23	2	200.00	18.00
24	2	200.00	18.00
25	2	200.00	18.00
26	2	200.00	18.00
27	1	600.00	34.00
28	1	600.00	34.00
29	1	600.00	34.00
30	1	600.00	34.00
31	1	600.00	34.00
32	1	600.00	34.00
33	1	600.00	34.00
34	1	600.00	34.00
35	1	600.00	34.00
36	1	600.00	34.00
37	1	600.00	34.00
38	1	600.00	34.00
39	1	600.00	34.00
40	1	600.00	34.00
41	1	600.00	34.00
42	1	600.00	34.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 42 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-39.23	186.96	1.46	4358.74	1616.24	1539.27
1	-39.23	186.96	1.46	4358.74	1616.24	1539.27
2	0.12	189.40	3.74	3034.72	1186.04	1129.56
2	0.12	189.40	3.74	3034.72	1186.04	1129.56
3	0.12	193.13	3.74	3007.73	1177.27	1121.20
3	0.12	193.13	3.74	3007.73	1177.27	1121.20

4	0.12	197.50	5.00	3143.50	1221.39
1163.22					
4	0.12	197.50	5.00	3143.50	1221.39
1163.22					
5	0.12	202.50	5.00	3442.03	1318.38
1255.60					
5	0.12	202.50	5.00	3442.03	1318.38
1255.60					
6	0.12	207.50	5.00	3740.56	1415.38
1347.97					
6	0.12	207.50	5.00	3740.56	1415.38
1347.97					
7	0.12	212.50	5.00	4039.09	1512.38
1440.35					
7	0.12	212.50	5.00	4039.09	1512.38
1440.35					
8	0.12	217.32	4.65	4287.70	1593.16
1517.28					
8	0.12	217.32	4.65	4287.70	1593.16
1517.28					
9	0.12	221.98	4.65	10933.46	3752.50
3573.79					
9	0.12	221.98	4.65	10933.46	3752.50
3573.79					
10	0.12	226.62	4.65	4685.07	1722.27
1640.25					
10	0.12	226.62	4.65	4685.07	1722.27
1640.25					
11	0.12	231.27	4.65	4883.76	1786.83
1701.73					
11	0.12	231.27	4.65	4883.76	1786.83
1701.73					
12	0.12	235.93	4.65	5082.44	1851.39
1763.22					
12	0.12	235.93	4.65	5082.44	1851.39
1763.22					
13	0.12	240.57	4.65	5281.13	1915.94
1824.70					
13	0.12	240.57	4.65	5281.13	1915.94
1824.70					
14	0.12	245.38	4.95	5528.25	1996.24
1901.17					
14	0.12	245.38	4.95	5528.25	1996.24
1901.17					
15	0.12	250.32	4.95	5823.79	2092.26
1992.62					
15	0.12	250.32	4.95	5823.79	2092.26
1992.62					
16	0.12	255.28	4.95	6119.33	2188.29
2084.08					

16	0.12	255.28	4.95	6119.33	2188.29	2084.08
17	0.12	260.23	4.95	6414.88	2284.32	2175.53
17	0.12	260.23	4.95	6414.88	2284.32	2175.53
18	0.12	265.25	5.10	6713.40	2381.32	2267.91
18	0.12	265.25	5.10	6713.40	2381.32	2267.91
19	0.12	270.35	5.10	7014.90	2479.28	2361.21
19	0.12	270.35	5.10	7014.90	2479.28	2361.21
20	0.12	275.45	5.10	7316.40	2577.24	2454.50
20	0.12	275.45	5.10	7316.40	2577.24	2454.50
21	0.12	280.55	5.10	7617.90	2675.21	2547.80
21	0.12	280.55	5.10	7617.90	2675.21	2547.80
22	0.12	285.35	4.50	7865.22	2755.56	2624.33
22	0.12	285.35	4.50	7865.22	2755.56	2624.33
23	0.12	289.85	4.50	8058.36	2818.32	2684.10
23	0.12	289.85	4.50	8058.36	2818.32	2684.10
24	0.12	294.35	4.50	8251.49	2881.07	2743.86
24	0.12	294.35	4.50	8251.49	2881.07	2743.86
25	0.12	298.85	4.50	8444.63	2943.83	2803.63
25	0.12	298.85	4.50	8444.63	2943.83	2803.63
26	45.06	302.42	3.74	6169.98	2204.75	2099.75
26	45.06	302.42	3.74	6169.98	2204.75	2099.75
27	45.06	305.46	4.85	4476.09	3619.16	3446.80
27	45.06	305.46	4.85	4476.09	3619.16	3446.80
28	45.06	308.89	4.85	4320.41	3514.16	3346.80
28	45.06	308.89	4.85	4320.41	3514.16	3346.80

29	45.06	312.94	6.64	4156.24	3403.42
3241.33					
29	45.06	312.94	6.64	4156.24	3403.42
3241.33					
30	45.06	317.63	6.64	3983.55	3286.94
3130.40					
30	45.06	317.63	6.64	3983.55	3286.94
3130.40					
31	45.06	322.32	6.64	3810.87	3170.46
3019.47					
31	45.06	322.32	6.64	3810.87	3170.46
3019.47					
32	45.06	327.01	6.64	3638.19	3053.99
2908.54					
32	45.06	327.01	6.64	3638.19	3053.99
2908.54					
33	45.52	330.74	3.96	3470.08	2940.60
2800.55					
33	45.52	330.74	3.96	3470.08	2940.60
2800.55					
34	45.52	333.51	3.96	3365.50	2870.06
2733.37					
34	45.52	333.51	3.96	3365.50	2870.06
2733.37					
35	45.52	337.62	7.78	3132.24	2712.73
2583.53					
35	45.52	337.62	7.78	3132.24	2712.73
2583.53					
36	45.52	343.08	7.78	2770.32	2468.61
2351.04					
36	45.52	343.08	7.78	2770.32	2468.61
2351.04					
37	45.52	348.70	8.27	2382.15	2206.78
2101.68					
37	45.52	348.70	8.27	2382.15	2206.78
2101.68					
38	45.52	354.49	8.27	1967.71	1927.24
1835.46					
38	45.52	354.49	8.27	1967.71	1927.24
1835.46					
39	63.38	358.71	5.93	873.35	1189.08
1132.45					
39	63.38	358.71	5.93	873.35	1189.08
1132.45					
40	63.38	361.37	5.93	606.56	1009.13
961.07					
40	63.38	361.37	5.93	606.56	1009.13
961.07					
41	63.38	365.07	10.58	225.68	752.23
716.40					

41	63.38	365.07	10.58	225.68	752.23	716.40
42	63.38	369.81	10.58	247.49	166.93	158.98
42	63.38	369.81	10.58	247.49	166.93	158.98

Table 4 - Base Force Data on the 42 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-39.23	186.96	1.46	6350.56	2354.82	2242.67
1	-39.23	186.96	1.46	6350.56	2354.82	2242.67
2	0.12	189.40	3.74	11336.83	4430.70	4219.69
2	0.12	189.40	3.74	11336.83	4430.70	4219.69
3	0.12	193.13	3.74	11236.01	4397.94	4188.50
3	0.12	193.13	3.74	11236.01	4397.94	4188.50
4	0.12	197.50	5.00	15717.54	6106.94	5816.10
4	0.12	197.50	5.00	15717.54	6106.94	5816.10
5	0.12	202.50	5.00	17210.19	6591.93	6278.00
5	0.12	202.50	5.00	17210.19	6591.93	6278.00
6	0.12	207.50	5.00	18702.84	7076.92	6739.89
6	0.12	207.50	5.00	18702.84	7076.92	6739.89
7	0.12	212.50	5.00	20195.48	7561.91	7201.78
7	0.12	212.50	5.00	20195.48	7561.91	7201.78
8	0.12	217.32	4.65	19937.83	7408.19	7055.39
8	0.12	217.32	4.65	19937.83	7408.19	7055.39

9	0.12	221.98	4.65	50840.69	17449.14	16618.14
9	0.12	221.98	4.65	50840.69	17449.14	16618.14
10	0.12	226.62	4.65	21785.62	8008.58	7627.18
10	0.12	226.62	4.65	21785.62	8008.58	7627.18
11	0.12	231.27	4.65	22709.52	8308.77	7913.07
11	0.12	231.27	4.65	22709.52	8308.77	7913.07
12	0.12	235.93	4.65	23633.41	8608.96	8198.97
12	0.12	235.93	4.65	23633.41	8608.96	8198.97
13	0.12	240.57	4.65	24557.31	8909.16	8484.87
13	0.12	240.57	4.65	24557.31	8909.16	8484.87
14	0.12	245.38	4.95	27364.88	9881.39	9410.80
14	0.12	245.38	4.95	27364.88	9881.39	9410.80
15	0.12	250.32	4.95	28827.82	10356.73	9863.50
15	0.12	250.32	4.95	28827.82	10356.73	9863.50
16	0.12	255.28	4.95	30290.76	10832.07	10316.20
16	0.12	255.28	4.95	30290.76	10832.07	10316.20
17	0.12	260.23	4.95	31753.70	11307.41	10768.90
17	0.12	260.23	4.95	31753.70	11307.41	10768.90
18	0.12	265.25	5.10	34238.40	12144.73	11566.35
18	0.12	265.25	5.10	34238.40	12144.73	11566.35
19	0.12	270.35	5.10	35776.06	12644.35	12042.17
19	0.12	270.35	5.10	35776.06	12644.35	12042.17
20	0.12	275.45	5.10	37313.72	13143.97	12518.00
20	0.12	275.45	5.10	37313.72	13143.97	12518.00
21	0.12	280.55	5.10	38851.38	13643.58	12993.82

21	0.12	280.55	5.10	38851.38	13643.58	12993.82
22	0.12	285.35	4.50	35395.08	12400.60	11810.03
22	0.12	285.35	4.50	35395.08	12400.60	11810.03
23	0.12	289.85	4.50	36264.24	12683.01	12078.99
23	0.12	289.85	4.50	36264.24	12683.01	12078.99
24	0.12	294.35	4.50	37133.39	12965.41	12347.94
24	0.12	294.35	4.50	37133.39	12965.41	12347.94
25	0.12	298.85	4.50	38002.55	13247.82	12616.90
25	0.12	298.85	4.50	38002.55	13247.82	12616.90
26	45.06	302.42	3.74	23100.16	8254.49	7861.38
26	45.06	302.42	3.74	23100.16	8254.49	7861.38
27	45.06	305.46	4.85	21717.36	17559.66	16723.40
27	45.06	305.46	4.85	21717.36	17559.66	16723.40
28	45.06	308.89	4.85	20962.06	17050.21	16238.20
28	45.06	308.89	4.85	20962.06	17050.21	16238.20
29	45.06	312.94	6.64	27589.42	22592.14	21516.21
29	45.06	312.94	6.64	27589.42	22592.14	21516.21
30	45.06	317.63	6.64	26443.13	21818.96	20779.85
30	45.06	317.63	6.64	26443.13	21818.96	20779.85
31	45.06	322.32	6.64	25296.84	21045.78	20043.49
31	45.06	322.32	6.64	25296.84	21045.78	20043.49
32	45.06	327.01	6.64	24150.56	20272.60	19307.14
32	45.06	327.01	6.64	24150.56	20272.60	19307.14
33	45.52	330.74	3.96	13728.51	11633.75	11079.71
33	45.52	330.74	3.96	13728.51	11633.75	11079.71

34	45.52	333.51	3.96	13314.76	11354.67
10813.92					
34	45.52	333.51	3.96	13314.76	11354.67
10813.92					
35	45.52	337.62	7.78	24364.23	21101.00
20096.08					
35	45.52	337.62	7.78	24364.23	21101.00
20096.08					
36	45.52	343.08	7.78	21549.03	19202.12
18287.64					
36	45.52	343.08	7.78	21549.03	19202.12
18287.64					
37	45.52	348.70	8.27	19688.98	18239.52
17370.88					
37	45.52	348.70	8.27	19688.98	18239.52
17370.88					
38	45.52	354.49	8.27	16263.60	15929.07
15170.46					
38	45.52	354.49	8.27	16263.60	15929.07
15170.46					
39	63.38	358.71	5.93	5182.74	7056.41
6720.36					
39	63.38	358.71	5.93	5182.74	7056.41
6720.36					
40	63.38	361.37	5.93	3599.55	5988.53
5703.33					
40	63.38	361.37	5.93	3599.55	5988.53
5703.33					
41	63.38	365.07	10.58	2387.89	7959.07
7580.03					
41	63.38	365.07	10.58	2387.89	7959.07
7580.03					
42	63.38	369.81	10.58	2618.57	1766.25
1682.13					
42	63.38	369.81	10.58	2618.57	1766.25
1682.13					

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 42 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
9	51961.5	30000.0	60000.0	30.00	-0.455807E+05

Sum of the Resisting Forces = 411258.18 (lbs)

Average Available Shear Strength = 1803.29(psf)

Sum of the Driving Forces = 423432.20 (lbs)

Average Mobilized Shear Stress = 1856.67(psf)

Total length of the failure surface = 228.06(ft)

Factor of Safety Balance Check: FS = 0.97125

Janbu's Correction Factor (fo) = 1.0777

Janub's FS Corrected = 1.04669

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.28253(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 1319.722(ft)

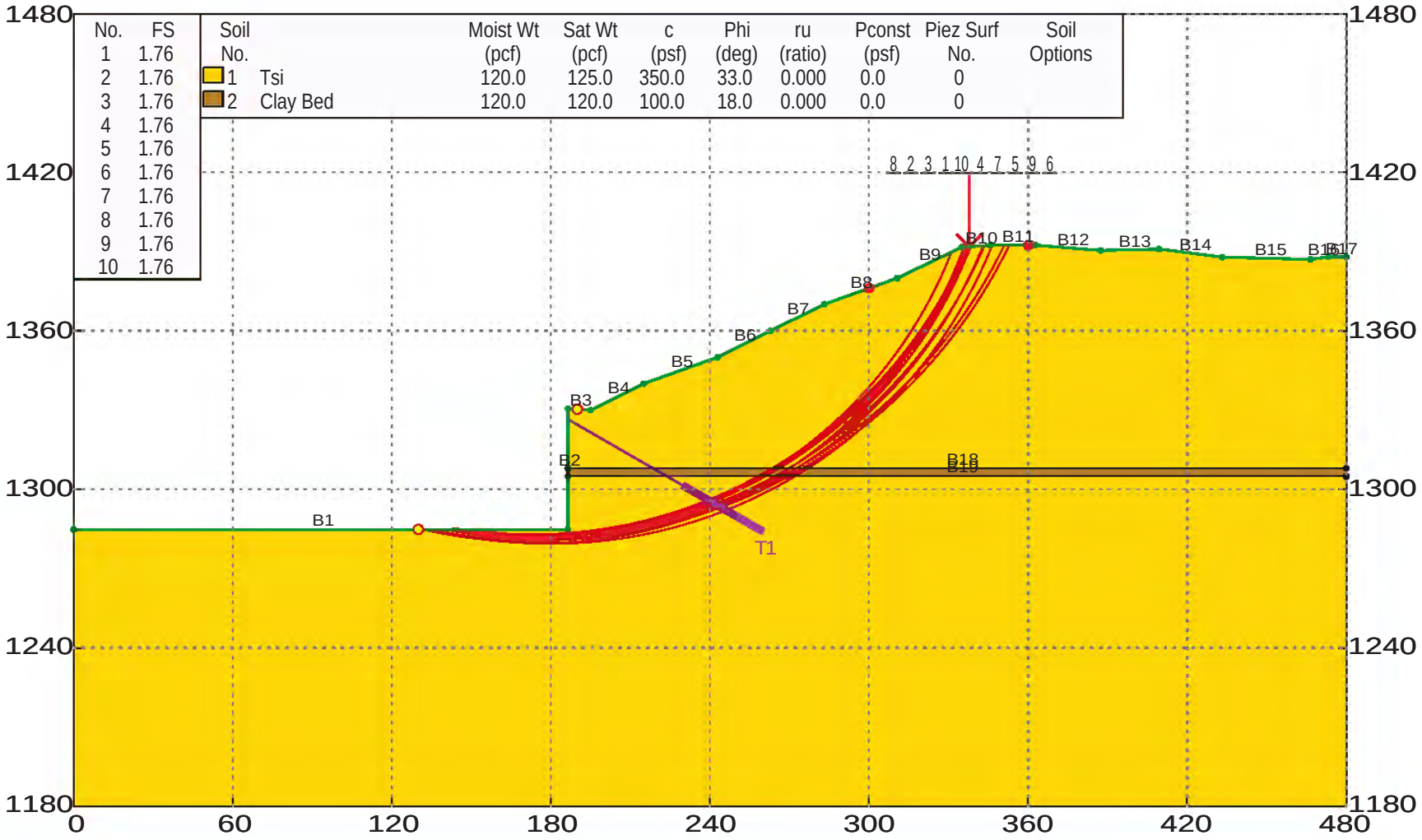
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Rotational (Static)

LGC Geotechnical / BPP

\Section B - Static - Rotational - Tieback.gsd



GEOSTASE FS = 1.76

Simplified Bishop Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Rotational - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Rotational - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Rotational (Static)

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface Option	Water Pressure Constant (psf)
1 Tsi	120.0	125.0	350.00	33.00	0.000	0	0.0
2 Clay Bed	120.0	120.0	100.00	18.00	0.000	0	0.0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

EARTHQUAKE DATA HAS BEEN SUPPRESSED

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 130.00(ft)
and X = 190.00(ft)

Each Surface Enters within a Range Between X = 300.00(ft)
and X = 360.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1180.00(ft)

Specified Maximum Radius = 10000.000(ft)

3.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 3.252 FS Min = 1.756 FS Ave = 2.115
Standard Deviation = 0.299 Coefficient of Variation = 14.15 %

Critical Surface is Sequence Number 215 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 172.573835(ft) ; Y = 1461.728997(ft); and Radius = 179.407934(ft)

Circular Trial Failure Surface Generated With 81 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	142.853	1284.800
2	145.815	1284.328
3	148.786	1283.905
4	151.762	1283.532
5	154.745	1283.209
6	157.732	1282.936
7	160.724	1282.713
8	163.719	1282.540
9	166.717	1282.417
10	169.716	1282.344
11	172.716	1282.321
12	175.715	1282.349
13	178.714	1282.426
14	181.712	1282.554
15	184.706	1282.732
16	187.698	1282.960
17	190.685	1283.238
18	193.667	1283.565
19	196.643	1283.943
20	199.612	1284.370
21	202.574	1284.847
22	205.528	1285.374
23	208.472	1285.949
24	211.406	1286.574
25	214.330	1287.248
26	217.241	1287.970
27	220.140	1288.742
28	223.026	1289.561
29	225.898	1290.429
30	228.755	1291.344
31	231.596	1292.308
32	234.421	1293.318

33	237.228	1294.376
34	240.017	1295.480
35	242.788	1296.631
36	245.539	1297.829
37	248.269	1299.072
38	250.978	1300.360
39	253.666	1301.694
40	256.330	1303.072
41	258.971	1304.495
42	261.588	1305.961
43	264.181	1307.471
44	266.747	1309.025
45	269.287	1310.621
46	271.801	1312.259
47	274.286	1313.939
48	276.743	1315.661
49	279.171	1317.423
50	281.569	1319.225
51	283.936	1321.068
52	286.273	1322.950
53	288.578	1324.870
54	290.850	1326.829
55	293.089	1328.826
56	295.294	1330.859
57	297.465	1332.930
58	299.602	1335.036
59	301.702	1337.178
60	303.767	1339.354
61	305.795	1341.565
62	307.785	1343.809
63	309.738	1346.087
64	311.653	1348.397
65	313.528	1350.738
66	315.365	1353.110
67	317.161	1355.513
68	318.917	1357.946
69	320.632	1360.407
70	322.305	1362.897
71	323.937	1365.415
72	325.526	1367.959
73	327.073	1370.530
74	328.576	1373.126
75	330.036	1375.747
76	331.451	1378.392
77	332.823	1381.060
78	334.149	1383.751
79	335.430	1386.463
80	336.666	1389.197
81	337.796	1391.813

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	240.08	1295.51

Factor Of Safety For The Critical or Specified Surface = 1.756

Table 1 - Geometry Data on the 90 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.96	0.24	144.33	1284.56	1284.80	-9.06	0.00	3.00
2	2.97	0.68	147.30	1284.12	1284.80	-8.10	0.00	3.00
3	2.98	1.08	150.27	1283.72	1284.80	-7.14	0.00	3.00
4	2.98	1.43	153.25	1283.37	1284.80	-6.18	0.00	3.00
5	2.99	1.73	156.24	1283.07	1284.80	-5.22	0.00	3.00
6	2.99	1.98	159.23	1282.82	1284.80	-4.27	0.00	3.00
7	3.00	2.17	162.22	1282.63	1284.80	-3.31	0.00	3.00
8	3.00	2.32	165.22	1282.48	1284.80	-2.35	0.00	3.00
9	3.00	2.42	168.22	1282.38	1284.80	-1.39	0.00	3.00
10	3.00	2.47	171.22	1282.33	1284.80	-0.43	0.00	3.00
11	3.00	2.47	174.22	1282.33	1284.80	0.52	0.00	3.00
12	3.00	2.41	177.21	1282.39	1284.80	1.48	0.00	3.00
13	3.00	2.31	180.21	1282.49	1284.80	2.44	0.00	3.00
14	2.99	2.16	183.21	1282.64	1284.80	3.40	0.00	3.00
15	1.69	2.00	185.55	1282.80	1284.80	4.36	0.00	1.70
16	1.30	47.55	187.05	1282.91	1330.46	4.36	-3.33	

1.30
17 2.99 47.24 189.19 1283.10 1330.34 5.31 -3.33
3.00
18 2.98 46.76 192.18 1283.40 1330.16 6.27 -3.33
3.00
19 1.33 46.39 194.33 1283.65 1330.04 7.23 -3.33
1.34
20 1.64 46.57 195.82 1283.84 1330.41 7.23 26.57
1.66
21 2.97 47.41 198.13 1284.16 1331.56 8.19 26.57
3.00
22 2.96 48.44 201.09 1284.61 1333.05 9.15 26.57
3.00
23 2.95 49.42 204.05 1285.11 1334.53 10.11 26.57
3.00
24 2.94 50.34 207.00 1285.66 1336.00 11.06 26.57
3.00
25 2.93 51.21 209.94 1286.26 1337.47 12.02 26.57
3.00
26 2.92 52.02 212.87 1286.91 1338.93 12.98 26.57
3.00
27 0.67 52.50 214.66 1287.33 1339.83 13.94 26.57
0.69
28 2.24 52.71 216.12 1287.69 1340.40 13.94 19.72
2.31
29 2.90 52.97 218.69 1288.36 1341.32 14.90 19.72
3.00
30 2.89 53.21 221.58 1289.15 1342.36 15.85 19.72
3.00
31 2.87 53.40 224.46 1290.00 1343.39 16.81 19.72
3.00
32 2.86 53.53 227.33 1290.89 1344.42 17.77 19.72
3.00
33 2.84 53.61 230.18 1291.83 1345.44 18.73 19.72
3.00
34 2.82 53.64 233.01 1292.81 1346.45 19.69 19.72
3.00
35 2.81 53.62 235.82 1293.85 1347.46 20.64 19.72
3.00
36 2.79 53.54 238.62 1294.93 1348.47 21.60 19.72
3.00
37 2.77 53.41 241.40 1296.06 1349.46 22.56 19.72
3.00
38 0.11 53.32 242.84 1296.66 1349.98 23.52 19.72
0.12
39 2.64 53.41 244.22 1297.25 1350.66 23.52 26.57
2.88
40 2.73 53.55 246.90 1298.45 1352.00 24.48 26.57
3.00
41 2.71 53.65 249.62 1299.72 1353.36 25.43 26.57

3.00							
42	2.69	53.68	252.32	1301.03	1354.71	26.39	26.57
3.00							
43	2.66	53.67	255.00	1302.38	1356.05	27.35	26.57
3.00							
44	2.64	53.59	257.65	1303.78	1357.38	28.31	26.57
3.00							
45	0.72	53.52	259.33	1304.70	1358.22	29.27	26.57
0.83							
46	1.89	53.44	260.64	1305.43	1358.87	29.27	26.57
2.17							
47	1.11	53.34	262.14	1306.29	1359.62	30.23	26.57
1.29							
48	1.48	53.23	263.44	1307.04	1360.27	30.23	26.34
1.71							
49	0.71	53.12	264.53	1307.69	1360.81	31.18	26.34
0.83							
50	1.86	52.98	265.82	1308.46	1361.44	31.18	26.34
2.17							
51	2.54	52.71	268.02	1309.82	1362.53	32.14	26.34
3.00							
52	2.51	52.34	270.54	1311.44	1363.78	33.10	26.34
3.00							
53	2.49	51.92	273.04	1313.10	1365.02	34.06	26.34
3.00							
54	2.46	51.44	275.51	1314.80	1366.24	35.02	26.34
3.00							
55	2.43	50.91	277.96	1316.54	1367.45	35.97	26.34
3.00							
56	2.40	50.32	280.37	1318.32	1368.65	36.93	26.34
3.00							
57	1.53	49.80	282.33	1319.82	1369.62	37.89	26.34
1.94							
58	0.84	49.41	283.52	1320.74	1370.15	37.89	19.80
1.06							
59	2.34	48.71	285.10	1322.01	1370.72	38.85	19.80
3.00							
60	2.30	47.65	287.43	1323.91	1371.56	39.81	19.80
3.00							
61	2.27	46.53	289.71	1325.85	1372.38	40.76	19.80
3.00							
62	2.24	45.37	291.97	1327.83	1373.19	41.72	19.80
3.00							
63	2.21	44.15	294.19	1329.84	1373.99	42.68	19.80
3.00							
64	2.17	42.89	296.38	1331.89	1374.78	43.64	19.80
3.00							
65	2.14	41.57	298.53	1333.98	1375.56	44.60	19.80
3.00							
66	2.10	40.21	300.65	1336.11	1376.32	45.55	19.80

3.00
67 2.06 38.80 302.73 1338.27 1377.07 46.51 19.80
3.00
68 2.03 37.35 304.78 1340.46 1377.81 47.47 19.80
3.00
69 1.99 35.84 306.79 1342.69 1378.53 48.43 19.80
3.00
70 1.95 34.29 308.76 1344.95 1379.24 49.39 19.80
3.00
71 0.86 33.14 310.17 1346.61 1379.74 50.35 19.80
1.35
72 1.05 32.39 311.13 1347.76 1380.15 50.35 25.71
1.65
73 1.88 31.29 312.59 1349.57 1380.86 51.30 25.71
3.00
74 1.84 29.83 314.45 1351.92 1381.75 52.26 25.71
3.00
75 1.80 28.31 316.26 1354.31 1382.63 53.22 25.71
3.00
76 1.76 26.75 318.04 1356.73 1383.48 54.18 25.71
3.00
77 1.71 25.14 319.77 1359.18 1384.32 55.14 25.71
3.00
78 1.67 23.48 321.47 1361.65 1385.13 56.09 25.71
3.00
79 1.63 21.77 323.12 1364.16 1385.93 57.05 25.71
3.00
80 1.59 20.02 324.73 1366.69 1386.70 58.01 25.71
3.00
81 1.55 18.21 326.30 1369.24 1387.46 58.97 25.71
3.00
82 1.50 16.37 327.82 1371.83 1388.19 59.93 25.71
3.00
83 1.46 14.47 329.31 1374.44 1388.91 60.88 25.71
3.00
84 1.42 12.53 330.74 1377.07 1389.60 61.84 25.71
3.00
85 1.37 10.54 332.14 1379.73 1390.27 62.80 25.71
3.00
86 1.33 8.51 333.49 1382.41 1390.92 63.76 25.71
3.00
87 0.75 6.87 334.52 1384.55 1391.42 64.72 25.71
1.76
88 0.53 5.72 335.17 1385.90 1391.62 64.72 4.20
1.24
89 1.24 3.85 336.05 1387.83 1391.68 65.67 4.20
3.00
90 1.13 1.27 337.23 1390.50 1391.77 66.63 4.20
2.85

Table 2 - Force Data On The 90 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	83.9	0.0	0.0	0.0	0.0	0.0
2	243.6	0.0	0.0	0.0	0.0	0.0
3	386.3	0.0	0.0	0.0	0.0	0.0
4	511.6	0.0	0.0	0.0	0.0	0.0
5	619.3	0.0	0.0	0.0	0.0	0.0
6	709.2	0.0	0.0	0.0	0.0	0.0
7	781.2	0.0	0.0	0.0	0.0	0.0
8	835.1	0.0	0.0	0.0	0.0	0.0
9	870.8	0.0	0.0	0.0	0.0	0.0
10	888.3	0.0	0.0	0.0	0.0	0.0
11	887.4	0.0	0.0	0.0	0.0	0.0
12	868.3	0.0	0.0	0.0	0.0	0.0
13	830.8	0.0	0.0	0.0	0.0	0.0
14	775.2	0.0	0.0	0.0	0.0	0.0
15	407.2	0.0	0.0	0.0	0.0	0.0
16	7405.3	0.0	0.0	0.0	0.0	0.0
17	16933.0	0.0	0.0	0.0	0.0	0.0
18	16733.8	0.0	0.0	0.0	0.0	0.0
19	7420.9	0.0	0.0	0.0	0.0	0.0
20	9182.4	0.0	0.0	0.0	0.0	0.0
21	16892.6	0.0	0.0	0.0	0.0	0.0
22	17215.9	0.0	0.0	0.0	0.0	0.0
23	17513.5	0.0	0.0	0.0	0.0	0.0
24	17785.1	0.0	0.0	0.0	0.0	0.0
25	18030.6	0.0	0.0	0.0	0.0	0.0
26	18249.8	0.0	0.0	0.0	0.0	0.0
27	4223.8	0.0	0.0	0.0	0.0	0.0
28	14176.1	0.0	0.0	0.0	0.0	0.0
29	18427.3	0.0	0.0	0.0	0.0	0.0
30	18426.3	0.0	0.0	0.0	0.0	0.0
31	18401.1	0.0	0.0	0.0	0.0	0.0
32	18351.9	0.0	0.0	0.0	0.0	0.0
33	18278.8	0.0	0.0	0.0	0.0	0.0
34	18182.3	0.0	0.0	0.0	0.0	0.0
35	18062.6	0.0	0.0	0.0	0.0	0.0
36	17920.2	0.0	0.0	0.0	0.0	0.0
37	17755.3	0.0	0.0	0.0	0.0	0.0
38	717.6	0.0	0.0	0.0	0.0	0.0
39	16910.1	0.0	0.0	0.0	0.0	0.0
40	17546.1	0.0	0.0	0.0	0.0	0.0
41	17440.7	0.0	0.0	0.0	0.0	0.0

42	17311.9	0.0	0.0	0.0	0.0	0.0
43	17160.1	0.0	0.0	0.0	0.0	0.0
44	16985.8	0.0	0.0	0.0	0.0	0.0
45	4646.2	0.0	0.0	0.0	0.0	0.0
46	12143.3	0.0	0.0	0.0	0.0	0.0
47	7114.4	0.0	0.0	0.0	0.0	0.0
48	9457.0	0.0	0.0	0.0	0.0	0.0
49	4514.3	0.0	0.0	0.0	0.0	0.0
50	11815.2	0.0	0.0	0.0	0.0	0.0
51	16067.3	0.0	0.0	0.0	0.0	0.0
52	15785.8	0.0	0.0	0.0	0.0	0.0
53	15485.8	0.0	0.0	0.0	0.0	0.0
54	15167.8	0.0	0.0	0.0	0.0	0.0
55	14832.9	0.0	0.0	0.0	0.0	0.0
56	14481.6	0.0	0.0	0.0	0.0	0.0
57	9150.0	0.0	0.0	0.0	0.0	0.0
58	4959.3	0.0	0.0	0.0	0.0	0.0
59	13657.8	0.0	0.0	0.0	0.0	0.0
60	13177.2	0.0	0.0	0.0	0.0	0.0
61	12687.5	0.0	0.0	0.0	0.0	0.0
62	12189.6	0.0	0.0	0.0	0.0	0.0
63	11684.6	0.0	0.0	0.0	0.0	0.0
64	11173.4	0.0	0.0	0.0	0.0	0.0
65	10657.1	0.0	0.0	0.0	0.0	0.0
66	10136.7	0.0	0.0	0.0	0.0	0.0
67	9613.3	0.0	0.0	0.0	0.0	0.0
68	9087.9	0.0	0.0	0.0	0.0	0.0
69	8561.7	0.0	0.0	0.0	0.0	0.0
70	8035.6	0.0	0.0	0.0	0.0	0.0
71	3426.6	0.0	0.0	0.0	0.0	0.0
72	4092.3	0.0	0.0	0.0	0.0	0.0
73	7042.8	0.0	0.0	0.0	0.0	0.0
74	6572.3	0.0	0.0	0.0	0.0	0.0
75	6103.3	0.0	0.0	0.0	0.0	0.0
76	5636.7	0.0	0.0	0.0	0.0	0.0
77	5173.7	0.0	0.0	0.0	0.0	0.0
78	4715.4	0.0	0.0	0.0	0.0	0.0
79	4263.1	0.0	0.0	0.0	0.0	0.0
80	3817.7	0.0	0.0	0.0	0.0	0.0
81	3380.4	0.0	0.0	0.0	0.0	0.0
82	2952.4	0.0	0.0	0.0	0.0	0.0
83	2534.7	0.0	0.0	0.0	0.0	0.0
84	2128.6	0.0	0.0	0.0	0.0	0.0
85	1735.1	0.0	0.0	0.0	0.0	0.0
86	1355.2	0.0	0.0	0.0	0.0	0.0
87	619.3	0.0	0.0	0.0	0.0	0.0
88	364.0	0.0	0.0	0.0	0.0	0.0
89	571.5	0.0	0.0	0.0	0.0	0.0
90	171.7	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 812279.25(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 812279.25(lbs)

TOTAL AREA OF SLIDING MASS = 6768.99(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 90 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	350.00	33.00	
2	1	350.00	33.00	
3	1	350.00	33.00	
4	1	350.00	33.00	
5	1	350.00	33.00	
6	1	350.00	33.00	
7	1	350.00	33.00	
8	1	350.00	33.00	
9	1	350.00	33.00	
10	1	350.00	33.00	
11	1	350.00	33.00	
12	1	350.00	33.00	
13	1	350.00	33.00	
14	1	350.00	33.00	
15	1	350.00	33.00	
16	1	350.00	33.00	
17	1	350.00	33.00	
18	1	350.00	33.00	
19	1	350.00	33.00	
20	1	350.00	33.00	
21	1	350.00	33.00	
22	1	350.00	33.00	
23	1	350.00	33.00	
24	1	350.00	33.00	
25	1	350.00	33.00	
26	1	350.00	33.00	
27	1	350.00	33.00	
28	1	350.00	33.00	
29	1	350.00	33.00	
30	1	350.00	33.00	
31	1	350.00	33.00	
32	1	350.00	33.00	
33	1	350.00	33.00	
34	1	350.00	33.00	
35	1	350.00	33.00	
36	1	350.00	33.00	
37	1	350.00	33.00	
38	1	350.00	33.00	
39	1	350.00	33.00	

40	1	350.00	33.00
41	1	350.00	33.00
42	1	350.00	33.00
43	1	350.00	33.00
44	1	350.00	33.00
45	1	350.00	33.00
46	2	100.00	18.00
47	2	100.00	18.00
48	2	100.00	18.00
49	2	100.00	18.00
50	1	350.00	33.00
51	1	350.00	33.00
52	1	350.00	33.00
53	1	350.00	33.00
54	1	350.00	33.00
55	1	350.00	33.00
56	1	350.00	33.00
57	1	350.00	33.00
58	1	350.00	33.00
59	1	350.00	33.00
60	1	350.00	33.00
61	1	350.00	33.00
62	1	350.00	33.00
63	1	350.00	33.00
64	1	350.00	33.00
65	1	350.00	33.00
66	1	350.00	33.00
67	1	350.00	33.00
68	1	350.00	33.00
69	1	350.00	33.00
70	1	350.00	33.00
71	1	350.00	33.00
72	1	350.00	33.00
73	1	350.00	33.00
74	1	350.00	33.00
75	1	350.00	33.00
76	1	350.00	33.00
77	1	350.00	33.00
78	1	350.00	33.00
79	1	350.00	33.00
80	1	350.00	33.00
81	1	350.00	33.00
82	1	350.00	33.00
83	1	350.00	33.00
84	1	350.00	33.00
85	1	350.00	33.00
86	1	350.00	33.00
87	1	350.00	33.00
88	1	350.00	33.00
89	1	350.00	33.00

90 1 350.00 33.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 90 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-9.06	144.33	3.00	63.87	391.48	222.91
1	-9.06	144.33	3.00	63.87	391.48	222.91
2	-8.10	147.30	3.00	116.52	425.67	242.38
2	-8.10	147.30	3.00	116.52	425.67	242.38
3	-7.14	150.27	3.00	162.24	455.36	259.29
3	-7.14	150.27	3.00	162.24	455.36	259.29
4	-6.18	153.25	3.00	201.17	480.64	273.68
4	-6.18	153.25	3.00	201.17	480.64	273.68
5	-5.22	156.24	3.00	233.41	501.58	285.61
5	-5.22	156.24	3.00	233.41	501.58	285.61
6	-4.27	159.23	3.00	259.09	518.25	295.10
6	-4.27	159.23	3.00	259.09	518.25	295.10
7	-3.31	162.22	3.00	278.32	530.74	302.21
7	-3.31	162.22	3.00	278.32	530.74	302.21
8	-2.35	165.22	3.00	291.21	539.12	306.98
8	-2.35	165.22	3.00	291.21	539.12	

306.98
9 -1.39 168.22 3.00 297.89 543.45
309.45
9 -1.39 168.22 3.00 297.89 543.45
309.45
10 -0.43 171.22 3.00 298.45 543.81
309.66
10 -0.43 171.22 3.00 298.45 543.81
309.66
11 0.52 174.22 3.00 293.00 540.28
307.64
11 0.52 174.22 3.00 293.00 540.28
307.64
12 1.48 177.21 3.00 281.66 532.91
303.45
12 1.48 177.21 3.00 281.66 532.91
303.45
13 2.44 180.21 3.00 264.53 521.79
297.11
13 2.44 180.21 3.00 264.53 521.79
297.11
14 3.40 183.21 3.00 241.71 506.97
288.68
14 3.40 183.21 3.00 241.71 506.97
288.68
15 4.36 185.55 1.70 219.09 492.28
280.31
15 4.36 185.55 1.70 219.09 492.28
280.31
16 4.36 187.05 1.30 5535.11 3944.54
2246.08
16 4.36 187.05 1.30 5535.11 3944.54
2246.08
17 5.31 189.19 3.00 5462.23 3897.21
2219.14
17 5.31 189.19 3.00 5462.23 3897.21
2219.14
18 6.27 192.18 3.00 5371.27 3838.14
2185.50
18 6.27 192.18 3.00 5371.27 3838.14
2185.50
19 7.23 194.33 1.34 5293.01 3787.32
2156.56
19 7.23 194.33 1.34 5293.01 3787.32
2156.56
20 7.23 195.82 1.66 5314.01 3800.96
2164.33
20 7.23 195.82 1.66 5314.01 3800.96
2164.33
21 8.19 198.13 3.00 5374.18 3840.03

2186.57					
21	8.19	198.13	3.00	5374.18	3840.03
2186.57					
22	9.15	201.09	3.00	5455.59	3892.90
2216.68					
22	9.15	201.09	3.00	5455.59	3892.90
2216.68					
23	10.11	204.05	3.00	5529.83	3941.11
2244.13					
23	10.11	204.05	3.00	5529.83	3941.11
2244.13					
24	11.06	207.00	3.00	5596.94	3984.69
2268.95					
24	11.06	207.00	3.00	5596.94	3984.69
2268.95					
25	12.02	209.94	3.00	5657.00	4023.70
2291.16					
25	12.02	209.94	3.00	5657.00	4023.70
2291.16					
26	12.98	212.87	3.00	5710.09	4058.17
2310.79					
26	12.98	212.87	3.00	5710.09	4058.17
2310.79					
27	13.94	214.66	0.69	5725.24	4068.01
2316.39					
27	13.94	214.66	0.69	5725.24	4068.01
2316.39					
28	13.94	216.12	2.31	5748.10	4082.86
2324.84					
28	13.94	216.12	2.31	5748.10	4082.86
2324.84					
29	14.90	218.69	3.00	5738.49	4076.62
2321.29					
29	14.90	218.69	3.00	5738.49	4076.62
2321.29					
30	15.85	221.58	3.00	5726.92	4069.11
2317.01					
30	15.85	221.58	3.00	5726.92	4069.11
2317.01					
31	16.81	224.46	3.00	5709.39	4057.72
2310.53					
31	16.81	224.46	3.00	5709.39	4057.72
2310.53					
32	17.77	227.33	3.00	5685.98	4042.52
2301.87					
32	17.77	227.33	3.00	5685.98	4042.52
2301.87					
33	18.73	230.18	3.00	5656.77	4023.55
2291.07					
33	18.73	230.18	3.00	5656.77	4023.55

2291.07					
34	19.69	233.01	3.00	5621.84	4000.86
2278.15					
34	19.69	233.01	3.00	5621.84	4000.86
2278.15					
35	20.64	235.82	3.00	5581.27	3974.52
2263.15					
35	20.64	235.82	3.00	5581.27	3974.52
2263.15					
36	21.60	238.62	3.00	5535.15	3944.57
2246.10					
36	21.60	238.62	3.00	5535.15	3944.57
2246.10					
37	22.56	241.40	3.00	11655.62	7919.25
4509.34					
37	22.56	241.40	3.00	11655.62	7919.25
4509.34					
38	23.52	242.84	0.12	5437.07	3880.88
2209.83					
38	23.52	242.84	0.12	5437.07	3880.88
2209.83					
39	23.52	244.22	2.88	5445.47	3886.33
2212.94					
39	23.52	244.22	2.88	5445.47	3886.33
2212.94					
40	24.48	246.90	3.00	5422.57	3871.46
2204.47					
40	24.48	246.90	3.00	5422.57	3871.46
2204.47					
41	25.43	249.62	3.00	5394.04	3852.93
2193.92					
41	25.43	249.62	3.00	5394.04	3852.93
2193.92					
42	26.39	252.32	3.00	5359.58	3830.55
2181.18					
42	26.39	252.32	3.00	5359.58	3830.55
2181.18					
43	27.35	255.00	3.00	5319.29	3804.39
2166.28					
43	27.35	255.00	3.00	5319.29	3804.39
2166.28					
44	28.31	257.65	3.00	5273.25	3774.49
2149.25					
44	28.31	257.65	3.00	5273.25	3774.49
2149.25					
45	29.27	259.33	0.83	5227.24	3744.61
2132.24					
45	29.27	259.33	0.83	5227.24	3744.61
2132.24					
46	29.27	260.64	2.17	5781.40	1978.49

1126.58
  46 29.27 260.64 2.17 5781.40 1978.49
1126.58
  47 30.23 262.14 1.29 5747.67 1967.53
1120.34
  47 30.23 262.14 1.29 5747.67 1967.53
1120.34
  48 30.23 263.44 1.71 5735.68 1963.64
1118.13
  48 30.23 263.44 1.71 5735.68 1963.64
1118.13
  49 31.18 264.53 0.83 5701.74 1952.61
1111.84
  49 31.18 264.53 0.83 5701.74 1952.61
1111.84
  50 31.18 265.82 2.17 5096.43 3659.66
2083.87
  50 31.18 265.82 2.17 5096.43 3659.66
2083.87
  51 32.14 268.02 3.00 5030.95 3617.14
2059.66
  51 32.14 268.02 3.00 5030.95 3617.14
2059.66
  52 33.10 270.54 3.00 4956.42 3568.74
2032.09
  52 33.10 270.54 3.00 4956.42 3568.74
2032.09
  53 34.06 273.04 3.00 4876.76 3517.00
2002.64
  53 34.06 273.04 3.00 4876.76 3517.00
2002.64
  54 35.02 275.51 3.00 4792.07 3462.01
1971.32
  54 35.02 275.51 3.00 4792.07 3462.01
1971.32
  55 35.97 277.96 3.00 4702.48 3403.82
1938.19
  55 35.97 277.96 3.00 4702.48 3403.82
1938.19
  56 36.93 280.37 3.00 4608.08 3342.52
1903.29
  56 36.93 280.37 3.00 4608.08 3342.52
1903.29
  57 37.89 282.33 1.94 4520.04 3285.35
1870.73
  57 37.89 282.33 1.94 4520.04 3285.35
1870.73
  58 37.89 283.52 1.06 4483.55 3261.65
1857.23
  58 37.89 283.52 1.06 4483.55 3261.65

1857.23					
59	38.85	285.10	3.00	4380.33	3194.62
1819.07					
59	38.85	285.10	3.00	4380.33	3194.62
1819.07					
60	39.81	287.43	3.00	4243.70	3105.89
1768.54					
60	39.81	287.43	3.00	4243.70	3105.89
1768.54					
61	40.76	289.71	3.00	4103.63	3014.93
1716.75					
61	40.76	289.71	3.00	4103.63	3014.93
1716.75					
62	41.72	291.97	3.00	3960.24	2921.81
1663.73					
62	41.72	291.97	3.00	3960.24	2921.81
1663.73					
63	42.68	294.19	3.00	3813.70	2826.64
1609.54					
63	42.68	294.19	3.00	3813.70	2826.64
1609.54					
64	43.64	296.38	3.00	3664.14	2729.52
1554.23					
64	43.64	296.38	3.00	3664.14	2729.52
1554.23					
65	44.60	298.53	3.00	3511.72	2630.54
1497.87					
65	44.60	298.53	3.00	3511.72	2630.54
1497.87					
66	45.55	300.65	3.00	3356.61	2529.81
1440.51					
66	45.55	300.65	3.00	3356.61	2529.81
1440.51					
67	46.51	302.73	3.00	3198.95	2427.42
1382.21					
67	46.51	302.73	3.00	3198.95	2427.42
1382.21					
68	47.47	304.78	3.00	3038.93	2323.51
1323.04					
68	47.47	304.78	3.00	3038.93	2323.51
1323.04					
69	48.43	306.79	3.00	2876.73	2218.17
1263.06					
69	48.43	306.79	3.00	2876.73	2218.17
1263.06					
70	49.39	308.76	3.00	2712.52	2111.53
1202.34					
70	49.39	308.76	3.00	2712.52	2111.53
1202.34					
71	50.35	310.17	1.35	2583.47	2027.73

1154.62					
71	50.35	310.17	1.35	2583.47	2027.73
1154.62					
72	50.35	311.13	1.65	2521.55	1987.51
1131.72					
72	50.35	311.13	1.65	2521.55	1987.51
1131.72					
73	51.30	312.59	3.00	2398.72	1907.75
1086.30					
73	51.30	312.59	3.00	2398.72	1907.75
1086.30					
74	52.26	314.45	3.00	2247.78	1809.72
1030.48					
74	52.26	314.45	3.00	2247.78	1809.72
1030.48					
75	53.22	316.26	3.00	2094.84	1710.40
973.93					
75	53.22	316.26	3.00	2094.84	1710.40
973.93					
76	54.18	318.04	3.00	1940.12	1609.93
916.72					
76	54.18	318.04	3.00	1940.12	1609.93
916.72					
77	55.14	319.77	3.00	1783.87	1508.46
858.94					
77	55.14	319.77	3.00	1783.87	1508.46
858.94					
78	56.09	321.47	3.00	1626.32	1406.14
800.68					
78	56.09	321.47	3.00	1626.32	1406.14
800.68					
79	57.05	323.12	3.00	1467.72	1303.15
742.03					
79	57.05	323.12	3.00	1467.72	1303.15
742.03					
80	58.01	324.73	3.00	1308.35	1199.65
683.10					
80	58.01	324.73	3.00	1308.35	1199.65
683.10					
81	58.97	326.30	3.00	1148.48	1095.83
623.99					
81	58.97	326.30	3.00	1148.48	1095.83
623.99					
82	59.93	327.82	3.00	988.42	991.89
564.80					
82	59.93	327.82	3.00	988.42	991.89
564.80					
83	60.88	329.31	3.00	828.47	888.01
505.65					
83	60.88	329.31	3.00	828.47	888.01

505.65
  84 61.84 330.74 3.00 668.96 784.43
446.67
  84 61.84 330.74 3.00 668.96 784.43
446.67
  85 62.80 332.14 3.00 510.26 681.37
387.98
  85 62.80 332.14 3.00 510.26 681.37
387.98
  86 63.76 333.49 3.00 352.73 579.07
329.73
  86 63.76 333.49 3.00 352.73 579.07
329.73
  87 64.72 334.52 1.76 225.97 496.74
282.85
  87 64.72 334.52 1.76 225.97 496.74
282.85
  88 64.72 335.17 1.24 148.16 446.21
254.08
  88 64.72 335.17 1.24 148.16 446.21
254.08
  89 65.67 336.05 3.00 254.39 165.20
94.07
  89 65.67 336.05 3.00 254.39 165.20
94.07
  90 66.63 337.23 2.85 81.88 53.17
30.28
  90 66.63 337.23 2.85 81.88 53.17
30.28

Table 4 - Base Force Data on the 90 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-9.06	144.33	3.00	191.61	1174.43	668.74
1	-9.06	144.33	3.00	191.61	1174.43	668.74
2	-8.10	147.30	3.00	349.56	1277.00	727.15
2	-8.10	147.30	3.00	349.56	1277.00	727.15
3	-7.14	150.27	3.00	486.73	1366.09	

777.87					
3	-7.14	150.27	3.00	486.73	1366.09
777.87					
4	-6.18	153.25	3.00	603.50	1441.92
821.05					
4	-6.18	153.25	3.00	603.50	1441.92
821.05					
5	-5.22	156.24	3.00	700.22	1504.73
856.82					
5	-5.22	156.24	3.00	700.22	1504.73
856.82					
6	-4.27	159.23	3.00	777.26	1554.76
885.30					
6	-4.27	159.23	3.00	777.26	1554.76
885.30					
7	-3.31	162.22	3.00	834.95	1592.22
906.64					
7	-3.31	162.22	3.00	834.95	1592.22
906.64					
8	-2.35	165.22	3.00	873.64	1617.35
920.94					
8	-2.35	165.22	3.00	873.64	1617.35
920.94					
9	-1.39	168.22	3.00	893.66	1630.35
928.35					
9	-1.39	168.22	3.00	893.66	1630.35
928.35					
10	-0.43	171.22	3.00	895.34	1631.44
928.97					
10	-0.43	171.22	3.00	895.34	1631.44
928.97					
11	0.52	174.22	3.00	879.01	1620.84
922.93					
11	0.52	174.22	3.00	879.01	1620.84
922.93					
12	1.48	177.21	3.00	844.98	1598.74
910.35					
12	1.48	177.21	3.00	844.98	1598.74
910.35					
13	2.44	180.21	3.00	793.59	1565.36
891.34					
13	2.44	180.21	3.00	793.59	1565.36
891.34					
14	3.40	183.21	3.00	725.14	1520.91
866.03					
14	3.40	183.21	3.00	725.14	1520.91
866.03					
15	4.36	185.55	1.70	372.12	836.12
476.10					
15	4.36	185.55	1.70	372.12	836.12

476.10
  16   4.36   187.05   1.30   7204.05   5133.89
2923.32
  16   4.36   187.05   1.30   7204.05   5133.89
2923.32
  17   5.31   189.19   3.00   16386.70   11691.64
6657.41
  17   5.31   189.19   3.00   16386.70   11691.64
6657.41
  18   6.27   192.18   3.00   16113.81   11514.43
6556.50
  18   6.27   192.18   3.00   16113.81   11514.43
6556.50
  19   7.23   194.33   1.34   7112.69   5089.36
2897.96
  19   7.23   194.33   1.34   7112.69   5089.36
2897.96
  20   7.23   195.82   1.66   8801.13   6295.19
3584.58
  20   7.23   195.82   1.66   8801.13   6295.19
3584.58
  21   8.19   198.13   3.00   16122.53   11520.09
6559.72
  21   8.19   198.13   3.00   16122.53   11520.09
6559.72
  22   9.15   201.09   3.00   16366.78   11678.71
6650.04
  22   9.15   201.09   3.00   16366.78   11678.71
6650.04
  23   10.11   204.05   3.00   16589.48   11823.33
6732.39
  23   10.11   204.05   3.00   16589.48   11823.33
6732.39
  24   11.06   207.00   3.00   16790.82   11954.08
6806.84
  24   11.06   207.00   3.00   16790.82   11954.08
6806.84
  25   12.02   209.94   3.00   16971.01   12071.10
6873.48
  25   12.02   209.94   3.00   16971.01   12071.10
6873.48
  26   12.98   212.87   3.00   17130.26   12174.52
6932.36
  26   12.98   212.87   3.00   17130.26   12174.52
6932.36
  27   13.94   214.66   0.69   3954.81   2810.05
1600.09
  27   13.94   214.66   0.69   3954.81   2810.05
1600.09
  28   13.94   216.12   2.31   13273.69   9428.27

5368.60
  28   13.94   216.12   2.31   13273.69   9428.27
5368.60
  29   14.90   218.69   3.00   17215.48   12229.87
6963.88
  29   14.90   218.69   3.00   17215.48   12229.87
6963.88
  30   15.85   221.58   3.00   17180.76   12207.32
6951.04
  30   15.85   221.58   3.00   17180.76   12207.32
6951.04
  31   16.81   224.46   3.00   17128.16   12173.16
6931.59
  31   16.81   224.46   3.00   17128.16   12173.16
6931.59
  32   17.77   227.33   3.00   17057.93   12127.55
6905.62
  32   17.77   227.33   3.00   17057.93   12127.55
6905.62
  33   18.73   230.18   3.00   16970.30   12070.64
6873.21
  33   18.73   230.18   3.00   16970.30   12070.64
6873.21
  34   19.69   233.01   3.00   16865.51   12002.59
6834.46
  34   19.69   233.01   3.00   16865.51   12002.59
6834.46
  35   20.64   235.82   3.00   16743.81   11923.56
6789.46
  35   20.64   235.82   3.00   16743.81   11923.56
6789.46
  36   21.60   238.62   3.00   16605.46   11833.71
6738.30
  36   21.60   238.62   3.00   16605.46   11833.71
6738.30
  37   22.56   241.40   3.00   34966.85   23757.74
13528.03
  37   22.56   241.40   3.00   34966.85   23757.74
13528.03
  38   23.52   242.84   0.12   664.99   474.65
270.28
  38   23.52   242.84   0.12   664.99   474.65
270.28
  39   23.52   244.22   2.88   15670.39   11183.66
6368.15
  39   23.52   244.22   2.88   15670.39   11183.66
6368.15
  40   24.48   246.90   3.00   16267.71   11614.37
6613.41
  40   24.48   246.90   3.00   16267.71   11614.37

6613.41
41 25.43 249.62 3.00 16182.12 11558.79
6581.76
41 25.43 249.62 3.00 16182.12 11558.79
6581.76
42 26.39 252.32 3.00 16078.75 11491.66
6543.53
42 26.39 252.32 3.00 16078.75 11491.66
6543.53
43 27.35 255.00 3.00 15957.88 11413.17
6498.84
43 27.35 255.00 3.00 15957.88 11413.17
6498.84
44 28.31 257.65 3.00 15819.76 11323.47
6447.76
44 28.31 257.65 3.00 15819.76 11323.47
6447.76
45 29.27 259.33 0.83 4335.01 3105.45
1768.29
45 29.27 259.33 0.83 4335.01 3105.45
1768.29
46 29.27 260.64 2.17 12549.63 4294.69
2445.46
46 29.27 260.64 2.17 12549.63 4294.69
2445.46
47 30.23 262.14 1.29 7393.97 2531.09
1441.24
47 30.23 262.14 1.29 7393.97 2531.09
1441.24
48 30.23 263.44 1.71 9828.50 3364.83
1915.99
48 30.23 263.44 1.71 9828.50 3364.83
1915.99
49 31.18 264.53 0.83 4719.64 1616.28
920.34
49 31.18 264.53 0.83 4719.64 1616.28
920.34
50 31.18 265.82 2.17 11070.69 7949.67
4526.67
50 31.18 265.82 2.17 11070.69 7949.67
4526.67
51 32.14 268.02 3.00 15092.86 10851.42
6178.97
51 32.14 268.02 3.00 15092.86 10851.42
6178.97
52 33.10 270.54 3.00 14869.26 10706.21
6096.28
52 33.10 270.54 3.00 14869.26 10706.21
6096.28
53 34.06 273.04 3.00 14630.27 10551.01

6007.91					
53	34.06	273.04	3.00	14630.27	10551.01
6007.91					
54	35.02	275.51	3.00	14376.22	10386.02
5913.97					
54	35.02	275.51	3.00	14376.22	10386.02
5913.97					
55	35.97	277.96	3.00	14107.43	10211.47
5814.57					
55	35.97	277.96	3.00	14107.43	10211.47
5814.57					
56	36.93	280.37	3.00	13824.24	10027.57
5709.86					
56	36.93	280.37	3.00	13824.24	10027.57
5709.86					
57	37.89	282.33	1.94	8769.38	6373.94
3629.42					
57	37.89	282.33	1.94	8769.38	6373.94
3629.42					
58	37.89	283.52	1.06	4752.06	3456.98
1968.46					
58	37.89	283.52	1.06	4752.06	3456.98
1968.46					
59	38.85	285.10	3.00	13140.99	9583.86
5457.20					
59	38.85	285.10	3.00	13140.99	9583.86
5457.20					
60	39.81	287.43	3.00	12731.10	9317.67
5305.63					
60	39.81	287.43	3.00	12731.10	9317.67
5305.63					
61	40.76	289.71	3.00	12310.88	9044.78
5150.24					
61	40.76	289.71	3.00	12310.88	9044.78
5150.24					
62	41.72	291.97	3.00	11880.73	8765.44
4991.18					
62	41.72	291.97	3.00	11880.73	8765.44
4991.18					
63	42.68	294.19	3.00	11441.10	8479.93
4828.61					
63	42.68	294.19	3.00	11441.10	8479.93
4828.61					
64	43.64	296.38	3.00	10992.42	8188.56
4662.70					
64	43.64	296.38	3.00	10992.42	8188.56
4662.70					
65	44.60	298.53	3.00	10535.17	7891.62
4493.61					
65	44.60	298.53	3.00	10535.17	7891.62

4493.61
  66 45.55 300.65 3.00 10069.82 7589.42
4321.53
  66 45.55 300.65 3.00 10069.82 7589.42
4321.53
  67 46.51 302.73 3.00 9596.86 7282.27
4146.64
  67 46.51 302.73 3.00 9596.86 7282.27
4146.64
  68 47.47 304.78 3.00 9116.80 6970.52
3969.12
  68 47.47 304.78 3.00 9116.80 6970.52
3969.12
  69 48.43 306.79 3.00 8630.19 6654.51
3789.18
  69 48.43 306.79 3.00 8630.19 6654.51
3789.18
  70 49.39 308.76 3.00 8137.57 6334.60
3607.02
  70 49.39 308.76 3.00 8137.57 6334.60
3607.02
  71 50.35 310.17 1.35 3488.38 2737.97
1559.04
  71 50.35 310.17 1.35 3488.38 2737.97
1559.04
  72 50.35 311.13 1.65 4159.88 3278.87
1867.04
  72 50.35 311.13 1.65 4159.88 3278.87
1867.04
  73 51.30 312.59 3.00 7196.17 5723.25
3258.91
  73 51.30 312.59 3.00 7196.17 5723.25
3258.91
  74 52.26 314.45 3.00 6743.33 5429.17
3091.45
  74 52.26 314.45 3.00 6743.33 5429.17
3091.45
  75 53.22 316.26 3.00 6284.51 5131.21
2921.79
  75 53.22 316.26 3.00 6284.51 5131.21
2921.79
  76 54.18 318.04 3.00 5820.37 4829.79
2750.16
  76 54.18 318.04 3.00 5820.37 4829.79
2750.16
  77 55.14 319.77 3.00 5351.61 4525.38
2576.82
  77 55.14 319.77 3.00 5351.61 4525.38
2576.82
  78 56.09 321.47 3.00 4878.96 4218.43

2402.04					
78	56.09	321.47	3.00	4878.96	4218.43
2402.04					
79	57.05	323.12	3.00	4403.17	3909.45
2226.10					
79	57.05	323.12	3.00	4403.17	3909.45
2226.10					
80	58.01	324.73	3.00	3925.05	3598.96
2049.30					
80	58.01	324.73	3.00	3925.05	3598.96
2049.30					
81	58.97	326.30	3.00	3445.45	3287.50
1871.96					
81	58.97	326.30	3.00	3445.45	3287.50
1871.96					
82	59.93	327.82	3.00	2965.26	2975.66
1694.39					
82	59.93	327.82	3.00	2965.26	2975.66
1694.39					
83	60.88	329.31	3.00	2485.40	2664.04
1516.95					
83	60.88	329.31	3.00	2485.40	2664.04
1516.95					
84	61.84	330.74	3.00	2006.89	2353.29
1340.00					
84	61.84	330.74	3.00	2006.89	2353.29
1340.00					
85	62.80	332.14	3.00	1530.78	2044.10
1163.94					
85	62.80	332.14	3.00	1530.78	2044.10
1163.94					
86	63.76	333.49	3.00	1058.19	1737.20
989.19					
86	63.76	333.49	3.00	1058.19	1737.20
989.19					
87	64.72	334.52	1.76	397.25	873.29
497.26					
87	64.72	334.52	1.76	397.25	873.29
497.26					
88	64.72	335.17	1.24	184.01	554.18
315.56					
88	64.72	335.17	1.24	184.01	554.18
315.56					
89	65.67	336.05	3.00	763.17	495.61
282.21					
89	65.67	336.05	3.00	763.17	495.61
282.21					
90	66.63	337.23	2.85	233.30	151.51
86.27					
90	66.63	337.23	2.85	233.30	151.51

86.27

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 90 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
37	34167.1	19726.4	39452.7	30.00	0.000000E+00

SUM OF MOMENTS = -0.364769E+00 (ft/lbs);Imbalance (Fraction of Total Weight) = -0.4490679E-06

Sum of the Resisting Forces = 586551.51 (lbs)

Average Available Shear Strength = 2445.50(psf)

Sum of the Driving Forces = 333991.66 (lbs)

Average Mobilized Shear Stress = 1392.51(psf)

Total length of the failure surface = 239.85(ft)

Factor of Safety Balance Check: FS = 1.75619

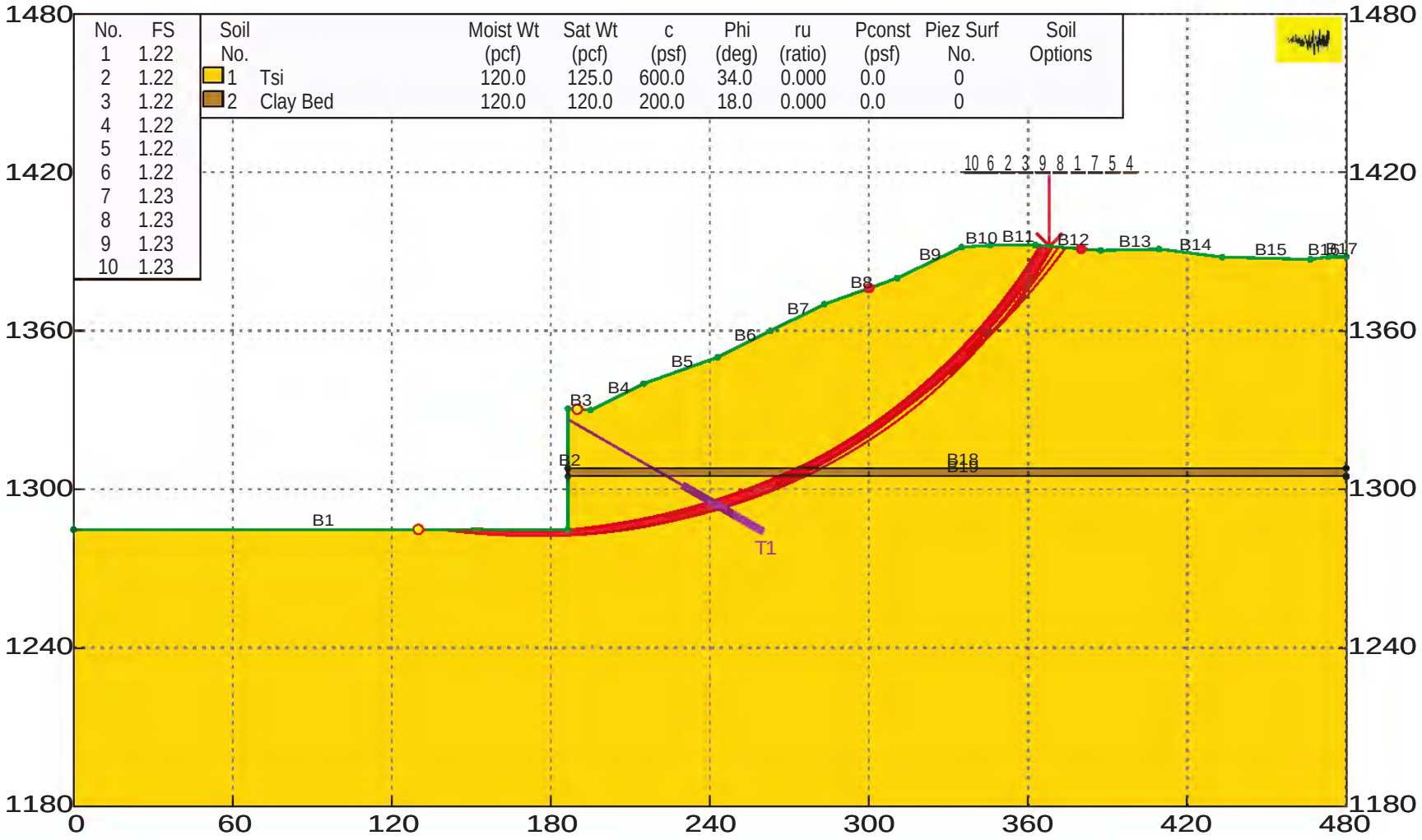
CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Rotational (Seismic (117A))

LGC Geotechnical / BPP

\Section B - Seismic (117A) - Rotational - Tieback.gsd



GEOSTASE FS = 1.22

Simplified Bishop Method

kh = 0.26000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Rotational - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Rotational - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Rotational (Seismic (117A))

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface Option	Water Pressure Constant (psf)
1 Tsi	120.0	125.0	600.00	34.00	0.000	0	0.0
2 Clay Bed	120.0	120.0	200.00	18.00	0.000	0	0.0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 130.00(ft)
and X = 190.00(ft)

Each Surface Enters within a Range Between X = 300.00(ft)
and X = 380.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1180.00(ft)

Specified Maximum Radius = 10000.000(ft)

3.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 3.988 FS Min = 1.220 FS Ave = 1.613
Standard Deviation = 0.337 Coefficient of Variation = 20.91 %

Critical Surface is Sequence Number 334 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 172.877784(ft) ; Y = 1513.603127(ft); and Radius = 229.944045(ft)

Circular Trial Failure Surface Generated With 87 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	150.000	1284.800
2	152.987	1284.521
3	155.977	1284.281
4	158.971	1284.080
5	161.966	1283.918
6	164.964	1283.795
7	167.963	1283.712
8	170.962	1283.667
9	173.962	1283.662
10	176.962	1283.695
11	179.961	1283.768
12	182.959	1283.880
13	185.955	1284.031
14	188.949	1284.221
15	191.940	1284.451
16	194.928	1284.719
17	197.913	1285.026
18	200.893	1285.372
19	203.868	1285.757
20	206.838	1286.181
21	209.802	1286.643
22	212.760	1287.144
23	215.711	1287.684
24	218.655	1288.262
25	221.591	1288.878
26	224.518	1289.533
27	227.437	1290.226
28	230.347	1290.956
29	233.247	1291.725
30	236.136	1292.532
31	239.015	1293.376
32	241.883	1294.257
33	244.738	1295.176
34	247.582	1296.132

35	250.413	1297.125
36	253.231	1298.155
37	256.034	1299.222
38	258.824	1300.325
39	261.599	1301.465
40	264.360	1302.640
41	267.104	1303.852
42	269.833	1305.099
43	272.545	1306.382
44	275.240	1307.699
45	277.917	1309.052
46	280.577	1310.440
47	283.218	1311.863
48	285.841	1313.319
49	288.444	1314.810
50	291.028	1316.335
51	293.591	1317.893
52	296.134	1319.484
53	298.657	1321.109
54	301.157	1322.766
55	303.636	1324.456
56	306.093	1326.178
57	308.526	1327.932
58	310.937	1329.718
59	313.324	1331.535
60	315.688	1333.382
61	318.027	1335.261
62	320.341	1337.170
63	322.631	1339.109
64	324.894	1341.077
65	327.132	1343.075
66	329.344	1345.102
67	331.529	1347.158
68	333.687	1349.242
69	335.818	1351.354
70	337.920	1353.493
71	339.995	1355.660
72	342.042	1357.854
73	344.059	1360.074
74	346.048	1362.320
75	348.007	1364.592
76	349.936	1366.890
77	351.835	1369.212
78	353.703	1371.559
79	355.541	1373.931
80	357.348	1376.326
81	359.123	1378.744
82	360.867	1381.185
83	362.578	1383.649
84	364.257	1386.135

85	365.904	1388.643
86	367.518	1391.172
87	368.013	1391.970

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	242.12	1294.33

Factor Of Safety For The Critical or Specified Surface = 1.220

Table 1 - Geometry Data on the 98 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.99	0.14	151.49	1284.66	1284.80	-5.34	0.00	3.00
2	2.99	0.40	154.48	1284.40	1284.80	-4.59	0.00	3.00
3	2.99	0.62	157.47	1284.18	1284.80	-3.84	0.00	3.00
4	3.00	0.80	160.47	1284.00	1284.80	-3.09	0.00	3.00
5	3.00	0.94	163.47	1283.86	1284.80	-2.35	0.00	3.00
6	3.00	1.05	166.46	1283.75	1284.80	-1.60	0.00	3.00
7	3.00	1.11	169.46	1283.69	1284.80	-0.85	0.00	3.00
8	3.00	1.14	172.46	1283.66	1284.80	-0.10	0.00	3.00
9	3.00	1.12	175.46	1283.68	1284.80	0.64	0.00	3.00
10	3.00	1.07	178.46	1283.73	1284.80	1.39	0.00	3.00
11	3.00	0.98	181.46	1283.82	1284.80	2.14	0.00	3.00
12	3.00	0.84	184.46	1283.96	1284.80	2.89	0.00	3.00
13	0.44	0.75	186.18	1284.05	1284.80	3.63	0.00	0.45
14	2.55	46.29	187.67	1284.14	1330.43	3.63	-3.33	

2.55
15 2.99 45.93 190.44 1284.34 1330.26 4.38 -3.33
3.00
16 2.99 45.51 193.43 1284.58 1330.09 5.13 -3.33
3.00
17 0.07 45.28 194.96 1284.72 1330.00 5.88 -3.33
0.07
18 2.91 45.85 196.46 1284.88 1330.73 5.88 26.57
2.93
19 2.98 47.00 199.40 1285.20 1332.20 6.62 26.57
3.00
20 2.98 48.13 202.38 1285.56 1333.69 7.37 26.57
3.00
21 2.97 49.21 205.35 1285.97 1335.18 8.12 26.57
3.00
22 2.96 50.25 208.32 1286.41 1336.66 8.87 26.57
3.00
23 2.96 51.25 211.28 1286.89 1338.14 9.61 26.57
3.00
24 2.24 52.09 213.88 1287.35 1339.44 10.36 26.57
2.28
25 0.71 52.51 215.36 1287.62 1340.13 10.36 19.72
0.72
26 2.94 52.81 217.18 1287.97 1340.78 11.11 19.72
3.00
27 2.94 53.27 220.12 1288.57 1341.84 11.86 19.72
3.00
28 2.93 53.68 223.05 1289.21 1342.89 12.60 19.72
3.00
29 2.92 54.06 225.98 1289.88 1343.93 13.35 19.72
3.00
30 2.91 54.39 228.89 1290.59 1344.98 14.10 19.72
3.00
31 2.90 54.68 231.80 1291.34 1346.02 14.85 19.72
3.00
32 2.89 54.93 234.69 1292.13 1347.06 15.59 19.72
3.00
33 2.88 55.14 237.58 1292.95 1348.09 16.34 19.72
3.00
34 2.87 55.30 240.45 1293.82 1349.12 17.09 19.72
3.00
35 1.02 55.40 242.39 1294.42 1349.82 17.84 19.72
1.07
36 1.84 55.58 243.82 1294.88 1350.46 17.84 26.57
1.93
37 2.84 55.98 246.16 1295.65 1351.63 18.58 26.57
3.00
38 2.83 56.42 249.00 1296.63 1353.05 19.33 26.57
3.00
39 2.82 56.82 251.82 1297.64 1354.46 20.08 26.57

3.00
40 2.80 57.18 254.63 1298.69 1355.87 20.83 26.57
3.00
41 2.79 57.49 257.43 1299.77 1357.26 21.57 26.57
3.00
42 2.78 57.76 260.21 1300.89 1358.66 22.32 26.57
3.00
43 1.10 57.93 262.15 1301.70 1359.62 23.07 26.57
1.20
44 1.66 58.02 263.53 1302.29 1360.31 23.07 26.34
1.80
45 2.74 58.16 265.73 1303.25 1361.40 23.82 26.34
3.00
46 2.29 58.27 268.25 1304.38 1362.65 24.56 26.34
2.52
47 0.44 58.32 269.62 1305.00 1363.32 24.56 26.34
0.48
48 2.71 58.36 271.19 1305.74 1364.10 25.31 26.34
3.00
49 2.70 58.40 273.89 1307.04 1365.44 26.06 26.34
3.00
50 0.40 58.41 275.44 1307.80 1366.21 26.81 26.34
0.44
51 2.28 58.39 276.78 1308.48 1366.87 26.81 26.34
2.56
52 2.66 58.35 279.25 1309.75 1368.09 27.55 26.34
3.00
53 2.52 58.26 281.84 1311.12 1369.38 28.30 26.34
2.87
54 0.12 58.19 283.16 1311.83 1370.02 28.30 19.80
0.13
55 2.62 57.92 284.53 1312.59 1370.51 29.05 19.80
3.00
56 2.60 57.39 287.14 1314.06 1371.46 29.80 19.80
3.00
57 2.58 56.82 289.74 1315.57 1372.39 30.54 19.80
3.00
58 2.56 56.20 292.31 1317.11 1373.32 31.29 19.80
3.00
59 2.54 55.55 294.86 1318.69 1374.23 32.04 19.80
3.00
60 2.52 54.85 297.40 1320.30 1375.15 32.79 19.80
3.00
61 2.50 54.11 299.91 1321.94 1376.05 33.54 19.80
3.00
62 2.48 53.34 302.40 1323.61 1376.95 34.28 19.80
3.00
63 2.46 52.52 304.86 1325.32 1377.84 35.03 19.80
3.00
64 2.43 51.66 307.31 1327.06 1378.72 35.78 19.80

3.00
65 2.07 50.83 309.56 1328.70 1379.53 36.53 19.80
2.58
66 0.34 50.39 310.77 1329.59 1379.98 36.53 25.71
0.42
67 2.39 50.01 312.13 1330.63 1380.64 37.27 25.71
3.00
68 2.36 49.32 314.51 1332.46 1381.78 38.02 25.71
3.00
69 2.34 48.59 316.86 1334.32 1382.91 38.77 25.71
3.00
70 2.31 47.82 319.18 1336.22 1384.03 39.52 25.71
3.00
71 2.29 47.00 321.49 1338.14 1385.14 40.26 25.71
3.00
72 2.26 46.14 323.76 1340.09 1386.24 41.01 25.71
3.00
73 2.24 45.25 326.01 1342.08 1387.32 41.76 25.71
3.00
74 2.21 44.30 328.24 1344.09 1388.39 42.51 25.71
3.00
75 2.19 43.32 330.44 1346.13 1389.45 43.25 25.71
3.00
76 2.16 42.30 332.61 1348.20 1390.50 44.00 25.71
3.00
77 1.21 41.47 334.29 1349.84 1391.31 44.75 25.71
1.71
78 0.92 40.73 335.36 1350.90 1391.63 44.75 4.20
1.29
79 2.10 39.32 336.87 1352.42 1391.74 45.50 4.20
3.00
80 2.07 37.32 338.96 1354.58 1391.90 46.24 4.20
3.00
81 2.05 35.29 341.02 1356.76 1392.05 46.99 4.20
3.00
82 2.02 33.23 343.05 1358.96 1392.20 47.74 4.20
3.00
83 1.74 31.28 344.93 1361.06 1392.34 48.49 4.20
2.63
84 0.25 30.22 345.92 1362.18 1392.40 48.49 0.00
0.37
85 1.96 28.94 347.03 1363.46 1392.40 49.23 0.00
3.00
86 1.93 26.66 348.97 1365.74 1392.40 49.98 0.00
3.00
87 1.90 24.35 350.89 1368.05 1392.40 50.73 0.00
3.00
88 1.87 22.01 352.77 1370.39 1392.40 51.48 0.00
3.00
89 1.84 19.65 354.62 1372.75 1392.40 52.22 0.00

3.00							
90	1.81	17.27	356.44	1375.13	1392.40	52.97	0.00
3.00							
91	1.78	14.87	358.24	1377.53	1392.40	53.72	0.00
3.00							
92	1.74	12.44	359.99	1379.96	1392.40	54.47	0.00
3.00							
93	1.71	9.98	361.72	1382.42	1392.40	55.21	0.00
3.00							
94	0.12	8.66	362.64	1383.74	1392.40	55.96	0.00
0.22							
95	1.56	7.35	363.48	1384.98	1392.34	55.96	-4.63
2.78							
96	1.65	4.82	365.08	1387.39	1392.21	56.71	-4.63
3.00							
97	1.61	2.17	366.71	1389.91	1392.08	57.46	-4.63
3.00							
98	0.49	0.42	367.77	1391.57	1391.99	58.20	-4.63
0.94							

Table 2 - Force Data On The 98 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	50.0	0.0	0.0	13.0	0.0	0.0
2	143.2	0.0	0.0	37.2	0.0	0.0
3	222.5	0.0	0.0	57.9	0.0	0.0
4	287.9	0.0	0.0	74.9	0.0	0.0
5	339.3	0.0	0.0	88.2	0.0	0.0
6	376.6	0.0	0.0	97.9	0.0	0.0
7	399.8	0.0	0.0	103.9	0.0	0.0
8	408.8	0.0	0.0	106.3	0.0	0.0
9	403.7	0.0	0.0	105.0	0.0	0.0
10	384.4	0.0	0.0	100.0	0.0	0.0
11	351.0	0.0	0.0	91.3	0.0	0.0
12	303.6	0.0	0.0	78.9	0.0	0.0
13	40.3	0.0	0.0	10.5	0.0	0.0
14	14159.2	0.0	0.0	3681.4	0.0	0.0
15	16486.1	0.0	0.0	4286.4	0.0	0.0
16	16316.7	0.0	0.0	4242.3	0.0	0.0
17	388.7	0.0	0.0	101.1	0.0	0.0
18	16026.4	0.0	0.0	4166.9	0.0	0.0
19	16807.9	0.0	0.0	4370.0	0.0	0.0
20	17182.0	0.0	0.0	4467.3	0.0	0.0
21	17537.2	0.0	0.0	4559.7	0.0	0.0

22	17873.1	0.0	0.0	4647.0	0.0	0.0
23	18189.7	0.0	0.0	4729.3	0.0	0.0
24	14003.2	0.0	0.0	3640.8	0.0	0.0
25	4479.4	0.0	0.0	1164.6	0.0	0.0
26	18655.2	0.0	0.0	4850.4	0.0	0.0
27	18766.7	0.0	0.0	4879.3	0.0	0.0
28	18859.6	0.0	0.0	4903.5	0.0	0.0
29	18934.0	0.0	0.0	4922.8	0.0	0.0
30	18989.9	0.0	0.0	4937.4	0.0	0.0
31	19027.5	0.0	0.0	4947.1	0.0	0.0
32	19046.7	0.0	0.0	4952.1	0.0	0.0
33	19047.7	0.0	0.0	4952.4	0.0	0.0
34	19030.7	0.0	0.0	4948.0	0.0	0.0
35	6762.9	0.0	0.0	1758.4	0.0	0.0
36	12261.5	0.0	0.0	3188.0	0.0	0.0
37	19100.5	0.0	0.0	4966.1	0.0	0.0
38	19165.9	0.0	0.0	4983.1	0.0	0.0
39	19212.0	0.0	0.0	4995.1	0.0	0.0
40	19238.9	0.0	0.0	5002.1	0.0	0.0
41	19246.7	0.0	0.0	5004.2	0.0	0.0
42	19235.7	0.0	0.0	5001.3	0.0	0.0
43	7649.8	0.0	0.0	1988.9	0.0	0.0
44	11555.4	0.0	0.0	3004.4	0.0	0.0
45	19152.9	0.0	0.0	4979.8	0.0	0.0
46	16037.3	0.0	0.0	4169.7	0.0	0.0
47	3044.7	0.0	0.0	791.6	0.0	0.0
48	18993.3	0.0	0.0	4938.3	0.0	0.0
49	18886.8	0.0	0.0	4910.6	0.0	0.0
50	2782.1	0.0	0.0	723.3	0.0	0.0
51	15980.9	0.0	0.0	4155.0	0.0	0.0
52	18622.0	0.0	0.0	4841.7	0.0	0.0
53	17638.7	0.0	0.0	4586.1	0.0	0.0
54	825.5	0.0	0.0	214.6	0.0	0.0
55	18229.2	0.0	0.0	4739.6	0.0	0.0
56	17929.0	0.0	0.0	4661.6	0.0	0.0
57	17615.6	0.0	0.0	4580.1	0.0	0.0
58	17289.3	0.0	0.0	4495.2	0.0	0.0
59	16950.6	0.0	0.0	4407.2	0.0	0.0
60	16600.0	0.0	0.0	4316.0	0.0	0.0
61	16238.0	0.0	0.0	4221.9	0.0	0.0
62	15865.0	0.0	0.0	4124.9	0.0	0.0
63	15481.6	0.0	0.0	4025.2	0.0	0.0
64	15088.2	0.0	0.0	3922.9	0.0	0.0
65	12647.2	0.0	0.0	3288.3	0.0	0.0
66	2039.0	0.0	0.0	530.1	0.0	0.0
67	14326.9	0.0	0.0	3725.0	0.0	0.0
68	13988.1	0.0	0.0	3636.9	0.0	0.0
69	13639.0	0.0	0.0	3546.1	0.0	0.0
70	13280.2	0.0	0.0	3452.8	0.0	0.0
71	12912.1	0.0	0.0	3357.1	0.0	0.0

72	12535.3	0.0	0.0	3259.2	0.0	0.0
73	12150.5	0.0	0.0	3159.1	0.0	0.0
74	11758.1	0.0	0.0	3057.1	0.0	0.0
75	11358.8	0.0	0.0	2953.3	0.0	0.0
76	10953.2	0.0	0.0	2847.8	0.0	0.0
77	6036.0	0.0	0.0	1569.4	0.0	0.0
78	4485.2	0.0	0.0	1166.2	0.0	0.0
79	9922.6	0.0	0.0	2579.9	0.0	0.0
80	9292.1	0.0	0.0	2415.9	0.0	0.0
81	8666.5	0.0	0.0	2253.3	0.0	0.0
82	8046.3	0.0	0.0	2092.0	0.0	0.0
83	6534.0	0.0	0.0	1698.8	0.0	0.0
84	898.0	0.0	0.0	233.5	0.0	0.0
85	6803.9	0.0	0.0	1769.0	0.0	0.0
86	6171.4	0.0	0.0	1604.6	0.0	0.0
87	5548.6	0.0	0.0	1442.6	0.0	0.0
88	4936.1	0.0	0.0	1283.4	0.0	0.0
89	4334.5	0.0	0.0	1127.0	0.0	0.0
90	3744.6	0.0	0.0	973.6	0.0	0.0
91	3166.8	0.0	0.0	823.4	0.0	0.0
92	2601.8	0.0	0.0	676.5	0.0	0.0
93	2050.4	0.0	0.0	533.1	0.0	0.0
94	126.7	0.0	0.0	32.9	0.0	0.0
95	1374.5	0.0	0.0	357.4	0.0	0.0
96	952.1	0.0	0.0	247.6	0.0	0.0
97	419.9	0.0	0.0	109.2	0.0	0.0
98	24.9	0.0	0.0	6.5	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1033924.20(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1033924.20(lbs)

TOTAL AREA OF SLIDING MASS = 8616.03(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 98 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	600.00	34.00	
2	1	600.00	34.00	
3	1	600.00	34.00	
4	1	600.00	34.00	
5	1	600.00	34.00	
6	1	600.00	34.00	
7	1	600.00	34.00	
8	1	600.00	34.00	
9	1	600.00	34.00	
10	1	600.00	34.00	
11	1	600.00	34.00	

12	1	600.00	34.00
13	1	600.00	34.00
14	1	600.00	34.00
15	1	600.00	34.00
16	1	600.00	34.00
17	1	600.00	34.00
18	1	600.00	34.00
19	1	600.00	34.00
20	1	600.00	34.00
21	1	600.00	34.00
22	1	600.00	34.00
23	1	600.00	34.00
24	1	600.00	34.00
25	1	600.00	34.00
26	1	600.00	34.00
27	1	600.00	34.00
28	1	600.00	34.00
29	1	600.00	34.00
30	1	600.00	34.00
31	1	600.00	34.00
32	1	600.00	34.00
33	1	600.00	34.00
34	1	600.00	34.00
35	1	600.00	34.00
36	1	600.00	34.00
37	1	600.00	34.00
38	1	600.00	34.00
39	1	600.00	34.00
40	1	600.00	34.00
41	1	600.00	34.00
42	1	600.00	34.00
43	1	600.00	34.00
44	1	600.00	34.00
45	1	600.00	34.00
46	1	600.00	34.00
47	2	200.00	18.00
48	2	200.00	18.00
49	2	200.00	18.00
50	2	200.00	18.00
51	1	600.00	34.00
52	1	600.00	34.00
53	1	600.00	34.00
54	1	600.00	34.00
55	1	600.00	34.00
56	1	600.00	34.00
57	1	600.00	34.00
58	1	600.00	34.00
59	1	600.00	34.00
60	1	600.00	34.00
61	1	600.00	34.00

62	1	600.00	34.00
63	1	600.00	34.00
64	1	600.00	34.00
65	1	600.00	34.00
66	1	600.00	34.00
67	1	600.00	34.00
68	1	600.00	34.00
69	1	600.00	34.00
70	1	600.00	34.00
71	1	600.00	34.00
72	1	600.00	34.00
73	1	600.00	34.00
74	1	600.00	34.00
75	1	600.00	34.00
76	1	600.00	34.00
77	1	600.00	34.00
78	1	600.00	34.00
79	1	600.00	34.00
80	1	600.00	34.00
81	1	600.00	34.00
82	1	600.00	34.00
83	1	600.00	34.00
84	1	600.00	34.00
85	1	600.00	34.00
86	1	600.00	34.00
87	1	600.00	34.00
88	1	600.00	34.00
89	1	600.00	34.00
90	1	600.00	34.00
91	1	600.00	34.00
92	1	600.00	34.00
93	1	600.00	34.00
94	1	600.00	34.00
95	1	600.00	34.00
96	1	600.00	34.00
97	1	600.00	34.00
98	1	600.00	34.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 98 Slices

Slice	Alpha	X-Coord.	Base	Effective	Available	Mobilized

No.	(deg)	Slice Cntr (ft)	Leng. (ft)	Normal Stress (psf)	Shear Strength (psf)	Shear Stress * (psf)
1	-5.34	151.49	3.00	63.80	643.03	527.08
1	-5.34	151.49	3.00	63.80	643.03	527.08
2	-4.59	154.48	3.00	89.40	660.30	541.23
2	-4.59	154.48	3.00	89.40	660.30	541.23
3	-3.84	157.47	3.00	109.80	674.06	552.51
3	-3.84	157.47	3.00	109.80	674.06	552.51
4	-3.09	160.47	3.00	125.09	684.37	560.97
4	-3.09	160.47	3.00	125.09	684.37	560.97
5	-2.35	163.47	3.00	135.38	691.32	566.66
5	-2.35	163.47	3.00	135.38	691.32	566.66
6	-1.60	166.46	3.00	140.78	694.96	569.64
6	-1.60	166.46	3.00	140.78	694.96	569.64
7	-0.85	169.46	3.00	141.37	695.36	569.97
7	-0.85	169.46	3.00	141.37	695.36	569.97
8	-0.10	172.46	3.00	137.26	692.58	567.69
8	-0.10	172.46	3.00	137.26	692.58	567.69
9	0.64	175.46	3.00	128.53	686.70	562.87
9	0.64	175.46	3.00	128.53	686.70	562.87
10	1.39	178.46	3.00	115.29	677.76	555.55
10	1.39	178.46	3.00	115.29	677.76	555.55
11	2.14	181.46	3.00	97.61	665.84	545.77
11	2.14	181.46	3.00	97.61	665.84	545.77
12	2.89	184.46	3.00	75.60	650.99	

533.60
  12 2.89 184.46 3.00 75.60 650.99
533.60
  13 3.63 186.18 0.45 58.73 639.61
524.28
  13 3.63 186.18 0.45 58.73 639.61
524.28
  14 3.63 187.67 2.55 5345.01 4205.25
3446.95
  14 3.63 187.67 2.55 5345.01 4205.25
3446.95
  15 4.38 190.44 3.00 5262.36 4149.51
3401.26
  15 4.38 190.44 3.00 5262.36 4149.51
3401.26
  16 5.13 193.43 3.00 5173.18 4089.36
3351.96
  16 5.13 193.43 3.00 5173.18 4089.36
3351.96
  17 5.88 194.96 0.07 5107.37 4044.96
3315.57
  17 5.88 194.96 0.07 5107.37 4044.96
3315.57
  18 5.88 196.46 2.93 5172.53 4088.91
3351.59
  18 5.88 196.46 2.93 5172.53 4088.91
3351.59
  19 6.62 199.40 3.00 5262.72 4149.75
3401.46
  19 6.62 199.40 3.00 5262.72 4149.75
3401.46
  20 7.37 202.38 3.00 5348.59 4207.67
3448.93
  20 7.37 202.38 3.00 5348.59 4207.67
3448.93
  21 8.12 205.35 3.00 5428.59 4261.63
3493.17
  21 8.12 205.35 3.00 5428.59 4261.63
3493.17
  22 8.87 208.32 3.00 5502.80 4311.68
3534.19
  22 8.87 208.32 3.00 5502.80 4311.68
3534.19
  23 9.61 211.28 3.00 5571.28 4357.88
3572.06
  23 9.61 211.28 3.00 5571.28 4357.88
3572.06
  24 10.36 213.88 2.28 5621.78 4391.94
3599.97
  24 10.36 213.88 2.28 5621.78 4391.94

3599.97

25	10.36	215.36	0.72	5667.48	4422.76

3625.24

25	10.36	215.36	0.72	5667.48	4422.76

3625.24

26	11.11	217.18	3.00	5657.77	4416.21

3619.87

26	11.11	217.18	3.00	5657.77	4416.21

3619.87

27	11.86	220.12	3.00	5664.77	4420.94

3623.74

27	11.86	220.12	3.00	5664.77	4420.94

3623.74

28	12.60	223.05	3.00	5667.03	4422.46

3624.99

28	12.60	223.05	3.00	5667.03	4422.46

3624.99

29	13.35	225.98	3.00	5664.61	4420.83

3623.66

29	13.35	225.98	3.00	5664.61	4420.83

3623.66

30	14.10	228.89	3.00	5657.59	4416.09

3619.77

30	14.10	228.89	3.00	5657.59	4416.09

3619.77

31	14.85	231.80	3.00	5646.02	4408.29

3613.38

31	14.85	231.80	3.00	5646.02	4408.29

3613.38

32	15.59	234.69	3.00	5629.99	4397.47

3604.51

32	15.59	234.69	3.00	5629.99	4397.47

3604.51

33	16.34	237.58	3.00	5609.54	4383.68

3593.21

33	16.34	237.58	3.00	5609.54	4383.68

3593.21

34	17.09	240.45	3.00	5584.75	4366.96

3579.50

34	17.09	240.45	3.00	5584.75	4366.96

3579.50

35	17.84	242.39	1.07	20432.57	14381.94

11788.56

35	17.84	242.39	1.07	20432.57	14381.94

11788.56

36	17.84	243.82	1.93	5570.95	4357.65

3571.87

36	17.84	243.82	1.93	5570.95	4357.65

3571.87

37	18.58	246.16	3.00	5569.45	4356.64

3571.04					
37	18.58	246.16	3.00	5569.45	4356.64
3571.04					
38	19.33	249.00	3.00	5572.40	4358.63
3572.67					
38	19.33	249.00	3.00	5572.40	4358.63
3572.67					
39	20.08	251.82	3.00	5570.55	4357.38
3571.65					
39	20.08	251.82	3.00	5570.55	4357.38
3571.65					
40	20.83	254.63	3.00	5563.99	4352.96
3568.02					
40	20.83	254.63	3.00	5563.99	4352.96
3568.02					
41	21.57	257.43	3.00	5552.77	4345.39
3561.82					
41	21.57	257.43	3.00	5552.77	4345.39
3561.82					
42	22.32	260.21	3.00	5536.96	4334.73
3553.08					
42	22.32	260.21	3.00	5536.96	4334.73
3553.08					
43	23.07	262.15	1.20	5510.62	4316.96
3538.52					
43	23.07	262.15	1.20	5510.62	4316.96
3538.52					
44	23.07	263.53	1.80	5520.23	4323.44
3543.83					
44	23.07	263.53	1.80	5520.23	4323.44
3543.83					
45	23.82	265.73	3.00	5490.42	4303.33
3527.35					
45	23.82	265.73	3.00	5490.42	4303.33
3527.35					
46	24.56	268.25	2.52	5459.17	4282.26
3510.07					
46	24.56	268.25	2.52	5459.17	4282.26
3510.07					
47	24.56	269.62	0.48	6205.26	2216.21
1816.58					
47	24.56	269.62	0.48	6205.26	2216.21
1816.58					
48	25.31	271.19	3.00	6184.77	2209.55
1811.12					
48	25.31	271.19	3.00	6184.77	2209.55
1811.12					
49	26.06	273.89	3.00	6164.12	2202.84
1805.62					
49	26.06	273.89	3.00	6164.12	2202.84

1805.62					
50	26.81	275.44	0.44	6139.89	2194.97
1799.17					
50	26.81	275.44	0.44	6139.89	2194.97
1799.17					
51	26.81	276.78	2.56	5342.97	4203.88
3445.83					
51	26.81	276.78	2.56	5342.97	4203.88
3445.83					
52	27.55	279.25	3.00	5295.98	4172.18
3419.84					
52	27.55	279.25	3.00	5295.98	4172.18
3419.84					
53	28.30	281.84	2.87	5245.02	4137.81
3391.67					
53	28.30	281.84	2.87	5245.02	4137.81
3391.67					
54	28.30	283.16	0.13	5238.92	4133.69
3388.30					
54	28.30	283.16	0.13	5238.92	4133.69
3388.30					
55	29.05	284.53	3.00	5171.72	4088.37
3351.15					
55	29.05	284.53	3.00	5171.72	4088.37
3351.15					
56	29.80	287.14	3.00	5080.33	4026.72
3300.62					
56	29.80	287.14	3.00	5080.33	4026.72
3300.62					
57	30.54	289.74	3.00	4985.84	3962.99
3248.37					
57	30.54	289.74	3.00	4985.84	3962.99
3248.37					
58	31.29	292.31	3.00	4888.33	3897.22
3194.46					
58	31.29	292.31	3.00	4888.33	3897.22
3194.46					
59	32.04	294.86	3.00	4787.87	3829.46
3138.93					
59	32.04	294.86	3.00	4787.87	3829.46
3138.93					
60	32.79	297.40	3.00	4684.56	3759.77
3081.80					
60	32.79	297.40	3.00	4684.56	3759.77
3081.80					
61	33.54	299.91	3.00	4578.45	3688.21
3023.14					
61	33.54	299.91	3.00	4578.45	3688.21
3023.14					
62	34.28	302.40	3.00	4469.64	3614.81

2962.98					
62	34.28	302.40	3.00	4469.64	3614.81
2962.98					
63	35.03	304.86	3.00	4358.21	3539.65
2901.37					
63	35.03	304.86	3.00	4358.21	3539.65
2901.37					
64	35.78	307.31	3.00	4244.23	3462.77
2838.35					
64	35.78	307.31	3.00	4244.23	3462.77
2838.35					
65	36.53	309.56	2.58	4133.32	3387.96
2777.04					
65	36.53	309.56	2.58	4133.32	3387.96
2777.04					
66	36.53	310.77	0.42	4095.52	3362.46
2756.14					
66	36.53	310.77	0.42	4095.52	3362.46
2756.14					
67	37.27	312.13	3.00	4024.89	3314.82
2717.09					
67	37.27	312.13	3.00	4024.89	3314.82
2717.09					
68	38.02	314.51	3.00	3928.17	3249.59
2663.61					
68	38.02	314.51	3.00	3928.17	3249.59
2663.61					
69	38.77	316.86	3.00	3828.62	3182.43
2608.57					
69	38.77	316.86	3.00	3828.62	3182.43
2608.57					
70	39.52	319.18	3.00	3726.32	3113.43
2552.01					
70	39.52	319.18	3.00	3726.32	3113.43
2552.01					
71	40.26	321.49	3.00	3621.36	3042.64
2493.99					
71	40.26	321.49	3.00	3621.36	3042.64
2493.99					
72	41.01	323.76	3.00	3513.85	2970.12
2434.54					
72	41.01	323.76	3.00	3513.85	2970.12
2434.54					
73	41.76	326.01	3.00	3403.86	2895.93
2373.73					
73	41.76	326.01	3.00	3403.86	2895.93
2373.73					
74	42.51	328.24	3.00	3291.50	2820.15
2311.61					
74	42.51	328.24	3.00	3291.50	2820.15

2311.61					
75	43.25	330.44	3.00	3176.87	2742.82
2248.23					
75	43.25	330.44	3.00	3176.87	2742.82
2248.23					
76	44.00	332.61	3.00	3060.05	2664.03
2183.65					
76	44.00	332.61	3.00	3060.05	2664.03
2183.65					
77	44.75	334.29	1.71	2959.58	2596.26
2128.10					
77	44.75	334.29	1.71	2959.58	2596.26
2128.10					
78	44.75	335.36	1.29	2902.08	2557.47
2096.31					
78	44.75	335.36	1.29	2902.08	2557.47
2096.31					
79	45.50	336.87	3.00	2757.60	2460.03
2016.43					
79	45.50	336.87	3.00	2757.60	2460.03
2016.43					
80	46.24	338.96	3.00	2569.54	2333.17
1912.45					
80	46.24	338.96	3.00	2569.54	2333.17
1912.45					
81	46.99	341.02	3.00	2381.83	2206.57
1808.67					
81	46.99	341.02	3.00	2381.83	2206.57
1808.67					
82	47.74	343.05	3.00	2194.61	2080.28
1705.16					
82	47.74	343.05	3.00	2194.61	2080.28
1705.16					
83	48.49	344.93	2.63	2017.80	1961.02
1607.41					
83	48.49	344.93	2.63	2017.80	1961.02
1607.41					
84	48.49	345.92	0.37	1938.20	1907.33
1563.40					
84	48.49	345.92	0.37	1938.20	1907.33
1563.40					
85	49.23	347.03	3.00	1815.35	1824.47
1495.47					
85	49.23	347.03	3.00	1815.35	1824.47
1495.47					
86	49.98	348.97	3.00	1619.81	1692.58
1387.37					
86	49.98	348.97	3.00	1619.81	1692.58
1387.37					
87	50.73	350.89	3.00	1425.62	1561.59

1280.00					
87	50.73	350.89	3.00	1425.62	1561.59
1280.00					
88	51.48	352.77	3.00	1232.89	1431.60
1173.45					
88	51.48	352.77	3.00	1232.89	1431.60
1173.45					
89	52.22	354.62	3.00	1041.77	1302.68
1067.78					
89	52.22	354.62	3.00	1041.77	1302.68
1067.78					
90	52.97	356.44	3.00	852.38	1174.93
963.07					
90	52.97	356.44	3.00	852.38	1174.93
963.07					
91	53.72	358.24	3.00	664.86	1048.45
859.40					
91	53.72	358.24	3.00	664.86	1048.45
859.40					
92	54.47	359.99	3.00	479.37	923.34
756.84					
92	54.47	359.99	3.00	479.37	923.34
756.84					
93	55.21	361.72	3.00	296.05	799.69
655.49					
93	55.21	361.72	3.00	296.05	799.69
655.49					
94	55.96	362.64	0.22	192.67	729.96
598.33					
94	55.96	362.64	0.22	192.67	729.96
598.33					
95	55.96	363.48	2.78	104.74	670.65
549.72					
95	55.96	363.48	2.78	104.74	670.65
549.72					
96	56.71	365.08	3.00	320.38	216.10
177.13					
96	56.71	365.08	3.00	320.38	216.10
177.13					
97	57.46	366.71	3.00	142.31	95.99
78.68					
97	57.46	366.71	3.00	142.31	95.99
78.68					
98	58.20	367.77	0.94	27.15	18.31
15.01					
98	58.20	367.77	0.94	27.15	18.31
15.01					

Table 4 - Base Force Data on the 98 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.34	151.49	3.00	191.39	1929.09	1581.23
1	-5.34	151.49	3.00	191.39	1929.09	1581.23
2	-4.59	154.48	3.00	268.20	1980.90	1623.70
2	-4.59	154.48	3.00	268.20	1980.90	1623.70
3	-3.84	157.47	3.00	329.39	2022.17	1657.53
3	-3.84	157.47	3.00	329.39	2022.17	1657.53
4	-3.09	160.47	3.00	375.27	2053.12	1682.90
4	-3.09	160.47	3.00	375.27	2053.12	1682.90
5	-2.35	163.47	3.00	406.15	2073.95	1699.97
5	-2.35	163.47	3.00	406.15	2073.95	1699.97
6	-1.60	166.46	3.00	422.34	2084.87	1708.92
6	-1.60	166.46	3.00	422.34	2084.87	1708.92
7	-0.85	169.46	3.00	424.12	2086.07	1709.91
7	-0.85	169.46	3.00	424.12	2086.07	1709.91
8	-0.10	172.46	3.00	411.78	2077.75	1703.08
8	-0.10	172.46	3.00	411.78	2077.75	1703.08
9	0.64	175.46	3.00	385.60	2060.09	1688.61
9	0.64	175.46	3.00	385.60	2060.09	1688.61
10	1.39	178.46	3.00	345.86	2033.29	1666.64
10	1.39	178.46	3.00	345.86	2033.29	1666.64
11	2.14	181.46	3.00	292.84	1997.52	

1637.32
  11 2.14 181.46 3.00 292.84 1997.52
1637.32
  12 2.89 184.46 3.00 226.79 1952.97
1600.81
  12 2.89 184.46 3.00 226.79 1952.97
1600.81
  13 3.63 186.18 0.45 26.17 285.02
233.62
  13 3.63 186.18 0.45 26.17 285.02
233.62
  14 3.63 187.67 2.55 13653.21 10741.84
8804.85
  14 3.63 187.67 2.55 13653.21 10741.84
8804.85
  15 4.38 190.44 3.00 15787.09 12448.53
10203.78
  15 4.38 190.44 3.00 15787.09 12448.53
10203.78
  16 5.13 193.43 3.00 15519.55 12268.07
10055.87
  16 5.13 193.43 3.00 15519.55 12268.07
10055.87
  17 5.88 194.96 0.07 367.26 290.87
238.42
  17 5.88 194.96 0.07 367.26 290.87
238.42
  18 5.88 196.46 2.93 15145.63 11972.71
9813.77
  18 5.88 196.46 2.93 15145.63 11972.71
9813.77
  19 6.62 199.40 3.00 15788.17 12449.25
10204.38
  19 6.62 199.40 3.00 15788.17 12449.25
10204.38
  20 7.37 202.38 3.00 16045.78 12623.01
10346.80
  20 7.37 202.38 3.00 16045.78 12623.01
10346.80
  21 8.12 205.35 3.00 16285.78 12784.90
10479.50
  21 8.12 205.35 3.00 16285.78 12784.90
10479.50
  22 8.87 208.32 3.00 16508.40 12935.05
10602.58
  22 8.87 208.32 3.00 16508.40 12935.05
10602.58
  23 9.61 211.28 3.00 16713.85 13073.63
10716.17
  23 9.61 211.28 3.00 16713.85 13073.63

10716.17
  24   10.36   213.88   2.28   12802.58   10001.84
8198.29
  24   10.36   213.88   2.28   12802.58   10001.84
8198.29
  25   10.36   215.36   0.72   4095.78   3196.25
2619.90
  25   10.36   215.36   0.72   4095.78   3196.25
2619.90
  26   11.11   217.18   3.00   16973.31   13248.64
10859.62
  26   11.11   217.18   3.00   16973.31   13248.64
10859.62
  27   11.86   220.12   3.00   16994.31   13262.81
10871.23
  27   11.86   220.12   3.00   16994.31   13262.81
10871.23
  28   12.60   223.05   3.00   17001.08   13267.38
10874.98
  28   12.60   223.05   3.00   17001.08   13267.38
10874.98
  29   13.35   225.98   3.00   16993.84   13262.49
10870.97
  29   13.35   225.98   3.00   16993.84   13262.49
10870.97
  30   14.10   228.89   3.00   16972.77   13248.28
10859.32
  30   14.10   228.89   3.00   16972.77   13248.28
10859.32
  31   14.85   231.80   3.00   16938.07   13224.87
10840.14
  31   14.85   231.80   3.00   16938.07   13224.87
10840.14
  32   15.59   234.69   3.00   16889.96   13192.42
10813.54
  32   15.59   234.69   3.00   16889.96   13192.42
10813.54
  33   16.34   237.58   3.00   16828.62   13151.05
10779.62
  33   16.34   237.58   3.00   16828.62   13151.05
10779.62
  34   17.09   240.45   3.00   16754.26   13100.89
10738.51
  34   17.09   240.45   3.00   16754.26   13100.89
10738.51
  35   17.84   242.39   1.07   21836.67   15370.25
12598.66
  35   17.84   242.39   1.07   21836.67   15370.25
12598.66
  36   17.84   243.82   1.93   10759.07   8415.85

6898.29					
36	17.84	243.82	1.93	10759.07	8415.85
6898.29					
37	18.58	246.16	3.00	16708.35	13069.92
10713.13					
37	18.58	246.16	3.00	16708.35	13069.92
10713.13					
38	19.33	249.00	3.00	16717.19	13075.88
10718.01					
38	19.33	249.00	3.00	16717.19	13075.88
10718.01					
39	20.08	251.82	3.00	16711.66	13072.15
10714.96					
39	20.08	251.82	3.00	16711.66	13072.15
10714.96					
40	20.83	254.63	3.00	16691.96	13058.87
10704.07					
40	20.83	254.63	3.00	16691.96	13058.87
10704.07					
41	21.57	257.43	3.00	16658.31	13036.17
10685.46					
41	21.57	257.43	3.00	16658.31	13036.17
10685.46					
42	22.32	260.21	3.00	16610.89	13004.19
10659.25					
42	22.32	260.21	3.00	16610.89	13004.19
10659.25					
43	23.07	262.15	1.20	6591.64	5163.82
4232.67					
43	23.07	262.15	1.20	6591.64	5163.82
4232.67					
44	23.07	263.53	1.80	9957.55	7798.75
6392.47					
44	23.07	263.53	1.80	9957.55	7798.75
6392.47					
45	23.82	265.73	3.00	16471.25	12910.00
10582.04					
45	23.82	265.73	3.00	16471.25	12910.00
10582.04					
46	24.56	268.25	2.52	13766.27	10798.47
8851.27					
46	24.56	268.25	2.52	13766.27	10798.47
8851.27					
47	24.56	269.62	0.48	2968.11	1060.06
868.91					
47	24.56	269.62	0.48	2968.11	1060.06
868.91					
48	25.31	271.19	3.00	18554.31	6628.66
5433.37					
48	25.31	271.19	3.00	18554.31	6628.66

5433.37
  49   26.06   273.89   3.00   18492.35   6608.53
5416.86
  49   26.06   273.89   3.00   18492.35   6608.53
5416.86
  50   26.81   275.44   0.44   2730.63   976.18
800.15
  50   26.81   275.44   0.44   2730.63   976.18
800.15
  51   26.81   276.78   2.56   13652.71   10742.03
8805.00
  51   26.81   276.78   2.56   13652.71   10742.03
8805.00
  52   27.55   279.25   3.00   15887.93   12516.54
10259.53
  52   27.55   279.25   3.00   15887.93   12516.54
10259.53
  53   28.30   281.84   2.87   15030.84   11857.87
9719.64
  53   28.30   281.84   2.87   15030.84   11857.87
9719.64
  54   28.30   283.16   0.13   703.39   555.00
454.92
  54   28.30   283.16   0.13   703.39   555.00
454.92
  55   29.05   284.53   3.00   15515.17   12265.12
10053.44
  55   29.05   284.53   3.00   15515.17   12265.12
10053.44
  56   29.80   287.14   3.00   15240.98   12080.17
9901.85
  56   29.80   287.14   3.00   15240.98   12080.17
9901.85
  57   30.54   289.74   3.00   14957.51   11888.97
9745.12
  57   30.54   289.74   3.00   14957.51   11888.97
9745.12
  58   31.29   292.31   3.00   14664.98   11691.65
9583.39
  58   31.29   292.31   3.00   14664.98   11691.65
9583.39
  59   32.04   294.86   3.00   14363.62   11488.38
9416.78
  59   32.04   294.86   3.00   14363.62   11488.38
9416.78
  60   32.79   297.40   3.00   14053.67   11279.32
9245.41
  60   32.79   297.40   3.00   14053.67   11279.32
9245.41
  61   33.54   299.91   3.00   13735.36   11064.62

9069.42					
61	33.54	299.91	3.00	13735.36	11064.62
9069.42					
62	34.28	302.40	3.00	13408.93	10844.44
8888.94					
62	34.28	302.40	3.00	13408.93	10844.44
8888.94					
63	35.03	304.86	3.00	13074.62	10618.94
8704.11					
63	35.03	304.86	3.00	13074.62	10618.94
8704.11					
64	35.78	307.31	3.00	12732.68	10388.30
8515.06					
64	35.78	307.31	3.00	12732.68	10388.30
8515.06					
65	36.53	309.56	2.58	10665.54	8742.22
7165.81					
65	36.53	309.56	2.58	10665.54	8742.22
7165.81					
66	36.53	310.77	0.42	1718.58	1410.97
1156.54					
66	36.53	310.77	0.42	1718.58	1410.97
1156.54					
67	37.27	312.13	3.00	12074.68	9944.47
8151.27					
67	37.27	312.13	3.00	12074.68	9944.47
8151.27					
68	38.02	314.51	3.00	11784.51	9748.76
7990.84					
68	38.02	314.51	3.00	11784.51	9748.76
7990.84					
69	38.77	316.86	3.00	11485.85	9547.30
7825.71					
69	38.77	316.86	3.00	11485.85	9547.30
7825.71					
70	39.52	319.18	3.00	11178.95	9340.30
7656.04					
70	39.52	319.18	3.00	11178.95	9340.30
7656.04					
71	40.26	321.49	3.00	10864.09	9127.92
7481.96					
71	40.26	321.49	3.00	10864.09	9127.92
7481.96					
72	41.01	323.76	3.00	10541.54	8910.36
7303.63					
72	41.01	323.76	3.00	10541.54	8910.36
7303.63					
73	41.76	326.01	3.00	10211.59	8687.80
7121.20					
73	41.76	326.01	3.00	10211.59	8687.80

7121.20						
74	42.51	328.24	3.00	9874.51	8460.44	
6934.84						
74	42.51	328.24	3.00	9874.51	8460.44	
6934.84						
75	43.25	330.44	3.00	9530.60	8228.47	
6744.70						
75	43.25	330.44	3.00	9530.60	8228.47	
6744.70						
76	44.00	332.61	3.00	9180.16	7992.10	
6550.95						
76	44.00	332.61	3.00	9180.16	7992.10	
6550.95						
77	44.75	334.29	1.71	5055.10	4434.53	
3634.89						
77	44.75	334.29	1.71	5055.10	4434.53	
3634.89						
78	44.75	335.36	1.29	3749.36	3304.15	
2708.34						
78	44.75	335.36	1.29	3749.36	3304.15	
2708.34						
79	45.50	336.87	3.00	8272.80	7380.08	
6049.28						
79	45.50	336.87	3.00	8272.80	7380.08	
6049.28						
80	46.24	338.96	3.00	7708.61	6999.52	
5737.35						
80	46.24	338.96	3.00	7708.61	6999.52	
5737.35						
81	46.99	341.02	3.00	7145.50	6619.70	
5426.02						
81	46.99	341.02	3.00	7145.50	6619.70	
5426.02						
82	47.74	343.05	3.00	6583.82	6240.84	
5115.48						
82	47.74	343.05	3.00	6583.82	6240.84	
5115.48						
83	48.49	344.93	2.63	5299.54	5150.42	
4221.68						
83	48.49	344.93	2.63	5299.54	5150.42	
4221.68						
84	48.49	345.92	0.37	724.12	712.59	
584.09						
84	48.49	345.92	0.37	724.12	712.59	
584.09						
85	49.23	347.03	3.00	5446.04	5473.40	
4486.42						
85	49.23	347.03	3.00	5446.04	5473.40	
4486.42						
86	49.98	348.97	3.00	4859.44	5077.74	

4162.11					
86	49.98	348.97	3.00	4859.44	5077.74
4162.11					
87	50.73	350.89	3.00	4276.86	4684.78
3840.01					
87	50.73	350.89	3.00	4276.86	4684.78
3840.01					
88	51.48	352.77	3.00	3698.68	4294.79
3520.35					
88	51.48	352.77	3.00	3698.68	4294.79
3520.35					
89	52.22	354.62	3.00	3125.30	3908.04
3203.33					
89	52.22	354.62	3.00	3125.30	3908.04
3203.33					
90	52.97	356.44	3.00	2557.13	3524.80
2889.20					
90	52.97	356.44	3.00	2557.13	3524.80
2889.20					
91	53.72	358.24	3.00	1994.58	3145.36
2578.19					
91	53.72	358.24	3.00	1994.58	3145.36
2578.19					
92	54.47	359.99	3.00	1438.11	2770.02
2270.52					
92	54.47	359.99	3.00	1438.11	2770.02
2270.52					
93	55.21	361.72	3.00	888.15	2399.07
1966.46					
93	55.21	361.72	3.00	888.15	2399.07
1966.46					
94	55.96	362.64	0.22	41.95	158.92
130.26					
94	55.96	362.64	0.22	41.95	158.92
130.26					
95	55.96	363.48	2.78	291.42	1865.94
1529.47					
95	55.96	363.48	2.78	291.42	1865.94
1529.47					
96	56.71	365.08	3.00	961.13	648.29
531.39					
96	56.71	365.08	3.00	961.13	648.29
531.39					
97	57.46	366.71	3.00	426.94	287.97
236.05					
97	57.46	366.71	3.00	426.94	287.97
236.05					
98	58.20	367.77	0.94	25.50	17.20
14.10					
98	58.20	367.77	0.94	25.50	17.20

14.10

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 98 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
35	30679.2	17712.6	35425.3	30.00	0.000000E+00

SUM OF MOMENTS = 0.687089E+00 (ft/lbs);Imbalance (Fraction of Total Weight) = 0.6645447E-06

Sum of the Resisting Forces = 750949.96 (lbs)

Average Available Shear Strength = 2934.10(psf)

Sum of the Driving Forces = 615537.13 (lbs)

Average Mobilized Shear Stress = 2405.01(psf)

Total length of the failure surface = 255.94(ft)

Factor of Safety Balance Check: FS = 1.21999

CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.43457(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 1337.717(ft)

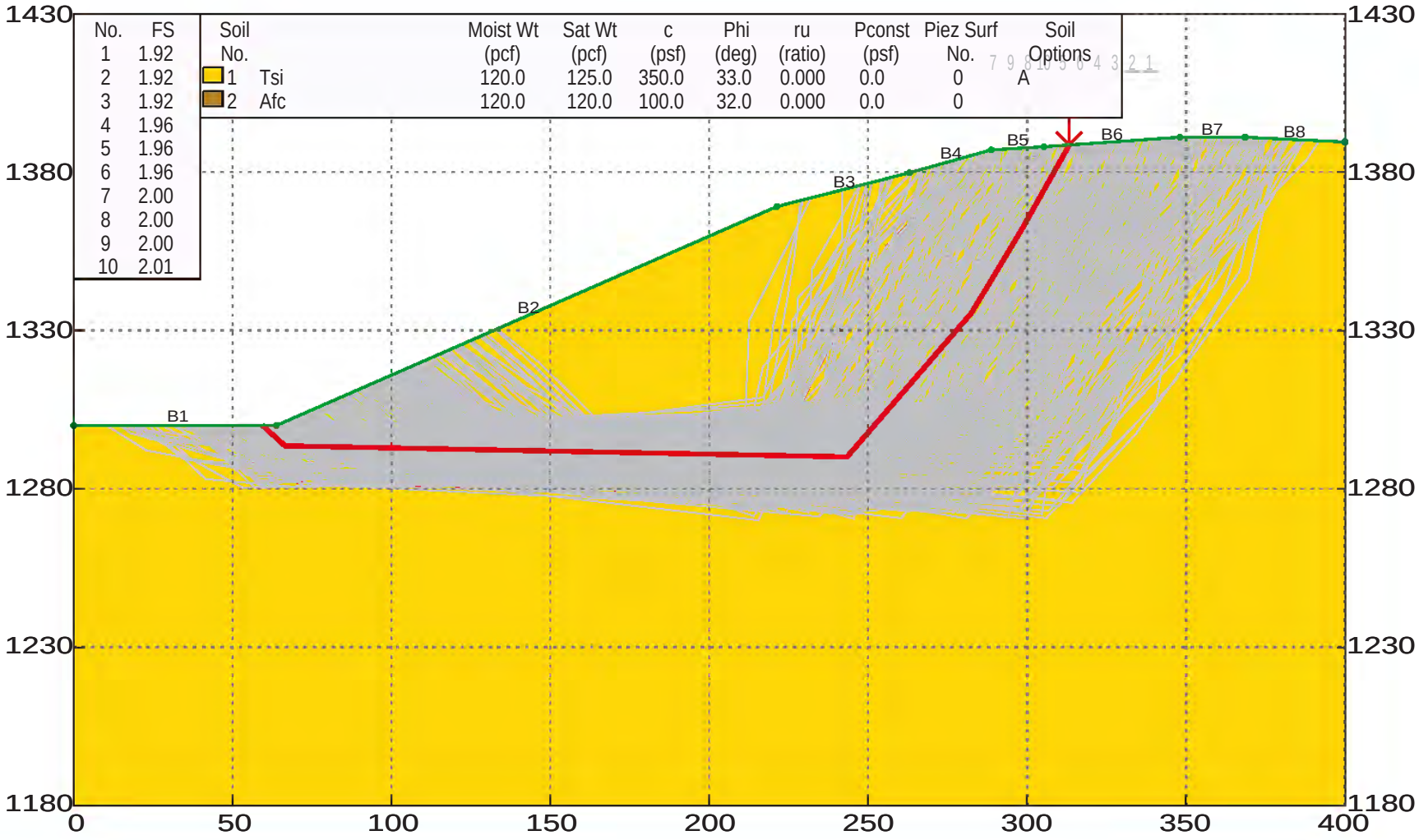
Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section C-C' - Block (Static)

LGC Geotechnical / BPP

\Section C - Static - Block (No Keyway).gsd



GEOSTASE FS = 1.92

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Static - Block (No Keyway).gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Static - Block (No Keyway).OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section C-C' - Block (Static)

BOUNDARY DATA

8 Surface Boundaries

8 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1300.000	63.800	1300.000	1
2	63.800	1300.000	221.300	1369.100	1
3	221.300	1369.100	263.000	1379.800	1
4	263.000	1379.800	288.700	1387.000	1
5	288.700	1387.000	305.300	1388.000	1
6	305.300	1388.000	348.000	1391.000	1
7	348.000	1391.000	368.600	1391.000	1
8	368.600	1391.000	400.000	1389.500	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Pressure Constant (psf)	Water Surface Option No.
1 Tsi	120.0	125.0	350.00	33.00	0.000	0.0	0 0
2 Afc	120.0	120.0	100.00	32.00	0.000	0.0	0 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	-5.0	350.00	33.00
2	0.0	100.00	18.00
3	90.0	350.00	33.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load Stress No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Deflection (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000

0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of
Non-Circular Zone Search = 30.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	50.00	1290.00	170.00	1290.00	20.00
2	210.00	1290.00	320.00	1290.00	40.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 41

Number of Trial Surfaces With Valid FS = 959

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted =   4.1 %

Statistical Data On All Valid FS Values:
   FS Max =   6.826   FS Min =   1.916   FS Ave =   3.308
   Standard Deviation =   0.760   Coefficient of Variation =   22.98 %

Critical Surface is Sequence Number   174 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

Factor Of Safety For The Critical or Specified Surface =   1.916

Table 1 - Geometry Data on the   57 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.37	1.99	61.62	1298.01	1300.00	-42.28	0.00	5.90
2	2.72	5.80	65.16	1294.79	1300.60	-42.28	23.69	3.67
3	4.99	8.78	69.01	1293.51	1302.29	-1.13	23.69	4.99
4	4.99	11.07	74.01	1293.41	1304.48	-1.13	23.69	4.99
5	4.99	13.36	79.00	1293.31	1306.67	-1.13	23.69	4.99
6	4.99	15.65	83.99	1293.21	1308.86	-1.13	23.69	4.99

7	4.99	17.93	88.98	1293.11	1311.05	-1.13	23.69
4.99							
8	4.99	20.22	93.98	1293.02	1313.24	-1.13	23.69
4.99							
9	4.99	22.51	98.97	1292.92	1315.43	-1.13	23.69
4.99							
10	4.99	24.80	103.96	1292.82	1317.62	-1.13	23.69
4.99							
11	4.99	27.09	108.96	1292.72	1319.81	-1.13	23.69
4.99							
12	4.99	29.38	113.95	1292.62	1322.00	-1.13	23.69
4.99							
13	4.99	31.67	118.94	1292.52	1324.19	-1.13	23.69
4.99							
14	4.99	33.96	123.94	1292.42	1326.38	-1.13	23.69
4.99							
15	4.99	36.25	128.93	1292.33	1328.57	-1.13	23.69
4.99							
16	4.99	38.54	133.92	1292.23	1330.76	-1.13	23.69
4.99							
17	4.99	40.83	138.92	1292.13	1332.96	-1.13	23.69
4.99							
18	4.99	43.12	143.91	1292.03	1335.15	-1.13	23.69
4.99							
19	4.99	45.41	148.90	1291.93	1337.34	-1.13	23.69
4.99							
20	4.99	47.69	153.89	1291.83	1339.53	-1.13	23.69
4.99							
21	4.99	49.98	158.89	1291.73	1341.72	-1.13	23.69
4.99							
22	4.99	52.27	163.88	1291.64	1343.91	-1.13	23.69
4.99							
23	4.99	54.56	168.87	1291.54	1346.10	-1.13	23.69
4.99							
24	4.99	56.85	173.87	1291.44	1348.29	-1.13	23.69
4.99							
25	4.99	59.14	178.86	1291.34	1350.48	-1.13	23.69
4.99							
26	4.99	61.43	183.85	1291.24	1352.67	-1.13	23.69
4.99							
27	4.99	63.72	188.85	1291.14	1354.86	-1.13	23.69
4.99							
28	4.99	66.01	193.84	1291.04	1357.05	-1.13	23.69
4.99							
29	4.99	68.30	198.83	1290.95	1359.24	-1.13	23.69
4.99							
30	4.99	70.59	203.82	1290.85	1361.43	-1.13	23.69
4.99							
31	4.99	72.88	208.82	1290.75	1363.62	-1.13	23.69
4.99							

32	4.99	75.16	213.81	1290.65	1365.81	-1.13	23.69
4.99							
33	4.99	77.45	218.80	1290.55	1368.00	-1.13	23.69
4.99							
34	3.40	79.07	223.00	1290.47	1369.54	-1.13	14.39
3.40							
35	4.66	80.18	227.03	1290.39	1370.57	-1.13	14.39
4.66							
36	4.66	81.47	231.69	1290.30	1371.77	-1.13	14.39
4.66							
37	4.66	82.76	236.35	1290.20	1372.96	-1.13	14.39
4.66							
38	4.66	84.05	241.02	1290.11	1374.16	-1.13	14.39
4.66							
39	4.90	82.48	245.80	1292.91	1375.39	49.21	14.39
7.50							
40	4.90	78.06	250.70	1298.58	1376.64	49.21	14.39
7.50							
41	4.90	73.64	255.60	1304.26	1377.90	49.21	14.39
7.50							
42	4.90	69.22	260.50	1309.94	1379.16	49.21	14.39
7.50							
43	0.05	66.98	262.97	1312.81	1379.79	49.32	14.39
0.08							
44	4.48	64.98	265.24	1315.44	1380.43	49.32	15.65
6.87							
45	4.47	61.03	269.71	1320.65	1381.68	49.32	15.65
6.87							
46	4.47	57.08	274.19	1325.86	1382.93	49.32	15.65
6.87							
47	4.48	53.12	278.66	1331.07	1384.19	49.32	15.65
6.87							
48	1.60	50.44	281.70	1334.60	1385.04	49.32	15.65
2.45							
49	3.10	47.58	284.05	1338.12	1385.70	59.07	15.65
6.03							
50	3.10	43.27	287.15	1343.29	1386.57	59.07	15.65
6.03							
51	4.61	37.41	291.00	1349.73	1387.14	59.07	3.45
8.97							
52	4.61	30.00	295.61	1357.42	1387.42	59.07	3.45
8.97							
53	3.69	23.12	299.76	1364.54	1387.67	60.60	3.45
7.52							
54	3.69	16.80	303.45	1371.09	1387.89	60.60	3.45
7.52							
55	3.67	10.50	307.14	1377.63	1388.13	60.60	4.02
7.48							
56	3.67	4.24	310.81	1384.14	1388.39	60.60	4.02
7.48							

57 0.63 0.56 312.96 1387.98 1388.54 61.42 4.02
1.32

Table 2 - Force Data On The 57 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1041.3	0.0	0.0	0.0	0.0	0.0
2	1891.3	0.0	0.0	0.0	0.0	0.0
3	5259.4	0.0	0.0	0.0	0.0	0.0
4	6631.0	0.0	0.0	0.0	0.0	0.0
5	8002.6	0.0	0.0	0.0	0.0	0.0
6	9374.2	0.0	0.0	0.0	0.0	0.0
7	10745.8	0.0	0.0	0.0	0.0	0.0
8	12117.4	0.0	0.0	0.0	0.0	0.0
9	13489.0	0.0	0.0	0.0	0.0	0.0
10	14860.6	0.0	0.0	0.0	0.0	0.0
11	16232.3	0.0	0.0	0.0	0.0	0.0
12	17603.9	0.0	0.0	0.0	0.0	0.0
13	18975.5	0.0	0.0	0.0	0.0	0.0
14	20347.1	0.0	0.0	0.0	0.0	0.0
15	21718.7	0.0	0.0	0.0	0.0	0.0
16	23090.3	0.0	0.0	0.0	0.0	0.0
17	24461.9	0.0	0.0	0.0	0.0	0.0
18	25833.5	0.0	0.0	0.0	0.0	0.0
19	27205.1	0.0	0.0	0.0	0.0	0.0
20	28576.7	0.0	0.0	0.0	0.0	0.0
21	29948.3	0.0	0.0	0.0	0.0	0.0
22	31319.9	0.0	0.0	0.0	0.0	0.0
23	32691.5	0.0	0.0	0.0	0.0	0.0
24	34063.2	0.0	0.0	0.0	0.0	0.0
25	35434.8	0.0	0.0	0.0	0.0	0.0
26	36806.4	0.0	0.0	0.0	0.0	0.0
27	38178.0	0.0	0.0	0.0	0.0	0.0
28	39549.6	0.0	0.0	0.0	0.0	0.0
29	40921.2	0.0	0.0	0.0	0.0	0.0
30	42292.8	0.0	0.0	0.0	0.0	0.0
31	43664.4	0.0	0.0	0.0	0.0	0.0
32	45036.0	0.0	0.0	0.0	0.0	0.0
33	46407.6	0.0	0.0	0.0	0.0	0.0
34	32259.9	0.0	0.0	0.0	0.0	0.0
35	44856.7	0.0	0.0	0.0	0.0	0.0
36	45577.4	0.0	0.0	0.0	0.0	0.0
37	46298.1	0.0	0.0	0.0	0.0	0.0
38	47018.8	0.0	0.0	0.0	0.0	0.0

39	48496.0	0.0	0.0	0.0	0.0	0.0
40	45896.6	0.0	0.0	0.0	0.0	0.0
41	43297.2	0.0	0.0	0.0	0.0	0.0
42	40697.8	0.0	0.0	0.0	0.0	0.0
43	428.7	0.0	0.0	0.0	0.0	0.0
44	34895.5	0.0	0.0	0.0	0.0	0.0
45	32772.4	0.0	0.0	0.0	0.0	0.0
46	30649.4	0.0	0.0	0.0	0.0	0.0
47	28526.4	0.0	0.0	0.0	0.0	0.0
48	9683.7	0.0	0.0	0.0	0.0	0.0
49	17699.5	0.0	0.0	0.0	0.0	0.0
50	16097.5	0.0	0.0	0.0	0.0	0.0
51	20690.3	0.0	0.0	0.0	0.0	0.0
52	16589.3	0.0	0.0	0.0	0.0	0.0
53	10243.0	0.0	0.0	0.0	0.0	0.0
54	7439.6	0.0	0.0	0.0	0.0	0.0
55	4627.3	0.0	0.0	0.0	0.0	0.0
56	1869.3	0.0	0.0	0.0	0.0	0.0
57	42.1	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1430423.91(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1430423.91(lbs)

TOTAL AREA OF SLIDING MASS = 11920.20(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 57 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	350.00	33.00	A
2	1	350.00	33.00	A
3	1	100.00	18.00	A
4	1	100.00	18.00	A
5	1	100.00	18.00	A
6	1	100.00	18.00	A
7	1	100.00	18.00	A
8	1	100.00	18.00	A
9	1	100.00	18.00	A
10	1	100.00	18.00	A
11	1	100.00	18.00	A
12	1	100.00	18.00	A
13	1	100.00	18.00	A
14	1	100.00	18.00	A
15	1	100.00	18.00	A
16	1	100.00	18.00	A
17	1	100.00	18.00	A
18	1	100.00	18.00	A
19	1	100.00	18.00	A

20	1	100.00	18.00	A
21	1	100.00	18.00	A
22	1	100.00	18.00	A
23	1	100.00	18.00	A
24	1	100.00	18.00	A
25	1	100.00	18.00	A
26	1	100.00	18.00	A
27	1	100.00	18.00	A
28	1	100.00	18.00	A
29	1	100.00	18.00	A
30	1	100.00	18.00	A
31	1	100.00	18.00	A
32	1	100.00	18.00	A
33	1	100.00	18.00	A
34	1	100.00	18.00	A
35	1	100.00	18.00	A
36	1	100.00	18.00	A
37	1	100.00	18.00	A
38	1	100.00	18.00	A
39	1	350.00	33.00	A
40	1	350.00	33.00	A
41	1	350.00	33.00	A
42	1	350.00	33.00	A
43	1	350.00	33.00	A
44	1	350.00	33.00	A
45	1	350.00	33.00	A
46	1	350.00	33.00	A
47	1	350.00	33.00	A
48	1	350.00	33.00	A
49	1	350.00	33.00	A
50	1	350.00	33.00	A
51	1	350.00	33.00	A
52	1	350.00	33.00	A
53	1	350.00	33.00	A
54	1	350.00	33.00	A
55	1	350.00	33.00	A
56	1	350.00	33.00	A
57	1	350.00	33.00	A

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 57 Slices

Slice	Alpha	X-Coord.	Base	Effective	Available

Slice No.	Base Angle (deg)	Slice Cntr (ft)	Base Leng. (ft)	Normal Stress (psf)	Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-42.28	61.62	5.90	626.71	756.99	397.92
1	-42.28	61.62	5.90	626.71	756.99	397.92
2	-42.28	65.16	3.67	1313.55	1203.03	632.38
2	-42.28	65.16	3.67	1313.55	1203.03	632.38
3	-1.13	69.01	4.99	1058.29	443.86	233.32
3	-1.13	69.01	4.99	1058.29	443.86	233.32
4	-1.13	74.01	4.99	1334.00	533.44	280.41
4	-1.13	74.01	4.99	1334.00	533.44	280.41
5	-1.13	79.00	4.99	1609.70	623.02	327.50
5	-1.13	79.00	4.99	1609.70	623.02	327.50
6	-1.13	83.99	4.99	1885.40	712.60	374.59
6	-1.13	83.99	4.99	1885.40	712.60	374.59
7	-1.13	88.98	4.99	2161.11	802.19	421.68
7	-1.13	88.98	4.99	2161.11	802.19	421.68
8	-1.13	93.98	4.99	2436.81	891.77	468.76
8	-1.13	93.98	4.99	2436.81	891.77	468.76
9	-1.13	98.97	4.99	2712.51	981.35	515.85
9	-1.13	98.97	4.99	2712.51	981.35	515.85
10	-1.13	103.96	4.99	2988.21	1070.93	562.94
10	-1.13	103.96	4.99	2988.21	1070.93	562.94
11	-1.13	108.96	4.99	3263.92	1160.51	610.03
11	-1.13	108.96	4.99	3263.92	1160.51	610.03

12	-1.13	113.95	4.99	3539.62	1250.09
657.12					
12	-1.13	113.95	4.99	3539.62	1250.09
657.12					
13	-1.13	118.94	4.99	3815.32	1339.67
704.21					
13	-1.13	118.94	4.99	3815.32	1339.67
704.21					
14	-1.13	123.94	4.99	4091.03	1429.26
751.30					
14	-1.13	123.94	4.99	4091.03	1429.26
751.30					
15	-1.13	128.93	4.99	4366.73	1518.84
798.39					
15	-1.13	128.93	4.99	4366.73	1518.84
798.39					
16	-1.13	133.92	4.99	4642.43	1608.42
845.48					
16	-1.13	133.92	4.99	4642.43	1608.42
845.48					
17	-1.13	138.92	4.99	4918.14	1698.00
892.57					
17	-1.13	138.92	4.99	4918.14	1698.00
892.57					
18	-1.13	143.91	4.99	5193.84	1787.58
939.66					
18	-1.13	143.91	4.99	5193.84	1787.58
939.66					
19	-1.13	148.90	4.99	5469.54	1877.16
986.75					
19	-1.13	148.90	4.99	5469.54	1877.16
986.75					
20	-1.13	153.89	4.99	5745.24	1966.74
1033.83					
20	-1.13	153.89	4.99	5745.24	1966.74
1033.83					
21	-1.13	158.89	4.99	6020.95	2056.32
1080.92					
21	-1.13	158.89	4.99	6020.95	2056.32
1080.92					
22	-1.13	163.88	4.99	6296.65	2145.91
1128.01					
22	-1.13	163.88	4.99	6296.65	2145.91
1128.01					
23	-1.13	168.87	4.99	6572.35	2235.49
1175.10					
23	-1.13	168.87	4.99	6572.35	2235.49
1175.10					
24	-1.13	173.87	4.99	6848.06	2325.07
1222.19					

24	-1.13	173.87	4.99	6848.06	2325.07
1222.19					
25	-1.13	178.86	4.99	7123.76	2414.65
1269.28					
25	-1.13	178.86	4.99	7123.76	2414.65
1269.28					
26	-1.13	183.85	4.99	7399.46	2504.23
1316.37					
26	-1.13	183.85	4.99	7399.46	2504.23
1316.37					
27	-1.13	188.85	4.99	7675.17	2593.81
1363.46					
27	-1.13	188.85	4.99	7675.17	2593.81
1363.46					
28	-1.13	193.84	4.99	7950.87	2683.39
1410.55					
28	-1.13	193.84	4.99	7950.87	2683.39
1410.55					
29	-1.13	198.83	4.99	8226.57	2772.97
1457.64					
29	-1.13	198.83	4.99	8226.57	2772.97
1457.64					
30	-1.13	203.82	4.99	8502.27	2862.56
1504.73					
30	-1.13	203.82	4.99	8502.27	2862.56
1504.73					
31	-1.13	208.82	4.99	8777.98	2952.14
1551.81					
31	-1.13	208.82	4.99	8777.98	2952.14
1551.81					
32	-1.13	213.81	4.99	9053.68	3041.72
1598.90					
32	-1.13	213.81	4.99	9053.68	3041.72
1598.90					
33	-1.13	218.80	4.99	9329.38	3131.30
1645.99					
33	-1.13	218.80	4.99	9329.38	3131.30
1645.99					
34	-1.13	223.00	3.40	9523.81	3194.47
1679.20					
34	-1.13	223.00	3.40	9523.81	3194.47
1679.20					
35	-1.13	227.03	4.66	9657.97	3238.07
1702.12					
35	-1.13	227.03	4.66	9657.97	3238.07
1702.12					
36	-1.13	231.69	4.66	9813.13	3288.48
1728.62					
36	-1.13	231.69	4.66	9813.13	3288.48
1728.62					

37	-1.13	236.35	4.66	9968.29	3338.89
1755.12					
37	-1.13	236.35	4.66	9968.29	3338.89
1755.12					
38	-1.13	241.02	4.66	10123.45	3389.31
1781.62					
38	-1.13	241.02	4.66	10123.45	3389.31
1781.62					
39	49.21	245.80	7.50	6786.57	4757.25
2500.69					
39	49.21	245.80	7.50	6786.57	4757.25
2500.69					
40	49.21	250.70	7.50	6414.19	4515.42
2373.57					
40	49.21	250.70	7.50	6414.19	4515.42
2373.57					
41	49.21	255.60	7.50	6041.81	4273.60
2246.45					
41	49.21	255.60	7.50	6041.81	4273.60
2246.45					
42	49.21	260.50	7.50	5669.44	4031.78
2119.34					
42	49.21	260.50	7.50	5669.44	4031.78
2119.34					
43	49.32	262.97	0.08	5473.92	3904.81
2052.59					
43	49.32	262.97	0.08	5473.92	3904.81
2052.59					
44	49.32	265.24	6.87	5305.59	3795.49
1995.13					
44	49.32	265.24	6.87	5305.59	3795.49
1995.13					
45	49.32	269.71	6.87	4973.00	3579.51
1881.60					
45	49.32	269.71	6.87	4973.00	3579.51
1881.60					
46	49.32	274.19	6.87	4640.41	3363.52
1768.06					
46	49.32	274.19	6.87	4640.41	3363.52
1768.06					
47	49.32	278.66	6.87	4307.82	3147.53
1654.53					
47	49.32	278.66	6.87	4307.82	3147.53
1654.53					
48	49.32	281.70	2.45	4082.07	3000.93
1577.46					
48	49.32	281.70	2.45	4082.07	3000.93
1577.46					
49	59.07	284.05	6.03	3337.89	2517.65
1323.42					

49	59.07	284.05	6.03	3337.89	2517.65	1323.42
50	59.07	287.15	6.03	3017.28	2309.44	1213.98
50	59.07	287.15	6.03	3017.28	2309.44	1213.98
51	59.07	291.00	8.97	2580.92	2026.07	1065.02
51	59.07	291.00	8.97	2580.92	2026.07	1065.02
52	59.07	295.61	8.97	2028.81	1667.53	876.55
52	59.07	295.61	8.97	2028.81	1667.53	876.55
53	60.60	299.76	7.52	1468.95	1303.95	685.43
53	60.60	299.76	7.52	1468.95	1303.95	685.43
54	60.60	303.45	7.52	1008.77	1005.11	528.34
54	60.60	303.45	7.52	1008.77	1005.11	528.34
55	60.60	307.14	7.48	551.14	707.92	372.12
55	60.60	307.14	7.48	551.14	707.92	372.12
56	60.60	310.81	7.48	96.05	412.38	216.77
56	60.60	310.81	7.48	96.05	412.38	216.77
57	61.42	312.96	1.32	39.91	25.92	13.63
57	61.42	312.96	1.32	39.91	25.92	13.63

Table 4 - Base Force Data on the 57 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-42.28	61.62	5.90	3700.69	4469.97	2349.68
1	-42.28	61.62	5.90	3700.69	4469.97	2349.68

2	-42.28	65.16	3.67	4821.87	4416.16
2321.39					
2	-42.28	65.16	3.67	4821.87	4416.16
2321.39					
3	-1.13	69.01	4.99	5285.12	2216.64
1165.20					
3	-1.13	69.01	4.99	5285.12	2216.64
1165.20					
4	-1.13	74.01	4.99	6661.98	2664.01
1400.36					
4	-1.13	74.01	4.99	6661.98	2664.01
1400.36					
5	-1.13	79.00	4.99	8038.85	3111.38
1635.52					
5	-1.13	79.00	4.99	8038.85	3111.38
1635.52					
6	-1.13	83.99	4.99	9415.71	3558.75
1870.68					
6	-1.13	83.99	4.99	9415.71	3558.75
1870.68					
7	-1.13	88.98	4.99	10792.57	4006.12
2105.85					
7	-1.13	88.98	4.99	10792.57	4006.12
2105.85					
8	-1.13	93.98	4.99	12169.43	4453.49
2341.01					
8	-1.13	93.98	4.99	12169.43	4453.49
2341.01					
9	-1.13	98.97	4.99	13546.29	4900.86
2576.17					
9	-1.13	98.97	4.99	13546.29	4900.86
2576.17					
10	-1.13	103.96	4.99	14923.15	5348.23
2811.34					
10	-1.13	103.96	4.99	14923.15	5348.23
2811.34					
11	-1.13	108.96	4.99	16300.01	5795.60
3046.50					
11	-1.13	108.96	4.99	16300.01	5795.60
3046.50					
12	-1.13	113.95	4.99	17676.87	6242.96
3281.66					
12	-1.13	113.95	4.99	17676.87	6242.96
3281.66					
13	-1.13	118.94	4.99	19053.74	6690.33
3516.83					
13	-1.13	118.94	4.99	19053.74	6690.33
3516.83					
14	-1.13	123.94	4.99	20430.60	7137.70
3751.99					

14	-1.13	123.94	4.99	20430.60	7137.70	3751.99
15	-1.13	128.93	4.99	21807.46	7585.07	3987.15
15	-1.13	128.93	4.99	21807.46	7585.07	3987.15
16	-1.13	133.92	4.99	23184.32	8032.44	4222.32
16	-1.13	133.92	4.99	23184.32	8032.44	4222.32
17	-1.13	138.92	4.99	24561.18	8479.81	4457.48
17	-1.13	138.92	4.99	24561.18	8479.81	4457.48
18	-1.13	143.91	4.99	25938.04	8927.18	4692.64
18	-1.13	143.91	4.99	25938.04	8927.18	4692.64
19	-1.13	148.90	4.99	27314.90	9374.55	4927.81
19	-1.13	148.90	4.99	27314.90	9374.55	4927.81
20	-1.13	153.89	4.99	28691.76	9821.92	5162.97
20	-1.13	153.89	4.99	28691.76	9821.92	5162.97
21	-1.13	158.89	4.99	30068.63	10269.29	5398.13
21	-1.13	158.89	4.99	30068.63	10269.29	5398.13
22	-1.13	163.88	4.99	31445.49	10716.66	5633.30
22	-1.13	163.88	4.99	31445.49	10716.66	5633.30
23	-1.13	168.87	4.99	32822.35	11164.03	5868.46
23	-1.13	168.87	4.99	32822.35	11164.03	5868.46
24	-1.13	173.87	4.99	34199.21	11611.40	6103.62
24	-1.13	173.87	4.99	34199.21	11611.40	6103.62
25	-1.13	178.86	4.99	35576.07	12058.77	6338.79
25	-1.13	178.86	4.99	35576.07	12058.77	6338.79
26	-1.13	183.85	4.99	36952.93	12506.14	6573.95
26	-1.13	183.85	4.99	36952.93	12506.14	6573.95

27	-1.13	188.85	4.99	38329.79	12953.50
6809.11					
27	-1.13	188.85	4.99	38329.79	12953.50
6809.11					
28	-1.13	193.84	4.99	39706.65	13400.87
7044.28					
28	-1.13	193.84	4.99	39706.65	13400.87
7044.28					
29	-1.13	198.83	4.99	41083.52	13848.24
7279.44					
29	-1.13	198.83	4.99	41083.52	13848.24
7279.44					
30	-1.13	203.82	4.99	42460.38	14295.61
7514.60					
30	-1.13	203.82	4.99	42460.38	14295.61
7514.60					
31	-1.13	208.82	4.99	43837.24	14742.98
7749.77					
31	-1.13	208.82	4.99	43837.24	14742.98
7749.77					
32	-1.13	213.81	4.99	45214.10	15190.35
7984.93					
32	-1.13	213.81	4.99	45214.10	15190.35
7984.93					
33	-1.13	218.80	4.99	46590.96	15637.72
8220.09					
33	-1.13	218.80	4.99	46590.96	15637.72
8220.09					
34	-1.13	223.00	3.40	32387.28	10863.33
5710.40					
34	-1.13	223.00	3.40	32387.28	10863.33
5710.40					
35	-1.13	227.03	4.66	45033.71	15098.62
7936.71					
35	-1.13	227.03	4.66	45033.71	15098.62
7936.71					
36	-1.13	231.69	4.66	45757.19	15333.70
8060.28					
36	-1.13	231.69	4.66	45757.19	15333.70
8060.28					
37	-1.13	236.35	4.66	46480.67	15568.77
8183.85					
37	-1.13	236.35	4.66	46480.67	15568.77
8183.85					
38	-1.13	241.02	4.66	47204.15	15803.84
8307.42					
38	-1.13	241.02	4.66	47204.15	15803.84
8307.42					
39	49.21	245.80	7.50	50899.24	35679.35
18755.14					

39	49.21	245.80	7.50	50899.24	35679.35	18755.14
40	49.21	250.70	7.50	48106.42	33865.68	17801.77
40	49.21	250.70	7.50	48106.42	33865.68	17801.77
41	49.21	255.60	7.50	45313.61	32052.00	16848.39
41	49.21	255.60	7.50	45313.61	32052.00	16848.39
42	49.21	260.50	7.50	42520.79	30238.33	15895.02
42	49.21	260.50	7.50	42520.79	30238.33	15895.02
43	49.32	262.97	0.08	447.92	319.53	167.96
43	49.32	262.97	0.08	447.92	319.53	167.96
44	49.32	265.24	6.87	36427.48	26059.34	13698.30
44	49.32	265.24	6.87	36427.48	26059.34	13698.30
45	49.32	269.71	6.87	34143.97	24576.40	12918.78
45	49.32	269.71	6.87	34143.97	24576.40	12918.78
46	49.32	274.19	6.87	31860.45	23093.47	12139.27
46	49.32	274.19	6.87	31860.45	23093.47	12139.27
47	49.32	278.66	6.87	29576.93	21610.54	11359.75
47	49.32	278.66	6.87	29576.93	21610.54	11359.75
48	49.32	281.70	2.45	10020.31	7366.41	3872.21
48	49.32	281.70	2.45	10020.31	7366.41	3872.21
49	59.07	284.05	6.03	20134.80	15186.96	7983.15
49	59.07	284.05	6.03	20134.80	15186.96	7983.15
50	59.07	287.15	6.03	18200.79	13931.00	7322.94
50	59.07	287.15	6.03	18200.79	13931.00	7322.94
51	59.07	291.00	8.97	23145.15	18169.37	9550.87
51	59.07	291.00	8.97	23145.15	18169.37	9550.87

52	59.07	295.61	8.97	18193.98	14954.04
7860.71					
52	59.07	295.61	8.97	18193.98	14954.04
7860.71					
53	60.60	299.76	7.52	11046.01	9805.25
5154.21					
53	60.60	299.76	7.52	11046.01	9805.25
5154.21					
54	60.60	303.45	7.52	7585.66	7558.07
3972.96					
54	60.60	303.45	7.52	7585.66	7558.07
3972.96					
55	60.60	307.14	7.48	4122.72	5295.44
2783.59					
55	60.60	307.14	7.48	4122.72	5295.44
2783.59					
56	60.60	310.81	7.48	718.50	3084.71
1621.50					
56	60.60	310.81	7.48	718.50	3084.71
1621.50					
57	61.42	312.96	1.32	52.59	34.15
17.95					
57	61.42	312.96	1.32	52.59	34.15
17.95					

Sum of the Resisting Forces = 553835.09 (lbs)

Average Available Shear Strength = 1799.57(psf)

Sum of the Driving Forces = 312465.10 (lbs)

Average Mobilized Shear Stress = 1015.29(psf)

Total length of the failure surface = 307.76(ft)

Factor of Safety Balance Check: FS = 1.77247

Janbu's Correction Factor (fo) = 1.0808

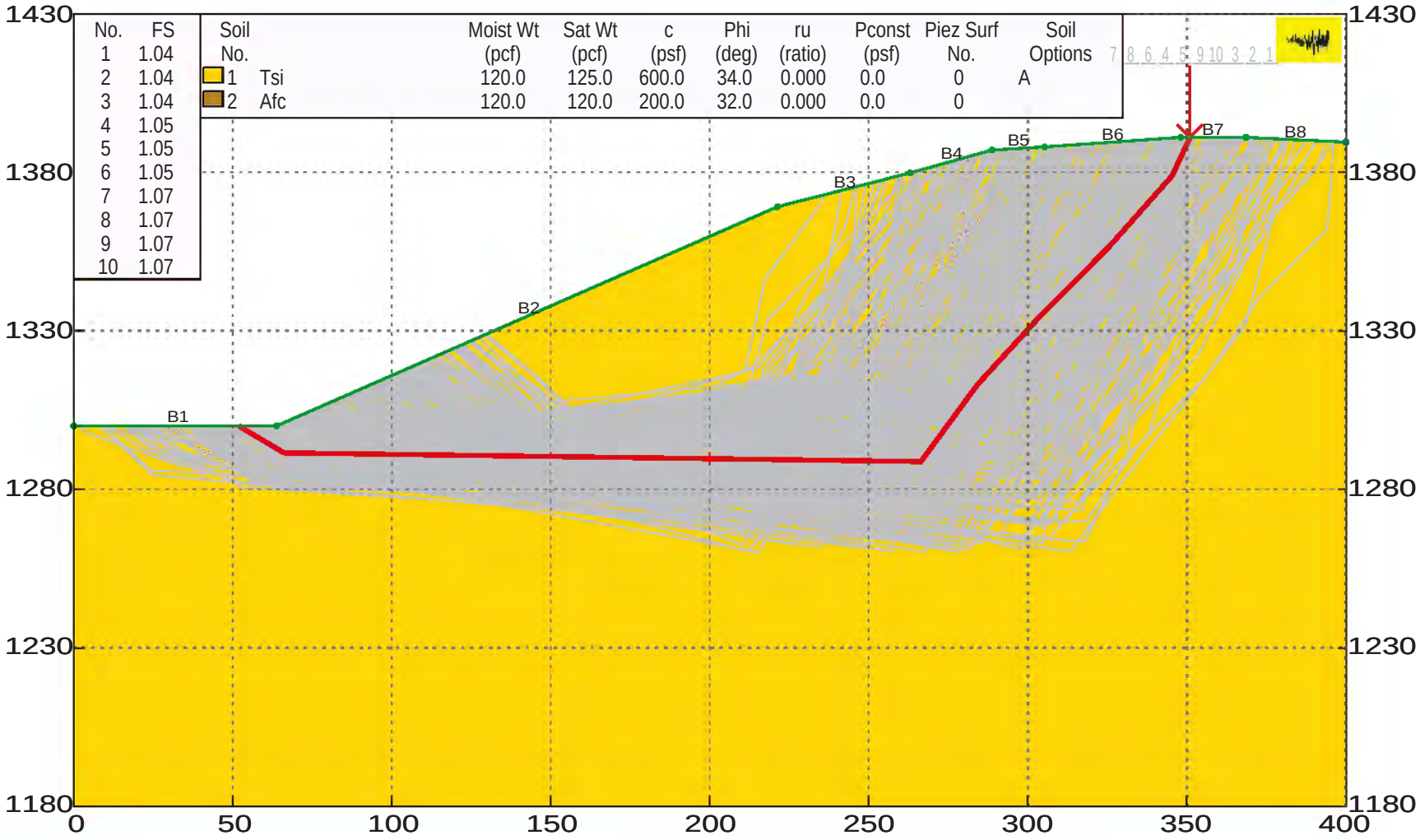
Janub's FS Corrected = 1.91564

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section C-C' - Block (Seismic (117A))

LGC Geotechnical / BPP

\Section C - Seismic (117A) - Block (No Keyway).gsd



GEOSTASE FS = 1.04

Simplified Janbu (Corrected) Method

kh = 0.26000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

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** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Seismic (117A) - Block (No Keyway).gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Seismic (117A) - Block (No Keyway).OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section C-C' - Block (Seismic (117A))

BOUNDARY DATA

8 Surface Boundaries

8 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1300.000	63.800	1300.000	1
2	63.800	1300.000	221.300	1369.100	1
3	221.300	1369.100	263.000	1379.800	1
4	263.000	1379.800	288.700	1387.000	1
5	288.700	1387.000	305.300	1388.000	1
6	305.300	1388.000	348.000	1391.000	1
7	348.000	1391.000	368.600	1391.000	1
8	368.600	1391.000	400.000	1389.500	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Pressure Constant (psf)	Water Surface Option No.
1 Tsi	120.0	125.0	600.00	34.00	0.000	0.0	0 0
2 Afc	120.0	120.0	200.00	32.00	0.000	0.0	0 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	-5.0	600.00	34.00
2	0.0	200.00	18.00
3	90.0	600.00	34.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000	0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of

Non-Circular Zone Search = 30.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	50.00	1290.00	170.00	1290.00	20.00
2	210.00	1290.00	320.00	1290.00	60.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 8

Number of Trial Surfaces With Valid FS = 992

Percentage of Trial Surfaces With Non-Converged and/or Non-Valid FS Solutions of the Total Attempted = 0.8 %

Statistical Data On All Valid FS Values:
FS Max = 3.488 FS Min = 1.041 FS Ave = 1.845
Standard Deviation = 0.440 Coefficient of Variation = 23.86 %

Critical Surface is Sequence Number 78 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

Factor Of Safety For The Critical or Specified Surface = 1.041

Table 1 - Geometry Data on the 63 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	5.94	1.78	54.89	1298.22	1300.00	-30.95	0.00	

6.92
2 5.94 5.34 60.83 1294.66 1300.00 -30.95 0.00
6.92
3 2.28 8.30 64.94 1292.20 1300.50 -30.95 23.69
2.65
4 5.01 10.62 68.58 1291.48 1302.10 -0.79 23.69
5.01
5 5.01 12.88 73.59 1291.41 1304.29 -0.79 23.69
5.01
6 5.01 15.15 78.59 1291.34 1306.49 -0.79 23.69
5.01
7 5.01 17.42 83.60 1291.27 1308.69 -0.79 23.69
5.01
8 5.01 19.68 88.61 1291.20 1310.88 -0.79 23.69
5.01
9 5.01 21.95 93.62 1291.13 1313.08 -0.79 23.69
5.01
10 5.01 24.21 98.62 1291.07 1315.28 -0.79 23.69
5.01
11 5.01 26.48 103.63 1291.00 1317.47 -0.79 23.69
5.01
12 5.01 28.74 108.64 1290.93 1319.67 -0.79 23.69
5.01
13 5.01 31.01 113.65 1290.86 1321.87 -0.79 23.69
5.01
14 5.01 33.27 118.65 1290.79 1324.07 -0.79 23.69
5.01
15 5.01 35.54 123.66 1290.72 1326.26 -0.79 23.69
5.01
16 5.01 37.80 128.67 1290.65 1328.46 -0.79 23.69
5.01
17 5.01 40.07 133.67 1290.59 1330.66 -0.79 23.69
5.01
18 5.01 42.34 138.68 1290.52 1332.85 -0.79 23.69
5.01
19 5.01 44.60 143.69 1290.45 1335.05 -0.79 23.69
5.01
20 5.01 46.87 148.70 1290.38 1337.25 -0.79 23.69
5.01
21 5.01 49.13 153.70 1290.31 1339.44 -0.79 23.69
5.01
22 5.01 51.40 158.71 1290.24 1341.64 -0.79 23.69
5.01
23 5.01 53.66 163.72 1290.17 1343.84 -0.79 23.69
5.01
24 5.01 55.93 168.72 1290.10 1346.03 -0.79 23.69
5.01
25 5.01 58.19 173.73 1290.04 1348.23 -0.79 23.69
5.01
26 5.01 60.46 178.74 1289.97 1350.43 -0.79 23.69

5.01							
27	5.01	62.73	183.75	1289.90	1352.62	-0.79	23.69
5.01							
28	5.01	64.99	188.75	1289.83	1354.82	-0.79	23.69
5.01							
29	5.01	67.26	193.76	1289.76	1357.02	-0.79	23.69
5.01							
30	5.01	69.52	198.77	1289.69	1359.21	-0.79	23.69
5.01							
31	5.01	71.79	203.77	1289.62	1361.41	-0.79	23.69
5.01							
32	5.01	74.05	208.78	1289.56	1363.61	-0.79	23.69
5.01							
33	5.01	76.32	213.79	1289.49	1365.80	-0.79	23.69
5.01							
34	5.01	78.58	218.80	1289.42	1368.00	-0.79	23.69
5.01							
35	3.40	80.18	223.00	1289.36	1369.54	-0.79	14.39
3.40							
36	4.79	81.28	227.09	1289.30	1370.59	-0.79	14.39
4.79							
37	4.79	82.58	231.88	1289.24	1371.82	-0.79	14.39
4.79							
38	4.79	83.87	236.67	1289.17	1373.04	-0.79	14.39
4.79							
39	4.79	85.16	241.46	1289.11	1374.27	-0.79	14.39
4.79							
40	4.79	86.46	246.24	1289.04	1375.50	-0.79	14.39
4.79							
41	4.79	87.75	251.03	1288.98	1376.73	-0.79	14.39
4.79							
42	4.79	89.05	255.82	1288.91	1377.96	-0.79	14.39
4.79							
43	4.79	90.34	260.61	1288.84	1379.19	-0.79	14.39
4.79							
44	3.36	91.48	264.68	1288.79	1380.27	-0.79	15.65
3.36							
45	4.85	89.35	268.79	1292.07	1381.42	53.78	15.65
8.20							
46	4.85	84.09	273.63	1298.69	1382.78	53.78	15.65
8.20							
47	4.85	78.83	278.48	1305.31	1384.14	53.78	15.65
8.20							
48	3.19	74.47	282.49	1310.79	1385.26	53.78	15.65
5.40							
49	4.61	70.86	286.39	1315.50	1386.35	47.63	15.65
6.84							
50	5.20	66.28	291.30	1320.88	1387.16	47.63	3.45
7.72							
51	5.20	60.89	296.50	1326.58	1387.47	47.63	3.45

7.72							
52	5.20	55.50	301.70	1332.28	1387.78	47.63	3.45
7.72							
53	1.00	52.33	304.80	1335.64	1387.97	45.14	3.45
1.41							
54	5.04	49.51	307.82	1338.67	1388.18	45.14	4.02
7.15							
55	5.04	44.80	312.86	1343.74	1388.53	45.14	4.02
7.15							
56	5.04	40.08	317.90	1348.80	1388.89	45.14	4.02
7.15							
57	5.04	35.37	322.94	1353.87	1389.24	45.14	4.02
7.15							
58	4.97	30.38	327.95	1359.21	1389.59	48.54	4.02
7.50							
59	4.97	25.11	332.91	1364.83	1389.94	48.54	4.02
7.50							
60	4.97	19.84	337.88	1370.45	1390.29	48.54	4.02
7.50							
61	4.97	14.56	342.84	1376.07	1390.64	48.54	4.02
7.50							
62	2.67	9.15	346.66	1381.76	1390.91	65.05	4.02
6.34							
63	2.96	3.19	349.48	1387.81	1391.00	65.05	0.00
7.03							

Table 2 - Force Data On The 63 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1268.9	0.0	0.0	329.9	0.0	0.0
2	3806.7	0.0	0.0	989.7	0.0	0.0
3	2268.7	0.0	0.0	589.9	0.0	0.0
4	6380.7	0.0	0.0	1659.0	0.0	0.0
5	7741.9	0.0	0.0	2012.9	0.0	0.0
6	9103.1	0.0	0.0	2366.8	0.0	0.0
7	10464.4	0.0	0.0	2720.7	0.0	0.0
8	11825.6	0.0	0.0	3074.7	0.0	0.0
9	13186.9	0.0	0.0	3428.6	0.0	0.0
10	14548.1	0.0	0.0	3782.5	0.0	0.0
11	15909.4	0.0	0.0	4136.4	0.0	0.0
12	17270.6	0.0	0.0	4490.4	0.0	0.0
13	18631.9	0.0	0.0	4844.3	0.0	0.0
14	19993.1	0.0	0.0	5198.2	0.0	0.0
15	21354.3	0.0	0.0	5552.1	0.0	0.0

16	22715.6	0.0	0.0	5906.1	0.0	0.0
17	24076.8	0.0	0.0	6260.0	0.0	0.0
18	25438.1	0.0	0.0	6613.9	0.0	0.0
19	26799.3	0.0	0.0	6967.8	0.0	0.0
20	28160.6	0.0	0.0	7321.7	0.0	0.0
21	29521.8	0.0	0.0	7675.7	0.0	0.0
22	30883.1	0.0	0.0	8029.6	0.0	0.0
23	32244.3	0.0	0.0	8383.5	0.0	0.0
24	33605.6	0.0	0.0	8737.4	0.0	0.0
25	34966.8	0.0	0.0	9091.4	0.0	0.0
26	36328.0	0.0	0.0	9445.3	0.0	0.0
27	37689.3	0.0	0.0	9799.2	0.0	0.0
28	39050.5	0.0	0.0	10153.1	0.0	0.0
29	40411.8	0.0	0.0	10507.1	0.0	0.0
30	41773.0	0.0	0.0	10861.0	0.0	0.0
31	43134.3	0.0	0.0	11214.9	0.0	0.0
32	44495.5	0.0	0.0	11568.8	0.0	0.0
33	45856.8	0.0	0.0	11922.8	0.0	0.0
34	47218.0	0.0	0.0	12276.7	0.0	0.0
35	32711.7	0.0	0.0	8505.0	0.0	0.0
36	46696.7	0.0	0.0	12141.1	0.0	0.0
37	47440.1	0.0	0.0	12334.4	0.0	0.0
38	48183.6	0.0	0.0	12527.7	0.0	0.0
39	48927.0	0.0	0.0	12721.0	0.0	0.0
40	49670.5	0.0	0.0	12914.3	0.0	0.0
41	50414.0	0.0	0.0	13107.6	0.0	0.0
42	51157.4	0.0	0.0	13300.9	0.0	0.0
43	51900.9	0.0	0.0	13494.2	0.0	0.0
44	36917.6	0.0	0.0	9598.6	0.0	0.0
45	51953.5	0.0	0.0	13507.9	0.0	0.0
46	48895.2	0.0	0.0	12712.7	0.0	0.0
47	45836.8	0.0	0.0	11917.6	0.0	0.0
48	28484.1	0.0	0.0	7405.9	0.0	0.0
49	39218.2	0.0	0.0	10196.7	0.0	0.0
50	41368.0	0.0	0.0	10755.7	0.0	0.0
51	38004.2	0.0	0.0	9881.1	0.0	0.0
52	34640.3	0.0	0.0	9006.5	0.0	0.0
53	6255.6	0.0	0.0	1626.5	0.0	0.0
54	29947.7	0.0	0.0	7786.4	0.0	0.0
55	27097.2	0.0	0.0	7045.3	0.0	0.0
56	24246.8	0.0	0.0	6304.2	0.0	0.0
57	21396.4	0.0	0.0	5563.1	0.0	0.0
58	18102.7	0.0	0.0	4706.7	0.0	0.0
59	14961.3	0.0	0.0	3889.9	0.0	0.0
60	11820.0	0.0	0.0	3073.2	0.0	0.0
61	8678.6	0.0	0.0	2256.4	0.0	0.0
62	2935.1	0.0	0.0	763.1	0.0	0.0
63	1133.5	0.0	0.0	294.7	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1797118.02(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1797118.02(lbs)

TOTAL AREA OF SLIDING MASS = 14975.98(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 63 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	600.00	34.00	A
2	1	600.00	34.00	A
3	1	600.00	34.00	A
4	1	200.00	18.00	A
5	1	200.00	18.00	A
6	1	200.00	18.00	A
7	1	200.00	18.00	A
8	1	200.00	18.00	A
9	1	200.00	18.00	A
10	1	200.00	18.00	A
11	1	200.00	18.00	A
12	1	200.00	18.00	A
13	1	200.00	18.00	A
14	1	200.00	18.00	A
15	1	200.00	18.00	A
16	1	200.00	18.00	A
17	1	200.00	18.00	A
18	1	200.00	18.00	A
19	1	200.00	18.00	A
20	1	200.00	18.00	A
21	1	200.00	18.00	A
22	1	200.00	18.00	A
23	1	200.00	18.00	A
24	1	200.00	18.00	A
25	1	200.00	18.00	A
26	1	200.00	18.00	A
27	1	200.00	18.00	A
28	1	200.00	18.00	A
29	1	200.00	18.00	A
30	1	200.00	18.00	A
31	1	200.00	18.00	A
32	1	200.00	18.00	A
33	1	200.00	18.00	A
34	1	200.00	18.00	A
35	1	200.00	18.00	A
36	1	200.00	18.00	A
37	1	200.00	18.00	A
38	1	200.00	18.00	A
39	1	200.00	18.00	A
40	1	200.00	18.00	A

41	1	200.00	18.00	A
42	1	200.00	18.00	A
43	1	200.00	18.00	A
44	1	200.00	18.00	A
45	1	600.00	34.00	A
46	1	600.00	34.00	A
47	1	600.00	34.00	A
48	1	600.00	34.00	A
49	1	600.00	34.00	A
50	1	600.00	34.00	A
51	1	600.00	34.00	A
52	1	600.00	34.00	A
53	1	600.00	34.00	A
54	1	600.00	34.00	A
55	1	600.00	34.00	A
56	1	600.00	34.00	A
57	1	600.00	34.00	A
58	1	600.00	34.00	A
59	1	600.00	34.00	A
60	1	600.00	34.00	A
61	1	600.00	34.00	A
62	1	600.00	34.00	A
63	1	600.00	34.00	A

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 63 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-30.95	54.89	6.92	1007.39	1279.49	1224.39
1	-30.95	54.89	6.92	1007.39	1279.49	1224.39
2	-30.95	60.83	6.92	1742.18	1775.11	1698.68
2	-30.95	60.83	6.92	1742.18	1775.11	1698.68
3	-30.95	64.94	2.65	2353.47	2187.44	

2093.24					
3	-30.95	64.94	2.65	2353.47	2187.44
2093.24					
4	-0.79	68.58	5.01	1283.05	616.89
590.32					
4	-0.79	68.58	5.01	1283.05	616.89
590.32					
5	-0.79	73.59	5.01	1556.16	705.63
675.24					
5	-0.79	73.59	5.01	1556.16	705.63
675.24					
6	-0.79	78.59	5.01	1829.28	794.37
760.16					
6	-0.79	78.59	5.01	1829.28	794.37
760.16					
7	-0.79	83.60	5.01	2102.39	883.11
845.08					
7	-0.79	83.60	5.01	2102.39	883.11
845.08					
8	-0.79	88.61	5.01	2375.51	971.85
930.00					
8	-0.79	88.61	5.01	2375.51	971.85
930.00					
9	-0.79	93.62	5.01	2648.63	1060.59
1014.92					
9	-0.79	93.62	5.01	2648.63	1060.59
1014.92					
10	-0.79	98.62	5.01	2921.74	1149.33
1099.84					
10	-0.79	98.62	5.01	2921.74	1149.33
1099.84					
11	-0.79	103.63	5.01	3194.86	1238.07
1184.76					
11	-0.79	103.63	5.01	3194.86	1238.07
1184.76					
12	-0.79	108.64	5.01	3467.98	1326.81
1269.68					
12	-0.79	108.64	5.01	3467.98	1326.81
1269.68					
13	-0.79	113.65	5.01	3741.09	1415.55
1354.60					
13	-0.79	113.65	5.01	3741.09	1415.55
1354.60					
14	-0.79	118.65	5.01	4014.21	1504.30
1439.52					
14	-0.79	118.65	5.01	4014.21	1504.30
1439.52					
15	-0.79	123.66	5.01	4287.32	1593.04
1524.44					
15	-0.79	123.66	5.01	4287.32	1593.04

1524.44					
16	-0.79	128.67	5.01	4560.44	1681.78
1609.36					
16	-0.79	128.67	5.01	4560.44	1681.78
1609.36					
17	-0.79	133.67	5.01	4833.56	1770.52
1694.28					
17	-0.79	133.67	5.01	4833.56	1770.52
1694.28					
18	-0.79	138.68	5.01	5106.67	1859.26
1779.20					
18	-0.79	138.68	5.01	5106.67	1859.26
1779.20					
19	-0.79	143.69	5.01	5379.79	1948.00
1864.12					
19	-0.79	143.69	5.01	5379.79	1948.00
1864.12					
20	-0.79	148.70	5.01	5652.90	2036.74
1949.04					
20	-0.79	148.70	5.01	5652.90	2036.74
1949.04					
21	-0.79	153.70	5.01	5926.02	2125.48
2033.96					
21	-0.79	153.70	5.01	5926.02	2125.48
2033.96					
22	-0.79	158.71	5.01	6199.14	2214.22
2118.88					
22	-0.79	158.71	5.01	6199.14	2214.22
2118.88					
23	-0.79	163.72	5.01	6472.25	2302.96
2203.79					
23	-0.79	163.72	5.01	6472.25	2302.96
2203.79					
24	-0.79	168.72	5.01	6745.37	2391.70
2288.71					
24	-0.79	168.72	5.01	6745.37	2391.70
2288.71					
25	-0.79	173.73	5.01	7018.48	2480.44
2373.63					
25	-0.79	173.73	5.01	7018.48	2480.44
2373.63					
26	-0.79	178.74	5.01	7291.60	2569.18
2458.55					
26	-0.79	178.74	5.01	7291.60	2569.18
2458.55					
27	-0.79	183.75	5.01	7564.72	2657.93
2543.47					
27	-0.79	183.75	5.01	7564.72	2657.93
2543.47					
28	-0.79	188.75	5.01	7837.83	2746.67

2628.39					
28	-0.79	188.75	5.01	7837.83	2746.67
2628.39					
29	-0.79	193.76	5.01	8110.95	2835.41
2713.31					
29	-0.79	193.76	5.01	8110.95	2835.41
2713.31					
30	-0.79	198.77	5.01	8384.07	2924.15
2798.23					
30	-0.79	198.77	5.01	8384.07	2924.15
2798.23					
31	-0.79	203.77	5.01	8657.18	3012.89
2883.15					
31	-0.79	203.77	5.01	8657.18	3012.89
2883.15					
32	-0.79	208.78	5.01	8930.30	3101.63
2968.07					
32	-0.79	208.78	5.01	8930.30	3101.63
2968.07					
33	-0.79	213.79	5.01	9203.41	3190.37
3052.99					
33	-0.79	213.79	5.01	9203.41	3190.37
3052.99					
34	-0.79	218.80	5.01	9476.53	3279.11
3137.91					
34	-0.79	218.80	5.01	9476.53	3279.11
3137.91					
35	-0.79	223.00	3.40	9668.49	3341.48
3197.59					
35	-0.79	223.00	3.40	9668.49	3341.48
3197.59					
36	-0.79	227.09	4.79	9801.89	3384.83
3239.07					
36	-0.79	227.09	4.79	9801.89	3384.83
3239.07					
37	-0.79	231.88	4.79	9957.90	3435.52
3287.58					
37	-0.79	231.88	4.79	9957.90	3435.52
3287.58					
38	-0.79	236.67	4.79	10113.91	3486.21
3336.09					
38	-0.79	236.67	4.79	10113.91	3486.21
3336.09					
39	-0.79	241.46	4.79	10269.92	3536.90
3384.60					
39	-0.79	241.46	4.79	10269.92	3536.90
3384.60					
40	-0.79	246.24	4.79	10425.93	3587.59
3433.11					
40	-0.79	246.24	4.79	10425.93	3587.59

3433.11					
41	-0.79	251.03	4.79	10581.94	3638.28
3481.61					
41	-0.79	251.03	4.79	10581.94	3638.28
3481.61					
42	-0.79	255.82	4.79	10737.96	3688.97
3530.12					
42	-0.79	255.82	4.79	10737.96	3688.97
3530.12					
43	-0.79	260.61	4.79	10893.97	3739.66
3578.63					
43	-0.79	260.61	4.79	10893.97	3739.66
3578.63					
44	-0.79	264.68	3.36	11031.54	3784.37
3621.41					
44	-0.79	264.68	3.36	11031.54	3784.37
3621.41					
45	53.78	268.79	8.20	5056.22	4010.46
3837.77					
45	53.78	268.79	8.20	5056.22	4010.46
3837.77					
46	53.78	273.63	8.20	4733.03	3792.47
3629.16					
46	53.78	273.63	8.20	4733.03	3792.47
3629.16					
47	53.78	278.48	8.20	4409.83	3574.47
3420.55					
47	53.78	278.48	8.20	4409.83	3574.47
3420.55					
48	53.78	282.49	5.40	4141.94	3393.77
3247.63					
48	53.78	282.49	5.40	4141.94	3393.77
3247.63					
49	47.63	286.39	6.84	4431.73	3589.24
3434.68					
49	47.63	286.39	6.84	4431.73	3589.24
3434.68					
50	47.63	291.30	7.72	4120.54	3379.34
3233.82					
50	47.63	291.30	7.72	4120.54	3379.34
3233.82					
51	47.63	296.50	7.72	3754.13	3132.19
2997.32					
51	47.63	296.50	7.72	3754.13	3132.19
2997.32					
52	47.63	301.70	7.72	3387.72	2885.05
2760.81					
52	47.63	301.70	7.72	3387.72	2885.05
2760.81					
53	45.14	304.80	1.41	3324.73	2842.56

2720.15					
53	45.14	304.80	1.41	3324.73	2842.56
2720.15					
54	45.14	307.82	7.15	3125.35	2708.07
2591.46					
54	45.14	307.82	7.15	3125.35	2708.07
2591.46					
55	45.14	312.86	7.15	2792.98	2483.89
2376.93					
55	45.14	312.86	7.15	2792.98	2483.89
2376.93					
56	45.14	317.90	7.15	2460.60	2259.70
2162.39					
56	45.14	317.90	7.15	2460.60	2259.70
2162.39					
57	45.14	322.94	7.15	2128.23	2035.51
1947.86					
57	45.14	322.94	7.15	2128.23	2035.51
1947.86					
58	48.54	327.95	7.50	1644.32	1709.11
1635.51					
58	48.54	327.95	7.50	1644.32	1709.11
1635.51					
59	48.54	332.91	7.50	1290.86	1470.70
1407.37					
59	48.54	332.91	7.50	1290.86	1470.70
1407.37					
60	48.54	337.88	7.50	937.41	1232.29
1179.23					
60	48.54	337.88	7.50	937.41	1232.29
1179.23					
61	48.54	342.84	7.50	583.95	993.88
951.08					
61	48.54	342.84	7.50	583.95	993.88
951.08					
62	65.05	346.66	6.34	439.29	296.30
283.54					
62	65.05	346.66	6.34	439.29	296.30
283.54					
63	65.05	349.48	7.03	152.95	103.17
98.72					
63	65.05	349.48	7.03	152.95	103.17
98.72					

Table 4 - Base Force Data on the 63 Slices

Slice	Alpha	X-Coord.	Base	Effective	Available
Mobilized					

No.	(deg)	Slice Cntr (ft)	Leng. (ft)	Normal Force (lbs)	Shear Force (lbs)	Shear Force * (lbs)
1	-30.95	54.89	6.92	6975.65	8859.84	8478.32
1	-30.95	54.89	6.92	6975.65	8859.84	8478.32
2	-30.95	60.83	6.92	12063.73	12291.79	11762.50
2	-30.95	60.83	6.92	12063.73	12291.79	11762.50
3	-30.95	64.94	2.65	6247.59	5806.82	5556.78
3	-30.95	64.94	2.65	6247.59	5806.82	5556.78
4	-0.79	68.58	5.01	6425.08	3089.17	2956.15
4	-0.79	68.58	5.01	6425.08	3089.17	2956.15
5	-0.79	73.59	5.01	7792.76	3533.56	3381.40
5	-0.79	73.59	5.01	7792.76	3533.56	3381.40
6	-0.79	78.59	5.01	9160.43	3977.94	3806.65
6	-0.79	78.59	5.01	9160.43	3977.94	3806.65
7	-0.79	83.60	5.01	10528.11	4422.33	4231.90
7	-0.79	83.60	5.01	10528.11	4422.33	4231.90
8	-0.79	88.61	5.01	11895.79	4866.71	4657.15
8	-0.79	88.61	5.01	11895.79	4866.71	4657.15
9	-0.79	93.62	5.01	13263.46	5311.10	5082.40
9	-0.79	93.62	5.01	13263.46	5311.10	5082.40
10	-0.79	98.62	5.01	14631.14	5755.48	5507.65
10	-0.79	98.62	5.01	14631.14	5755.48	5507.65
11	-0.79	103.63	5.01	15998.82	6199.87	5932.89
11	-0.79	103.63	5.01	15998.82	6199.87	5932.89
12	-0.79	108.64	5.01	17366.49	6644.25	

6358.14
  12   -0.79   108.64   5.01   17366.49   6644.25
6358.14
  13   -0.79   113.65   5.01   18734.17   7088.64
6783.39
  13   -0.79   113.65   5.01   18734.17   7088.64
6783.39
  14   -0.79   118.65   5.01   20101.85   7533.02
7208.64
  14   -0.79   118.65   5.01   20101.85   7533.02
7208.64
  15   -0.79   123.66   5.01   21469.52   7977.41
7633.89
  15   -0.79   123.66   5.01   21469.52   7977.41
7633.89
  16   -0.79   128.67   5.01   22837.20   8421.79
8059.14
  16   -0.79   128.67   5.01   22837.20   8421.79
8059.14
  17   -0.79   133.67   5.01   24204.88   8866.18
8484.39
  17   -0.79   133.67   5.01   24204.88   8866.18
8484.39
  18   -0.79   138.68   5.01   25572.55   9310.56
8909.64
  18   -0.79   138.68   5.01   25572.55   9310.56
8909.64
  19   -0.79   143.69   5.01   26940.23   9754.95
9334.89
  19   -0.79   143.69   5.01   26940.23   9754.95
9334.89
  20   -0.79   148.70   5.01   28307.91   10199.33
9760.14
  20   -0.79   148.70   5.01   28307.91   10199.33
9760.14
  21   -0.79   153.70   5.01   29675.58   10643.72
10185.39
  21   -0.79   153.70   5.01   29675.58   10643.72
10185.39
  22   -0.79   158.71   5.01   31043.26   11088.10
10610.64
  22   -0.79   158.71   5.01   31043.26   11088.10
10610.64
  23   -0.79   163.72   5.01   32410.94   11532.49
11035.89
  23   -0.79   163.72   5.01   32410.94   11532.49
11035.89
  24   -0.79   168.72   5.01   33778.62   11976.87
11461.14
  24   -0.79   168.72   5.01   33778.62   11976.87

11461.14					
25	-0.79	173.73	5.01	35146.29	12421.26
11886.39					
25	-0.79	173.73	5.01	35146.29	12421.26
11886.39					
26	-0.79	178.74	5.01	36513.97	12865.64
12311.64					
26	-0.79	178.74	5.01	36513.97	12865.64
12311.64					
27	-0.79	183.75	5.01	37881.65	13310.03
12736.89					
27	-0.79	183.75	5.01	37881.65	13310.03
12736.89					
28	-0.79	188.75	5.01	39249.32	13754.41
13162.14					
28	-0.79	188.75	5.01	39249.32	13754.41
13162.14					
29	-0.79	193.76	5.01	40617.00	14198.80
13587.39					
29	-0.79	193.76	5.01	40617.00	14198.80
13587.39					
30	-0.79	198.77	5.01	41984.68	14643.18
14012.64					
30	-0.79	198.77	5.01	41984.68	14643.18
14012.64					
31	-0.79	203.77	5.01	43352.35	15087.57
14437.89					
31	-0.79	203.77	5.01	43352.35	15087.57
14437.89					
32	-0.79	208.78	5.01	44720.03	15531.95
14863.13					
32	-0.79	208.78	5.01	44720.03	15531.95
14863.13					
33	-0.79	213.79	5.01	46087.71	15976.34
15288.38					
33	-0.79	213.79	5.01	46087.71	15976.34
15288.38					
34	-0.79	218.80	5.01	47455.38	16420.72
15713.63					
34	-0.79	218.80	5.01	47455.38	16420.72
15713.63					
35	-0.79	223.00	3.40	32875.94	11362.10
10872.84					
35	-0.79	223.00	3.40	32875.94	11362.10
10872.84					
36	-0.79	227.09	4.79	46930.96	16206.38
15508.52					
36	-0.79	227.09	4.79	46930.96	16206.38
15508.52					
37	-0.79	231.88	4.79	47677.93	16449.09

15740.78					
37	-0.79	231.88	4.79	47677.93	16449.09
15740.78					
38	-0.79	236.67	4.79	48424.90	16691.79
15973.03					
38	-0.79	236.67	4.79	48424.90	16691.79
15973.03					
39	-0.79	241.46	4.79	49171.88	16934.50
16205.29					
39	-0.79	241.46	4.79	49171.88	16934.50
16205.29					
40	-0.79	246.24	4.79	49918.85	17177.21
16437.54					
40	-0.79	246.24	4.79	49918.85	17177.21
16437.54					
41	-0.79	251.03	4.79	50665.82	17419.91
16669.80					
41	-0.79	251.03	4.79	50665.82	17419.91
16669.80					
42	-0.79	255.82	4.79	51412.80	17662.62
16902.05					
42	-0.79	255.82	4.79	51412.80	17662.62
16902.05					
43	-0.79	260.61	4.79	52159.77	17905.33
17134.31					
43	-0.79	260.61	4.79	52159.77	17905.33
17134.31					
44	-0.79	264.68	3.36	37101.63	12727.70
12179.63					
44	-0.79	264.68	3.36	37101.63	12727.70
12179.63					
45	53.78	268.79	8.20	41469.30	32892.38
31476.01					
45	53.78	268.79	8.20	41469.30	32892.38
31476.01					
46	53.78	273.63	8.20	38818.58	31104.44
29765.06					
46	53.78	273.63	8.20	38818.58	31104.44
29765.06					
47	53.78	278.48	8.20	36167.85	29316.51
28054.12					
47	53.78	278.48	8.20	36167.85	29316.51
28054.12					
48	53.78	282.49	5.40	22346.09	18309.68
17521.25					
48	53.78	282.49	5.40	22346.09	18309.68
17521.25					
49	47.63	286.39	6.84	30333.68	24567.12
23509.24					
49	47.63	286.39	6.84	30333.68	24567.12

23509.24					
50	47.63	291.30	7.72	31804.17	26083.25
24960.09					
50	47.63	291.30	7.72	31804.17	26083.25
24960.09					
51	47.63	296.50	7.72	28976.05	24175.66
23134.64					
51	47.63	296.50	7.72	28976.05	24175.66
23134.64					
52	47.63	301.70	7.72	26147.93	22268.07
21309.19					
52	47.63	301.70	7.72	26147.93	22268.07
21309.19					
53	45.14	304.80	1.41	4695.33	4014.39
3841.53					
53	45.14	304.80	1.41	4695.33	4014.39
3841.53					
54	45.14	307.82	7.15	22336.68	19354.44
18521.02					
54	45.14	307.82	7.15	22336.68	19354.44
18521.02					
55	45.14	312.86	7.15	19961.22	17752.18
16987.76					
55	45.14	312.86	7.15	19961.22	17752.18
16987.76					
56	45.14	317.90	7.15	17585.77	16149.91
15454.49					
56	45.14	317.90	7.15	17585.77	16149.91
15454.49					
57	45.14	322.94	7.15	15210.31	14547.65
13921.22					
57	45.14	322.94	7.15	15210.31	14547.65
13921.22					
58	48.54	327.95	7.50	12332.40	12818.31
12266.34					
58	48.54	327.95	7.50	12332.40	12818.31
12266.34					
59	48.54	332.91	7.50	9681.48	11030.24
10555.27					
59	48.54	332.91	7.50	9681.48	11030.24
10555.27					
60	48.54	337.88	7.50	7030.57	9242.18
8844.20					
60	48.54	337.88	7.50	7030.57	9242.18
8844.20					
61	48.54	342.84	7.50	4379.65	7454.11
7133.13					
61	48.54	342.84	7.50	4379.65	7454.11
7133.13					
62	65.05	346.66	6.34	2783.34	1877.39

```
1796.54
  62      65.05     346.66       6.34         2783.34         1877.39
1796.54
  63      65.05     349.48       7.03         1074.85          725.00
693.78
  63      65.05     349.48       7.03         1074.85          725.00
693.78

     Sum of the Resisting Forces =  695993.80 (lbs)

     Average Available Shear Strength =   1987.58(psf)

     Sum of the Driving Forces =   720131.34 (lbs)

     Average Mobilized Shear Stress =    2056.51(psf)

     Total length of the failure surface =     350.17(ft)


     Factor of Safety Balance Check: FS =  0.96648

     Janbu's Correction Factor (fo) =  1.0771

     Janub's FS Corrected =  1.04101

               *** SEISMIC SLOPE DISPLACEMENT DATA ***
          (Note: kv is set = zero for displacement calculations)
          Seismic Yield Coefficient (ky) =  0.28050(g)
          Calculated Newmark Seismic Displacement =    0.000(ft)


          Average Elevation of Point of Application of kh on Sliding Mass =
1305.439(ft)

          Non-Symmetrical Sliding Resistance Has Been Specified
          for Downhill Sliding.

                        **** END OF GEOSTASE OUTPUT ****
```

Appendix E
Infiltration Testing Results

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/27/2023
Boring Number: I-2

Test hole dimensions (if circular)	
Boring Depth (feet)*:	3
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	7:25	7:54	29.0	0.17	0.19	0.02	No
2	7:54	8:19	25.0	0.19	0.19	0.00	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	8:19	8:49	30.0	0.19	0.20	0.01	0.01
2	8:49	9:19	30.0	0.20	0.21	0.01	0.01
3	9:19	9:49	30.0	0.21	0.21	0.00	0.00
4	9:49	10:19	30.0	0.21	0.22	0.01	0.01
5	10:19	10:49	30.0	0.22	0.23	0.01	0.01
6	10:49	11:19	30.0	0.23	0.23	0.00	0.00
7	11:19	11:49	30.0	0.23	0.24	0.01	0.01
8	11:49	12:19	30.0	0.24	0.24	0.00	0.00
9	12:19	12:49	30.0	0.24	0.25	0.01	0.01
10	12:49	13:19	30.0	0.25	0.26	0.01	0.01
11	13:19	13:49	30.0	0.26	0.26	0.00	0.00
12	13:49	14:19	30.0	0.26	0.27	0.01	0.01
						Tested Infiltration Rate (No Factor of Safety)	**0.01**
						MinimumFactor of Safety	**See Report**
						Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/27/2023
Boring Number: I-3

Test hole dimensions (if circular)	
Boring Depth (feet)*:	10
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	7:44	8:09	25.0	6.27	6.31	0.04	No
2	8:09	8:34	25.0	6.31	6.34	0.03	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	8:34	9:04	30.0	6.06	6.06	0.00	0.00
2	9:04	9:34	30.0	6.06	6.07	0.01	0.01
3	9:34	10:04	30.0	6.07	6.09	0.02	0.02
4	10:04	10:36	32.0	6.09	6.11	0.02	0.02
5	10:36	11:06	30.0	6.11	6.14	0.03	0.03
6	11:06	11:38	32.0	6.14	6.16	0.02	0.02
7	11:38	12:09	31.0	6.16	6.19	0.03	0.03
8	12:09	12:39	30.0	6.19	6.21	0.02	0.02
9	12:39	13:09	30.0	6.21	6.24	0.03	0.03
10	13:10	13:40	30.0	6.04	6.06	0.02	0.02
11	13:40	14:13	33.0	6.06	6.08	0.02	0.02
12	14:13	14:43	30.0	6.08	6.10	0.02	0.02

Tested Infiltration Rate (No Factor of Safety)	**0.02**
MinimumFactor of Safety	**See Report**
Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/27/2023
Boring Number: I-4

Test hole dimensions (if circular)	
Boring Depth (feet)*:	3
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	7:38	8:03	25.0	0.26	0.45	0.19	No
2	8:05	8:30	25.0	0.27	0.38	0.11	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	8:30	9:00	30.0	0.27	0.36	0.09	0.13
2	9:01	9:31	30.0	0.26	0.33	0.07	0.10
3	9:32	10:02	30.0	0.27	0.31	0.04	0.06
4	10:03	10:33	30.0	0.25	0.3	0.05	0.07
5	10:34	11:04	30.0	0.25	0.29	0.04	0.06
6	11:05	11:35	30.0	0.24	0.28	0.04	0.06
7	11:36	12:06	30.0	0.24	0.27	0.03	0.04
8	12:07	12:37	30.0	0.24	0.28	0.04	0.06
9	12:37	13:07	30.0	0.23	0.27	0.04	0.05
10	13:08	13:38	30.0	0.23	0.26	0.03	0.04
11	13:39	14:10	31.0	0.21	0.26	0.05	0.07
12	14:11	14:41	30.0	0.21	0.26	0.05	0.07
						Tested Infiltration Rate (No Factor of Safety)	**0.07**
						MinimumFactor of Safety	**See Report**
						Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/28/2023
Boring Number: I-5

Test hole dimensions (if circular)	
Boring Depth (feet)*:	12
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	6:56	7:22	26.0	4.88	4.89	0.01	No
2	7:22	7:47	25.0	4.89	4.89	0.00	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	7:47	8:17	30.0	4.89	4.91	0.02	0.01
2	8:17	8:47	30.0	4.91	4.92	0.01	0.01
3	8:47	9:17	30.0	4.92	4.94	0.02	0.01
4	9:17	9:47	30.0	4.94	4.96	0.02	0.01
5	9:47	10:17	30.0	4.96	4.97	0.01	0.01
6	10:17	10:47	30.0	4.97	4.99	0.02	0.01
7	10:47	11:17	30.0	4.99	5.00	0.01	0.01
8	11:17	11:47	30.0	5.00	5.01	0.01	0.01
9	11:47	12:18	31.0	5.01	5.03	0.02	0.01
10	12:18	12:48	30.0	5.03	5.05	0.02	0.01
11	12:48	13:18	30.0	5.05	5.07	0.02	0.01
12	13:19	13:49	30.0	5.07	5.08	0.01	0.01

Tested Infiltration Rate (No Factor of Safety)	**0.01**
MinimumFactor of Safety	**See Report**
Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/28/2023
Boring Number: I-6

Test hole dimensions (if circular)	
Boring Depth (feet)*:	3
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	6:59	7:24	25.0	0.31	0.46	0.15	No
2	7:24	7:49	25.0	0.46	0.54	0.08	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	7:50	8:20	30.0	0.42	0.50	0.08	0.12
2	8:21	8:51	30.0	0.34	0.44	0.10	0.14
3	8:51	9:21	30.0	0.44	0.53	0.09	0.13
4	9:22	9:52	30.0	0.29	0.44	0.15	0.21
5	9:53	10:23	30.0	0.21	0.43	0.22	0.31
6	10:24	10:54	30.0	0.27	0.43	0.16	0.23
7	10:55	11:25	30.0	0.31	0.43	0.12	0.17
8	11:26	11:56	30.0	0.20	0.41	0.21	0.29
9	11:58	12:28	30.0	0.20	0.43	0.23	0.32
10	12:30	13:00	30.0	0.25	0.42	0.17	0.24
11	13:00	13:30	30.0	0.42	0.50	0.08	0.12
12	13:31	14:01	30.0	0.33	0.43	0.10	0.14

Tested Infiltration Rate (No Factor of Safety)	**0.14**
MinimumFactor of Safety	**See Report**
Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

Appendix F
General Earthwork and Grading Specifications for Rough Grading

General Earthwork and Grading Specifications for Rough Grading

1.0 General

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ a qualified Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to confirm that the attained level of compaction is being accomplished as specified. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the project plans and specifications. The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of “equipment” of work and the estimated quantities of daily earthwork

contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the
Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate personnel will be available for observation and testing. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified. It is the contractor's sole responsibility to provide proper fill compaction.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed. The contractor is responsible for all hazardous waste relating to his work. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Client should acquire the services of a qualified environmental assessor.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be over-excavated as specified in the following section. Scarification shall continue until soils are broken down and free of oversize material and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Over-excavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of the geotechnical consultant. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than
5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 The Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

7.2 All bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over

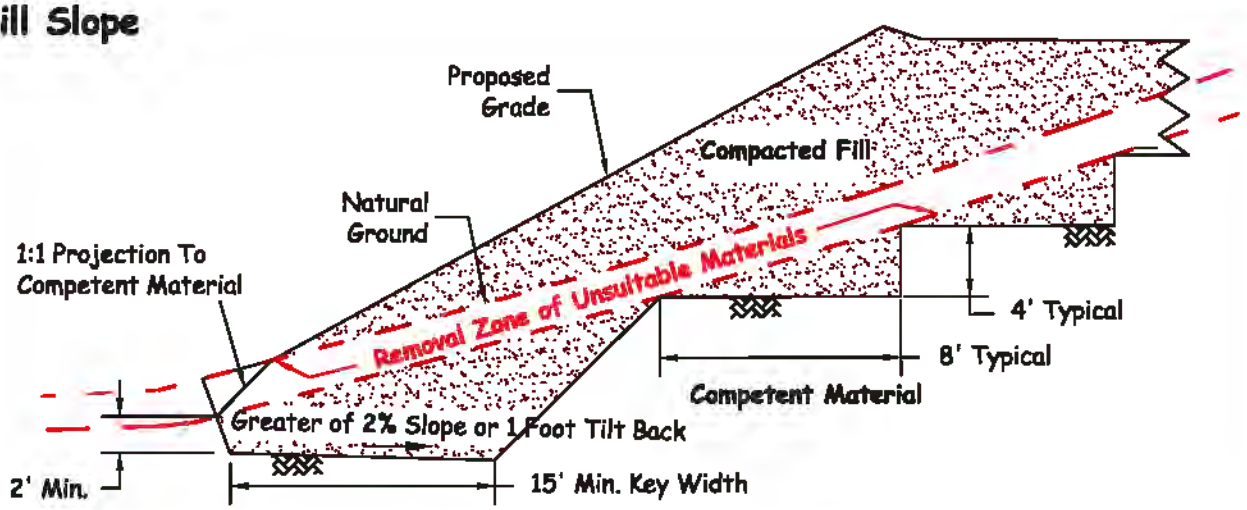
the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

7.3 The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

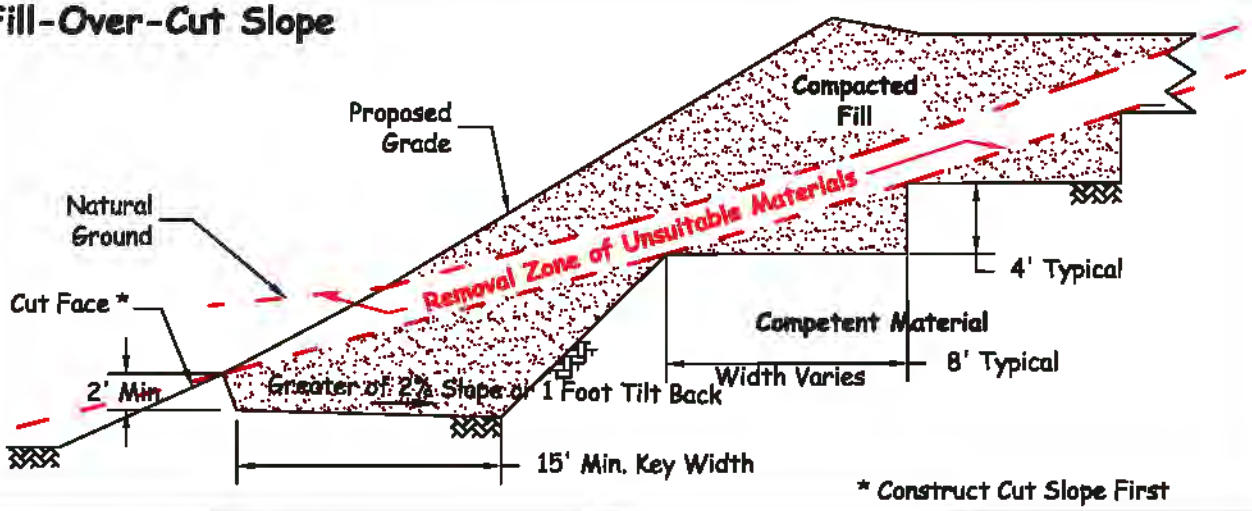
7.4 The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.5 Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

Fill Slope

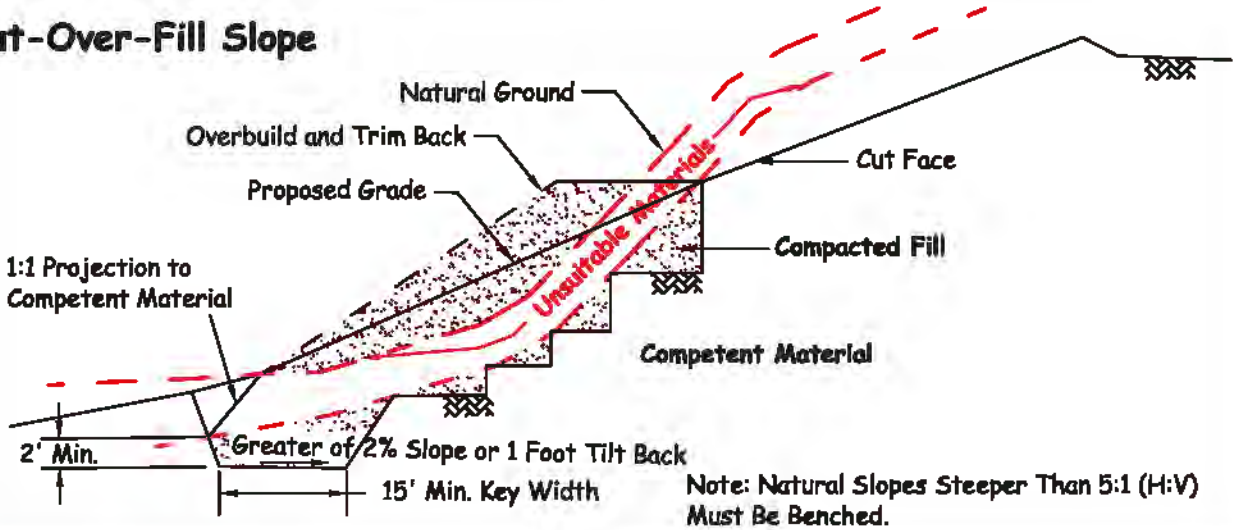


Fill-Over-Cut Slope



* Construct Cut Slope First

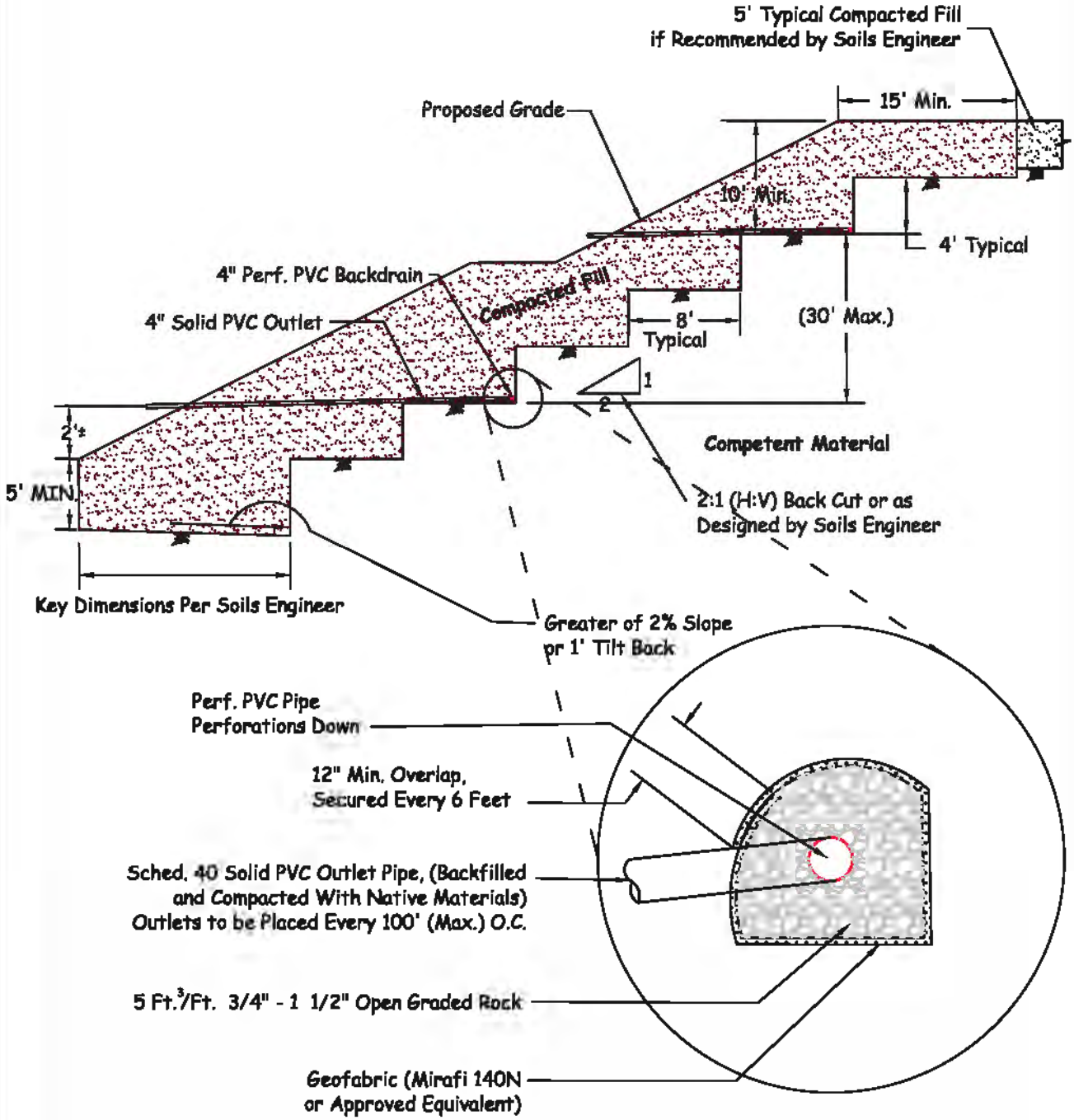
Cut-Over-Fill Slope



Note: Natural Slopes Steeper Than 5:1 (H:V) Must Be Benched.

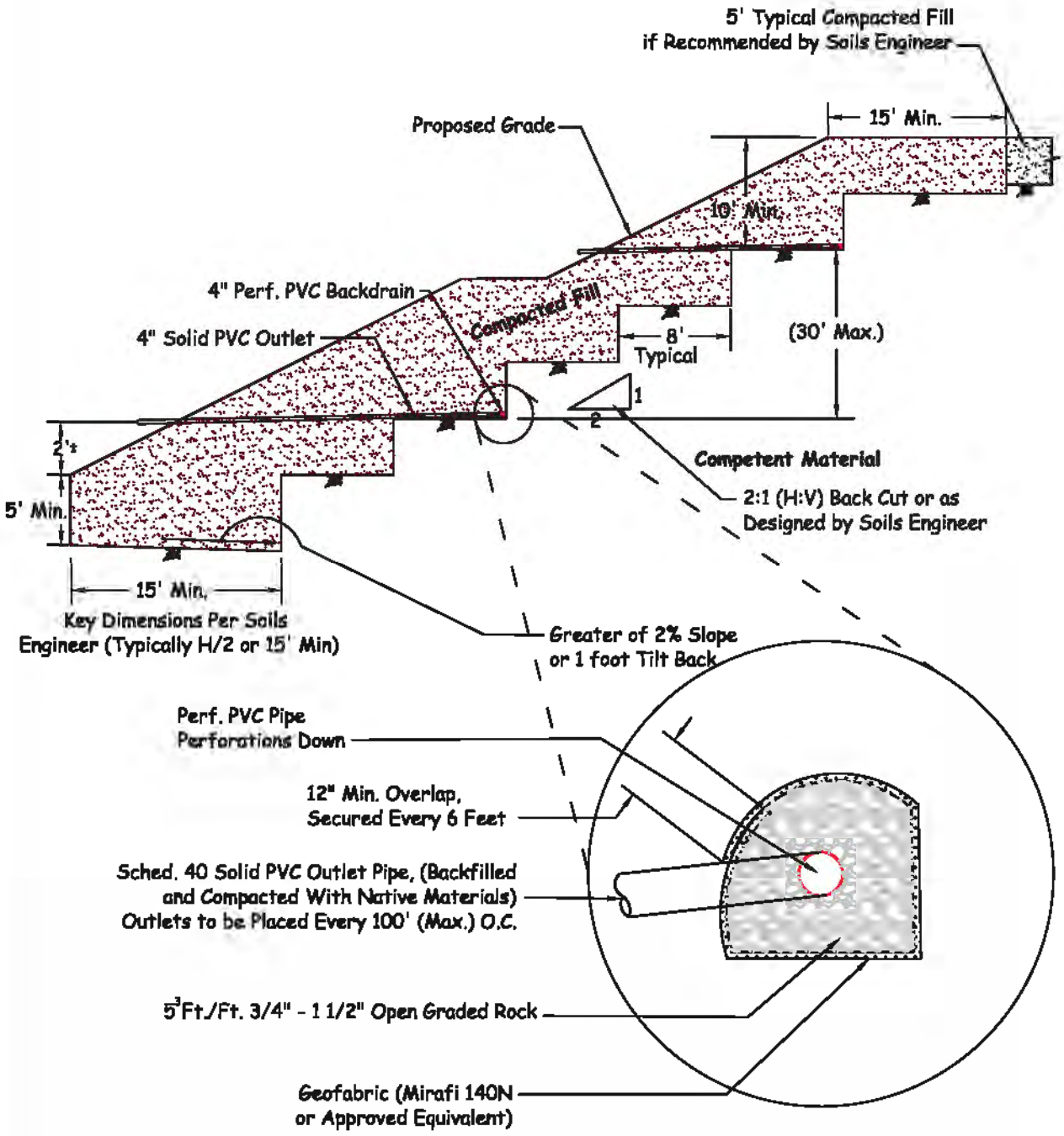
LGC Geotechnical, Inc.

KEYING AND BENCHING



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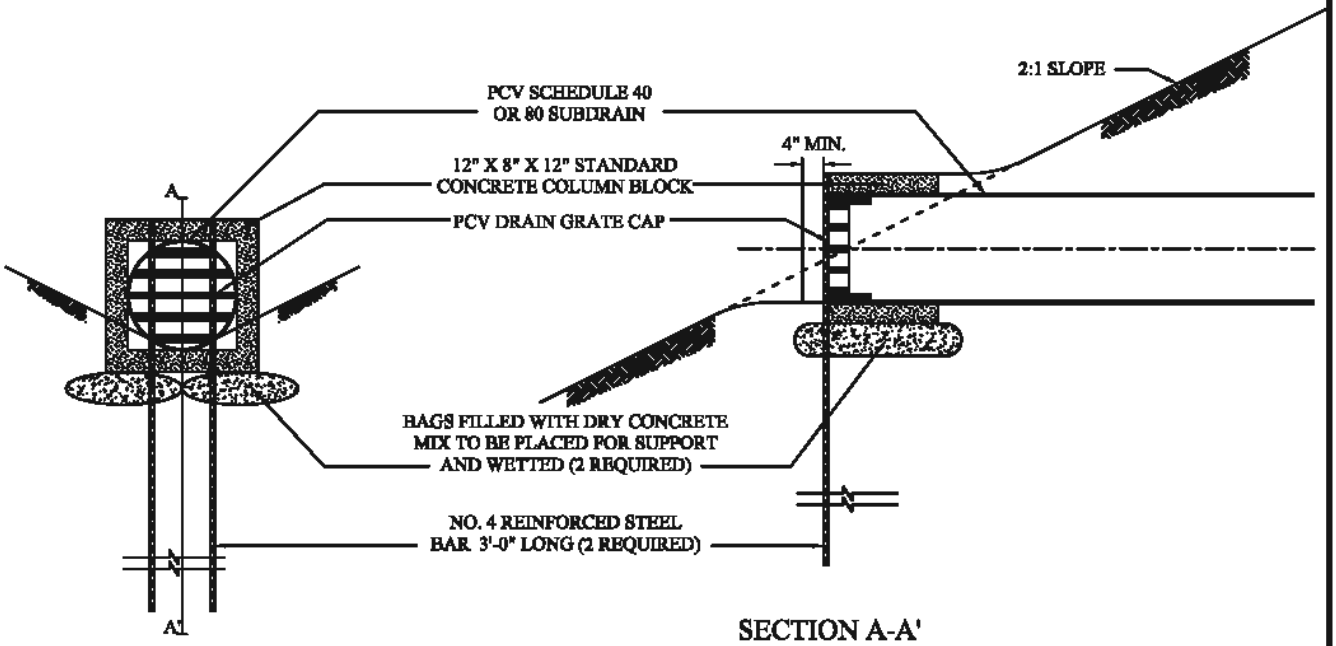
TYPICAL BUTTRESS DETAIL



LGC Geotechnical, Inc.

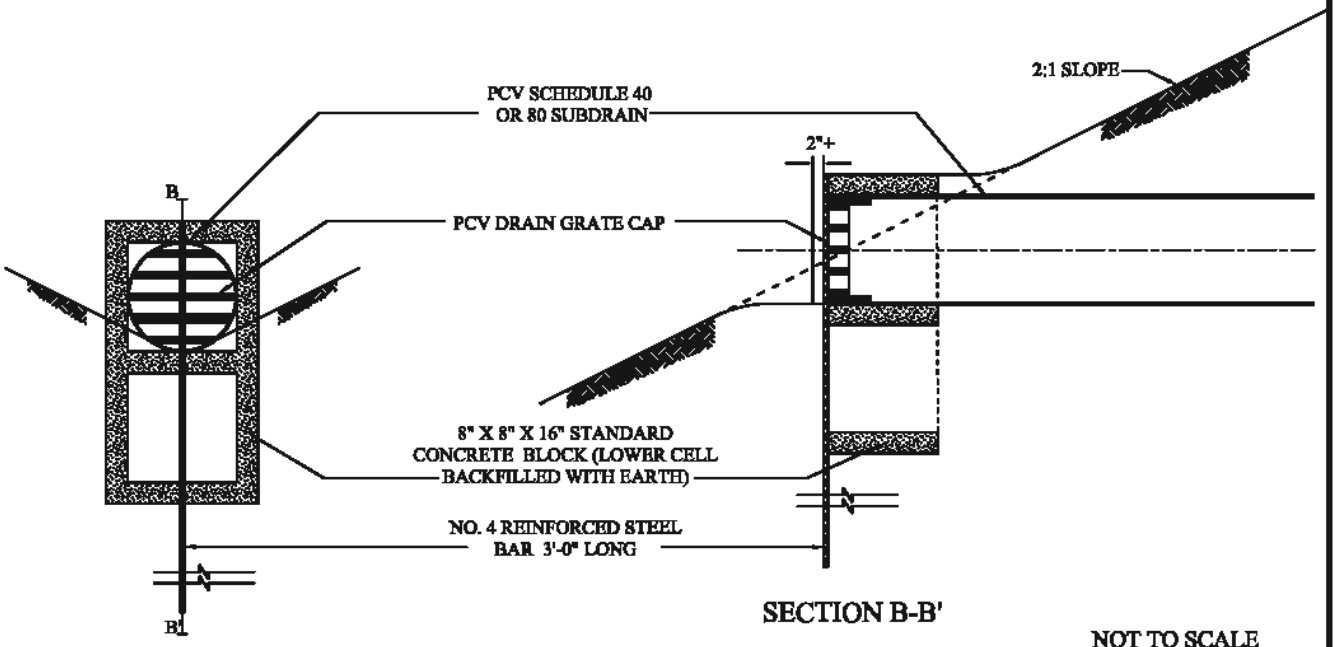
TYPICAL STABILIZATION FILL DETAIL

SUBDRAIN OUTLET MARKER -6" & 8" PIPE



SECTION A-A'

SUBDRAIN OUTLET MARKER -4" PIPE



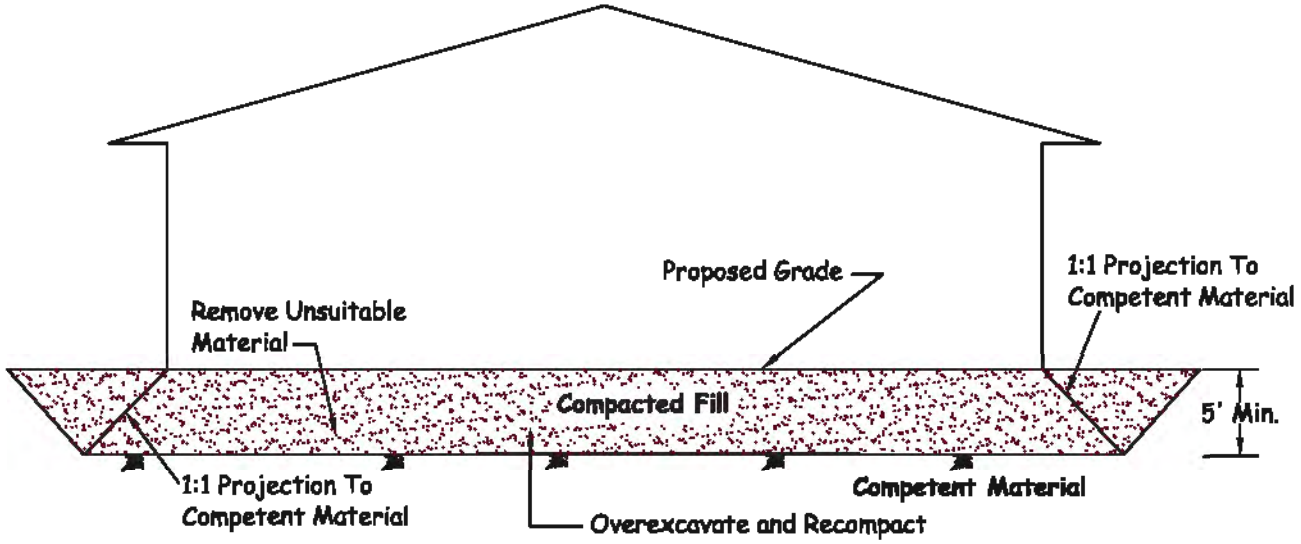
SECTION B-B'

NOT TO SCALE

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SUBDRAIN OUTLET MARKER DETAIL

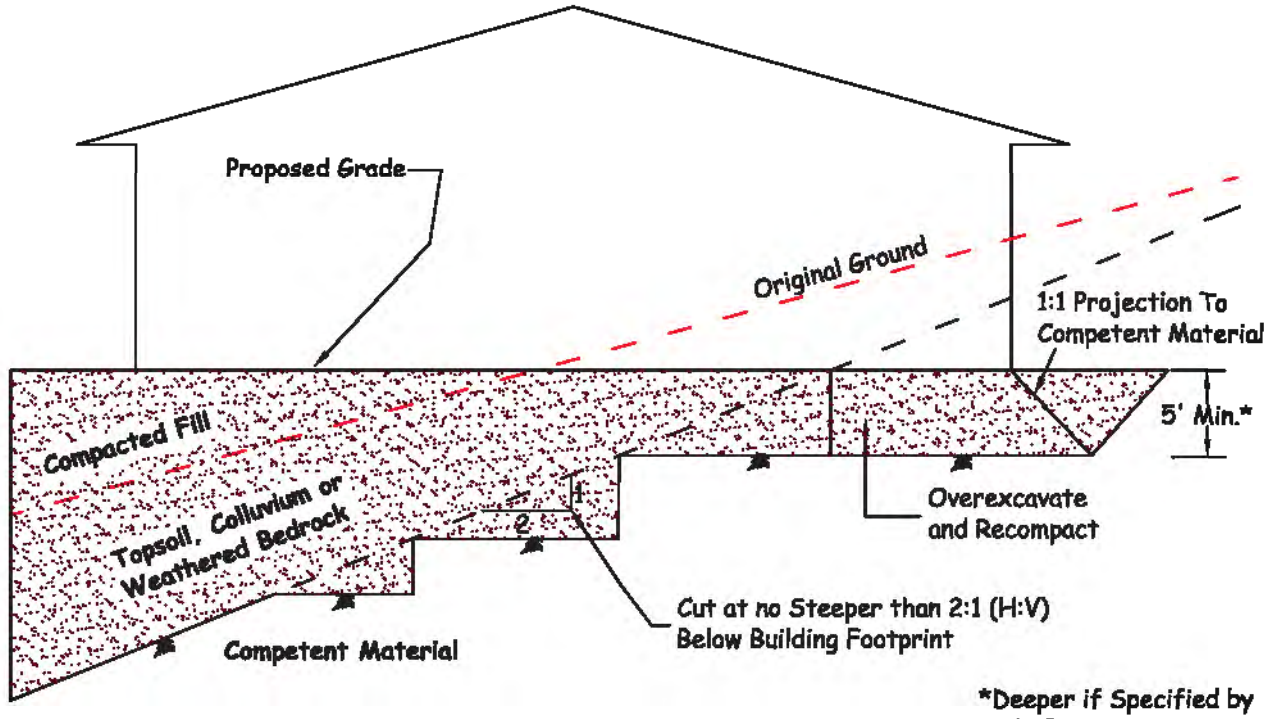
Cut Lot
(Exposing Unsuitable Soils at Design Grade)



Note 1: Removal Bottom Should be Graded With Minimum 2% Fall Towards Street or Other Suitable Area (as Determined by Soils Engineer) to Avaid Ponding Below Building

Note 2: Where Design Cut Lots are Excavated Entirely Into Competent Material, Overexcavation May Still be Required for Hard-Rock Conditions or for Materials With Variable Expansion Characteristics.

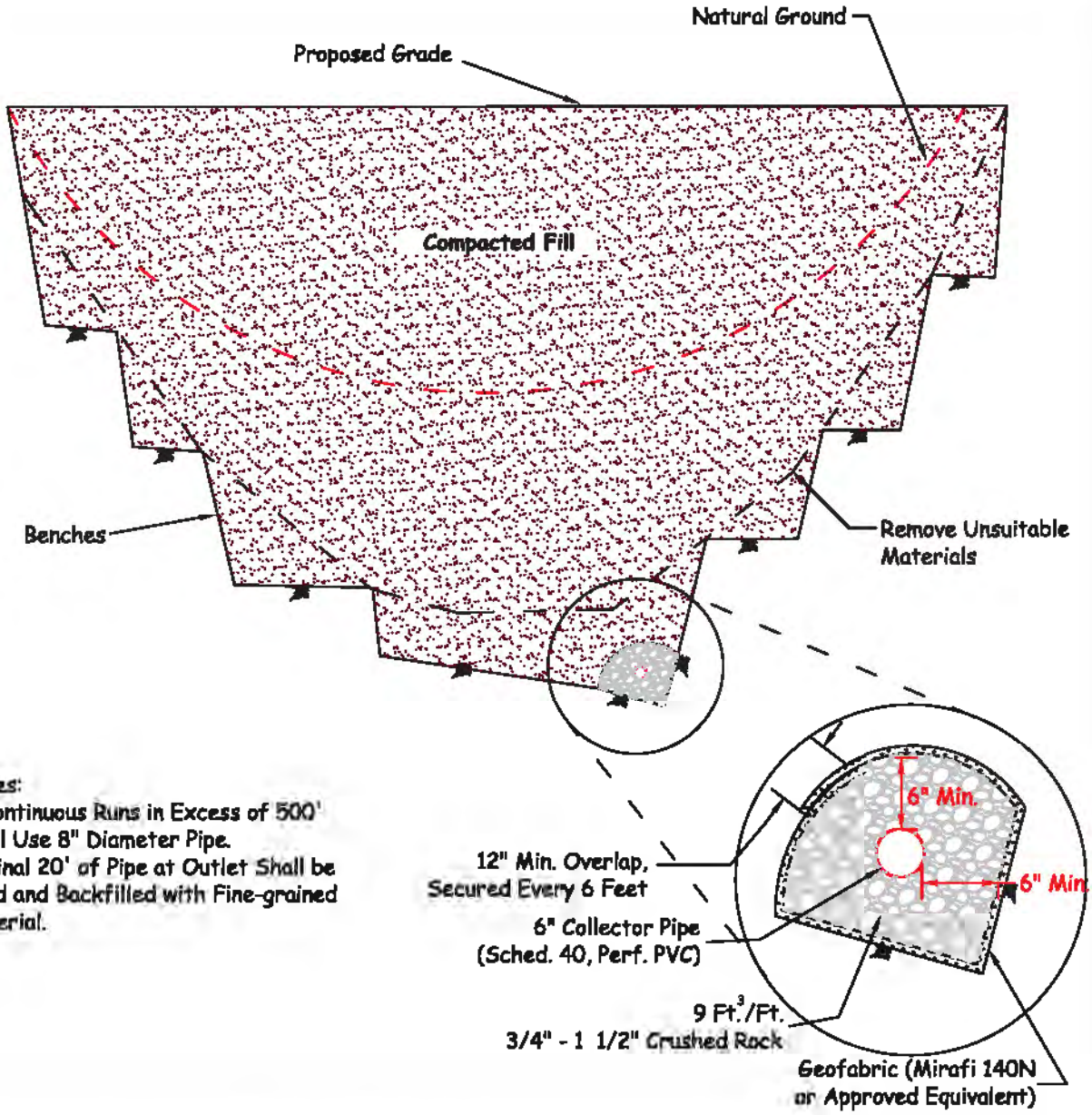
Cut/Fill Transition Lot



*Deeper if Specified by Soils Engineer

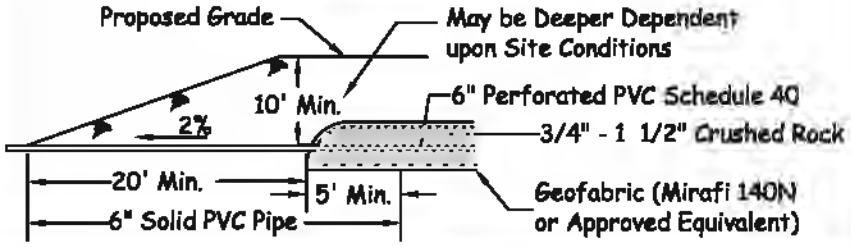
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CUT AND TRANSITION LOT OVEREXCAVATION DETAIL



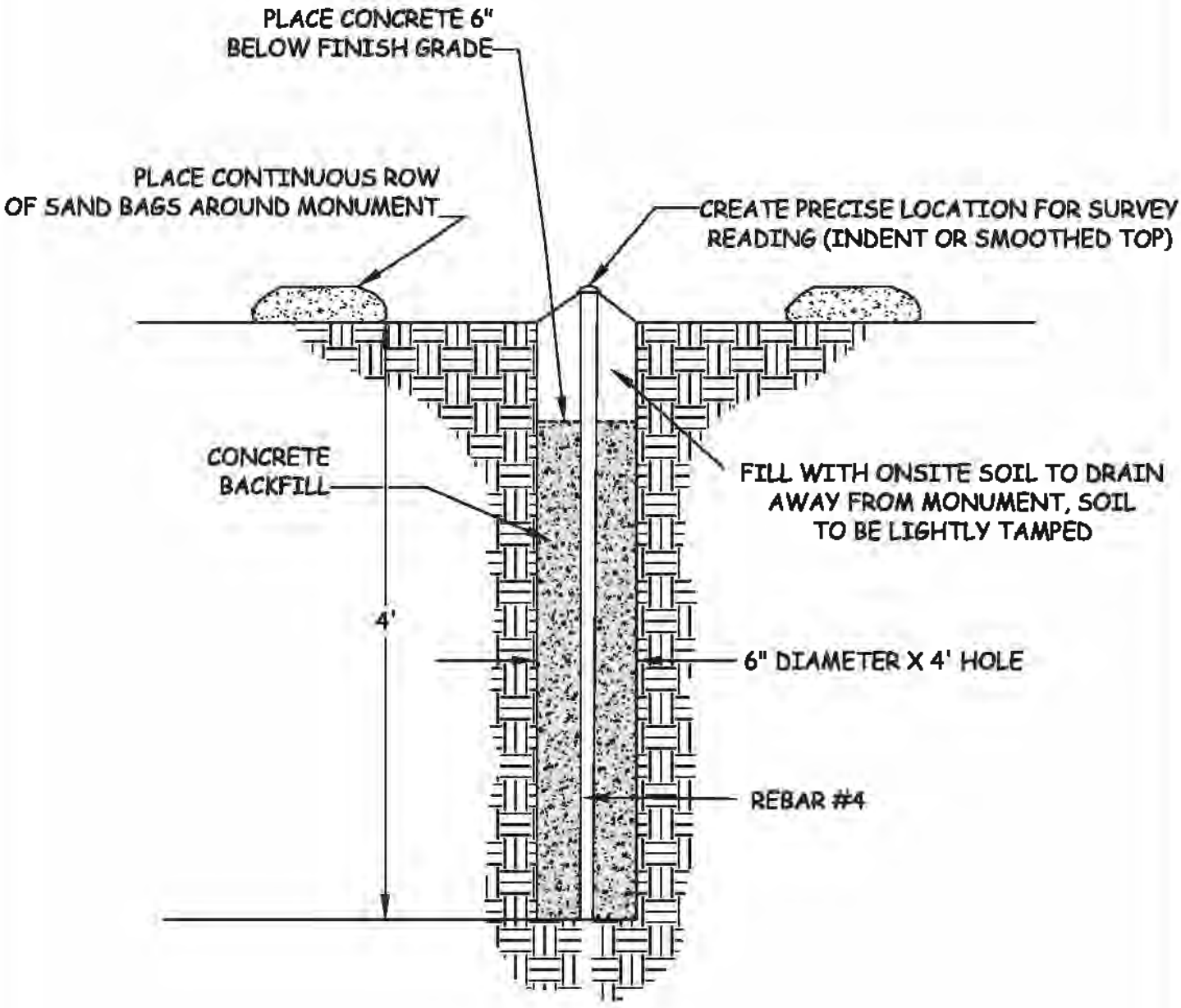
Notes:
1) Continuous Runs in Excess of 500' Shall Use 8" Diameter Pipe.
2) Final 20' of Pipe at Outlet Shall be Solid and Backfilled with Fine-grained Material.

Proposed Outlet Detail



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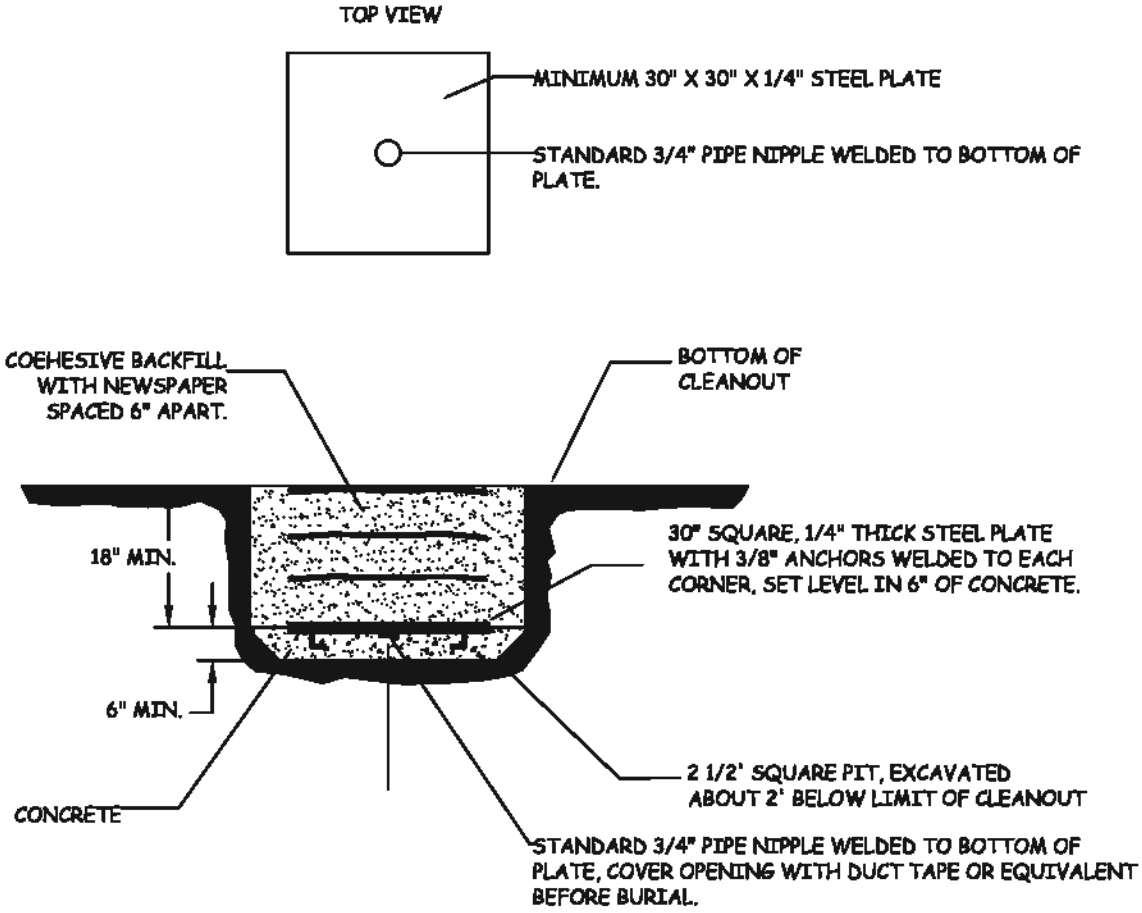
CANYON SUBDRAINS



NO CONSTRUCTION EQUIPMENT WITHIN 25 FEET OF ANY INSTALLED SETTLEMENT MONUMENTS

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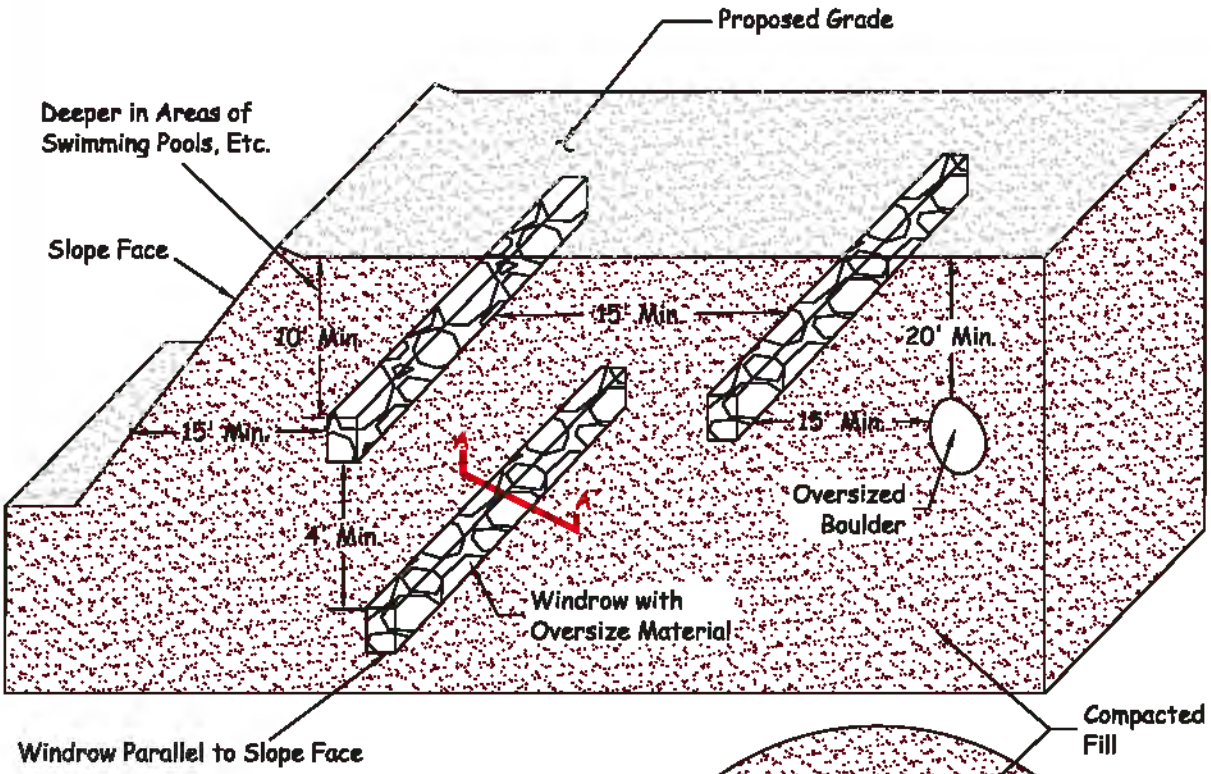
TYPICAL SURFACE SETTLEMENT MONUMENT

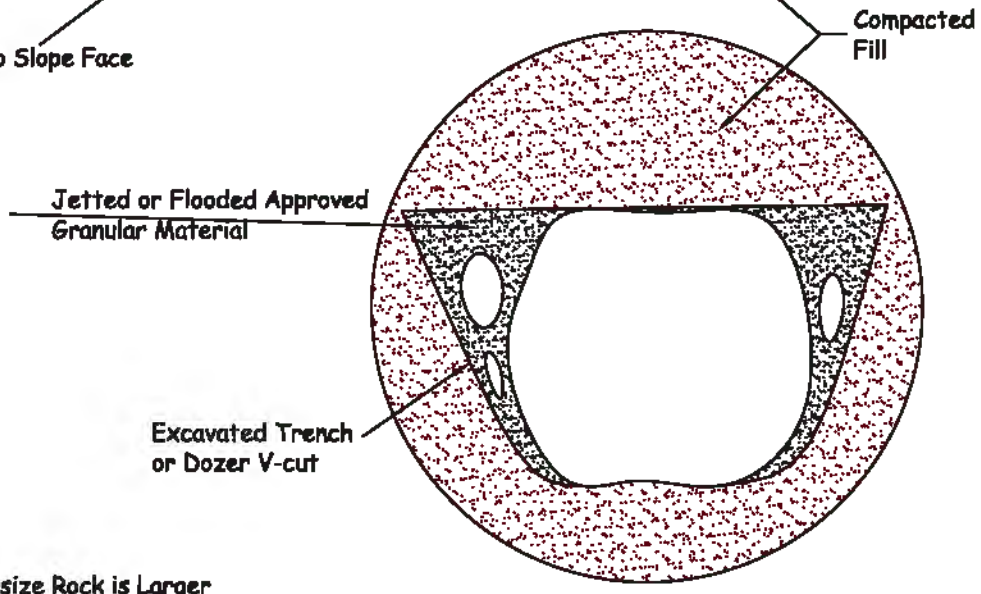


1. SURVEY FOR HORIZONTAL AND VERTICAL LOCATION TO NEAREST .01 INCH PRIOR TO BACKFILL USING KNOW LOCATIONS THAT WILL REMAIN INTACT DURING THE DURATION OF THE MONITORING PROGRAM. KNOW POINTS EXPLICITELY NOT ALLOWED ARE THOSE LOCATED ON FILL OR THAT WILL BE DESTROYED DURING GRADING.
2. IN THE EVENT OF DAMAGE TO SETTLEMENT PLATE DURING GRADING, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE GEOTECHNICAL ENGINEER AND SHALL BE RESPONSIBLE FOR RESTORING THE SETTLEMENT PLATES TO WORKING ORDER.
3. DRILL TO RECOVER AND ATTACH RISER PIPE.

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TYPICAL SETTLEMENT PLATE AND RISER



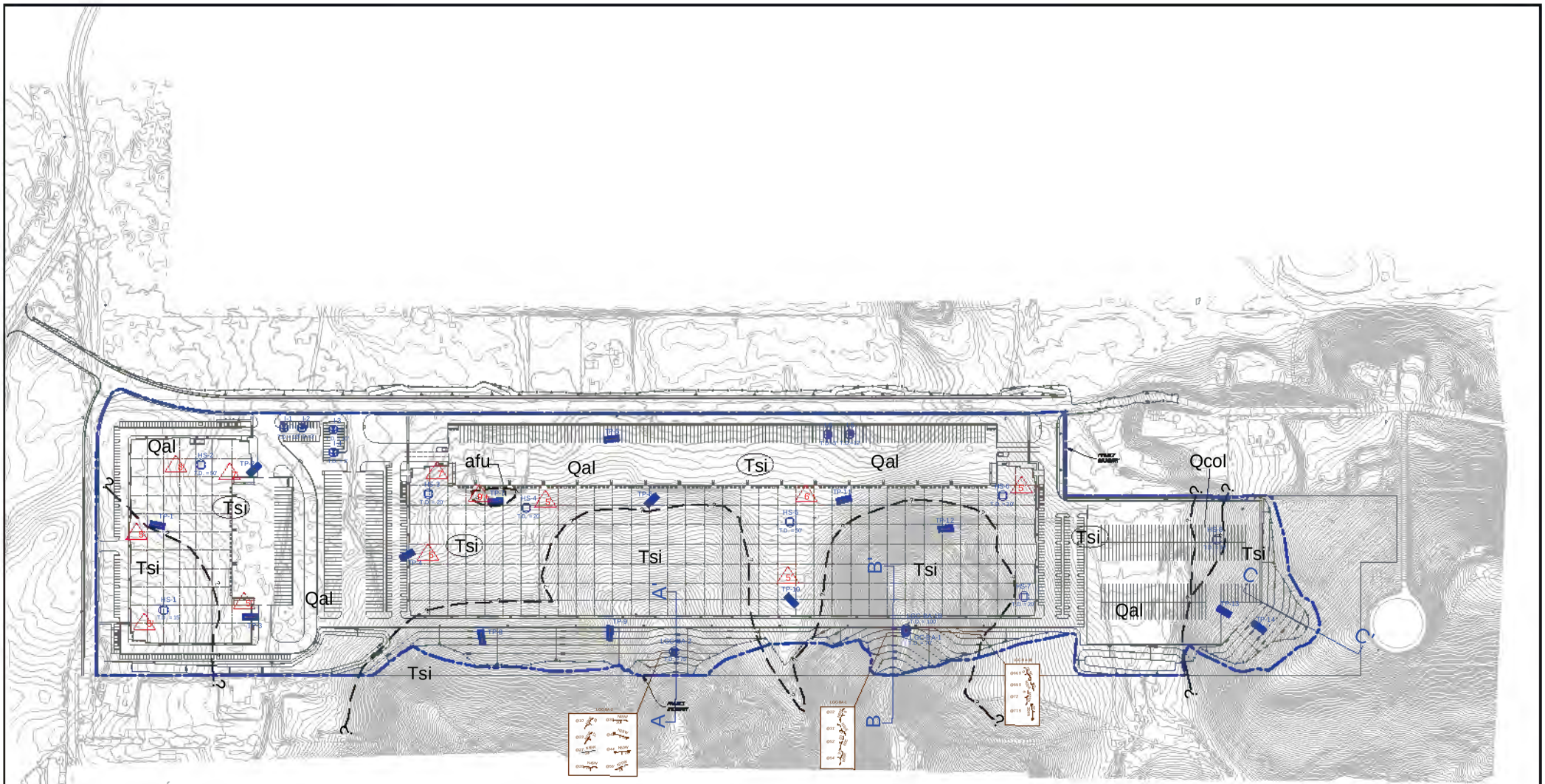


Note: Oversize Rock is Larger than 8" in Maximum Dimension.

Section A-A'

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OVERSIZE ROCK DISPOSAL DETAIL



LEGEND

afu	Artificial Fill - Undocumented, Circled Where Buried
Qal	Quaternary Alluvium, Circled Where Buried
Qcol	Quaternary Colluvium, Circled Where Buried
Tsi	Tertiary Silverado Formation
	Approximate Location of Geologic Contact; Dotted Where Buried, Queried Where Uncertain
	Approximate Location of Large Diameter Bucket Auger Boring by LGC Geotechnical, With Total Depth in Feet
	Approximate Location of Hollow Stem Auger Boring by LGC Geotechnical, With Total Depth in Feet
	Approximate Location of Hollow Stem Auger Infiltration Boring by LGC Geotechnical, With Total Depth in Feet
	Approximate Location of Exploratory Test Pit by LGC Geotechnical, With Total Depth in Feet
	Estimated Remedial Grading Depth in Feet
C C'	Geotechnical Cross-Section Alignment
	Approximate Limits of This Report

Geologic Attitudes (Dashed Where Subsurface)

	General Bedding
	Bedding
	Clay Bed

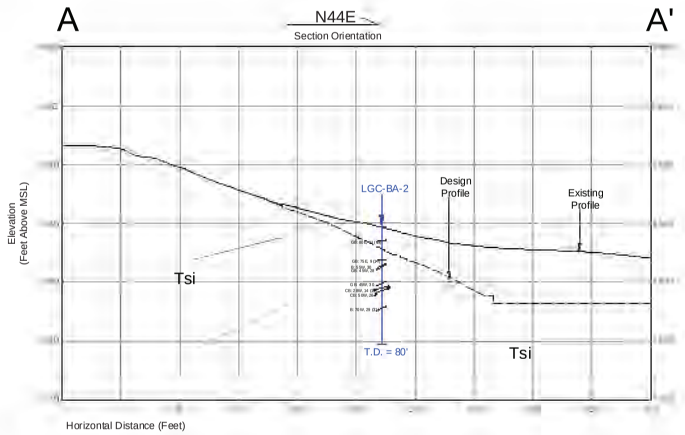
SCALE: 1"=100'

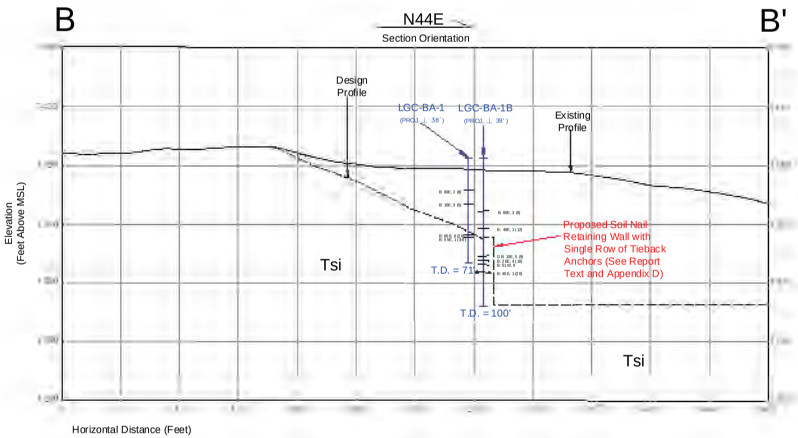
LGC Geotechnical, Inc.
131 Calle Iglesia, Ste. 200
San Clemente, CA 92672
TEL (949) 369-6141 FAX (949) 369-6142

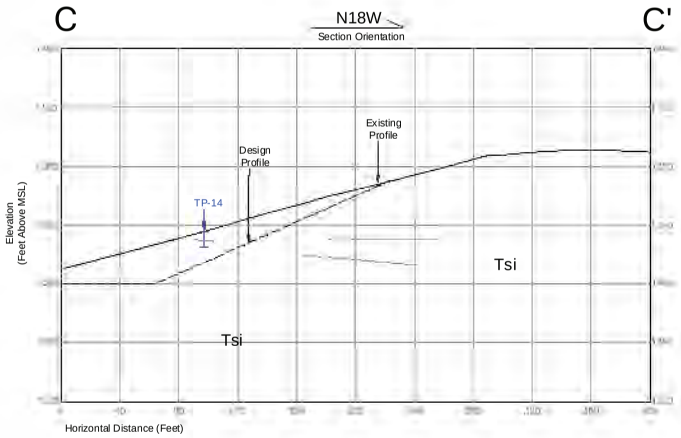
Preliminary Geotechnical Map

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	2310-01
ENG. / GEOL.	RLD / BPC
SCALE	1" = 80'
DATE	January 2024

SHEET 1 of 2







SCALE: 1"=40'

40' 0 40' 80'

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San Clemente, CA 92672
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Geotechnical Cross-Sections
A-A', B-B', and C-C'

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	23160-01
ENG. / GEOL.	RLD / BPG
SCALE	1" = 40'
DATE	January 2024

SHEET 2 of 2

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Western Riverside Area, California



January 29, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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AbF—Altamont cobbly clay, 8 to 35 percent slopes.....14
GaC—Garretson very fine sandy loam, 2 to 8 percent slopes.....15
RaD3—Ramona sandy loam, 8 to 15 percent slopes, severely eroded.....16
RuF—Rough broken land.....18
Wg—Willows silty clay, saline-alkali.....18
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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 16, Aug 30, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AaD	Altamont clay, 5 to 15 percent slopes	2.1	3.6%
AbF	Altamont cobbly clay, 8 to 35 percent slopes	27.9	47.5%
GaC	Garretson very fine sandy loam, 2 to 8 percent slopes	1.0	1.6%
RaD3	Ramona sandy loam, 8 to 15 percent slopes, severely eroded	2.3	3.9%
RuF	Rough broken land	3.1	5.2%
Wg	Willows silty clay, saline-alkali	22.5	38.2%
Totals for Area of Interest		**58.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Western Riverside Area, California

AaD—Altamont clay, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: hcqg
Elevation: 200 to 3,250 feet
Mean annual precipitation: 9 to 25 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 200 to 310 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Altamont and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Altamont

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 18 inches: clay
H2 - 18 to 23 inches: silty clay
H3 - 23 to 27 inches: bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R019XD001CA - CLAYEY
Hydric soil rating: No

Minor Components

Gaviota
Percent of map unit: 5 percent
Hydric soil rating: No

Soper
Percent of map unit: 5 percent
Hydric soil rating: No

Vallecitos
Percent of map unit: 2 percent
Hydric soil rating: No

Altamont
Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 1 percent
Hydric soil rating: No

AbF—Altamont cobbly clay, 8 to 35 percent slopes

Map Unit Setting
National map unit symbol: hcqk
Elevation: 200 to 3,000 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 250 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition
Altamont and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Altamont

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile
H1 - 0 to 18 inches: cobbly clay
H2 - 18 to 23 inches: silty clay
H3 - 23 to 27 inches: bedrock

Properties and qualities

Slope: 8 to 35 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R019XD001CA - CLAYEY
Hydric soil rating: No

Minor Components

Soper

Percent of map unit: 5 percent

Gaviota

Percent of map unit: 5 percent

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 2 percent
Hydric soil rating: No

GaC—Garretson very fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hcv2
Elevation: 430 to 1,740 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Garretson and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Garretson

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metasedimentary rock

Typical profile

H1 - 0 to 10 inches: very fine sandy loam
H2 - 10 to 60 inches: loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Arbuckle

Percent of map unit: 5 percent
Hydric soil rating: No

Cortina

Percent of map unit: 5 percent
Hydric soil rating: No

Perkins

Percent of map unit: 5 percent
Hydric soil rating: No

RaD3—Ramona sandy loam, 8 to 15 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: hcyb
Elevation: 250 to 3,500 feet

Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Ramona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramona

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 8 inches: sandy loam
H2 - 8 to 17 inches: fine sandy loam
H3 - 17 to 68 inches: sandy clay loam
H4 - 68 to 74 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Greenfield

Percent of map unit: 5 percent
Hydric soil rating: No

Hanford

Percent of map unit: 5 percent
Hydric soil rating: No

Tujunga

Percent of map unit: 5 percent
Hydric soil rating: No

RuF—Rough broken land

Map Unit Composition

Rough broken land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rough Broken Land

Setting

Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum derived from mixed sources

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 0 to 3 inches to paralithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Wg—Willows silty clay, saline-alkali

Map Unit Setting

National map unit symbol: hd08
Elevation: 0 to 1,700 feet
Mean annual precipitation: 19 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 210 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Willows and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Willows

Setting

Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Alluvium derived from mixed sources

Typical profile

H1 - 0 to 10 inches: silty clay
H2 - 10 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: R019XD068CA - SILTY BASIN
Hydric soil rating: No

Minor Components

Domino

Percent of map unit: 5 percent
Hydric soil rating: No

Chino

Percent of map unit: 5 percent
Hydric soil rating: No

Madera

Percent of map unit: 5 percent
Hydric soil rating: No

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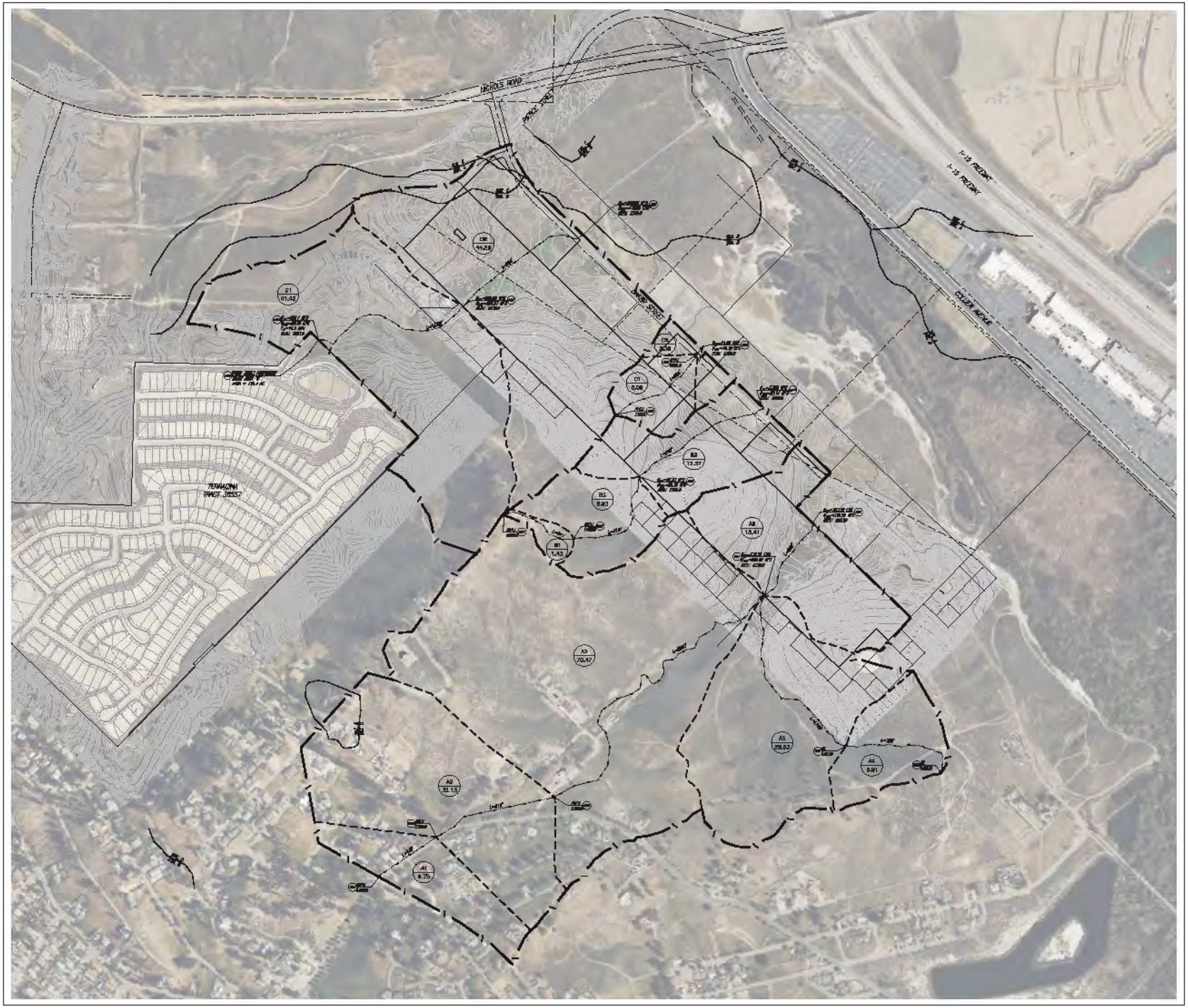
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Appendix

C

EXISTING CONDITION HYDROLOGY RATIONAL METHOD & KEY MAP



DRAINAGE AREA A					
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	TRIBUTARY AREA (AC.)
102	Q10 = 13.85 CFS	13.28	Q100 = 33.29 CFS	13.28	9.75
103	Q10 = 55.67 CFS	15.21	Q100 = 63.83 CFS	15.68	41.86
104	Q10 = 126.35 CFS	24.88	Q100 = 300.61 CFS	23.14	102.09
105	Q10 = 14.68 CFS	11.10	Q100 = 33.59 CFS	11.10	5.61
107	Q10 = 167.29 CFS	27.48	Q100 = 393.93 CFS	25.31	165.40

DRAINAGE AREA B					
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	TRIBUTARY AREA (AC.)
202	Q10 = 2.87 CFS	8.42	Q100 = 4.21 CFS	8.42	1.32
203	Q10 = 17.53 CFS	11.14	Q100 = 24.72 CFS	10.74	10.36
204	Q10 = 37.66 CFS	13.23	Q100 = 48.11 CFS	12.62	23.83

DRAINAGE AREA C					
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	TRIBUTARY AREA (AC.)
302	Q10 = 6.10 CFS	11.82	Q100 = 14.25 CFS	11.82	3.85
303	Q10 = 11.93 CFS	11.83	Q100 = 16.38 CFS	11.83	7.46

DRAINAGE AREA D					
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	TRIBUTARY AREA (AC.)
401	Q10 = 183.10 CFS	14.90	Q100 = 302.40 CFS	14.86	131.49
402	Q10 = 254.88 CFS	17.23	Q100 = 397.51 CFS	16.79	173.82
403	Q10 = 388.69 CFS	19.85	Q100 = 575.61 CFS	19.76	317.10

LEGEND

SCALE IN FEET

STORM CREATION
MCKINZEY KEY 1449
IN
BRIGHT INDUSTRIAL
PROJECT BY RIVERSIDE

100 YEAR EXISTING CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 08/10/23 File:1994E100A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
EXISTING CONDITION
RCFC&WCD 100-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

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Rainfall intensity =      2.847(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.803
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =     22.286(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1340.000(Ft.)
Length of natural channel  =   816.000(Ft.)
Estimated mean flow rate at midpoint of channel =     59.005(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.53(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0662
Corrected/adjusted channel slope =  0.0662
Travel time =    2.46 min.     TC =   15.85  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.040
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.960
RI index for soil(AMC 2)  =  88.56
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.639(In/Hr) for a   100.0 year storm
Subarea runoff =     71.646(CFS) for     32.130(Ac.)
Total runoff =     93.931(CFS)  Total area =      41.880(Ac.)


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Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1340.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  2280.000(Ft.)
Estimated mean flow rate at midpoint of channel =    172.959(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0285
Corrected/adjusted channel slope =  0.0285
Travel time =    7.29 min.     TC =   23.14  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.226(In/Hr) for a   100.0 year storm
Subarea runoff =    131.461(CFS) for     70.470(Ac.)
Total runoff =    225.393(CFS)  Total area =     112.350(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    112.350(Ac.)
Runoff from this stream =    225.393(CFS)
Time of concentration =   23.14 min.
Rainfall intensity =     2.226(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** INITIAL AREA EVALUATION ****
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```
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      3.098(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     23.590(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  1246.000(Ft.)
Estimated mean flow rate at midpoint of channel =     61.754(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.48(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0417
Corrected/adjusted channel slope =  0.0417
Travel time =    4.64 min.     TC =   15.74  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
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```
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.648(In/Hr) for a   100.0 year storm
Subarea runoff =     64.676(CFS) for     28.830(Ac.)
Total runoff =     88.266(CFS)  Total area =      37.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.740(Ac.)
Runoff from this stream =     88.266(CFS)
Time of concentration =   15.74 min.
Rainfall intensity =     2.648(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      225.393     23.14                2.226
2       88.266     15.74                2.648
Largest stream flow has longer time of concentration
Qp =    225.393 + sum of
          Qb         Ia/Ib
          88.266 *    0.841 =     74.213
Qp =    299.605

Total of 2 main streams to confluence:
Flow rates before confluence point:
     225.393      88.266
Area of streams before confluence:
      112.350       37.740


Results of confluence:
Total flow rate =    299.605(CFS)
Time of concentration =    23.141 min.
Effective stream area after confluence  =    150.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      107.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1275.000(Ft.)
End of natural channel elevation =   1267.000(Ft.)
```

```
Length of natural channel  =   580.000(Ft.)
Estimated mean flow rate at midpoint of channel =    317.980(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.46(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0138
Corrected/adjusted channel slope =  0.0138
Travel time =    2.17 min.     TC =   25.31  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.836
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.138(In/Hr) for a   100.0 year storm
Subarea runoff =     32.894(CFS) for     18.410(Ac.)
Total runoff =    332.500(CFS)  Total area =     168.500(Ac.)
End of computations, total study area =          168.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.988
Area averaged RI index number =  88.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E100B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
EXISTING CONDITION
RCFC&WCD 100-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 511.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1400.000(Ft.)
Difference in elevation = 132.000(Ft.)
Slope = 0.25832 s(percent)= 25.83
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.418 min.

```
Rainfall intensity =      3.509(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.314(CFS)
Total initial stream area =        1.430(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1400.000(Ft.)
End of natural channel elevation =   1299.000(Ft.)
Length of natural channel  =   719.000(Ft.)
Estimated mean flow rate at midpoint of channel =     17.782(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.16(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1405
Corrected/adjusted channel slope =  0.1283
Travel time =    2.32 min.     TC =   10.74  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.145(In/Hr) for a   100.0 year storm
Subarea runoff =     24.015(CFS) for      8.930(Ac.)
Total runoff =     28.328(CFS)  Total area =      10.360(Ac.)


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```

```
Process from Point/Station      203.000 to Point/Station      204.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1299.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =   918.000(Ft.)
Estimated mean flow rate at midpoint of channel =     46.881(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.03(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0447
Corrected/adjusted channel slope =  0.0447
Travel time =    1.91 min.     TC =   12.65  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.922(In/Hr) for a   100.0 year storm
Subarea runoff =     33.779(CFS) for     13.570(Ac.)
Total runoff =     62.107(CFS)  Total area =      23.930(Ac.)
End of computations, total study area =           23.93 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E100C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
EXISTING CONDITION
RCFC&WCD 100-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 684.000(Ft.)
Top (of initial area) elevation = 1327.000(Ft.)
Bottom (of initial area) elevation = 1261.000(Ft.)
Difference in elevation = 66.000(Ft.)
Slope = 0.09649 s(percent)= 9.65
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.519 min.

```
Rainfall intensity =      3.047(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     13.217(CFS)
Total initial stream area =        5.080(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      302.000 to Point/Station      303.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1261.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =    44.000(Ft.)
Estimated mean flow rate at midpoint of channel =     16.313(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.41(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0682
Corrected/adjusted channel slope =  0.0682
Travel time =    0.10 min.     TC =   11.62  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.036(In/Hr) for a   100.0 year storm
Subarea runoff =      6.167(CFS) for      2.380(Ac.)
Total runoff =     19.384(CFS)  Total area =       7.460(Ac.)
End of computations, total study area =            7.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 89.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E100D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
EXISTING CONDITION
RCFC&WCD 100-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 2.773(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.801
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000

```
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
User specified values are as follows:
TC =  14.20 min.  Rain intensity =       2.77(In/Hr)
Total area =       131.40(Ac.)  Total runoff =    297.40(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1283.000(Ft.)
End of natural channel elevation =   1272.000(Ft.)
Length of natural channel  =  1086.000(Ft.)
Estimated mean flow rate at midpoint of channel =    344.273(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.00(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0101
Corrected/adjusted channel slope =  0.0101
Travel time =    2.59 min.     TC =   16.79  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.572(In/Hr) for a   100.0 year storm
Subarea runoff =     90.113(CFS) for     41.420(Ac.)
Total runoff =    387.513(CFS)  Total area =     172.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1272.000(Ft.)
End of natural channel elevation =   1261.000(Ft.)
Length of natural channel  =   936.000(Ft.)
Estimated mean flow rate at midpoint of channel =    437.157(CFS)
```

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.13(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope = 0.0118
Corrected/adjusted channel slope = 0.0118
Travel time =   1.92 min.   TC =   18.70 min.

 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.010
Decimal fraction soil group C = 0.050
Decimal fraction soil group D = 0.940
RI index for soil(AMC 2) = 88.74
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity =   2.450(In/Hr) for a   100.0 year storm
Subarea runoff =   91.328(CFS) for   44.280(Ac.)
Total runoff =   478.841(CFS) Total area =   217.100(Ac.)
End of computations, total study area =   217.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.879
Area averaged RI index number = 80.5

10 YEAR EXISTING CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 08/10/23 File:1994E10A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
EXISTING CONDITION
RCFC&WCD 10-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

```
Rainfall intensity =      1.807(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.758
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =     13.353(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1340.000(Ft.)
Length of natural channel  =   816.000(Ft.)
Estimated mean flow rate at midpoint of channel =     35.354(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.67(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0662
Corrected/adjusted channel slope =  0.0662
Travel time =    2.91 min.     TC =   16.31  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.815
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.040
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.960
RI index for soil(AMC 2)  =  88.56
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.654(In/Hr) for a    10.0 year storm
Subarea runoff =     43.318(CFS) for     32.130(Ac.)
Total runoff =     56.671(CFS)  Total area =      41.880(Ac.)


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```
Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1340.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  2280.000(Ft.)
Estimated mean flow rate at midpoint of channel =    104.349(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.41(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0285
Corrected/adjusted channel slope =  0.0285
Travel time =    8.61 min.     TC =   24.92  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.803
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.367(In/Hr) for a    10.0 year storm
Subarea runoff =     77.352(CFS) for     70.470(Ac.)
Total runoff =    134.022(CFS)  Total area =     112.350(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    112.350(Ac.)
Runoff from this stream =    134.022(CFS)
Time of concentration =   24.92 min.
Rainfall intensity =     1.367(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** INITIAL AREA EVALUATION ****
```

```
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      1.966(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     14.549(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  1246.000(Ft.)
Estimated mean flow rate at midpoint of channel =     38.086(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.82(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0417
Corrected/adjusted channel slope =  0.0417
Travel time =    5.44 min.     TC =   16.54  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.818
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
```

```
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.643(In/Hr) for a    10.0 year storm
Subarea runoff =     38.752(CFS) for     28.830(Ac.)
Total runoff =     53.301(CFS)  Total area =      37.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.740(Ac.)
Runoff from this stream =     53.301(CFS)
Time of concentration =   16.54 min.
Rainfall intensity =     1.643(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      134.022     24.92                1.367
2       53.301     16.54                1.643
Largest stream flow has longer time of concentration
Qp =    134.022 + sum of
          Qb         Ia/Ib
          53.301 *    0.832 =     44.329
Qp =    178.351

Total of 2 main streams to confluence:
Flow rates before confluence point:
     134.022      53.301
Area of streams before confluence:
      112.350       37.740


Results of confluence:
Total flow rate =    178.351(CFS)
Time of concentration =    24.916 min.
Effective stream area after confluence  =    150.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      107.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1275.000(Ft.)
End of natural channel elevation =   1267.000(Ft.)
```

```
Length of natural channel  =   580.000(Ft.)
Estimated mean flow rate at midpoint of channel =    189.289(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.76(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0138
Corrected/adjusted channel slope =  0.0138
Travel time =    2.57 min.     TC =   27.49  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.799
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.308(In/Hr) for a    10.0 year storm
Subarea runoff =     19.240(CFS) for     18.410(Ac.)
Total runoff =    197.591(CFS)  Total area =     168.500(Ac.)
End of computations, total study area =          168.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.988
Area averaged RI index number =  88.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E10B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
EXISTING CONDITION
RCFC&WCD 10-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 511.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1400.000(Ft.)
Difference in elevation = 132.000(Ft.)
Slope = 0.25832 s(percent)= 25.83
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.418 min.

```
Rainfall intensity =      2.227(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.669(CFS)
Total initial stream area =        1.430(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1400.000(Ft.)
End of natural channel elevation =   1299.000(Ft.)
Length of natural channel  =   719.000(Ft.)
Estimated mean flow rate at midpoint of channel =     11.002(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.40(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1405
Corrected/adjusted channel slope =  0.1283
Travel time =    2.72 min.     TC =   11.14  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.963(In/Hr) for a    10.0 year storm
Subarea runoff =     14.557(CFS) for      8.930(Ac.)
Total runoff =     17.226(CFS)  Total area =      10.360(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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```
Process from Point/Station      203.000 to Point/Station      204.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
---------------------------------------------------------------------------
Top of natural channel elevation =   1299.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =   918.000(Ft.)
Estimated mean flow rate at midpoint of channel =     28.508(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.98(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0447
Corrected/adjusted channel slope =  0.0447
Travel time =    2.19 min.     TC =   13.33  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.811(In/Hr) for a    10.0 year storm
Subarea runoff =     20.271(CFS) for     13.570(Ac.)
Total runoff =     37.497(CFS)  Total area =      23.930(Ac.)
End of computations, total study area =           23.93 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E10C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
EXISTING CONDITION
RCFC&WCD 10-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 684.000(Ft.)
Top (of initial area) elevation = 1327.000(Ft.)
Bottom (of initial area) elevation = 1261.000(Ft.)
Difference in elevation = 66.000(Ft.)
Slope = 0.09649 s(percent)= 9.65
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.519 min.

```
Rainfall intensity =      1.934(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      8.148(CFS)
Total initial stream area =        5.080(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      302.000 to Point/Station      303.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1261.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =    44.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.057(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.54(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0682
Corrected/adjusted channel slope =  0.0682
Travel time =    0.11 min.     TC =   11.63  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.926(In/Hr) for a    10.0 year storm
Subarea runoff =      3.799(CFS) for      2.380(Ac.)
Total runoff =     11.947(CFS)  Total area =       7.460(Ac.)
End of computations, total study area =            7.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 89.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E10D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
EXISTING CONDITION
RCFC&WCD 10-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 1.760(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.755
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000

```
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
User specified values are as follows:
TC =  14.20 min.  Rain intensity =       1.76(In/Hr)
Total area =       131.40(Ac.)  Total runoff =    180.10(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1283.000(Ft.)
End of natural channel elevation =   1272.000(Ft.)
Length of natural channel  =  1086.000(Ft.)
Estimated mean flow rate at midpoint of channel =    208.486(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.98(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0101
Corrected/adjusted channel slope =  0.0101
Travel time =    3.03 min.     TC =   17.23  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.614(In/Hr) for a    10.0 year storm
Subarea runoff =     54.576(CFS) for     41.420(Ac.)
Total runoff =    234.676(CFS)  Total area =     172.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1272.000(Ft.)
End of natural channel elevation =   1261.000(Ft.)
Length of natural channel  =   936.000(Ft.)
Estimated mean flow rate at midpoint of channel =    264.741(CFS)
```

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.94(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope = 0.0118
Corrected/adjusted channel slope = 0.0118
Travel time =   2.25 min.   TC =   19.48 min.

 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.810
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.010
Decimal fraction soil group C = 0.050
Decimal fraction soil group D = 0.940
RI index for soil(AMC 2) = 88.74
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity =   1.527(In/Hr) for a   10.0 year storm
Subarea runoff =   54.781(CFS) for   44.280(Ac.)
Total runoff =   289.457(CFS) Total area =   217.100(Ac.)
End of computations, total study area =   217.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.879
Area averaged RI index number = 80.5

5 YEAR EXISTING CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 08/10/23 File:1994E5A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
EXISTING CONDITION
RCFC&WCD 5-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 5.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 5.0
Calculated rainfall intensity data:
1 hour intensity = 0.761(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

```
Rainfall intensity =      1.494(In/Hr) for a     5.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.610
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      8.889(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1340.000(Ft.)
Length of natural channel  =   816.000(Ft.)
Estimated mean flow rate at midpoint of channel =     23.536(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.09(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0662
Corrected/adjusted channel slope =  0.0662
Travel time =    3.33 min.     TC =   16.72  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.684
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.040
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.960
RI index for soil(AMC 1)  =  75.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.352(In/Hr) for a     5.0 year storm
Subarea runoff =     29.691(CFS) for     32.130(Ac.)
Total runoff =     38.580(CFS)  Total area =      41.880(Ac.)


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```
Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1340.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  2280.000(Ft.)
Estimated mean flow rate at midpoint of channel =     71.039(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.89(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0285
Corrected/adjusted channel slope =  0.0285
Travel time =    9.78 min.     TC =   26.50  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.655
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.099(In/Hr) for a     5.0 year storm
Subarea runoff =     50.699(CFS) for     70.470(Ac.)
Total runoff =     89.279(CFS)  Total area =     112.350(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    112.350(Ac.)
Runoff from this stream =     89.279(CFS)
Time of concentration =   26.50 min.
Rainfall intensity =     1.099(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** INITIAL AREA EVALUATION ****
```

```
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      1.626(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.718
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.401(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  1246.000(Ft.)
Estimated mean flow rate at midpoint of channel =     27.227(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.42(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0417
Corrected/adjusted channel slope =  0.0417
Travel time =    6.08 min.     TC =   17.18  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.688
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
```

```
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.336(In/Hr) for a     5.0 year storm
Subarea runoff =     26.487(CFS) for     28.830(Ac.)
Total runoff =     36.888(CFS)  Total area =      37.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.740(Ac.)
Runoff from this stream =     36.888(CFS)
Time of concentration =   17.18 min.
Rainfall intensity =     1.336(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       89.279     26.50                 1.099
2       36.888     17.18                 1.336
Largest stream flow has longer time of concentration
Qp =     89.279 + sum of
          Qb         Ia/Ib
          36.888 *    0.823 =     30.352
Qp =    119.631

Total of 2 main streams to confluence:
Flow rates before confluence point:
      89.279      36.888
Area of streams before confluence:
      112.350       37.740


Results of confluence:
Total flow rate =    119.631(CFS)
Time of concentration =    26.499 min.
Effective stream area after confluence  =    150.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      107.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1275.000(Ft.)
End of natural channel elevation =   1267.000(Ft.)
```

```
Length of natural channel  =   580.000(Ft.)
Estimated mean flow rate at midpoint of channel =    126.968(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.29(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0138
Corrected/adjusted channel slope =  0.0138
Travel time =    2.93 min.     TC =   29.43  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.646
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.048(In/Hr) for a     5.0 year storm
Subarea runoff =     12.469(CFS) for     18.410(Ac.)
Total runoff =    132.100(CFS)  Total area =     168.500(Ac.)
End of computations, total study area =          168.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.988
Area averaged RI index number =  88.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E5B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
EXISTING CONDITION
RCFC&WCD 5-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 5.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 5.0
Calculated rainfall intensity data:
1 hour intensity = 0.761(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 511.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1400.000(Ft.)
Difference in elevation = 132.000(Ft.)
Slope = 0.25832 s(percent)= 25.83
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.418 min.

```
Rainfall intensity =      1.841(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.735
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.936(CFS)
Total initial stream area =        1.430(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1400.000(Ft.)
End of natural channel elevation =   1299.000(Ft.)
Length of natural channel  =   719.000(Ft.)
Estimated mean flow rate at midpoint of channel =      7.983(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.96(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1405
Corrected/adjusted channel slope =  0.1283
Travel time =    3.03 min.     TC =   11.44  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.716
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.604(In/Hr) for a     5.0 year storm
Subarea runoff =     10.254(CFS) for      8.930(Ac.)
Total runoff =     12.191(CFS)  Total area =      10.360(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station      203.000 to Point/Station      204.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1299.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =   918.000(Ft.)
Estimated mean flow rate at midpoint of channel =     20.174(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.35(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0447
Corrected/adjusted channel slope =  0.0447
Travel time =    2.41 min.     TC =   13.85  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.703
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.471(In/Hr) for a     5.0 year storm
Subarea runoff =     14.040(CFS) for     13.570(Ac.)
Total runoff =     26.231(CFS)  Total area =      23.930(Ac.)
End of computations, total study area =           23.93 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E5C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
EXISTING CONDITION
RCFC&WCD 5-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 5.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 5.0
Calculated rainfall intensity data:
1 hour intensity = 0.761(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 684.000(Ft.)
Top (of initial area) elevation = 1327.000(Ft.)
Bottom (of initial area) elevation = 1261.000(Ft.)
Difference in elevation = 66.000(Ft.)
Slope = 0.09649 s(percent)= 9.65
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.519 min.

```
Rainfall intensity =      1.599(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.627(CFS)
Total initial stream area =        5.080(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      302.000 to Point/Station      303.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1261.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =    44.000(Ft.)
Estimated mean flow rate at midpoint of channel =      8.179(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0682
Corrected/adjusted channel slope =  0.0682
Travel time =    0.12 min.     TC =   11.64  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.592(In/Hr) for a     5.0 year storm
Subarea runoff =      3.089(CFS) for      2.380(Ac.)
Total runoff =      9.716(CFS)  Total area =       7.460(Ac.)
End of computations, total study area =            7.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 89.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E5D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
EXISTING CONDITION
RCFC&WCD 5-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 5.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 5.0
Calculated rainfall intensity data:
1 hour intensity = 0.761(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 1.455(In/Hr) for a 5.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.732
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000

```
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
User specified values are as follows:
TC =  14.20 min.  Rain intensity =       1.46(In/Hr)
Total area =       131.40(Ac.)  Total runoff =    112.60(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1283.000(Ft.)
End of natural channel elevation =   1272.000(Ft.)
Length of natural channel  =  1086.000(Ft.)
Estimated mean flow rate at midpoint of channel =    130.347(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.18(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0101
Corrected/adjusted channel slope =  0.0101
Travel time =    3.50 min.     TC =   17.70  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.800
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.318(In/Hr) for a     5.0 year storm
Subarea runoff =     43.668(CFS) for     41.420(Ac.)
Total runoff =    156.268(CFS)  Total area =     172.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1272.000(Ft.)
End of natural channel elevation =   1261.000(Ft.)
Length of natural channel  =   936.000(Ft.)
Estimated mean flow rate at midpoint of channel =    176.288(CFS)
```

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.11(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope = 0.0118
Corrected/adjusted channel slope = 0.0118
Travel time =   2.55 min.   TC =   20.25 min.

 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.792
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.010
Decimal fraction soil group C = 0.050
Decimal fraction soil group D = 0.940
RI index for soil(AMC 2) = 88.74
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity =   1.240(In/Hr) for a   5.0 year storm
Subarea runoff =   43.499(CFS) for   44.280(Ac.)
Total runoff =   199.767(CFS) Total area =   217.100(Ac.)
End of computations, total study area =   217.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.879
Area averaged RI index number = 80.5

2 YEAR EXISTING CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 08/10/23 File:1994E2A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
EXISTING CONDITION
RCFC&WCD 2-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.550(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

```
Rainfall intensity =      1.080(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.553
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      5.821(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


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Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1340.000(Ft.)
Length of natural channel  =   816.000(Ft.)
Estimated mean flow rate at midpoint of channel =     15.412(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.55(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0662
Corrected/adjusted channel slope =  0.0662
Travel time =    3.83 min.     TC =   17.22  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.623
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.040
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.960
RI index for soil(AMC 1)  =  75.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.964(In/Hr) for a     2.0 year storm
Subarea runoff =     19.316(CFS) for     32.130(Ac.)
Total runoff =     25.137(CFS)  Total area =      41.880(Ac.)


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```
Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1340.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  2280.000(Ft.)
Estimated mean flow rate at midpoint of channel =     46.285(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.37(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0285
Corrected/adjusted channel slope =  0.0285
Travel time =   11.26 min.     TC =   28.48  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.586
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.769(In/Hr) for a     2.0 year storm
Subarea runoff =     31.765(CFS) for     70.470(Ac.)
Total runoff =     56.902(CFS)  Total area =     112.350(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    112.350(Ac.)
Runoff from this stream =     56.902(CFS)
Time of concentration =   28.48 min.
Rainfall intensity =     0.769(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** INITIAL AREA EVALUATION ****
```

```
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      1.175(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.666
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.978(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  1246.000(Ft.)
Estimated mean flow rate at midpoint of channel =     18.268(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.00(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0417
Corrected/adjusted channel slope =  0.0417
Travel time =    6.93 min.     TC =   18.04  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.627
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
```

```
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.945(In/Hr) for a     2.0 year storm
Subarea runoff =     17.069(CFS) for     28.830(Ac.)
Total runoff =     24.047(CFS)  Total area =      37.740(Ac.)


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Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.740(Ac.)
Runoff from this stream =     24.047(CFS)
Time of concentration =   18.04 min.
Rainfall intensity =     0.945(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       56.902     28.48                 0.769
2       24.047     18.04                 0.945
Largest stream flow has longer time of concentration
Qp =     56.902 + sum of
          Qb         Ia/Ib
          24.047 *    0.814 =     19.577
Qp =     76.479

Total of 2 main streams to confluence:
Flow rates before confluence point:
      56.902      24.047
Area of streams before confluence:
      112.350       37.740


Results of confluence:
Total flow rate =     76.479(CFS)
Time of concentration =    28.483 min.
Effective stream area after confluence  =    150.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      107.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1275.000(Ft.)
End of natural channel elevation =   1267.000(Ft.)
```

```
Length of natural channel  =   580.000(Ft.)
Estimated mean flow rate at midpoint of channel =     81.170(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   2.84(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0138
Corrected/adjusted channel slope =  0.0138
Travel time =    3.40 min.     TC =   31.88  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.576
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.731(In/Hr) for a     2.0 year storm
Subarea runoff =      7.747(CFS) for     18.410(Ac.)
Total runoff =     84.226(CFS)  Total area =     168.500(Ac.)
End of computations, total study area =          168.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.988
Area averaged RI index number =  88.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E2B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
EXISTING CONDITION
RCFC&WCD 2-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.550(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 511.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1400.000(Ft.)
Difference in elevation = 132.000(Ft.)
Slope = 0.25832 s(percent)= 25.83
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.418 min.

```
Rainfall intensity =      1.331(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.687
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.308(CFS)
Total initial stream area =        1.430(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1400.000(Ft.)
End of natural channel elevation =   1299.000(Ft.)
Length of natural channel  =   719.000(Ft.)
Estimated mean flow rate at midpoint of channel =      5.393(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.48(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1405
Corrected/adjusted channel slope =  0.1283
Travel time =    3.44 min.     TC =   11.86  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.661
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.141(In/Hr) for a     2.0 year storm
Subarea runoff =      6.736(CFS) for      8.930(Ac.)
Total runoff =      8.044(CFS)  Total area =      10.360(Ac.)


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```
Process from Point/Station      203.000 to Point/Station      204.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1299.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =   918.000(Ft.)
Estimated mean flow rate at midpoint of channel =     13.312(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.68(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0447
Corrected/adjusted channel slope =  0.0447
Travel time =    2.69 min.     TC =   14.55  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.645
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.040(In/Hr) for a     2.0 year storm
Subarea runoff =      9.103(CFS) for     13.570(Ac.)
Total runoff =     17.147(CFS)  Total area =      23.930(Ac.)
End of computations, total study area =           23.93 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E2C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
EXISTING CONDITION
RCFC&WCD 2-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.550(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 684.000(Ft.)
Top (of initial area) elevation = 1327.000(Ft.)
Bottom (of initial area) elevation = 1261.000(Ft.)
Difference in elevation = 66.000(Ft.)
Slope = 0.09649 s(percent)= 9.65
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.519 min.

```
Rainfall intensity =      1.156(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.788
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.625(CFS)
Total initial stream area =        5.080(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1261.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =    44.000(Ft.)
Estimated mean flow rate at midpoint of channel =      5.709(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.68(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0682
Corrected/adjusted channel slope =  0.0682
Travel time =    0.13 min.     TC =   11.65  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.787
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.150(In/Hr) for a     2.0 year storm
Subarea runoff =      2.155(CFS) for      2.380(Ac.)
Total runoff =      6.780(CFS)  Total area =       7.460(Ac.)
End of computations, total study area =            7.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 89.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 06/27/24 File:1994E2D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
EXISTING CONDITION
RCFC&WCD 2-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.550(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 1.052(In/Hr) for a 2.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.686
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000

```
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
User specified values are as follows:
TC =  14.20 min.  Rain intensity =       1.05(In/Hr)
Total area =       131.40(Ac.)  Total runoff =     71.90(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1283.000(Ft.)
End of natural channel elevation =   1272.000(Ft.)
Length of natural channel  =  1086.000(Ft.)
Estimated mean flow rate at midpoint of channel =     83.232(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.52(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0101
Corrected/adjusted channel slope =  0.0101
Travel time =    4.00 min.     TC =   18.20  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.766
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.941(In/Hr) for a     2.0 year storm
Subarea runoff =     29.842(CFS) for     41.420(Ac.)
Total runoff =    101.742(CFS)  Total area =     172.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1272.000(Ft.)
End of natural channel elevation =   1261.000(Ft.)
Length of natural channel  =   936.000(Ft.)
Estimated mean flow rate at midpoint of channel =    114.776(CFS)
```

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.36(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope = 0.0118
Corrected/adjusted channel slope = 0.0118
Travel time =   2.91 min.   TC =   21.11 min.

 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.755
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.010
Decimal fraction soil group C = 0.050
Decimal fraction soil group D = 0.940
RI index for soil(AMC 2) = 88.74
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity =   0.880(In/Hr) for a   2.0 year storm
Subarea runoff =   29.416(CFS) for   44.280(Ac.)
Total runoff =   131.158(CFS) Total area =   217.100(Ac.)
End of computations, total study area =   217.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

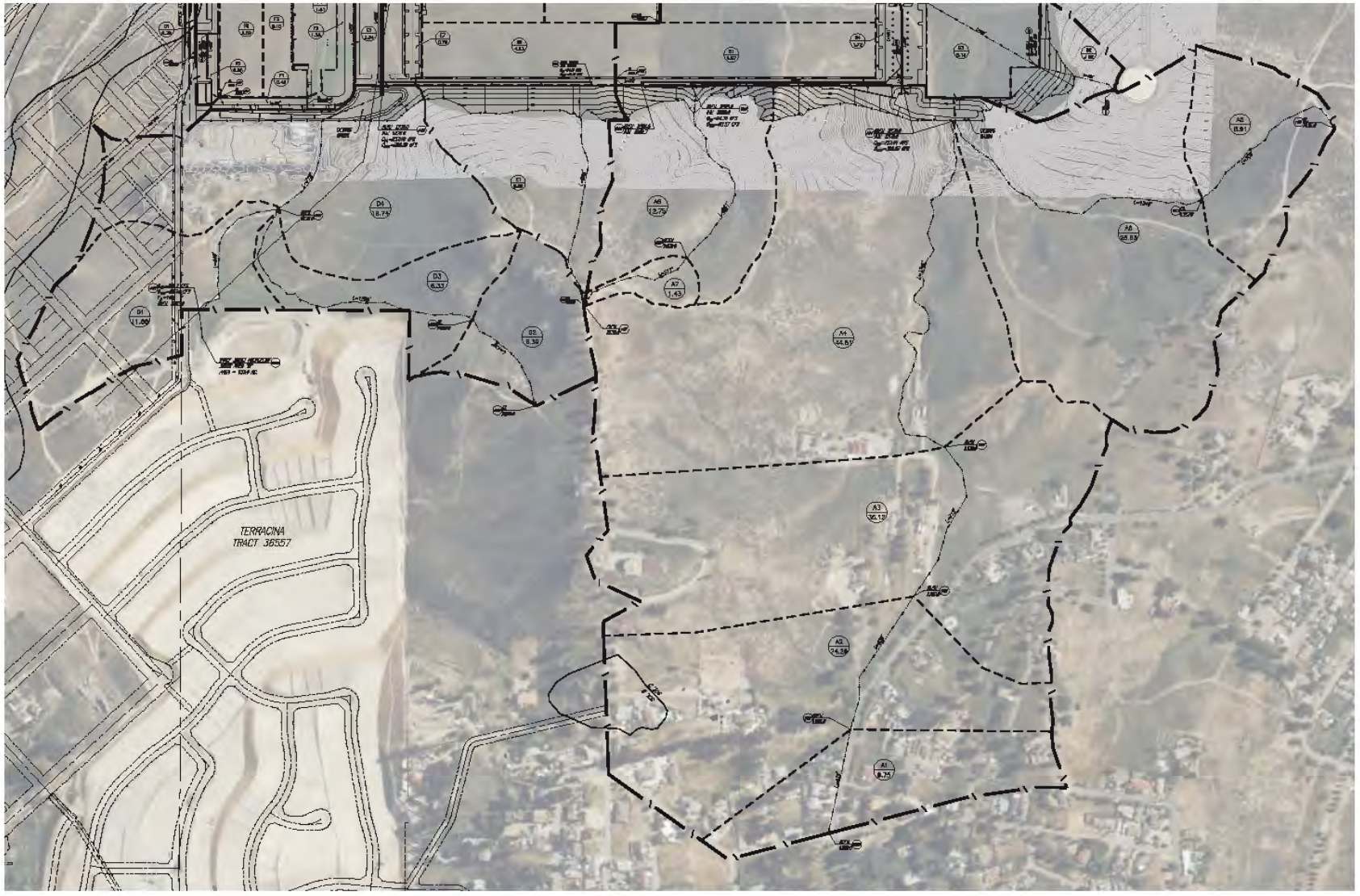
Area averaged pervious area fraction(Ap) = 0.879
Area averaged RI index number = 80.5

Appendix

D

PROPOSED CONDITION HYDROLOGY RATIONAL METHOD & KEY MAP

FOR ONSITE SEE SHEET 2



DRAINAGE AREA A					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
102	Q10 = 46.39 CFS	10.08	Q100 = 78.80 CFS	10.04	24.28
103	Q10 = 89.32 CFS	15.85	Q100 = 136.12 CFS	17.74	69.18
107	Q10 = 14.55 CFS	11.10	Q100 = 23.56 CFS	11.10	5.91
104	Q10 = 184.41 CFS	16.30	Q100 = 299.53 CFS	23.46	113.47
108	Q10 = 2.57 CFS	8.42	Q100 = 4.31 CFS	8.43	1.43
109	Q10 = 34.79 CFS	9.63	Q100 = 60.27 CFS	9.59	14.18
109	Q10 = 339.43 CFS	24.98	Q100 = 536.79 CFS	33.77	193.29
106	Q10 = 332.46 CFS	25.36	Q100 = 536.79 CFS	33.60	165.69

DRAINAGE AREA B					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
202	Q10 = 10.34 CFS	9.90	Q100 = 17.26 CFS	9.90	5.27
203	Q10 = 36.33 CFS	11.11	Q100 = 64.51 CFS	10.65	34.61
207	Q10 = 8.63 CFS	8.62	Q100 = 10.03 CFS	8.92	3.23
205	Q10 = 13.83 CFS	10.80	Q100 = 24.44 CFS	10.61	8.37
204	Q10 = 41.86 CFS	12.80	Q100 = 80.18 CFS	11.84	25.98
210	Q10 = 63.25 CFS	13.01	Q100 = 4.27 CFS	8.09	1.27
200	Q10 = 41.09 CFS	12.62	Q100 = 98.18 CFS	11.84	23.98

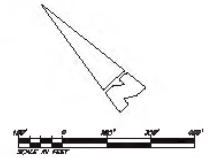
DRAINAGE AREA C					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
302	Q10 = 0.50 CFS	13.31	Q100 = 0.89 CFS	13.31	0.19
303	Q10 = 3.65 CFS	27.34	Q100 = 4.84 CFS	29.13	2.57
304	Q10 = 5.18 CFS	28.29	Q100 = 6.73 CFS	27.87	3.09
305	Q10 = 4.15 CFS	28.73	Q100 = 5.73 CFS	28.38	3.59

DRAINAGE AREA D					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
401	Q10 = 185.10 CFS	14.20	Q100 = 297.40 CFS	14.20	131.45
406	Q10 = 11.78 CFS	9.20	Q100 = 18.44 CFS	9.10	4.79
403	Q10 = 214.23 CFS	17.43	Q100 = 352.45 CFS	16.94	155.78
405	Q10 = 237.48 CFS	21.24	Q100 = 382.18 CFS	20.17	170.52
404	Q10 = 237.48 CFS	22.03	Q100 = 382.18 CFS	20.88	175.52

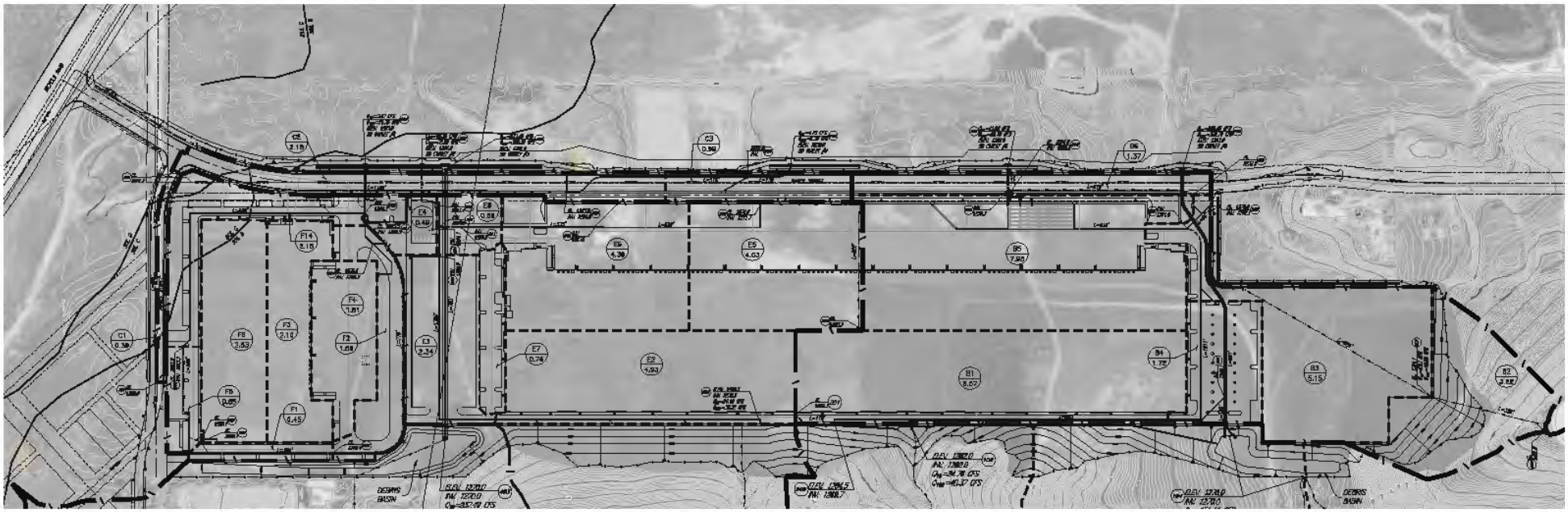
DRAINAGE AREA E					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
501	Q10 = 84.19 CFS	10.88	Q100 = 38.30 CFS	10.86	14.82
503	Q10 = 272.61 CFS	13.82	Q100 = 43.28 CFS	13.27	17.19
504	Q10 = 36.68 CFS	13.98	Q100 = 62.50 CFS	13.40	17.86
506	Q10 = 7.78 CFS	8.66	Q100 = 12.23 CFS	8.88	4.03
510	Q10 = 13.94 CFS	10.38	Q100 = 24.77 CFS	10.81	8.39
511	Q10 = 16.09 CFS	11.34	Q100 = 30.87 CFS	11.20	8.15
505	Q10 = 44.23 CFS	13.67	Q100 = 71.21 CFS	13.41	26.80
506	Q10 = 45.30 CFS	13.66	Q100 = 72.83 CFS	13.66	27.46
507	Q10 = 45.30 CFS	13.66	Q100 = 72.82 CFS	13.61	27.46

DRAINAGE AREA F					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
602	Q10 = 5.94 CFS	14.72	Q100 = 1.04 CFS	14.72	4.49
602	Q10 = 2.52 CFS	24.32	Q100 = 2.65 CFS	23.62	2.01
604	Q10 = 7.82 CFS	24.36	Q100 = 11.75 CFS	23.67	6.82
605	Q10 = 7.27 CFS	24.80	Q100 = 11.75 CFS	23.67	5.82
606	Q10 = 7.27 CFS	24.83	Q100 = 11.75 CFS	23.68	5.82

LEGEND



PROPOSED CONDITION HYDROLOGY KEY MAP
for
BAKER INDUSTRIAL
COUNTY OF RIVERSIDE



FOR OFFSITE SEE SHEET 1

LEGEND

PROPOSED CONDITION HYDROLOGY KEY MAP

BAKER INDUSTRIAL

DELETE OF 05/12/2025

100 YEAR PROPOSED CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/09/24 File:1994D100A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

```
Rainfall intensity =      2.847(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.803
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =     22.286(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1360.000(Ft.)
Length of natural channel  =   636.000(Ft.)
Estimated mean flow rate at midpoint of channel =     50.045(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.72(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0535
Corrected/adjusted channel slope =  0.0535
Travel time =    2.25 min.     TC =   15.64  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.040
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.960
RI index for soil(AMC 2)  =  88.56
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.655(In/Hr) for a   100.0 year storm
Subarea runoff =     54.512(CFS) for     24.290(Ac.)
Total runoff =     76.797(CFS)  Total area =      34.040(Ac.)


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```
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1360.000(Ft.)
End of natural channel elevation =   1330.000(Ft.)
Length of natural channel  =   715.000(Ft.)
Estimated mean flow rate at midpoint of channel =    116.414(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.53(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0420
Corrected/adjusted channel slope =  0.0420
Travel time =    2.15 min.     TC =   17.79  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.040
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.960
RI index for soil(AMC 2)  =  88.56
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.506(In/Hr) for a   100.0 year storm
Subarea runoff =     74.102(CFS) for     35.120(Ac.)
Total runoff =    150.899(CFS)  Total area =      69.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1330.000(Ft.)
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =  1745.000(Ft.)
Estimated mean flow rate at midpoint of channel =    199.457(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.99(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
```

```
        Normal channel slope =  0.0344
Corrected/adjusted channel slope =  0.0344
Travel time =    4.85 min.     TC =   22.65  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.248(In/Hr) for a   100.0 year storm
Subarea runoff =     83.897(CFS) for     44.510(Ac.)
Total runoff =    234.796(CFS)  Total area =     113.670(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    113.670(Ac.)
Runoff from this stream =    234.796(CFS)
Time of concentration =   22.65 min.
Rainfall intensity =     2.248(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      3.098(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
```

```
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     23.590(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =  1246.000(Ft.)
Estimated mean flow rate at midpoint of channel =     61.754(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.68(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0457
Corrected/adjusted channel slope =  0.0457
Travel time =    4.43 min.     TC =   15.54  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.663(In/Hr) for a   100.0 year storm
Subarea runoff =     65.081(CFS) for     28.830(Ac.)
Total runoff =     88.671(CFS)  Total area =      37.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.740(Ac.)
Runoff from this stream =     88.671(CFS)
```

```
Time of concentration =   15.54 min.
Rainfall intensity =     2.663(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      234.796     22.65                 2.248
2       88.671     15.54                 2.663
Largest stream flow has longer time of concentration
Qp =    234.796 + sum of
          Qb         Ia/Ib
          88.671 *    0.844 =     74.836
Qp =    309.633

Total of 2 main streams to confluence:
Flow rates before confluence point:
     234.796      88.671
Area of streams before confluence:
      113.670       37.740


Results of confluence:
Total flow rate =    309.633(CFS)
Time of concentration =    22.648 min.
Effective stream area after confluence  =    151.410(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1270.000(Ft.)
Downstream point/station elevation =  1269.100(Ft.)
Pipe length  =   108.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   309.633(CFS)
Nearest computed pipe diameter  =     66.00(In.)
Calculated individual pipe flow  =   309.633(CFS)
Normal flow depth in pipe =   54.75(In.)
Flow top width inside pipe =   49.64(In.)
Critical Depth =   57.90(In.)
Pipe flow velocity =     14.70(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    22.77 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      105.000
**** CONFLUENCE OF MAIN STREAMS ****
```

```
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    151.410(Ac.)
Runoff from this stream =    309.633(CFS)
Time of concentration =   22.77 min.
Rainfall intensity =     2.242(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   511.000(Ft.)
Top (of initial area) elevation =  1532.000(Ft.)
Bottom (of initial area) elevation =  1400.000(Ft.)
Difference in elevation =   132.000(Ft.)
Slope =    0.25832  s(percent)=      25.83
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.418 min.
Rainfall intensity =      3.509(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.314(CFS)
Total initial stream area =        1.430(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1400.000(Ft.)
End of natural channel elevation =   1282.000(Ft.)
Length of natural channel  =   861.000(Ft.)
Estimated mean flow rate at midpoint of channel =     23.544(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.60(Ft/s)

Correction to map slope used on extremely rugged channels with
```

```
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1370
Corrected/adjusted channel slope =  0.1370
Travel time =    1.24 min.     TC =    9.66  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.857
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.299(In/Hr) for a   100.0 year storm
Subarea runoff =     36.055(CFS) for     12.750(Ac.)
Total runoff =     40.369(CFS)  Total area =      14.180(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1282.000(Ft.)
Downstream point/station elevation =  1269.100(Ft.)
Pipe length  =   923.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    40.369(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    40.369(CFS)
Normal flow depth in pipe =   20.91(In.)
Flow top width inside pipe =   27.58(In.)
Critical Depth =   25.64(In.)
Pipe flow velocity =     11.05(Ft/s)
Travel time through pipe =    1.39 min.
Time of concentration (TC) =    11.05 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      105.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     14.180(Ac.)
Runoff from this stream =     40.369(CFS)
Time of concentration =   11.05 min.
Rainfall intensity =     3.105(In/Hr)
Summary of stream data:
```

```
Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      309.633     22.77                2.242
2       40.369     11.05                3.105
Largest stream flow has longer time of concentration
Qp =    309.633 + sum of
          Qb         Ia/Ib
          40.369 *    0.722 =     29.154
Qp =    338.787

Total of 2 main streams to confluence:
Flow rates before confluence point:
     309.633      40.369
Area of streams before confluence:
      151.410       14.180


Results of confluence:
Total flow rate =    338.787(CFS)
Time of concentration =    22.770 min.
Effective stream area after confluence  =    165.590(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1269.100(Ft.)
Downstream point/station elevation =  1263.000(Ft.)
Pipe length  =   667.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   338.787(CFS)
Nearest computed pipe diameter  =     66.00(In.)
Calculated individual pipe flow  =   338.787(CFS)
Normal flow depth in pipe =   58.13(In.)
Flow top width inside pipe =   42.79(In.)
Critical Depth =   59.66(In.)
Pipe flow velocity =     15.29(Ft/s)
Travel time through pipe =    0.73 min.
Time of concentration (TC) =    23.50 min.
End of computations, total study area =          165.59 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.988
Area averaged RI index number =  88.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 07/08/24 File:1994D100B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 116.000(Ft.)
Top (of initial area) elevation = 1285.300(Ft.)
Bottom (of initial area) elevation = 1284.500(Ft.)
Difference in elevation = 0.800(Ft.)
Slope = 0.00690 s(percent)= 0.69
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.601 min.

```
Rainfall intensity =      3.307(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.800
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     17.391(CFS)
Total initial stream area =        6.570(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1269.700(Ft.)
Downstream point/station elevation =  1261.600(Ft.)
Pipe length  =  1611.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.391(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    17.391(CFS)
Normal flow depth in pipe =   18.14(In.)
Flow top width inside pipe =   25.35(In.)
Critical Depth =   17.49(In.)
Pipe flow velocity =      6.13(Ft/s)
Travel time through pipe =    4.38 min.
Time of concentration (TC) =    13.98 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.570(Ac.)
Runoff from this stream =     17.391(CFS)
Time of concentration =   13.98 min.
Rainfall intensity =     2.792(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   336.000(Ft.)
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```
Top (of initial area) elevation =  1401.000(Ft.)
Bottom (of initial area) elevation =  1301.100(Ft.)
Difference in elevation =    99.900(Ft.)
Slope =    0.29732  s(percent)=      29.73
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.921 min.
Rainfall intensity =      3.832(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.028(CFS)
Total initial stream area =        3.220(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      208.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1301.100(Ft.)
End of street segment elevation =  1276.000(Ft.)
Length of street segment  =   924.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     17.295(CFS)
Depth of flow =   0.397(Ft.), Average velocity =   4.413(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.538(Ft.)
Flow velocity =   4.41(Ft/s)
Travel time =    3.49 min.     TC =   10.41  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
```

```
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      3.189(In/Hr) for a   100.0 year storm
Subarea runoff =     14.427(CFS) for      5.150(Ac.)
Total runoff =     24.455(CFS)  Total area =       8.370(Ac.)
Street flow at end of street =     24.455(CFS)
Half street flow at end of street =     12.228(CFS)
Depth of flow =   0.438(Ft.), Average velocity =   4.796(Ft/s)
Flow width (from curb towards crown)=  15.565(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      208.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1262.100(Ft.)
Downstream point/station elevation =  1261.600(Ft.)
Pipe length  =    96.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.455(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    24.455(CFS)
Normal flow depth in pipe =   20.79(In.)
Flow top width inside pipe =   27.68(In.)
Critical Depth =   20.23(In.)
Pipe flow velocity =      6.74(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =    10.65 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      8.370(Ac.)
Runoff from this stream =     24.455(CFS)
Time of concentration =   10.65 min.
Rainfall intensity =     3.157(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       17.391     13.98                2.792
2       24.455     10.65                3.157
```

```
Largest stream flow has longer or shorter time of concentration
Qp =     24.455 + sum of
          Qa          Tb/Ta
          17.391 *    0.761 =     13.242
Qp =     37.697

Total of 2 main streams to confluence:
Flow rates before confluence point:
      17.391      24.455
Area of streams before confluence:
        6.570        8.370


Results of confluence:
Total flow rate =     37.697(CFS)
Time of concentration =    10.648 min.
Effective stream area after confluence  =     14.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.65 min.
Rainfall intensity =      3.157(In/Hr) for a   100.0 year storm
Subarea runoff =      4.769(CFS) for      1.720(Ac.)
Total runoff =     42.466(CFS)  Total area =      16.660(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.65 min.
```

```
Rainfall intensity =      3.157(In/Hr) for a   100.0 year storm
Subarea runoff =     22.042(CFS) for      7.950(Ac.)
Total runoff =     64.508(CFS)  Total area =      24.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1261.600(Ft.)
Downstream point/station elevation =  1258.300(Ft.)
Pipe length  =   616.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    64.508(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    64.508(CFS)
Normal flow depth in pipe =   30.47(In.)
Flow top width inside pipe =   37.49(In.)
Critical Depth =   30.22(In.)
Pipe flow velocity =      8.63(Ft/s)
Travel time through pipe =    1.19 min.
Time of concentration (TC) =    11.84 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     24.610(Ac.)
Runoff from this stream =     64.508(CFS)
Time of concentration =   11.84 min.
Rainfall intensity =     3.010(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      209.000 to Point/Station      210.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   516.000(Ft.)
Top (of initial area) elevation =  1273.300(Ft.)
Bottom (of initial area) elevation =  1264.600(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01686  s(percent)=       1.69
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.257 min.
Rainfall intensity =      3.540(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.880
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.268(CFS)
Total initial stream area =        1.370(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1258.500(Ft.)
Downstream point/station elevation =  1258.300(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.268(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     4.268(CFS)
Normal flow depth in pipe =   10.82(In.)
Flow top width inside pipe =   17.63(In.)
Critical Depth =    9.49(In.)
Pipe flow velocity =      3.85(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =     8.50 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.370(Ac.)
Runoff from this stream =      4.268(CFS)
Time of concentration =    8.50 min.
Rainfall intensity =     3.495(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       64.508     11.84                3.010
2        4.268      8.50                3.495
Largest stream flow has longer time of concentration
Qp =     64.508 + sum of
          Qb         Ia/Ib
```

```
          4.268 *    0.861 =      3.676
Qp =     68.184

Total of 2 main streams to confluence:
Flow rates before confluence point:
      64.508       4.268
Area of streams before confluence:
       24.610        1.370


Results of confluence:
Total flow rate =     68.184(CFS)
Time of concentration =    11.838 min.
Effective stream area after confluence  =     25.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1258.300(Ft.)
Downstream point/station elevation =  1258.000(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    68.184(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    68.184(CFS)
Normal flow depth in pipe =   31.69(In.)
Flow top width inside pipe =   36.15(In.)
Critical Depth =   31.07(In.)
Pipe flow velocity =      8.76(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    11.94 min.
End of computations, total study area =           25.98 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.439
Area averaged RI index number =  80.3
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/09/24 File:1994D100C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 601.000(Ft.)
Top (of initial area) elevation = 1282.000(Ft.)
Bottom (of initial area) elevation = 1271.200(Ft.)
Difference in elevation = 10.800(Ft.)
Slope = 0.01797 s(percent)= 1.80
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.308 min.

```
Rainfall intensity =      2.681(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.887(CFS)
Total initial stream area =        0.390(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1271.200(Ft.)
End of street segment elevation =  1263.900(Ft.)
Length of street segment  =  1106.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.975(CFS)
Depth of flow =   0.299(Ft.), Average velocity =   1.705(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.634(Ft.)
Flow velocity =   1.71(Ft/s)
Travel time =   10.81 min.     TC =   26.12  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.050
Decimal fraction soil group D = 0.850
RI index for soil(AMC 2)  =  72.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.108(In/Hr) for a   100.0 year storm
```

```
Subarea runoff =      4.057(CFS) for      2.180(Ac.)
Total runoff =      4.944(CFS)  Total area =       2.570(Ac.)
Street flow at end of street =      4.944(CFS)
Half street flow at end of street =      2.472(CFS)
Depth of flow =   0.343(Ft.), Average velocity =   1.913(Ft/s)
Flow width (from curb towards crown)=  10.795(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1261.900(Ft.)
Downstream point/station elevation =  1258.800(Ft.)
Pipe length  =   516.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.944(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.944(CFS)
Normal flow depth in pipe =   12.12(In.)
Flow top width inside pipe =   11.82(In.)
Critical Depth =   10.82(In.)
Pipe flow velocity =      4.65(Ft/s)
Travel time through pipe =    1.85 min.
Time of concentration (TC) =    27.97 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      304.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    27.97 min.
Rainfall intensity =      2.044(In/Hr) for a   100.0 year storm
Subarea runoff =      1.789(CFS) for      0.990(Ac.)
Total runoff =      6.733(CFS)  Total area =       3.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      305.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1258.800(Ft.)
Downstream point/station elevation =  1258.000(Ft.)
```

Pipe length =   130.00(Ft.)   Manning's N = 0.013
No. of pipes = 1 Required pipe flow =   6.733(CFS)
Nearest computed pipe diameter =   18.00(In.)
Calculated individual pipe flow =   6.733(CFS)
Normal flow depth in pipe =   12.38(In.)
Flow top width inside pipe =   16.69(In.)
Critical Depth =   12.05(In.)
Pipe flow velocity =   5.20(Ft/s)
Travel time through pipe =   0.42 min.
Time of concentration (TC) =   28.38 min.
End of computations, total study area =   3.56 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.199
Area averaged RI index number = 75.2

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/10/24 File:1994D100D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 2.773(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.801
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000

```
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
User specified values are as follows:
TC =  14.20 min.  Rain intensity =       2.77(In/Hr)
Total area =       131.40(Ac.)  Total runoff =    297.40(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1283.000(Ft.)
End of natural channel elevation =   1276.000(Ft.)
Length of natural channel  =   646.000(Ft.)
Estimated mean flow rate at midpoint of channel =    310.595(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.93(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0108
Corrected/adjusted channel slope =  0.0108
Travel time =    2.74 min.     TC =   16.94  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.562(In/Hr) for a   100.0 year storm
Subarea runoff =     25.258(CFS) for     11.660(Ac.)
Total runoff =    322.658(CFS)  Total area =     143.060(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      402.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    143.060(Ac.)
Runoff from this stream =    322.658(CFS)
```

```
Time of concentration =   16.94 min.
Rainfall intensity =     2.562(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      406.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   470.000(Ft.)
Top (of initial area) elevation =  1464.000(Ft.)
Bottom (of initial area) elevation =  1400.000(Ft.)
Difference in elevation =    64.000(Ft.)
Slope =    0.13617  s(percent)=      13.62
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.253 min.
Rainfall intensity =      3.363(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.858
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     18.436(CFS)
Total initial stream area =        6.390(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      406.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1400.000(Ft.)
End of natural channel elevation =   1276.000(Ft.)
Length of natural channel  =  1250.000(Ft.)
Estimated mean flow rate at midpoint of channel =     27.567(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.25(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0992
Corrected/adjusted channel slope =  0.0992
Travel time =    3.97 min.     TC =   13.22  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.851
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.864(In/Hr) for a   100.0 year storm
Subarea runoff =     15.429(CFS) for      6.330(Ac.)
Total runoff =     33.865(CFS)  Total area =      12.720(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      402.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     12.720(Ac.)
Runoff from this stream =     33.865(CFS)
Time of concentration =   13.22 min.
Rainfall intensity =     2.864(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      322.658     16.94                2.562
2       33.865     13.22                2.864
Largest stream flow has longer time of concentration
Qp =    322.658 + sum of
          Qb         Ia/Ib
          33.865 *    0.894 =     30.289
Qp =    352.947

Total of 2 main streams to confluence:
Flow rates before confluence point:
     322.658      33.865
Area of streams before confluence:
      143.060       12.720


Results of confluence:
Total flow rate =    352.947(CFS)
Time of concentration =    16.940 min.
Effective stream area after confluence  =    155.780(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1276.000(Ft.)
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =   715.000(Ft.)
Estimated mean flow rate at midpoint of channel =    375.309(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.69(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0084
Corrected/adjusted channel slope =  0.0084
Travel time =    3.23 min.     TC =   20.17  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.368(In/Hr) for a   100.0 year storm
Subarea runoff =     39.336(CFS) for     19.740(Ac.)
Total runoff =    392.283(CFS)  Total area =     175.520(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      404.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1270.000(Ft.)
Downstream point/station elevation =  1261.000(Ft.)
Pipe length  =   750.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   392.283(CFS)
Nearest computed pipe diameter  =     66.00(In.)
Calculated individual pipe flow  =   392.283(CFS)
Normal flow depth in pipe =   59.40(In.)
Flow top width inside pipe =   39.60(In.)
Critical Depth =   62.03(In.)
```

Pipe flow velocity =   17.41(Ft/s)
Travel time through pipe =   0.72 min.
Time of concentration (TC) =   20.89 min.
End of computations, total study area =   175.52 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.850
Area averaged RI index number = 78.5

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/09/24 File:1994D100E.out

BAKER INDUSTRIAL HYDROLOGY AREA E
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++
Process from Point/Station 501.000 to Point/Station 502.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 966.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1284.500(Ft.)
Difference in elevation = 247.500(Ft.)
Slope = 0.25621 s(percent)= 25.62
TC = k(0.530)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =   10.878 min.
Rainfall intensity =      3.127(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.450
Decimal fraction soil group C = 0.290
Decimal fraction soil group D = 0.260
RI index for soil(AMC 2)  =  83.18
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     25.622(CFS)
Total initial stream area =        9.890(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      502.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.88 min.
Rainfall intensity =      3.127(In/Hr) for a   100.0 year storm
Subarea runoff =     13.701(CFS) for      4.930(Ac.)
Total runoff =     39.322(CFS)  Total area =      14.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1278.500(Ft.)
Downstream point/station elevation =  1264.900(Ft.)
Pipe length  =  1365.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    39.322(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    39.322(CFS)
Normal flow depth in pipe =   23.58(In.)
Flow top width inside pipe =   24.61(In.)
Critical Depth =   25.38(In.)
Pipe flow velocity =      9.50(Ft/s)
Travel time through pipe =    2.40 min.
Time of concentration (TC) =    13.27 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      503.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.27 min.
Rainfall intensity =      2.859(In/Hr) for a   100.0 year storm
Subarea runoff =      5.940(CFS) for      2.340(Ac.)
Total runoff =     45.262(CFS)  Total area =      17.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1264.900(Ft.)
Downstream point/station elevation =  1264.100(Ft.)
Pipe length  =    76.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    45.262(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    45.262(CFS)
Normal flow depth in pipe =   23.04(In.)
Flow top width inside pipe =   30.30(In.)
Critical Depth =   26.74(In.)
Pipe flow velocity =     10.22(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    13.40 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      504.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.40 min.
```

```
Rainfall intensity =      2.847(In/Hr) for a   100.0 year storm
Subarea runoff =      1.239(CFS) for      0.490(Ac.)
Total runoff =     46.501(CFS)  Total area =      17.650(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1264.100(Ft.)
Downstream point/station elevation =  1264.000(Ft.)
Pipe length  =     6.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    46.501(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    46.501(CFS)
Normal flow depth in pipe =   21.80(In.)
Flow top width inside pipe =   26.74(In.)
Critical Depth =   27.00(In.)
Pipe flow velocity =     12.17(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    13.41 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     17.650(Ac.)
Runoff from this stream =     46.501(CFS)
Time of concentration =   13.41 min.
Rainfall intensity =     2.846(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      508.000 to Point/Station      509.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   622.000(Ft.)
Top (of initial area) elevation =  1285.300(Ft.)
Bottom (of initial area) elevation =  1274.600(Ft.)
Difference in elevation =    10.700(Ft.)
Slope =    0.01720  s(percent)=       1.72
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.862 min.
Rainfall intensity =      3.429(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     12.294(CFS)
Total initial stream area =        4.030(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      509.000 to Point/Station      510.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1271.700(Ft.)
Downstream point/station elevation =  1267.500(Ft.)
Pipe length  =   532.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.294(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    12.294(CFS)
Normal flow depth in pipe =   15.19(In.)
Flow top width inside pipe =   18.79(In.)
Critical Depth =   15.67(In.)
Pipe flow velocity =      6.60(Ft/s)
Travel time through pipe =    1.34 min.
Time of concentration (TC) =    10.21 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      510.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.21 min.
Rainfall intensity =      3.218(In/Hr) for a   100.0 year storm
Subarea runoff =     12.473(CFS) for      4.360(Ac.)
Total runoff =     24.767(CFS)  Total area =       8.390(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      511.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =  1267.500(Ft.)
Downstream point/station elevation =  1264.500(Ft.)
Pipe length  =   375.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.767(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    24.767(CFS)
Normal flow depth in pipe =   19.92(In.)
Flow top width inside pipe =   23.75(In.)
Critical Depth =   20.86(In.)
Pipe flow velocity =      7.88(Ft/s)
Travel time through pipe =    0.79 min.
Time of concentration (TC) =    11.00 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      511.000 to Point/Station      511.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.00 min.
Rainfall intensity =      3.111(In/Hr) for a   100.0 year storm
Subarea runoff =      2.101(CFS) for      0.760(Ac.)
Total runoff =     26.869(CFS)  Total area =       9.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      511.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1264.500(Ft.)
Downstream point/station elevation =  1264.000(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.869(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    26.869(CFS)
Normal flow depth in pipe =   21.00(In.)
Flow top width inside pipe =   22.45(In.)
Critical Depth =   21.68(In.)
Pipe flow velocity =      8.09(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    11.12 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      9.150(Ac.)
Runoff from this stream =     26.869(CFS)
Time of concentration =   11.12 min.
Rainfall intensity =     3.096(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       46.501     13.41                 2.846
2       26.869     11.12                 3.096
Largest stream flow has longer time of concentration
Qp =     46.501 + sum of
          Qb         Ia/Ib
          26.869 *    0.919 =     24.704
Qp =     71.205

Total of 2 main streams to confluence:
Flow rates before confluence point:
      46.501      26.869
Area of streams before confluence:
       17.650        9.150


Results of confluence:
Total flow rate =     71.205(CFS)
Time of concentration =    13.405 min.
Effective stream area after confluence  =     26.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      506.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1264.000(Ft.)
Downstream point/station elevation =  1263.400(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    71.205(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    71.205(CFS)
Normal flow depth in pipe =   28.13(In.)
Flow top width inside pipe =   34.98(In.)
```

```
Critical Depth =   32.11(In.)
Pipe flow velocity =     11.12(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    13.50 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      506.000 to Point/Station      506.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.50 min.
Rainfall intensity =      2.837(In/Hr) for a   100.0 year storm
Subarea runoff =      1.713(CFS) for      0.680(Ac.)
Total runoff =     72.918(CFS)  Total area =      27.480(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      506.000 to Point/Station      507.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1263.400(Ft.)
Downstream point/station elevation =  1261.000(Ft.)
Pipe length  =   154.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    72.918(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    72.918(CFS)
Normal flow depth in pipe =   26.11(In.)
Flow top width inside pipe =   32.14(In.)
Critical Depth =   32.32(In.)
Pipe flow velocity =     13.28(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =    13.69 min.
End of computations, total study area =           27.48 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.424
Area averaged RI index number =  77.9
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/09/24 File:1994D100F.out

BAKER INDUSTRIAL HYDROLOGY AREA F
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 601.000 to Point/Station 602.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 394.000(Ft.)
Top (of initial area) elevation = 1283.100(Ft.)
Bottom (of initial area) elevation = 1279.400(Ft.)
Difference in elevation = 3.700(Ft.)
Slope = 0.00939 s(percent)= 0.94
TC = k(0.530)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =   14.721 min.
Rainfall intensity =      2.729(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.849
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.042(CFS)
Total initial stream area =        0.450(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      603.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1279.400(Ft.)
End of street segment elevation =  1275.500(Ft.)
Length of street segment  =   779.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.642(CFS)
Depth of flow =   0.301(Ft.), Average velocity =   1.492(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.711(Ft.)
Flow velocity =   1.49(Ft/s)
Travel time =    8.70 min.     TC =   23.42  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Rainfall intensity =      2.214(In/Hr) for a   100.0 year storm
Subarea runoff =      3.057(CFS) for      1.560(Ac.)
Total runoff =      4.099(CFS)  Total area =       2.010(Ac.)
Street flow at end of street =      4.099(CFS)
Half street flow at end of street =      2.049(CFS)
Depth of flow =   0.338(Ft.), Average velocity =   1.647(Ft/s)
Flow width (from curb towards crown)=  10.570(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1269.500(Ft.)
Downstream point/station elevation =  1265.300(Ft.)
Pipe length  =    35.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.099(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     4.099(CFS)
Normal flow depth in pipe =    5.63(In.)
Flow top width inside pipe =    8.71(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.10(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    23.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    23.47 min.
Rainfall intensity =      2.212(In/Hr) for a   100.0 year storm
Subarea runoff =      4.111(CFS) for      2.100(Ac.)
Total runoff =      8.210(CFS)  Total area =       4.110(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
```

```
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    23.47 min.
Rainfall intensity =      2.212(In/Hr) for a   100.0 year storm
Subarea runoff =      3.543(CFS) for      1.810(Ac.)
Total runoff =     11.753(CFS)  Total area =       5.920(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1265.300(Ft.)
Downstream point/station elevation =  1264.300(Ft.)
Pipe length  =    93.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.753(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.753(CFS)
Normal flow depth in pipe =   13.14(In.)
Flow top width inside pipe =   20.33(In.)
Critical Depth =   15.34(In.)
Pipe flow velocity =      7.42(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =    23.67 min.


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Process from Point/Station      605.000 to Point/Station      606.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1264.300(Ft.)
Downstream point/station elevation =  1263.000(Ft.)
Pipe length  =   125.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.753(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.753(CFS)
Normal flow depth in pipe =   13.29(In.)
Flow top width inside pipe =   20.25(In.)
Critical Depth =   15.34(In.)
Pipe flow velocity =      7.33(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =    23.96 min.
End of computations, total study area =            5.92 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

Area averaged pervious area fraction(Ap) = 0.168
Area averaged RI index number = 76.1

10 YEAR PROPOSED CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/09/24 File:1994D10A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

```
Rainfall intensity =      1.807(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.758
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =     13.353(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1360.000(Ft.)
Length of natural channel  =   636.000(Ft.)
Estimated mean flow rate at midpoint of channel =     29.985(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.98(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0535
Corrected/adjusted channel slope =  0.0535
Travel time =    2.66 min.     TC =   16.05  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.040
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.960
RI index for soil(AMC 2)  =  88.56
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.666(In/Hr) for a    10.0 year storm
Subarea runoff =     32.998(CFS) for     24.290(Ac.)
Total runoff =     46.351(CFS)  Total area =      34.040(Ac.)


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```
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1360.000(Ft.)
End of natural channel elevation =   1330.000(Ft.)
Length of natural channel  =   715.000(Ft.)
Estimated mean flow rate at midpoint of channel =     70.261(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.68(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0420
Corrected/adjusted channel slope =  0.0420
Travel time =    2.54 min.     TC =   18.60  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.810
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.040
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.960
RI index for soil(AMC 2)  =  88.56
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.559(In/Hr) for a    10.0 year storm
Subarea runoff =     44.370(CFS) for     35.120(Ac.)
Total runoff =     90.721(CFS)  Total area =      69.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1330.000(Ft.)
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =  1745.000(Ft.)
Estimated mean flow rate at midpoint of channel =    119.914(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.07(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
```

```
        Normal channel slope =  0.0344
Corrected/adjusted channel slope =  0.0344
Travel time =    5.74 min.     TC =   24.34  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.381(In/Hr) for a    10.0 year storm
Subarea runoff =     49.430(CFS) for     44.510(Ac.)
Total runoff =    140.151(CFS)  Total area =     113.670(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    113.670(Ac.)
Runoff from this stream =    140.151(CFS)
Time of concentration =   24.34 min.
Rainfall intensity =     1.381(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      1.966(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
```

```
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     14.549(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =  1246.000(Ft.)
Estimated mean flow rate at midpoint of channel =     38.086(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.99(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0457
Corrected/adjusted channel slope =  0.0457
Travel time =    5.20 min.     TC =   16.30  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.818
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.654(In/Hr) for a    10.0 year storm
Subarea runoff =     39.031(CFS) for     28.830(Ac.)
Total runoff =     53.580(CFS)  Total area =      37.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.740(Ac.)
Runoff from this stream =     53.580(CFS)
```

```
Time of concentration =   16.30 min.
Rainfall intensity =     1.654(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      140.151     24.34                 1.381
2       53.580     16.30                 1.654
Largest stream flow has longer time of concentration
Qp =    140.151 + sum of
          Qb         Ia/Ib
          53.580 *    0.835 =     44.738
Qp =    184.889

Total of 2 main streams to confluence:
Flow rates before confluence point:
     140.151      53.580
Area of streams before confluence:
      113.670       37.740


Results of confluence:
Total flow rate =    184.889(CFS)
Time of concentration =    24.340 min.
Effective stream area after confluence  =    151.410(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1270.000(Ft.)
Downstream point/station elevation =  1269.100(Ft.)
Pipe length  =   108.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   184.889(CFS)
Nearest computed pipe diameter  =     54.00(In.)
Calculated individual pipe flow  =   184.889(CFS)
Normal flow depth in pipe =   45.84(In.)
Flow top width inside pipe =   38.67(In.)
Critical Depth =   47.12(In.)
Pipe flow velocity =     12.84(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =    24.48 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      105.000
**** CONFLUENCE OF MAIN STREAMS ****
```

```
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    151.410(Ac.)
Runoff from this stream =    184.889(CFS)
Time of concentration =   24.48 min.
Rainfall intensity =     1.378(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   511.000(Ft.)
Top (of initial area) elevation =  1532.000(Ft.)
Bottom (of initial area) elevation =  1400.000(Ft.)
Difference in elevation =   132.000(Ft.)
Slope =    0.25832  s(percent)=      25.83
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.418 min.
Rainfall intensity =      2.227(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.669(CFS)
Total initial stream area =        1.430(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1400.000(Ft.)
End of natural channel elevation =   1282.000(Ft.)
Length of natural channel  =   861.000(Ft.)
Estimated mean flow rate at midpoint of channel =     14.566(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.20(Ft/s)

Correction to map slope used on extremely rugged channels with
```

```
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1370
Corrected/adjusted channel slope =  0.1370
Travel time =    1.41 min.     TC =    9.83  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.834
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.077(In/Hr) for a    10.0 year storm
Subarea runoff =     22.086(CFS) for     12.750(Ac.)
Total runoff =     24.755(CFS)  Total area =      14.180(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1282.000(Ft.)
Downstream point/station elevation =  1269.100(Ft.)
Pipe length  =   923.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.755(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    24.755(CFS)
Normal flow depth in pipe =   18.23(In.)
Flow top width inside pipe =   20.51(In.)
Critical Depth =   21.06(In.)
Pipe flow velocity =      9.66(Ft/s)
Travel time through pipe =    1.59 min.
Time of concentration (TC) =    11.42 min.


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Process from Point/Station      105.000 to Point/Station      105.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     14.180(Ac.)
Runoff from this stream =     24.755(CFS)
Time of concentration =   11.42 min.
Rainfall intensity =     1.942(In/Hr)
Summary of stream data:
```

```
Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      184.889     24.48                1.378
2       24.755     11.42                1.942
Largest stream flow has longer time of concentration
Qp =    184.889 + sum of
          Qb         Ia/Ib
          24.755 *    0.709 =     17.563
Qp =    202.452

Total of 2 main streams to confluence:
Flow rates before confluence point:
     184.889      24.755
Area of streams before confluence:
      151.410       14.180


Results of confluence:
Total flow rate =    202.452(CFS)
Time of concentration =    24.480 min.
Effective stream area after confluence  =    165.590(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1269.100(Ft.)
Downstream point/station elevation =  1263.000(Ft.)
Pipe length  =   667.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   202.452(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =   202.452(CFS)
Normal flow depth in pipe =   43.59(In.)
Flow top width inside pipe =   48.35(In.)
Critical Depth =   48.85(In.)
Pipe flow velocity =     13.93(Ft/s)
Travel time through pipe =    0.80 min.
Time of concentration (TC) =    25.28 min.
End of computations, total study area =          165.59 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.988
Area averaged RI index number =  88.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 07/08/24 File:1994D10B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 116.000(Ft.)
Top (of initial area) elevation = 1285.300(Ft.)
Bottom (of initial area) elevation = 1284.500(Ft.)
Difference in elevation = 0.800(Ft.)
Slope = 0.00690 s(percent)= 0.69
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.601 min.

```
Rainfall intensity =      2.099(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.752
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.376(CFS)
Total initial stream area =        6.570(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1269.700(Ft.)
Downstream point/station elevation =  1261.600(Ft.)
Pipe length  =  1611.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.376(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    10.376(CFS)
Normal flow depth in pipe =   15.94(In.)
Flow top width inside pipe =   17.96(In.)
Critical Depth =   14.39(In.)
Pipe flow velocity =      5.30(Ft/s)
Travel time through pipe =    5.06 min.
Time of concentration (TC) =    14.67 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.570(Ac.)
Runoff from this stream =     10.376(CFS)
Time of concentration =   14.67 min.
Rainfall intensity =     1.735(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   336.000(Ft.)
```

```
Top (of initial area) elevation =  1401.000(Ft.)
Bottom (of initial area) elevation =  1301.100(Ft.)
Difference in elevation =    99.900(Ft.)
Slope =    0.29732  s(percent)=      29.73
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.921 min.
Rainfall intensity =      2.432(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.770
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.028(CFS)
Total initial stream area =        3.220(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      208.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1301.100(Ft.)
End of street segment elevation =  1276.000(Ft.)
Length of street segment  =   924.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     10.573(CFS)
Depth of flow =   0.347(Ft.), Average velocity =   3.929(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  11.040(Ft.)
Flow velocity =   3.93(Ft/s)
Travel time =    3.92 min.     TC =   10.84  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.870
Decimal fraction soil group A = 0.000
```

```
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.988(In/Hr) for a    10.0 year storm
Subarea runoff =      8.903(CFS) for      5.150(Ac.)
Total runoff =     14.931(CFS)  Total area =       8.370(Ac.)
Street flow at end of street =     14.931(CFS)
Half street flow at end of street =      7.465(CFS)
Depth of flow =   0.382(Ft.), Average velocity =   4.261(Ft/s)
Flow width (from curb towards crown)=  12.748(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      208.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1262.100(Ft.)
Downstream point/station elevation =  1261.600(Ft.)
Pipe length  =    96.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.931(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    14.931(CFS)
Normal flow depth in pipe =   18.05(In.)
Flow top width inside pipe =   20.73(In.)
Critical Depth =   16.71(In.)
Pipe flow velocity =      5.89(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    11.11 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      8.370(Ac.)
Runoff from this stream =     14.931(CFS)
Time of concentration =   11.11 min.
Rainfall intensity =     1.966(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       10.376     14.67                1.735
2       14.931     11.11                1.966
```

```
Largest stream flow has longer or shorter time of concentration
Qp =     14.931 + sum of
          Qa          Tb/Ta
          10.376 *    0.758 =      7.862
Qp =     22.793

Total of 2 main streams to confluence:
Flow rates before confluence point:
      10.376      14.931
Area of streams before confluence:
        6.570        8.370


Results of confluence:
Total flow rate =     22.793(CFS)
Time of concentration =    11.112 min.
Effective stream area after confluence  =     14.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.870
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.11 min.
Rainfall intensity =      1.966(In/Hr) for a    10.0 year storm
Subarea runoff =      2.940(CFS) for      1.720(Ac.)
Total runoff =     25.732(CFS)  Total area =      16.660(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.870
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.11 min.
```

```
Rainfall intensity =      1.966(In/Hr) for a    10.0 year storm
Subarea runoff =     13.587(CFS) for      7.950(Ac.)
Total runoff =     39.320(CFS)  Total area =      24.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1261.600(Ft.)
Downstream point/station elevation =  1258.300(Ft.)
Pipe length  =   616.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    39.320(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    39.320(CFS)
Normal flow depth in pipe =   27.56(In.)
Flow top width inside pipe =   24.48(In.)
Critical Depth =   25.03(In.)
Pipe flow velocity =      7.42(Ft/s)
Travel time through pipe =    1.38 min.
Time of concentration (TC) =    12.49 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     24.610(Ac.)
Runoff from this stream =     39.320(CFS)
Time of concentration =   12.49 min.
Rainfall intensity =     1.864(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      209.000 to Point/Station      210.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   516.000(Ft.)
Top (of initial area) elevation =  1273.300(Ft.)
Bottom (of initial area) elevation =  1264.600(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01686  s(percent)=       1.69
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.257 min.
Rainfall intensity =      2.247(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.872
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.684(CFS)
Total initial stream area =        1.370(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1258.500(Ft.)
Downstream point/station elevation =  1258.300(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.684(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.684(CFS)
Normal flow depth in pipe =    9.15(In.)
Flow top width inside pipe =   14.63(In.)
Critical Depth =    7.89(In.)
Pipe flow velocity =      3.42(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =     8.52 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.370(Ac.)
Runoff from this stream =      2.684(CFS)
Time of concentration =    8.52 min.
Rainfall intensity =     2.215(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       39.320     12.49                 1.864
2        2.684      8.52                 2.215
Largest stream flow has longer time of concentration
Qp =     39.320 + sum of
          Qb         Ia/Ib
```

```
          2.684 *    0.842 =      2.260
Qp =     41.580

Total of 2 main streams to confluence:
Flow rates before confluence point:
      39.320       2.684
Area of streams before confluence:
       24.610        1.370


Results of confluence:
Total flow rate =     41.580(CFS)
Time of concentration =    12.495 min.
Effective stream area after confluence  =     25.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1258.300(Ft.)
Downstream point/station elevation =  1258.000(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    41.580(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    41.580(CFS)
Normal flow depth in pipe =   29.63(In.)
Flow top width inside pipe =   20.00(In.)
Critical Depth =   25.70(In.)
Pipe flow velocity =      7.40(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    12.62 min.
End of computations, total study area =           25.98 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.439
Area averaged RI index number =  80.3
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/09/24 File:1994D10C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 601.000(Ft.)
Top (of initial area) elevation = 1282.000(Ft.)
Bottom (of initial area) elevation = 1271.200(Ft.)
Difference in elevation = 10.800(Ft.)
Slope = 0.01797 s(percent)= 1.80
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.308 min.

```
Rainfall intensity =      1.702(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.821
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.545(CFS)
Total initial stream area =        0.390(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1271.200(Ft.)
End of street segment elevation =  1263.900(Ft.)
Length of street segment  =  1106.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      1.867(CFS)
Depth of flow =   0.265(Ft.), Average velocity =   1.545(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   6.910(Ft.)
Flow velocity =   1.55(Ft/s)
Travel time =   11.93 min.     TC =   27.24  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.050
Decimal fraction soil group D = 0.850
RI index for soil(AMC 2)  =  72.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.313(In/Hr) for a    10.0 year storm
```

```
Subarea runoff =      2.505(CFS) for      2.180(Ac.)
Total runoff =      3.050(CFS)  Total area =       2.570(Ac.)
Street flow at end of street =      3.050(CFS)
Half street flow at end of street =      1.525(CFS)
Depth of flow =   0.301(Ft.), Average velocity =   1.715(Ft/s)
Flow width (from curb towards crown)=   8.733(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1261.900(Ft.)
Downstream point/station elevation =  1258.800(Ft.)
Pipe length  =   516.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.050(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.050(CFS)
Normal flow depth in pipe =    8.45(In.)
Flow top width inside pipe =   14.88(In.)
Critical Depth =    8.43(In.)
Pipe flow velocity =      4.28(Ft/s)
Travel time through pipe =    2.01 min.
Time of concentration (TC) =    29.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      304.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    29.25 min.
Rainfall intensity =      1.272(In/Hr) for a    10.0 year storm
Subarea runoff =      1.104(CFS) for      0.990(Ac.)
Total runoff =      4.153(CFS)  Total area =       3.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      305.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1258.800(Ft.)
Downstream point/station elevation =  1258.000(Ft.)
```

Pipe length =   130.00(Ft.)   Manning's N = 0.013
No. of pipes = 1 Required pipe flow =   4.153(CFS)
Nearest computed pipe diameter =   15.00(In.)
Calculated individual pipe flow =   4.153(CFS)
Normal flow depth in pipe =   10.34(In.)
Flow top width inside pipe =   13.89(In.)
Critical Depth =   9.90(In.)
Pipe flow velocity =   4.61(Ft/s)
Travel time through pipe =   0.47 min.
Time of concentration (TC) =   29.72 min.
End of computations, total study area =   3.56 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.199
Area averaged RI index number = 75.2

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/10/24 File:1994D10D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 1.760(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.755
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000

```
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
User specified values are as follows:
TC =  14.20 min.  Rain intensity =       1.76(In/Hr)
Total area =       131.40(Ac.)  Total runoff =    180.10(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1283.000(Ft.)
End of natural channel elevation =   1276.000(Ft.)
Length of natural channel  =   646.000(Ft.)
Estimated mean flow rate at midpoint of channel =    188.091(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.33(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0108
Corrected/adjusted channel slope =  0.0108
Travel time =    3.23 min.     TC =   17.43  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.605(In/Hr) for a    10.0 year storm
Subarea runoff =     15.274(CFS) for     11.660(Ac.)
Total runoff =    195.374(CFS)  Total area =     143.060(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      402.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    143.060(Ac.)
Runoff from this stream =    195.374(CFS)
```

```
Time of concentration =   17.43 min.
Rainfall intensity =     1.605(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      406.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   470.000(Ft.)
Top (of initial area) elevation =  1464.000(Ft.)
Bottom (of initial area) elevation =  1400.000(Ft.)
Difference in elevation =    64.000(Ft.)
Slope =    0.13617  s(percent)=      13.62
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.253 min.
Rainfall intensity =      2.134(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     11.394(CFS)
Total initial stream area =        6.390(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      406.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1400.000(Ft.)
End of natural channel elevation =   1276.000(Ft.)
Length of natural channel  =  1250.000(Ft.)
Estimated mean flow rate at midpoint of channel =     17.038(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.48(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0992
Corrected/adjusted channel slope =  0.0992
Travel time =    4.65 min.     TC =   13.90  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.824
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.777(In/Hr) for a    10.0 year storm
Subarea runoff =      9.265(CFS) for      6.330(Ac.)
Total runoff =     20.659(CFS)  Total area =      12.720(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      402.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     12.720(Ac.)
Runoff from this stream =     20.659(CFS)
Time of concentration =   13.90 min.
Rainfall intensity =     1.777(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      195.374     17.43                 1.605
2       20.659     13.90                 1.777
Largest stream flow has longer time of concentration
Qp =    195.374 + sum of
          Qb         Ia/Ib
          20.659 *    0.903 =     18.658
Qp =    214.033

Total of 2 main streams to confluence:
Flow rates before confluence point:
     195.374      20.659
Area of streams before confluence:
      143.060       12.720


Results of confluence:
Total flow rate =    214.033(CFS)
Time of concentration =    17.433 min.
Effective stream area after confluence  =    155.780(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1276.000(Ft.)
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =   715.000(Ft.)
Estimated mean flow rate at midpoint of channel =    227.593(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.13(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0084
Corrected/adjusted channel slope =  0.0084
Travel time =    3.81 min.     TC =   21.24  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.809
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.468(In/Hr) for a    10.0 year storm
Subarea runoff =     23.454(CFS) for     19.740(Ac.)
Total runoff =    237.487(CFS)  Total area =     175.520(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      404.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1270.000(Ft.)
Downstream point/station elevation =  1261.000(Ft.)
Pipe length  =   750.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   237.487(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =   237.487(CFS)
Normal flow depth in pipe =   44.53(In.)
Flow top width inside pipe =   47.13(In.)
Critical Depth =   51.70(In.)
```

Pipe flow velocity =   15.98(Ft/s)
Travel time through pipe =   0.78 min.
Time of concentration (TC) =   22.03 min.
End of computations, total study area =   175.52 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.850
Area averaged RI index number = 78.5

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/09/24 File:1994D10E.out

BAKER INDUSTRIAL HYDROLOGY AREA E
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 501.000 to Point/Station 502.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 966.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1284.500(Ft.)
Difference in elevation = 247.500(Ft.)
Slope = 0.25621 s(percent)= 25.62
TC = k(0.530)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =   10.878 min.
Rainfall intensity =      1.984(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.792
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.450
Decimal fraction soil group C = 0.290
Decimal fraction soil group D = 0.260
RI index for soil(AMC 2)  =  83.18
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     15.551(CFS)
Total initial stream area =        9.890(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      502.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.88 min.
Rainfall intensity =      1.984(In/Hr) for a    10.0 year storm
Subarea runoff =      8.644(CFS) for      4.930(Ac.)
Total runoff =     24.194(CFS)  Total area =      14.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1278.500(Ft.)
Downstream point/station elevation =  1264.900(Ft.)
Pipe length  =  1365.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.194(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    24.194(CFS)
Normal flow depth in pipe =   17.98(In.)
Flow top width inside pipe =   25.47(In.)
Critical Depth =   20.65(In.)
Pipe flow velocity =      8.60(Ft/s)
Travel time through pipe =    2.64 min.
Time of concentration (TC) =    13.52 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      503.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.52 min.
Rainfall intensity =      1.799(In/Hr) for a    10.0 year storm
Subarea runoff =      3.714(CFS) for      2.340(Ac.)
Total runoff =     27.909(CFS)  Total area =      17.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1264.900(Ft.)
Downstream point/station elevation =  1264.100(Ft.)
Pipe length  =    76.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    27.909(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    27.909(CFS)
Normal flow depth in pipe =   19.64(In.)
Flow top width inside pipe =   24.05(In.)
Critical Depth =   22.06(In.)
Pipe flow velocity =      9.02(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =    13.66 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      504.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.66 min.
```

```
Rainfall intensity =      1.791(In/Hr) for a    10.0 year storm
Subarea runoff =      0.774(CFS) for      0.490(Ac.)
Total runoff =     28.683(CFS)  Total area =      17.650(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1264.100(Ft.)
Downstream point/station elevation =  1264.000(Ft.)
Pipe length  =     6.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.683(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    28.683(CFS)
Normal flow depth in pipe =   19.31(In.)
Flow top width inside pipe =   19.03(In.)
Critical Depth =   22.09(In.)
Pipe flow velocity =     10.60(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    13.67 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     17.650(Ac.)
Runoff from this stream =     28.683(CFS)
Time of concentration =   13.67 min.
Rainfall intensity =     1.790(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      508.000 to Point/Station      509.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   622.000(Ft.)
Top (of initial area) elevation =  1285.300(Ft.)
Bottom (of initial area) elevation =  1274.600(Ft.)
Difference in elevation =    10.700(Ft.)
Slope =    0.01720  s(percent)=       1.72
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.862 min.
Rainfall intensity =      2.176(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.759(CFS)
Total initial stream area =        4.030(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      509.000 to Point/Station      510.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1271.700(Ft.)
Downstream point/station elevation =  1267.500(Ft.)
Pipe length  =   532.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.759(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.759(CFS)
Normal flow depth in pipe =   12.54(In.)
Flow top width inside pipe =   16.55(In.)
Critical Depth =   12.95(In.)
Pipe flow velocity =      5.91(Ft/s)
Travel time through pipe =    1.50 min.
Time of concentration (TC) =    10.36 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      510.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.36 min.
Rainfall intensity =      2.028(In/Hr) for a    10.0 year storm
Subarea runoff =      7.816(CFS) for      4.360(Ac.)
Total runoff =     15.575(CFS)  Total area =       8.390(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      511.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =  1267.500(Ft.)
Downstream point/station elevation =  1264.500(Ft.)
Pipe length  =   375.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.575(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    15.575(CFS)
Normal flow depth in pipe =   15.80(In.)
Flow top width inside pipe =   22.77(In.)
Critical Depth =   17.08(In.)
Pipe flow velocity =      7.10(Ft/s)
Travel time through pipe =    0.88 min.
Time of concentration (TC) =    11.24 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      511.000 to Point/Station      511.000
**** SUBAREA FLOW ADDITION ****
```

```
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.24 min.
Rainfall intensity =      1.955(In/Hr) for a    10.0 year storm
Subarea runoff =      1.313(CFS) for      0.760(Ac.)
Total runoff =     16.888(CFS)  Total area =       9.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      511.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =  1264.500(Ft.)
Downstream point/station elevation =  1264.000(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.888(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    16.888(CFS)
Normal flow depth in pipe =   16.50(In.)
Flow top width inside pipe =   22.25(In.)
Critical Depth =   17.78(In.)
Pipe flow velocity =      7.33(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =    11.38 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      9.150(Ac.)
Runoff from this stream =     16.888(CFS)
Time of concentration =   11.38 min.
Rainfall intensity =     1.945(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       28.683     13.67                1.790
2       16.888     11.38                1.945
Largest stream flow has longer time of concentration
Qp =     28.683 + sum of
          Qb         Ia/Ib
          16.888 *    0.921 =     15.548
Qp =     44.231

Total of 2 main streams to confluence:
Flow rates before confluence point:
      28.683      16.888
Area of streams before confluence:
       17.650        9.150


Results of confluence:
Total flow rate =     44.231(CFS)
Time of concentration =    13.672 min.
Effective stream area after confluence  =     26.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      506.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1264.000(Ft.)
Downstream point/station elevation =  1263.400(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    44.231(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    44.231(CFS)
Normal flow depth in pipe =   23.23(In.)
Flow top width inside pipe =   30.13(In.)
```

```
Critical Depth =   26.48(In.)
Pipe flow velocity =      9.90(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    13.78 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      506.000 to Point/Station      506.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.78 min.
Rainfall intensity =      1.784(In/Hr) for a    10.0 year storm
Subarea runoff =      1.070(CFS) for      0.680(Ac.)
Total runoff =     45.301(CFS)  Total area =      27.480(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      506.000 to Point/Station      507.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1263.400(Ft.)
Downstream point/station elevation =  1261.000(Ft.)
Pipe length  =   154.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    45.301(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    45.301(CFS)
Normal flow depth in pipe =   21.94(In.)
Flow top width inside pipe =   26.60(In.)
Critical Depth =   26.77(In.)
Pipe flow velocity =     11.78(Ft/s)
Travel time through pipe =    0.22 min.
Time of concentration (TC) =    13.99 min.
End of computations, total study area =           27.48 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.424
Area averaged RI index number =  77.9
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/09/24 File:1994D10F.out

BAKER INDUSTRIAL HYDROLOGY AREA F
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 601.000 to Point/Station 602.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 394.000(Ft.)
Top (of initial area) elevation = 1283.100(Ft.)
Bottom (of initial area) elevation = 1279.400(Ft.)
Difference in elevation = 3.700(Ft.)
Slope = 0.00939 s(percent)= 0.94
TC = k(0.530)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =   14.721 min.
Rainfall intensity =      1.732(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.822
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.640(CFS)
Total initial stream area =        0.450(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      603.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1279.400(Ft.)
End of street segment elevation =  1275.500(Ft.)
Length of street segment  =   779.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      1.670(CFS)
Depth of flow =   0.267(Ft.), Average velocity =   1.353(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   7.003(Ft.)
Flow velocity =   1.35(Ft/s)
Travel time =    9.60 min.     TC =   24.32  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Rainfall intensity =      1.382(In/Hr) for a    10.0 year storm
Subarea runoff =      1.893(CFS) for      1.560(Ac.)
Total runoff =      2.533(CFS)  Total area =       2.010(Ac.)
Street flow at end of street =      2.533(CFS)
Half street flow at end of street =      1.267(CFS)
Depth of flow =   0.298(Ft.), Average velocity =   1.478(Ft/s)
Flow width (from curb towards crown)=   8.546(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1269.500(Ft.)
Downstream point/station elevation =  1265.300(Ft.)
Pipe length  =    35.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.533(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.533(CFS)
Normal flow depth in pipe =    4.19(In.)
Flow top width inside pipe =    8.98(In.)
Critical Depth =    8.34(In.)
Pipe flow velocity =     12.57(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    24.36 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    24.36 min.
Rainfall intensity =      1.381(In/Hr) for a    10.0 year storm
Subarea runoff =      2.546(CFS) for      2.100(Ac.)
Total runoff =      5.079(CFS)  Total area =       4.110(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
```

```
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    24.36 min.
Rainfall intensity =      1.381(In/Hr) for a    10.0 year storm
Subarea runoff =      2.194(CFS) for      1.810(Ac.)
Total runoff =      7.273(CFS)  Total area =       5.920(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1265.300(Ft.)
Downstream point/station elevation =  1264.300(Ft.)
Pipe length  =    93.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.273(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.273(CFS)
Normal flow depth in pipe =   10.76(In.)
Flow top width inside pipe =   17.65(In.)
Critical Depth =   12.53(In.)
Pipe flow velocity =      6.60(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =    24.60 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      606.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1264.300(Ft.)
Downstream point/station elevation =  1263.000(Ft.)
Pipe length  =   125.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.273(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.273(CFS)
Normal flow depth in pipe =   10.88(In.)
Flow top width inside pipe =   17.61(In.)
Critical Depth =   12.53(In.)
Pipe flow velocity =      6.52(Ft/s)
Travel time through pipe =    0.32 min.
Time of concentration (TC) =    24.92 min.
End of computations, total study area =            5.92 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

Area averaged pervious area fraction(Ap) = 0.168
Area averaged RI index number = 76.1

Appendix

E

FEMA FLOOD INSURANCE RATE MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross-sections and interpolated between cross-sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The horizontal datum was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later.

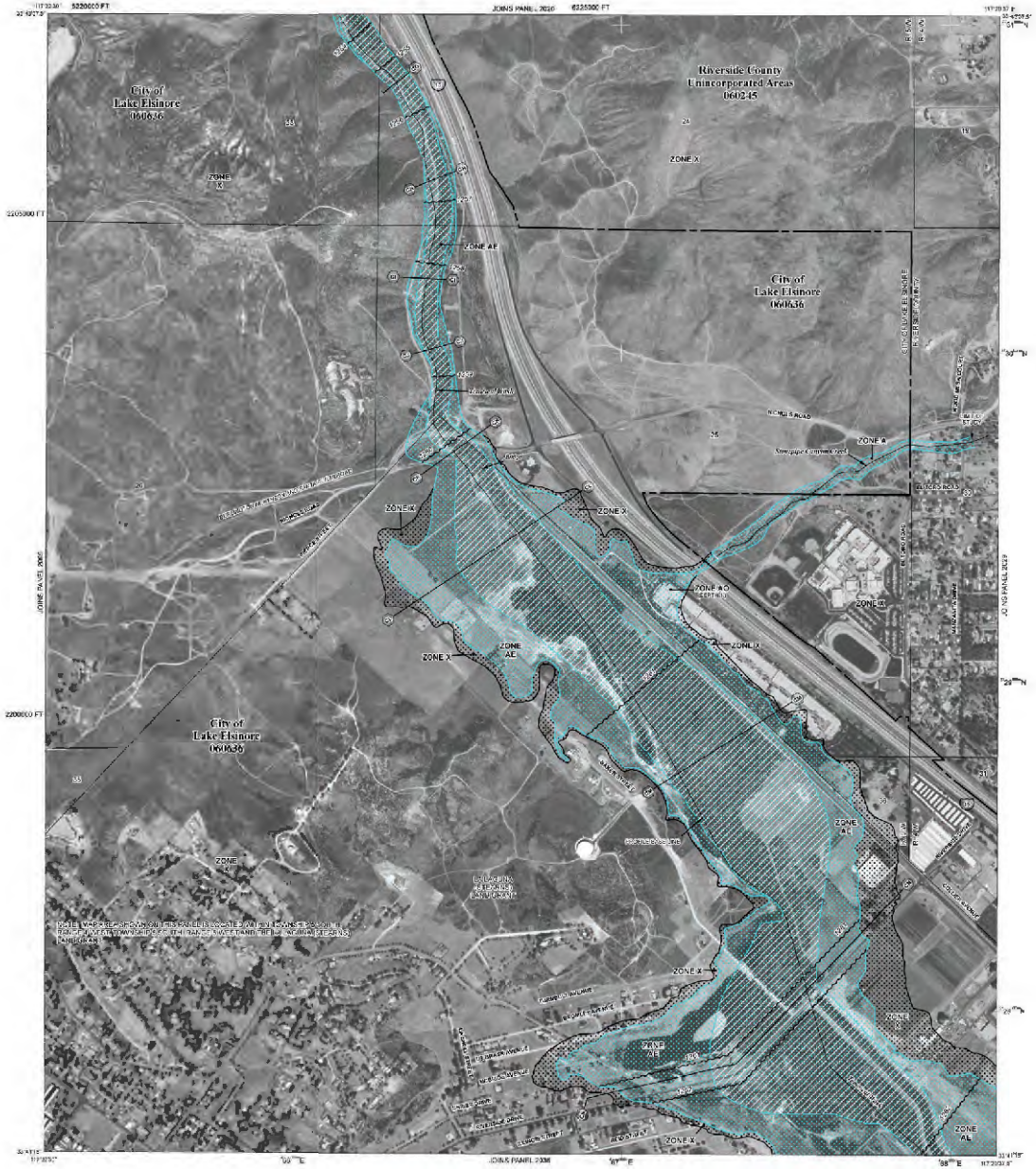
This map may reflect more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of special flood hazard include Zones A, AE, A1-A30, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A — No Base Flood Elevations determined.
- ZONE AE — Base Flood Elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — Cross section line
- 97°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid values, zone 11N
- 600000 FT — Transverse Mercator grid ticks, Lambert Conformal Conic projection
- 5000-foot ticks: California State Plane coordinate system, zone V (FIPSZONE 0405), Lambert Conformal Conic projection
- BM5516 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.6 — Annotation

MAP REPOSITORY
Refer to Map of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
500 0 500 1000 FEET
150 0 150 300 METERS

PANEL 2028G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 2028 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAKE ELSINORE, CITY OF	060636	2028	G
RIVERSIDE COUNTY	060245	2028	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06065C2028G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

Appendix

F

STORM DRAIN HYDRAULICS WSPG ANALYSIS

```
T1 1994 Baker Industrial                                                    0
T2 City of Lake Elsinore
T3 1994 SD Line A
SO   1000.0001263.000  1                          1265.000
R    1079.0001263.710  1      .013                                 .000    .000 0
R    1107.6501263.970  1      .013                              -33.160    .000 0
R    1200.6501264.800  1      .013                                 .000    .000 0
R    1226.5101265.030  1      .013                               33.670    .000 0
R    1298.4501265.680  1      .013                                 .000    .000 0
R    1336.3501266.020  1      .013                              -34.600    .000 0
R    1393.7301266.530  1      .013                                 .000    .000 0
R    1428.3001266.840  1      .013                               34.600    .000 0
R    1664.1801268.950  1      .013                                 .000    .000 0
JX   1672.7001269.150  3  2   .013   37.660         1269.100         45.0         .000
R    1775.0301270.000  3      .013                                 .000    .000 0
WE   1775.0301270.000  4      .200
SH   1775.0301270.000  4                          1270.000
CD   1  4   2    .000   4.000     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
CD   3  4   2    .000   4.000     .000  .000  .000   .00
CD   4  2   0    .000   8.000    5.000  .000  .000   .00
Q           299.500   .0
```

Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING Date: 7- 9-2024 Time:11:16:42

1994 Baker Industrial
City of Lake Elsinore
1994 SD Line A

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	1263.000	3.718	1266.718	337.16	13.85	2.98	1269.69	.00	3.72	2.05	4.000	.000	.00	2 .0
27.963	.0090					.0126	.35	3.72	.71	4.00	.013	.00	.00	PIPE
1027.963	1263.251	4.000	1267.251	337.16	13.42	2.79	1270.05	.00	3.72	.00	4.000	.000	.00	2 .0
51.037	.0090					.0135	.69	4.00	.00	4.00	.013	.00	.00	PIPE
1079.000	1263.710	4.244	1267.954	337.16	13.42	2.79	1270.75	.00	3.72	.00	4.000	.000	.00	2 .0
28.650	.0091					.0138	.39	.00	.00	4.00	.013	.00	.00	PIPE
1107.650	1263.970	4.718	1268.688	337.16	13.42	2.79	1271.48	.00	3.72	.00	4.000	.000	.00	2 .0
93.000	.0089					.0138	1.28	4.72	.00	4.00	.013	.00	.00	PIPE
1200.650	1264.800	5.169	1269.969	337.16	13.42	2.79	1272.76	.00	3.72	.00	4.000	.000	.00	2 .0
25.860	.0089					.0138	.36	.00	.00	4.00	.013	.00	.00	PIPE
1226.510	1265.030	5.637	1270.667	337.16	13.42	2.79	1273.46	.00	3.72	.00	4.000	.000	.00	2 .0
71.940	.0090					.0138	.99	5.64	.00	4.00	.013	.00	.00	PIPE
1298.450	1265.680	5.978	1271.658	337.16	13.42	2.79	1274.45	.00	3.72	.00	4.000	.000	.00	2 .0
37.900	.0090					.0138	.52	.00	.00	4.00	.013	.00	.00	PIPE
1336.350	1266.020	6.506	1272.526	337.16	13.42	2.79	1275.32	.00	3.72	.00	4.000	.000	.00	2 .0
57.380	.0089					.0138	.79	6.51	.00	4.00	.013	.00	.00	PIPE
1393.730	1266.530	6.787	1273.317	337.16	13.42	2.79	1276.11	.00	3.72	.00	4.000	.000	.00	2 .0
34.570	.0090					.0138	.48	.00	.00	4.00	.013	.00	.00	PIPE

Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING Date: 7- 9-2024 Time:11:16:42

1994 Baker Industrial
City of Lake Elsinore
1994 SD Line A

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1428.300	1266.840	7.299	1274.139	337.16	13.42	2.79	1276.93	.00	3.72	.00	4.000	.000	.00	2 .0
235.880	.0089					.0138	3.25	7.30	.00	4.00	.013	.00	.00	PIPE
1664.180	1268.950	8.438	1277.388	337.16	13.42	2.79	1280.18	.00	3.72	.00	4.000	.000	.00	2 .0
JUNCT STR	.0235					.0123	.10	8.44	.00		.013	.00	.00	PIPE
1672.700	1269.150	9.128	1278.278	299.50	11.92	2.21	1280.48	.00	3.59	.00	4.000	.000	.00	2 .0
102.330	.0083					.0109	1.11	9.13	.00	4.00	.013	.00	.00	PIPE
1775.030	1270.000	9.390	1279.390	299.50	11.92	2.21	1281.59	.00	3.59	.00	4.000	.000	.00	2 .0
WALL	ENTRANCE													
1775.030	1270.000	11.534	1281.534	299.50	5.19	.42	1281.95	.00	4.81	5.00	8.000	5.000	.00	0 .0

```
T1 1994 Baker Industrial                                                    0
T2 City of Lake Elsinore
T3 1994 SD LINE B
SO   1000.0001259.000  1                          1260.500
R    1155.6301261.240  1      .013                                .000    .000 0
R    1175.4301261.520  1      .013                             -19.480    .000 0
R    1665.8701268.560  1      .013                                .000    .000 0
R    1694.6601268.970  1      .013                              27.490    .000 0
R    1766.4301270.000  1      .013                                .000    .000 0
WE   1766.4301270.000  2      .200
SH   1766.4301270.000  2                          1270.000
CD   1  3   1   1.000   4.000   10.000  .000  .000   .00
CD   2  3   0    .000   7.000    5.000  .000  .000   .00
Q           391.600   .0
```

Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING Date: 7- 9-2024 Time:11:56:18

1994 Baker Industrial
City of Lake Elsinore
1994 SD LINE B

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	1259.000	2.754	1261.754	391.60	15.80	3.88	1265.63	.00	3.89	10.00	4.000	10.000	.00	1 1.0
155.630	.0144					.0143	2.23	2.75	1.77	2.75	.013	.00	.00	BOX
1155.630	1261.240	2.757	1263.997	391.60	15.78	3.87	1267.86	1.20	3.89	10.00	4.000	10.000	.00	1 1.0
19.800	.0141					.0143	.28	3.95	1.77	2.77	.013	.00	.00	BOX
1175.430	1261.520	2.755	1264.275	391.60	15.79	3.87	1268.15	.00	3.89	10.00	4.000	10.000	.00	1 1.0
129.700	.0144					.0144	1.86	2.75	1.77	2.75	.013	.00	.00	BOX
1305.130	1263.382	2.755	1266.137	391.60	15.79	3.87	1270.01	.00	3.89	10.00	4.000	10.000	.00	1 1.0
263.142	.0144					.0138	3.62	2.75	1.77	2.75	.013	.00	.00	BOX
1568.273	1267.159	2.848	1270.007	391.60	15.28	3.62	1273.63	.00	3.89	10.00	4.000	10.000	.00	1 1.0
97.597	.0144					.0124	1.21	2.85	1.68	2.75	.013	.00	.00	BOX
1665.870	1268.560	2.987	1271.547	391.60	14.57	3.29	1274.84	.99	3.89	10.00	4.000	10.000	.00	1 1.0
28.790	.0142					.0113	.32	3.98	1.57	2.76	.013	.00	.00	BOX
1694.660	1268.970	3.063	1272.033	391.60	14.21	3.13	1275.17	.00	3.89	10.00	4.000	10.000	.00	1 1.0
.136	.0144					.0109	.00	3.06	1.51	2.76	.013	.00	.00	BOX
1694.796	1268.972	3.063	1272.035	391.60	14.21	3.13	1275.17	.00	3.89	10.00	4.000	10.000	.00	1 1.0
33.332	.0144					.0103	.34	3.06	1.51	2.76	.013	.00	.00	BOX
1728.128	1269.450	3.212	1272.663	391.60	13.54	2.85	1275.51	.00	3.89	10.00	4.000	10.000	.00	1 1.0
19.504	.0144					.0091	.18	3.21	1.40	2.76	.013	.00	.00	BOX

Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING Date: 7- 9-2024 Time:11:56:18

1994 Baker Industrial
City of Lake Elsinore
1994 SD LINE B

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1747.632	1269.730	3.369	1273.099	391.60	12.91	2.59	1275.69	.00	3.89	10.00	4.000	10.000	.00	1 1.0
11.310	.0144					.0081	.09	3.37	1.31	2.76	.013	.00	.00	BOX
1758.942	1269.893	3.534	1273.426	391.60	12.31	2.35	1275.78	.00	3.89	10.00	4.000	10.000	.00	1 1.0
5.779	.0144					.0072	.04	3.53	1.22	2.76	.013	.00	.00	BOX
1764.720	1269.975	3.706	1273.682	391.60	11.74	2.14	1275.82	.00	3.89	10.00	4.000	10.000	.00	1 1.0
1.710	.0144					.0064	.01	3.71	1.13	2.76	.013	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
1766.430	1270.000	3.888	1273.888	391.60	11.19	1.94	1275.83	.00	3.89	10.00	4.000	10.000	.00	1 1.0
WALL	ENTRANCE													
		---------- WARNING - Flow depth near top of box conduit ----------												
1766.430	1270.000	3.889	1273.889	391.60	20.14	6.30	1280.19	.00	5.75	5.00	7.000	5.000	.00	0 .0
1766.430	1270.000	5.755	1275.755	391.60	13.61	2.88	1278.63	.00	5.75	5.00	7.000	5.000	.00	0 .0

Appendix

G

DEBRIS SIZING CALCULATIONS

DEBRIS BASIN VOLUME DETERMINATION WORKSHEET
DEBRIS BASIN 1: 100-YEAR STORM

= User entry required = Computed by worksheet

1) Determine the Debris Yield*

$$LogDY = 0.65(Log(P*100)) + 0.62(LogRR) + 0.18(LogA) + 0.12FF$$

Where:
Dy = Debris Yield given in cubic yards per square mile
P = Maximum one-hour precipitation (Usually 100-year as shown on isohyeatal map), inches
RR = Relief Ratio given in feet-of-drop per mile (ft/mile)
A = Area of the watershed, Acres
FF = Fire Factor (Non-dimensional)

User to Supply:

P =	1.45	Inches/hr
RR =	122.968	ft/mile
A =	151.41	acres
FF =	4	

Work sheet computes:

Dy	3741.004	Yds^3/mi.^2	*

*Based on Tatum method (US Army COE, Los Angeles District)

Debris Volume = 885 cy 0.55 ac-ft

2) Use Dy (above) to determine the Bulking Factor:

$$Fb = 1 + \left[\frac{D}{120{,}000}\right]$$

Where:
Fb = Bulking Factor
D = Debris Yield

Worksheet Computes:

Fb =	1.03

Solution: Use 1.03

DEBRIS BASIN VOLUME DETERMINATION WORKSHEET
DEBRIS BASIN 2: 100-YEAR STORM

= User entry required = Computed by worksheet

1) Determine the Debris Yield*

$$LogDY = 0.65(Log(P*100)) + 0.62(LogRR) + 0.18(LogA) + 0.12FF$$

Where:
Dy = Debris Yield given in cubic yards per square mile
P = Maximum one-hour precipitation (Usually 100-year as shown on isohyeatal map), inches
RR = Relief Ratio given in feet-of-drop per mile (ft/mile)
A = Area of the watershed, Acres
FF = Fire Factor (Non-dimensional)

User to Supply:

P =	1.45	Inches/hr
RR =	21.57812	ft/mile
A =	175.52	acres
FF =	4	

Work sheet computes:

Dy	1306.04	Yds^3/mi.^2 *

*Based on Tatum method (US Army COE, Los Angeles District)

Debris Volume = 358 cy 0.22 ac-ft

2) Use Dy (above) to determine the Bulking Factor:

$$Fb = 1 + \left[\frac{D}{120{,}000}\right]$$

Where:
Fb = Bulking Factor
D = Debris Yield

Worksheet Computes:

Fb =	1.01

Solution: Use 1.01

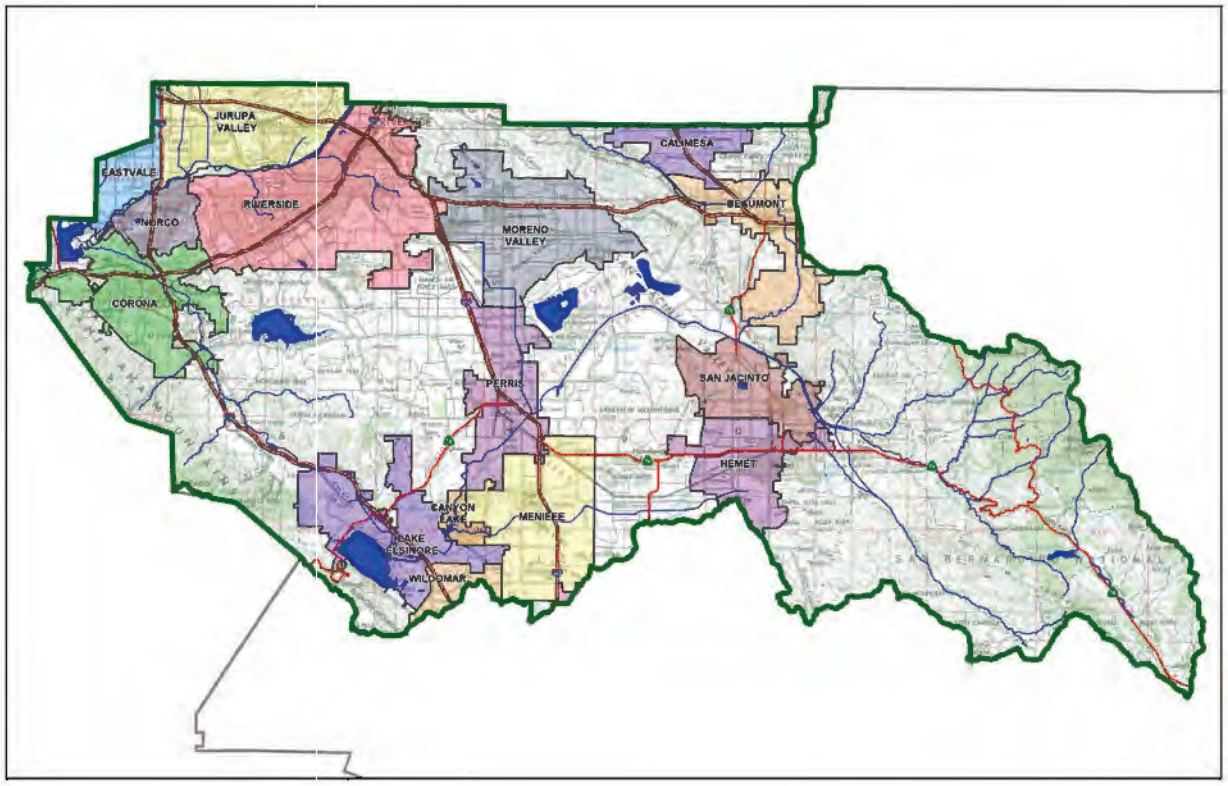
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Baker Industrial

Development No: TPM 38812

Design Review/Case No: PWQMP-2023-0011



☒ **Preliminary**
☐ **Final**

Original Date Prepared: 8-14-2023

Revision Date(s): 07-16-2024, 12-09-2024

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
Template revised June 30, 2016

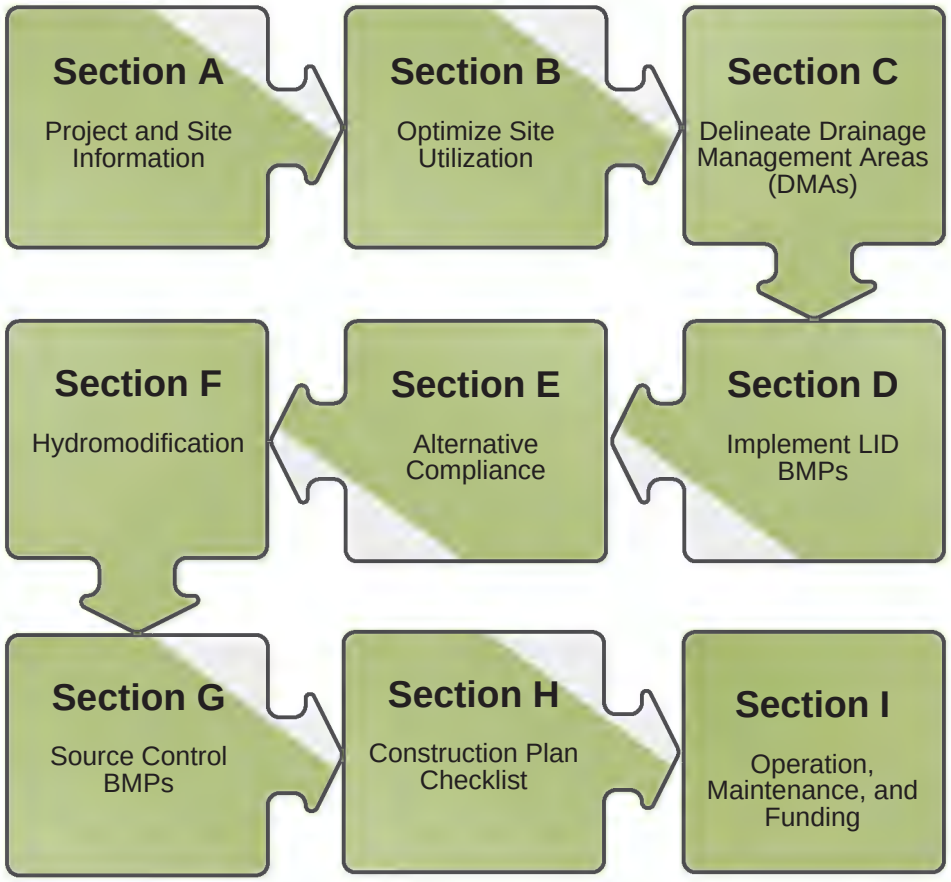
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A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Riverside Legacy IV Nichols Road, LLC by KWC Engineers for the Baker Industrial project.

This WQMP is intended to comply with the requirements of The City of Lake Elsinore for Ordinance 1296 (Municipal Code 14.08) which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under The City of Lake Elsinore Water Quality Ordinance (Municipal Code Section 14.08).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Trygg Danforth	Director of Real Estate
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	Date
Brandon Barnett, P.E.	President
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

Project Information

Type of Project:	Industrial
Planning Area:	General Manufacturing District
Community Name:	City of Lake Elsinore
Development Name:	Baker Industrial

Project Location

Latitude & Longitude (DMS): 33°42'07.0"N, 117°21'50.7"W

Project Watershed and Sub-Watershed: Santa Ana River Watershed and Temescal Creek Reach 5

Gross Acres: 66.23

APN(s): 378-020-014, -015, -016, -028, -029, -030, -031, -036, -048

Map Book and Page No.: Riverside County Book 378 Page 02

Project Characteristics

Proposed or Potential Land Use(s)	Limited Industrial
Proposed or Potential SIC Code(s)	4225
Area of Impervious Project Footprint (SF)	2,191,294
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	2,191,294
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N

Existing Site Characteristics

Total area of existing Impervious Surfaces within the Project limits Footprint (SF)	0
Is the project located within any MSHCP Criteria Cell?	☒ Y ☐ N
If so, identify the Cell number:	4166
Are there any natural hydrologic features on the project site?	☒ Y ☐ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	Soil Type C & D
What is the Water Quality Design Storm Depth for the project?	0.70

Project Description

The Baker Industrial project is comprised of 66.23 acres of developed land along Baker Street in the City of Lake Elsinore in Riverside County, California, adjacent to Pierce Street. Appendix A shows a vicinity map of the area illustrating the location of the project.

The Baker Industrial project is generally bounded to the northeast by Baker Street. Bounded on the northwest by Pierce Street. To the southeast and southwest of the site, the area is bounded by undeveloped hills.

The project site existing conditions is generally flat with some hills coming onto the site along the southern boundary. The existing project gross acreage is 66.23 acres. The site's drainage area flows from the south and southwest to the north and northeast to the north side of Baker Street. Two new buildings are proposed, building 1 is 206,982 sf and building 2 is 778,423 sf, landscape areas, driveways, and parking lots.

The proposed buildings will consist of a warehouse and connected office space with the necessary improvements to facilitate business. The offsite drainage areas will be captured with a flow-by basin and a debris basin routed through storm drain before discharging at their historical locations on the north side of baker street. The onsite drainage areas will be captured by CMP Detention System and treated by MWS Units.

Baker Street will be improved on the project frontage. The full width drainage of the street will be captured within the catch basin at the low points of Baker Street. The flows will continue into MWS units within Baker Street.

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Temescal Creek Channel Reaches 5-6	Indicator Bacteria	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	N/A
Lake Elsinore	Nutrients, Orgqanic Enrichment/Low Dissolved Oxygen, PCBs, Sediment Toxicity, Unknown Toxicity	AGR, GWR, REC1, REC2, WARM, WILD	N/A
Santa Ana River Reach 3	PH	AGR, GWR, RARE, REC1, REC2, SPWN, WARM, WILD	N/A

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☒ Y	☐ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☒ Y	☐ N

Other *(please list in the space below as required)* City of Lake Elsinore Grading, Improvements, and Building Permits.	☒ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, constraints might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. Opportunities might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration based BMPs.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

Yes. Pre-project site drains north-easterly into Temescal Creek. There will be no impact to Temescal Creek in the proposed conditions, as the site will detained, treated, and outletted at locations similar to existing condition flows.

Did you identify and protect existing vegetation? If so, how? If not, why?

Yes. Some existing vegetation will be preserved during site improvements in the natural open space areas.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

Yes. The natural open space areas will preserve their natural infiltration by not disturbing the existing drainage patterns.

Did you identify and minimize impervious area? If so, how? If not, why?

The proposed impervious areas incorporate landscaped areas within the site to increase infiltration.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Yes, roof runoff has been designed to drain into pervious landscape areas prior to discharge onto streets.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1][2]	Area (Sq. Ft.)	DMA Type
DMA A	Roofs	207,768	Type D
	Concrete	186,269	
	Landscape	58,531	
DMA B	Roofs	356,102	Type D
	Concrete	324,568	
	Landscape	124,738	
DMA C	Roofs	421,203	Type D
	Concrete	465,993	
	Landscape	107,278	
DMA D	Concrete	173,576	Type D
	Landscape	86,064	
DMA E	Concrete	55,815	Type D
	Landscape	28,861	

[1]Reference Table 2-1 in the WQMP Guidance Document to populate this column
[2]If multi-surface provide back-up

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet) [A]	Post-project surface type	Impervious fraction [B]	Product [C] = [A] x [B]	DMA name /ID	Area (square feet) [D]	Ratio [C]/[D]

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
DMA A	MWS Unit
DMA B	MWS Unit
DMA C	MWS Unit
DMA D	MWS Unit

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Co-permittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?	X	
If Yes, list affected DMAs: DMA A, DMA B, DMA C, DMA D		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: DMA A, DMA B, DMA C, DMA D		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

See Appendix 6 for additional information on Infiltration feasibility.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Co-permittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 9.31 AC

Type of Landscaping (Conservation Design or Active Turf): Conservation Design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 50.31 AC

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 1.32

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 66.41 AC

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
66.41 AC	9.31 AC

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shutdowns or other lapses in occupancy:

Projected Number of Daily Toilet Users: 150

Project Type: Industrial

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 50.31 AC

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 198

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 9,962

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	Projected number of toilet users (Step 1)
9,962	150

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shutdowns or other lapses in occupancy or operation.

Average Daily Demand:

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces:

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-4:

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use:

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Co-permittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DMA A	☐	☐	☐	☒	☐
DMA B	☐	☐	☐	☒	☐
DMA C	☐	☐	☐	☒	☐
DMA D	☐	☐	☐	☒	☐
DMA E	☐	☐	☐	☒	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

No alternative compliance measures were studied or used for this project.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Co-permittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Co-permittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*MWS Unit "A"*		
DMA A	[A]		[B]	[C]	[A] x [C]			
Roofs	*207,768*	*Roofs*	*1*	*0.89*	*185,329.1*	*Design Rainfall Intensity (in/hr)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume (cubic feet)*
Concrete	*186,269*	*Concrete or Asphalt*	*1*	*0.892*	*166,151.9*			
Landscape	*58,531*	*Ornamental Landscaping*	*0.1*	*0.1104558*	*6,465.2*			
	A_T = 452,568				Σ= 357,946.2	0.68	20,880.2	***20,881***

Table D.4 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*MWS Unit "B"*		
DMA B	[A]		[B]	[C]	[A] x [C]			
Roofs	*356,102*	*Roofs*	*1*	*0.89*	*317,643*	*Design Rainfall Intensity (in/hr)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume (cubic feet)*
Concrete	*324,568*	*Concrete or Asphalt*	*1*	*0.892*	*289,514.7*			
Landscape	*124,738*	*Ornamental Landscaping*	*0.1*	*0.1104558*	*13,778.3*			
	A_T = 805,408				Σ= 620,936	0.68	36,221.3	***36,222***

Table D.5 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*MWS Unit "C"*		
DMA C	[A]		[B]	[C]	[A] x [C]			
Roofs	*421,203*	*Roofs*	*1*	*0.89*	*375,713.1*	*Design Rainfall Intensity (in/hr)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume (cubic feet)*
Concrete	*465,993*	*Concrete or Asphalt*	*1*	*0.892*	*415,665.8*			
Landscape	*107,278*	*Ornamental Landscaping*	*0.1*	*0.1104558*	*11,849.7*			
	A_T = 994,474				Σ= 803,228.6	0.68	46,855	***55,041***

Table D.6 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*MWS Unit "D"*		
DMA C	[A]		[B]	[C]	[A] x [C]			
Concrete	*173,576*	*Concrete or Asphalt*	*1*	*0.892*	*154,829.8*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cfs)*	*Proposed Flow Rate (cfs)*
Landscape	*86,064*	*Ornamental Landscaping*	*0.1*	*0.1104558*	*9,506.5*			
	A_T = 259,640				Σ= 164,336.3	0.20	0.8	***1.1***

Table D.7 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*MWS Unit "E"*		
DMA C	[A]		[B]	[C]	[A] x [C]			
Concrete	*55,815*	*Concrete or Asphalt*	*1*	*0.892*	*49,787*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cfs)*	*Proposed Flow Rate (cfs)*
Landscape	*28,861*	*Ornamental Landscaping*	*0.1*	*0.1104558*	*3,187.9*			
	A_T = 84,676				Σ= 52,974.9	0.20	0.2	***0.2***

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Co-permittee). Check one of the following boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☒ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☒ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☒	☒	☒	☒	☒	☒	☒	☒

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
N/A	
Total Credit Percentage[1]	

[1]Cannot Exceed 50%

[2]Obtain corresponding data from Table 3-8 in the WQMP Guidance Document

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document

[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document

[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12

[H] is from the Total Credit Percentage as Calculated from Table E.2 above

[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
MWS Unit	Bacteria, Metals, Nutrients, Pesticides, Toxic Organic, Compounds, Sediment, Trash and Debris, Oil and Grease	Medium

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Co-permittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration			
Volume (Cubic Feet)			

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Susceptibility Maps.

Does the project qualify for this HCOC Exemption? ☒ Y ☐ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Co-permittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site Storm Drain Inlets	• Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers shall be per local agency requirements	• Maintain and periodically repaint or replace inlet markings. • Provide Stormwater pollution prevention informations to new site owners, lessees, or operators. • See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com • Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
Landscape/ Outdoor Pesticide Use	Final landscape plans will accomplish all of the following: • Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. • Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. • Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. • Consider using pest-resistant plants, especially adjacent to hardscape. • To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement,	• Maintain landscaping using minimum or no pesticides. • See applicable operational BMPs in "What you should know for…..landscape and Gardening" at http://rcflood.org/stormwater/ • Provide IPM information to new owners, lessees and operators.

	ecological consistency, and plant interactions.	
Loading Docks		• Move loaded and unloaded items indoors as soon as possible • See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Fire Sprinkler Test Water	• Provide a means to drain fire sprinkler water to the sanitary sewer.	• See the note in Fact Sheets SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Miscellaneous Drain or Wash Water of Other Sources Roofing, gutters, and trim	• Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff	
Plazas, sidewalks, and parking lots		• Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris.
Refuse areas	• Site refuse will be handled through dumpsters located around the project that will be covered, graded, and paved to prevent run on • Signs will be posted on or near dumpsters with the words "do not dump hazardous materials here" or similar.	• Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

Industrial processes	• All process activities to be performed indoors. No processes to drain to exterior or to storm drain system.	• See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
DMA A	Modular Wetland System Unit	Conceptual Grading Plan
DMA B	Modular Wetland System Unit	Conceptual Grading Plan
DMA C	Modular Wetland System Unit	Conceptual Grading Plan
DMA D	Modular Wetland System Unit	Conceptual Grading Plan
DMA E	Modular Wetland System Unit	Conceptual Grading Plan

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Co-permittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Co-permittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: POA

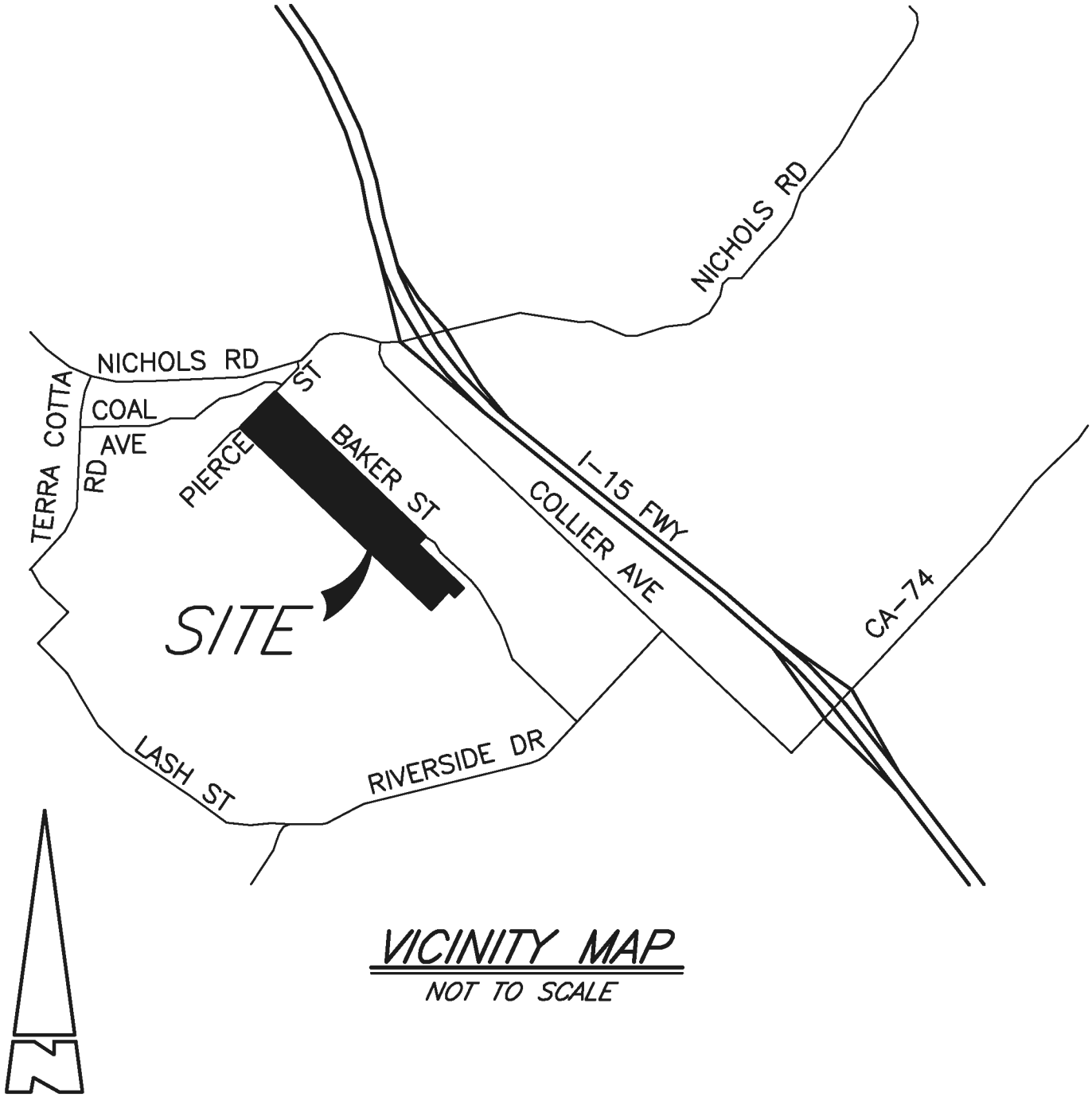
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☒ Y ☐ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



VICINITY MAP

NOT TO SCALE

PREPARED BY:

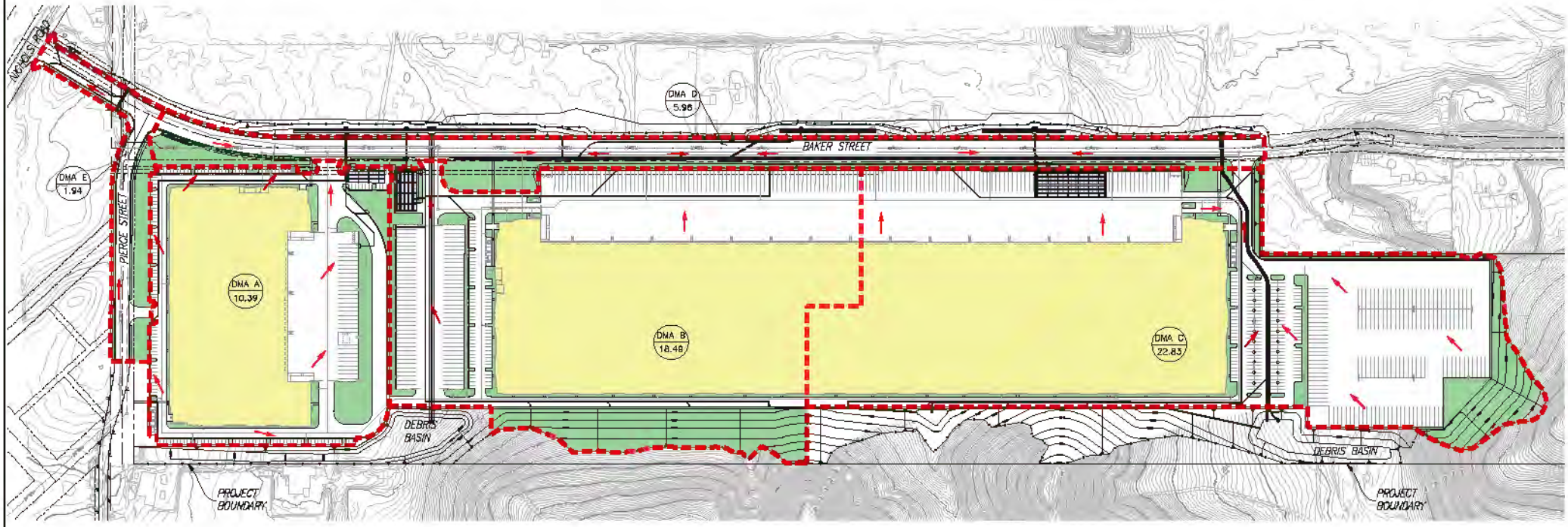
KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

VICINITY MAP
BAKER INDUSTRIAL

DATE	DRAWN BY	CHECKED BY	J.N.
04/28/23	AB	BB	19.1994

BAKER INDUSTRIAL PROJECT

PRELIMINARY WQMP SITE PLAN

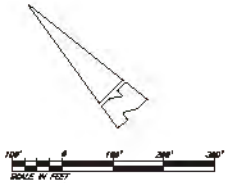


LEGEND

- PROPOSED WQMP BASINS
- ROOF AREA
- CONCRETE AREA
- LANDSCAPING AREA
- A1 / 4.7 — DMA NUMBER / TRIBUTARY AREA (ACRES)
- WQMP TRIBUTARY AREA BOUNDARY
- PROPOSED STORM DRAIN
- FLOW ARROW



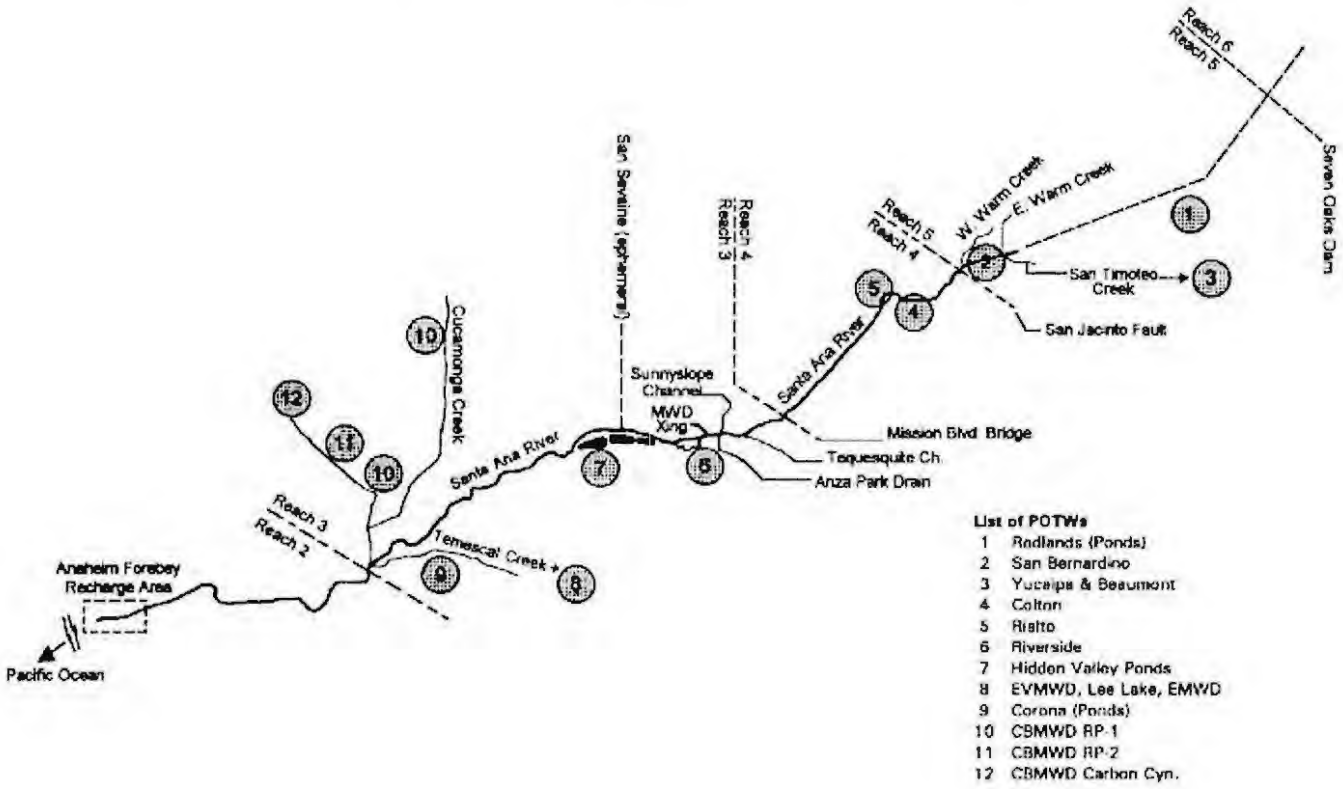
CMP TYPICAL SECTION
N.T.S.



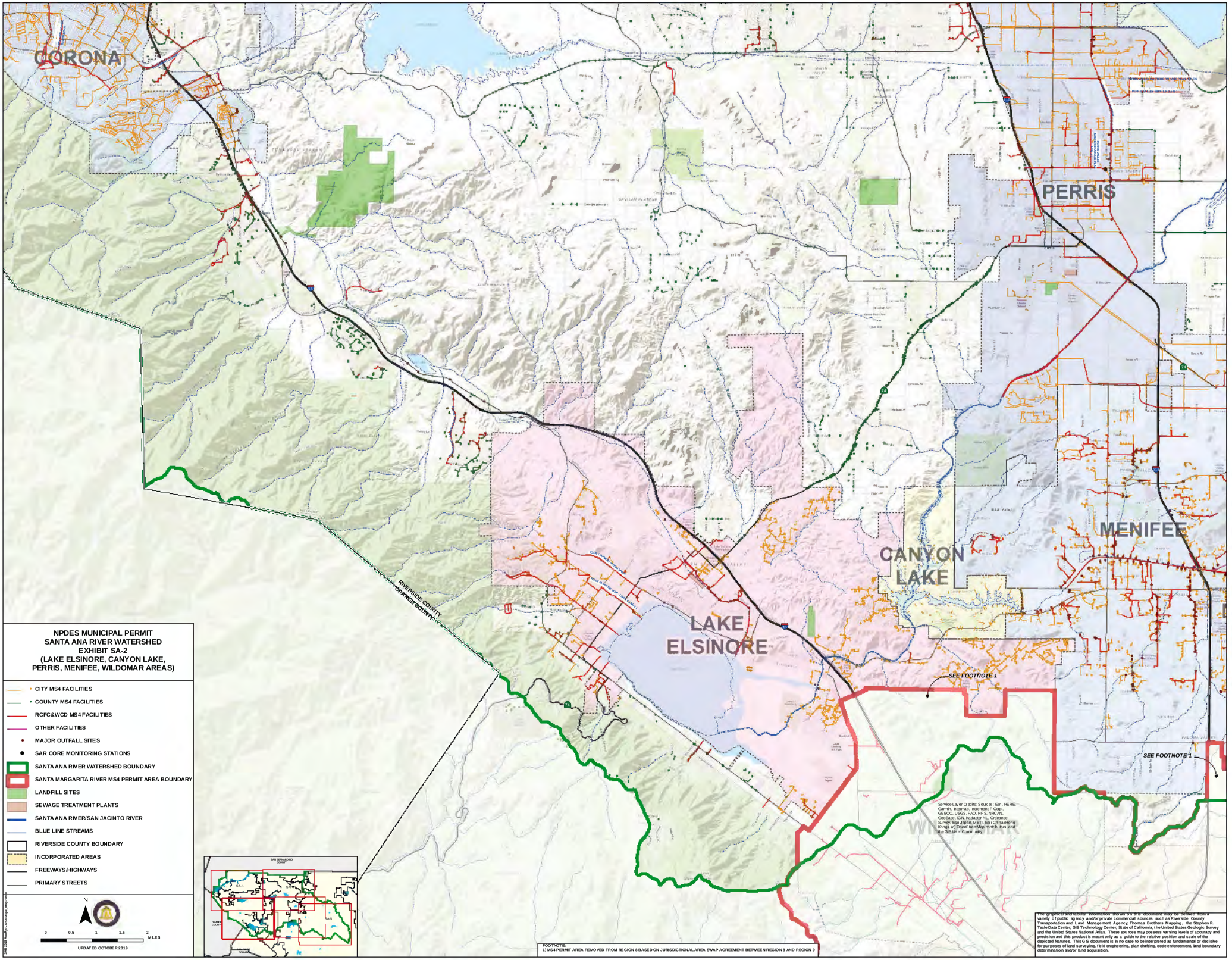
KWC ENGINEERS	CITY OF LAKE ELSINORE
PREPARED FOR: RIVERSIDE LEGACY IV NICHOLS ROAD, LLC	TRACT MAP NO. 38812
	BAKER INDUSTRIAL
	WQMP SITE PLAN
	SHEET 2 OF 2
	DATE 8/24/2023

K:\C_SOLUTION\1 - KWC\PROJECTS\RIVERSIDE\NICHOLS\WQMP\WQMP 1 - WQMP AND SITE PLANS\38812 WQMP SITE PLAN.DWG

FIGURE 1-2
SANTA ANA RIVER AND TRIBUTARIES



FROM SANTA ANA BASIN PLAN


CORONA
PERRIS
MENIFEE
CANYON LAKE
LAKE ELSINORE
RIVERSIDE COUNTY
ORANGE COUNTY
SEE FOOTNOTE 1
SEE FOOTNOTE 1
NPDES MUNICIPAL PERMIT
SANTA ANA RIVER WATERSHED
EXHIBIT SA-2
(LAKE ELSINORE, CANYON LAKE,
PERRIS, MENIFEE, WILDOMAR AREAS)
CITY MS4 FACILITIES
COUNTY MS4 FACILITIES
RCFC&WCD MS4 FACILITIES
OTHER FACILITIES
MAJOR OUTFALL SITES
SAR CORE MONITORING STATIONS
SANTA ANA RIVER WATERSHED BOUNDARY
SANTA MARGARITA RIVER MS4 PERMIT AREA BOUNDARY
LANDFILL SITES
SEWAGE TREATMENT PLANTS
SANTA ANA RIVER/SAN JACINTO RIVER
BLUE LINE STREAMS
RIVERSIDE COUNTY BOUNDARY
INCORPORATED AREAS
FREEWAYS/HIGHWAYS
PRIMARY STREETS
N
0 0.5 1 1.5 2 MILES
UPDATED OCTOBER 2019
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
FOOTNOTE:
1) MS4 PERMIT AREA REMOVED FROM REGION 8 BASED ON JURISDICTIONAL AREA SWAP AGREEMENT BETWEEN REGION 8 AND REGION 9
The graphical and tabular information shown on this document may be derived from a variety of public agency and/or private commercial sources such as Riverside County Transportation and Land Management Agency, Thomas Brothers Mapping, , the Stephen P. Teale Data Center, GIS Technology Center, State of California, the United States Geologic Survey and the United States National Atlas. These sources may possess varying levels of accuracy and precision and this product is meant only as a guide to the relative position and scale of the depicted features. This GIS document is in no case to be interpreted as fundamental or decisive for purposes of land surveying, field engineering, plan drafting, code enforcement, land boundary determination and/or land acquisition.

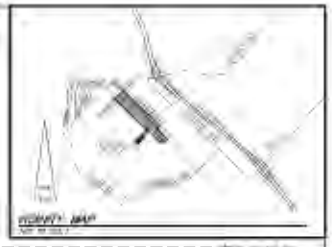
Appendix 2: Construction Plans

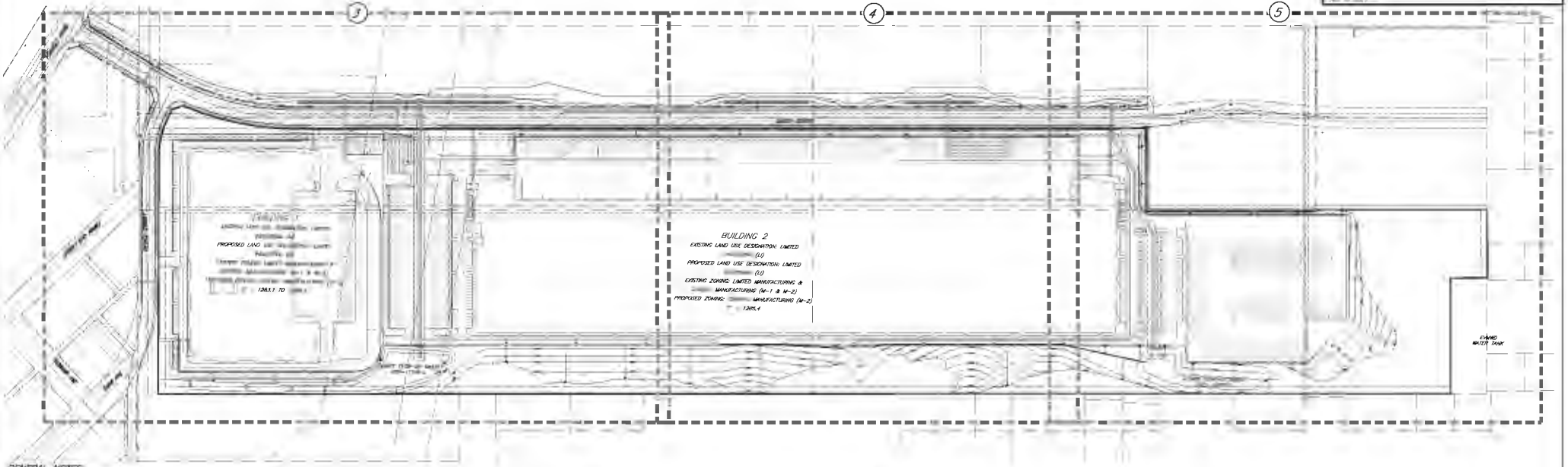
Grading and Drainage Plans

BAKER INDUSTRIAL PROJECT

CONCEPTUAL GRADING PLAN

IN THE CITY OF LAKE ELSINORE





GENERAL NOTES:

1. [illegible]
2. ACREAGE SUMMARY:

		ACREAGE	PERCENT
	TOTAL	68.23 AC	100.00%
A.	INDUSTRIAL NET AREA	56.49 AC	82.80%
B.	PARKING LOT	10.41 AC	15.26%
C.	PAVED STREETS	1.33 AC	1.94%

3. [illegible] OF PARCELS: 2
4. ESTIMATED RAW EARTHWORK QUANTITIES:

[illegible]		
[illegible]		
[illegible]		
[illegible]		

5. [illegible] (LI)
6. [illegible] (LI)
7. [illegible] LIMITED MANUFACTURING (M-1) & GENERAL MANUFACTURING (M-2)
8. [illegible] GENERAL MANUFACTURING (M-2)
9. [illegible] USE.
10. [illegible] (TYP.)
11. SOURCE OF TOPOGRAPHY IS AERIAL TOPOGRAPHY FLOWN ON AUGUST 18TH, 2020 BY KWC ENGINEERS.
12. [illegible]
13. [illegible] 1.0% MINIMUM, 10% MAXIMUM.
14. ALL CONC. [illegible] HAVE A MINIMUM GRADE OF: 0.5%
15. ALL A.C. [illegible] HAVE A MINIMUM GRADE OF: 1.0%
16. [illegible] 10%
17. ALL SLOPES ADJACENT TO STREET R.O.W. TO BE MAINTAINED BY P.O.A.
18. ALL [illegible]
19. [illegible]
20. [illegible]
21. [illegible] SANTA ANA

LEGAL DESCRIPTION:

PARCEL 1: (APN: 378-020-074:)

PARCEL 1:

ALL THAT PORTION OF LOT 1, IN BLOCK "A" OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 8, PAGE 27, OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

[illegible] DISTANCE OF 80 FEET TO THE TRUE POINT OF

EXCEPTING THEREFROM [illegible] OIL AND GAS AS RESERVED BY DEED RECORDED MAY 8, 1936 IN BOOK 2-75, PAGE 344.

PARCEL 2: (APN: 378-020-015 AND 378-020-016:)

[illegible]

ALL THAT PORTION OF LOTS 1, 2 AND 3, IN BLOCK "A" OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 8, PAGE 27, OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, PARTICULARLY DESCRIBED AS FOLLOWS:

[illegible] THAT PORTION

COMMENCING AT THE MOST WESTERLY CORNER OF THAT CERTAIN TRACT OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, BY DEED RECORDED MAY 8, 1936 IN BOOK 2-75 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE SOUTH 46° 50' EAST, 2.38 FEET; THENCE NORTH 43° 10' EAST, 300 FEET FOR THE POINT OF BEGINNING; THENCE NORTH 43° 50' EAST, 30 FEET; THENCE NORTH 46° 50' WEST, 80 FEET; THENCE SOUTH 43° 10' WEST, 30 FEET; THENCE SOUTH 46° 50' EAST, 80 FEET TO THE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM A STRIP(S) OF LAND 1 RED WIDE, 4-½ FEET ON THE EASTERLY SIDE AND 12 FEET ON THE WESTERLY SIDE OF THE CENTER LINE OF THE PIPELINE OF THE TEMESCAL WATER COMPANY, AS NOW LAID OVER AND ACROSS THE HEREINABOVE DESCRIBED PROPERTY, AS CONVEYED TO THE TEMESCAL WATER COMPANY, A CORPORATION, BY DEED RECORDED MAY 12, 1917, IN BOOK 262 PAGE 58, OF DEEDS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

ALSO EXCEPTING THEREFROM THE 1/3 PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 2-75 PAGE 344 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

INDEX MAP

SCALE: 1"=100'

[illegible] B: (APN: 378-020-028)

PARCEL 1 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, ON FILE IN BOOK 58 PAGE 68 OF PARCEL MAPS, [illegible]

EXCEPTING THEREFROM 1/3 PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 2-75 PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS

[illegible] C: (APN: 378-020-037 AND OTHER PROPERTY)

PARCEL 3 OF PARCEL MAP 16885, AS SHOWN BY MAP ON FILE IN BOOK 36, PAGE 39 OF PARCEL MAPS, [illegible] RECORDS OF RIVERSIDE COUNTY;

EXCEPTING THE 1 30TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 2-75, PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL D: (APN: 378-020-031)

PARCEL 4 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 58, PAGE 68, OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY;

EXCEPTING THE 1 30TH PART OF ALL OIL, GAS AND MINERALS IN, UNDER OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 2-75, PAGE 344, OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

[illegible] E: (APN: 378-020-042)

PARCEL 1 :

THE SOUTHEAST ONE-HALF OF THE SOUTHWEST ONE-HALF OF THE FOLLOWING DESCRIBED PROPERTY:

ALL THAT PORTION OF LOTS 1, 2 AND 3 IN BLOCK A OF ELSINORE, AND OF LOW ROLLING HILLS ADJOINING SAID LOTS ON THE SOUTHWEST, AS SHOWN BY MAP ON FILE IN BOOK 8 PAGE 27, OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA, PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE MOST NORTHERLY CORNER OF LOT 50 OF COUNTRY CLUB HEIGHTS, UNIT "B" AS SHOWN BY MAP ON FILE IN BOOK 7 PAGES 25 AND 26 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;

THENCE NORTH 43° 34' EAST, ALONG THE SOUTHERLY EXTENSION OF THE MOST WESTERLY LINE AND ALONG THE WEST WESTERLY LINE OF THAT CERTAIN PARCEL OF LAND CONVEYED TO JOE GOMLIN AND HENRY C. SENULIS, BY DEED RECORDED NOVEMBER 19, 1928 IN BOOK 389 PAGE 213 OF DEEDS, RECORDS OF RIVERSIDE COUNTY, TO THE MOST NORTHERLY POINT IN SAID MOST WESTERLY LINE, FOR THE POINT OF BEGINNING;

THENCE 46° 50' EAST, [illegible] 306.16 FEET;

THENCE NORTH 43° 10' EAST, CONNERLY RECORDED NORTH 43 EAST, 1100 FEET TO THE MOST EASTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, BY DEED RECORDED MAY 8, 1936 IN BOOK 2-75 PAGE 344 OF OFFICIAL RECORDS OF SAID RIVERSIDE COUNTY;

THENCE NORTH 46° 50' WEST, ALONG THE NORTHEASTERLY LINE OF SAID PARCEL SO CONVEYED TO GREAT COASTAL OIL CORPORATION, 306.1 FEET TO THE NORTHWESTERLY LINE OF LOT 1 IN BLOCK A, ABOVE DESCRIBED;

THENCE SOUTHWESTERLY ALONG SAID NORTHWEST LINE AND ALONG THE SOUTHWESTERLY PROLONGATION OF SAID NORTHWESTERLY LINE TO A POINT WHICH BEARS NORTH 46° 50' WEST FROM THE POINT OF BEGINNING, SAID POINT BEING THE MOST WESTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO GREAT COASTAL OIL CORPORATION, HEREINABOVE REFERRED TO;

THENCE SOUTH 46° 50' EAST, ALONG [illegible] PARCEL, TO THE POINT OF BEGINNING;

EXCEPTING THEREFROM THAT PORTION CONVEYED TO ELSINORE VALLEY MUNICIPAL WATER DISTRICT, A PUBLIC CORPORATION BY DEED RECORDED APRIL 8, 1988, AS INSTRUMENT NO. [illegible] OF OFFICIAL RECORDS.

[illegible] 2 :

AN EASEMENT FOR ROAD PURPOSES, 80 FEET WIDE, OVER AND ACROSS THE EXISTING ROAD, THE CENTER LINE BEING THE NORTHEASTERLY LINE OF THE ABOVE DESCRIBED PROPERTY; AND THE NORTHWESTERLY EXTENSION OF SAID LINES AS EXTENDED TO THE SOUTHWESTERLY LINE OF MERGE STREET, EXCEPTING THEREFROM THAT PORTION INCLUDED WITH PARCEL E ABOVE.

[illegible] 1 30TH INTEREST OF ALL OIL, [illegible]

[illegible] F: (APN: 378-020-029)

PARCEL 3 OF PARCEL MAP NO. 11395, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 58, PAGE 68 PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA

EXCEPT THE 1 30TH PART OF ALL OIL, GAS AND MINERALS IN, UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 2-75, PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

[illegible] G: (APN: 378-020-030)

[illegible] 11395, IN THE CITY OF LAKE ELSINORE, [illegible] ON FILE IN BOOK 58, PAGE 68, [illegible] COUNTY;

EXCEPTING THE 1 30TH PART OF ALL OIL, GAS AND MINERALS IN, OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 2-75, PAGE 344, OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

PARCEL H: (APN: 378-020-036 AND OTHER PROPERTY)

[illegible] AS SHOWN BY MAP ON FILE IN BOOK [illegible]

EXCEPTING THE 1 30TH PART OF ALL OIL, GAS AND MINERALS IN, OR UPON SAID LAND OR WHICH MAY BE SECURED THEREFROM, AS RESERVED IN DEED FROM CHARLES HUDSON AND DESSIE HUDSON, RECORDED MAY 8, 1936 IN BOOK 2-75, PAGE 344 OF OFFICIAL RECORDS, RIVERSIDE COUNTY, RECORDS.

UTILITY CONTACTS:

[illegible]	ELSINORE VALLEY MUNICIPAL 31315 CHAPEL STREET LAKE ELSINORE, CA 92531 (951) 674-3146
[illegible]	ELSINORE VALLEY MUNICIPAL 31315 CHAPEL STREET LAKE ELSINORE, CA 92531 (951) 674-3146
POWER:	SOUTHERN CALIFORNIA EDISON CO. 26100 MENIFEE ROAD ROMOLAND, CA. 92585 (951) 928-8301 (951) 928-5488
GAS:	SOUTHERN CALIFORNIA GAS CO. 1981 W. LUGONIA AVENUE REDLANDS, CA. 92373 (909) 335-7636
PHONE:	VERIZON FIOS 41770 CALIFORNIA OAKS ROAD MURRIETA, CA 92563 (951) 290-3151
CABLE TV:	TIME WARNER CABLE 31811 CORYDON STREET LAKE ELSINORE, CA 92532 (888) 371-1348

ASSESSOR PARCEL NO:

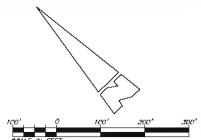
378-020-074, -075, -076, -028, -029, -030, -031, -036, -037, -048

BASIS OF BEARINGS

[illegible]

BENCHMARK

BENCH MARK NO. C-18-33 ELEV. = 1356.15 MSL (1929 DATUM) ADJUSTED BY VERTCON TO 1358.83 (1988 DATUM) FROM THE INTERSECTION OF LAKESHORE DRIVE AND SPOKEN STREET 10 FEET SOUTHWESTERLY ALONG LAKESHORE AND 20 FEET NORTHWESTERLY TO THE CHISELED "SQUARE" IN TOP OF CURB AT BCR



OWNER/APPLICANT:

RIVERSIDE LEGEND 8 MENDOLS ROAD, LLC
13205 BIRCHBAY, SUITE 100
SANTA ANA, CA 92705
(817) 870-7500
CONTACT: TYREE DANFORTH

SITE ADDRESS:

31711 BAKER STREET
LAKE ELSINORE, CA 92530

ENGINEER:

KWC ENGINEERS
1880 COMPTON AVENUE, SUITE 100
CORONA, CA. 92881 - 3372
(951) 734-9100
ATTN: BRANDON BARNETT, P.E.

LEGEND:

(SAN1)	PROPOSED WATER
(SAN1)	PROPOSED SEWER
(SAN1)	PROPOSED RECLAIMED
(SAN1)	PROPOSED STORM DRAIN
(SAN1)	EXISTING WATER
(SAN1)	EXISTING SEWER
(SAN1)	EXISTING RECLAIMED WA
(SAN1)	EXISTING STORM DRAIN
	EXISTING CONTOUR ELEVATION
	PROPOSED SURFACE ELEVATION
	PROPOSED PAD ELEVATION
	LOT NUMBER
	ELEVATION
	FINISH GRADE
	FLOWLINE
	FINISHED SURFACE
	LENGTH
W=	WIDTH
MIN.	MINIMUM
P/L	PROPERTY LINE
R/W	RIGHT OF WAY
GB	GRADE BREAK
TC	TOP OF CURB
	TOE OF SLOPE (3:1 UNLESS OTHERWISE NOTED)
	TOP OF SLOPE
	AQUA FAITH OF TRAVEL
	CUTOFF SWALE

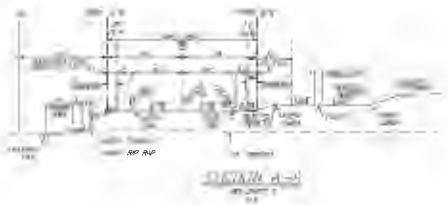
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CROSS SECTION AND DETAILS SHEETS	SHEETS 2
CONCEPTUAL GRADING PLAN SHEETS	SHEETS 3-5
WET UTILITY PLAN SHEET	SHEET 6

CONCEPTUAL GRADING PLAN
BAKER INDUSTRIAL
CITY OF LAKE ELSINORE

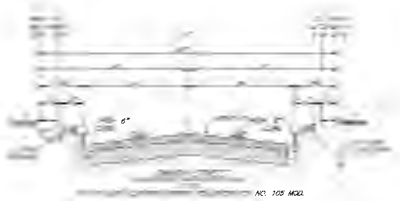
KWC ENGINEERS

SHEET 1 OF 6 SHEET







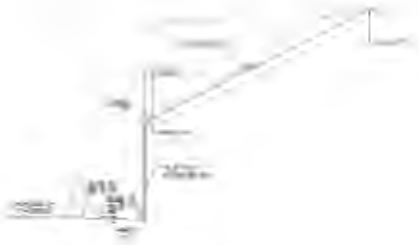






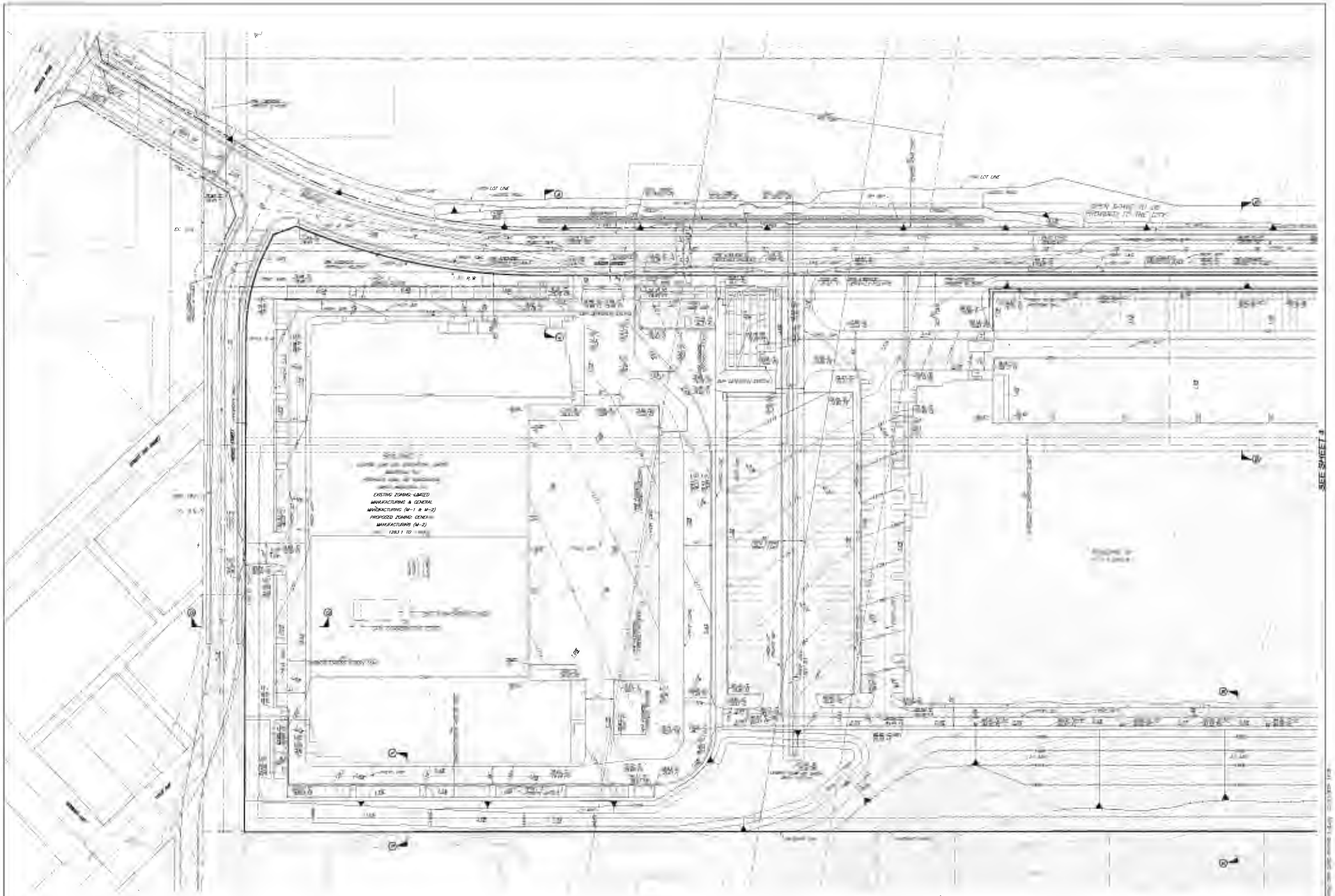








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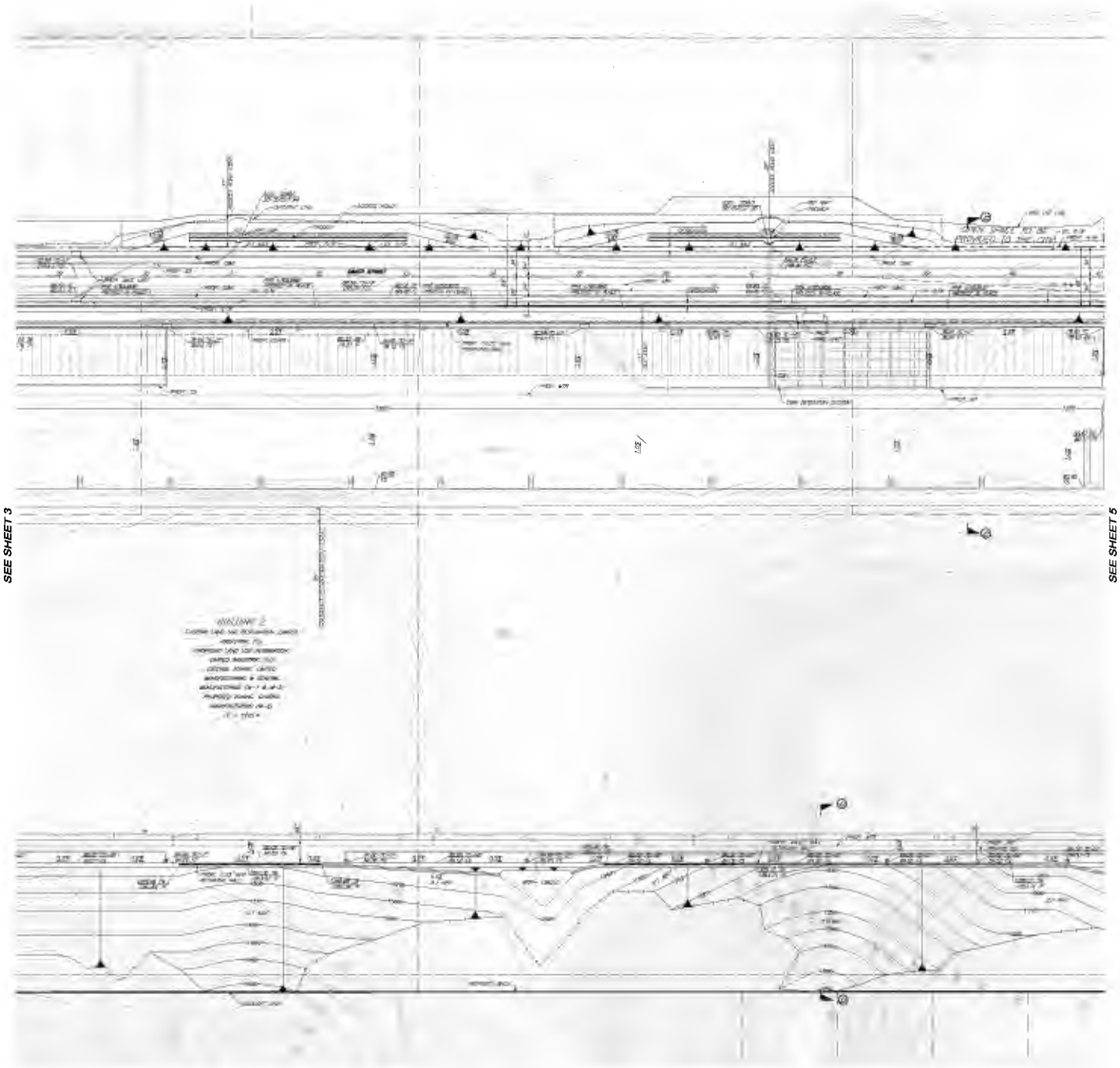


CONCEPTUAL GRADING PLAN
BAKER INDUSTRIAL
CITY OF LAKE ELSINORE

PREPARED BY:

KWC ENGINEERS

SHEET 3 OF 6 SHEET

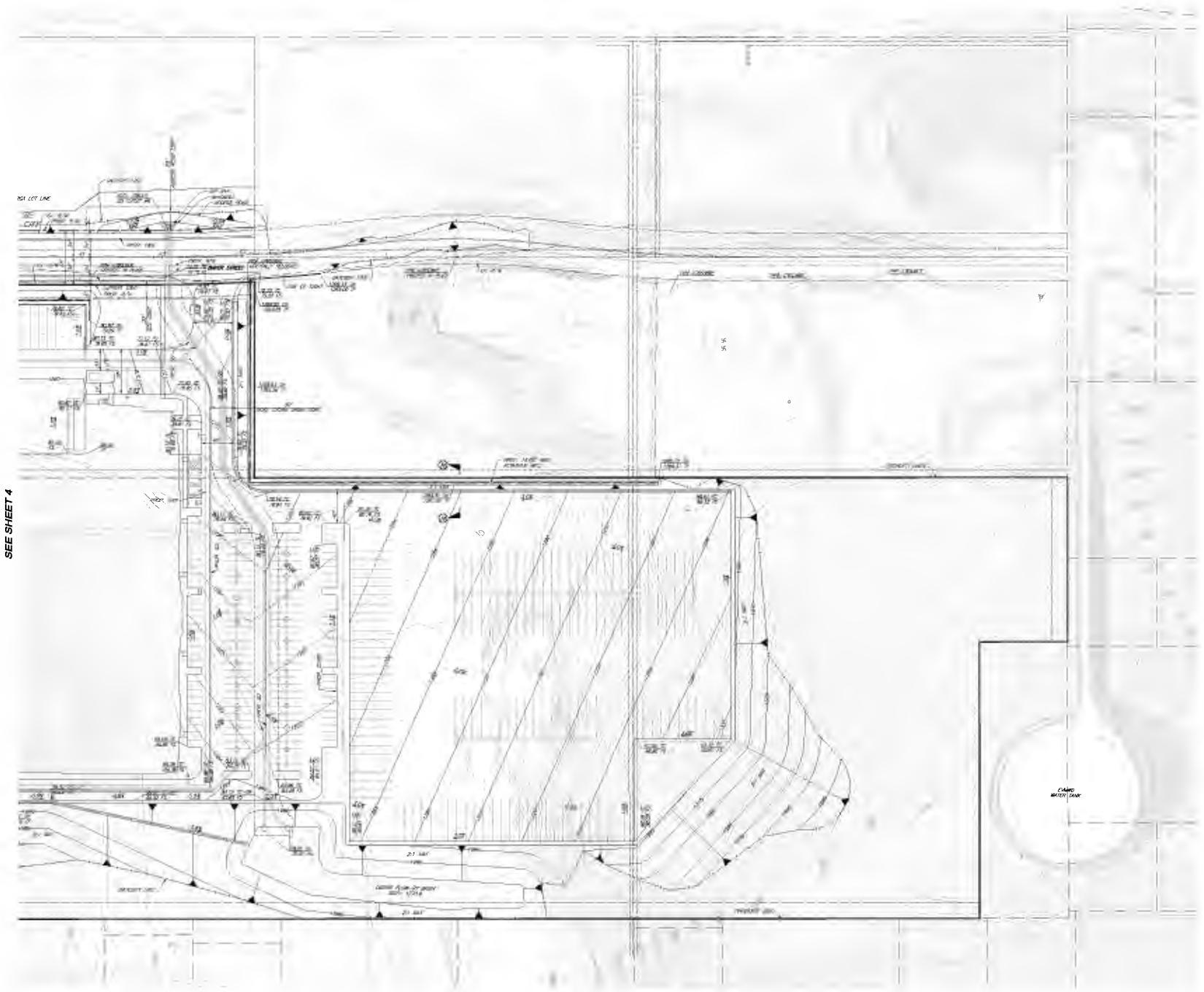


CONCEPTUAL GRADING PLAN
BAKER INDUSTRIAL
CITY OF LAKE ELSINORE

PREPARED BY:
KWC ENGINEERS

SHEET 4 OF 6 SHEET

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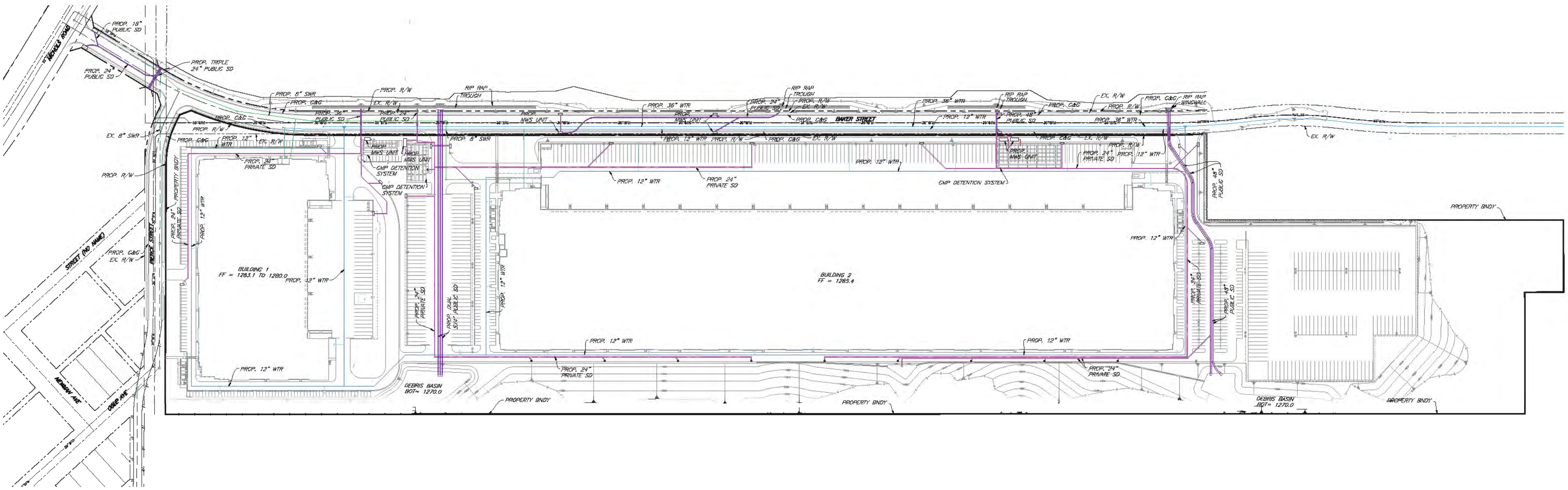
CONCEPTUAL GRADING PLAN
BAKER INDUSTRIAL
CITY OF LAKE ELSINORE

PREPARED BY:

KWC ENGINEERS

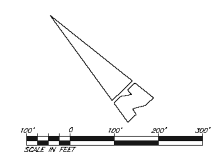
SHEET 5 OF 6 SHEET

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LEGEND:

- PROPOSED WATER
- EXISTING SEWER
- PROPOSED SEWER
- PROPSED PUBLIC STORM DRAIN
- PROPOSED PRIVATE STORM DRAIN
- TOP OF SLOPE
- SLOPE DAGGER
- TOE OF SLOPE
- PROPOSED CATCH BASIN
- PROPOSED FIRE HYDRANT



PRELIMINARY WET UTILITY PLAN
BAKER INDUSTRIAL
CITY OF LAKE ELSINORE

PREPARED BY:

KWC ENGINEERS

SHEET 6 OF 6 SHEET

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Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

January 31, 2024 Project No. 23160-01

Mr. Trygg Danforth
Ecosystem Investment Partners
5550 Newbury Street, Suite B
Baltimore, Maryland 21209

Subject: ***Preliminary Geotechnical Subsurface Evaluation and Recommendations, Proposed Approximate 65-Acre Industrial Development, Baker Street, Lake Elsinore, California***

In accordance with your request, LGC Geotechnical, Inc. has performed a preliminary geotechnical subsurface evaluation and recommendations for the proposed approximately 65-acre industrial development located on Baker Street in the City of Lake Elsinore, California. The purpose of our study was to evaluate the existing onsite geotechnical conditions and to confirm that the site can be developed from a geotechnical perspective. This report presents the results of our evaluation and geotechnical analysis and provides a summary of our conclusions and recommendations relative to the proposed development of the site.

Should you have any questions regarding this report, please do not hesitate to contact our office. We appreciate this opportunity to be of service.

Sincerely,

LGC Geotechnical, Inc.

Ryan Douglas, GE 3147
Project Engineer

Barry Graham, CEG 2749
Project Geologist

RLD/BPG/BPP/amm

Distribution: (1) Addressee (electronic copy)

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1.0 INTRODUCTION

1.1 Purpose and Scope of Services

This report presents the results of our preliminary geotechnical evaluation for the proposed approximately 65-acre industrial development located along Baker Street in Lake Elsinore, California (Figure 1).

The purpose of our study was to provide a preliminary geotechnical evaluation relative to the proposed industrial development. As part of our scope, we have: 1) reviewed available geotechnical background information including in-house regional geologic maps; 2) performed a subsurface geotechnical evaluation in the area of the proposed development; 3) performed laboratory testing of select soil samples obtained during our subsurface evaluation; 4) incorporated field and laboratory data into our analysis; and 5) prepared this preliminary geotechnical summary report presenting our findings, preliminary conclusions and recommendations for the development of the proposed project.

The findings, conclusions, and recommendations presented herein should be considered preliminary and will need to be confirmed/updated as part of a future 40-scale grading plan review report. Additional fieldwork and laboratory testing may be required. It should be noted that LGC Geotechnical does not provide environmental consulting services and did not address the environmental conditions of the subject site.

1.2 Project Description

The subject property is located on an approximately 65-acre site along the southwest side of Baker Street, in the city of Lake Elsinore, California (Figure 1). Site elevations range from approximately 1,392 in the southwest portion of the site to approximately 1,260 in the northeast portion of the site. The site is mostly undeveloped with one existing structure in the eastern portion of the site. The site is covered by low lying vegetation and manmade (dirt) trails throughout.

The proposed development will include grading and construction of two industrial buildings totaling approximately 1,000,000 square feet, associated drive aisles, retaining walls, and parking areas (RGA, 2023). The proposed grading will include cutting into the hillsides on the southwest portion of the site. The proposed cut slopes will be up to approximately 70 feet tall. Proposed slope inclinations will be at 2:1 (horizontal to vertical) inclinations or flatter. Retaining walls are proposed along all sides of the site. One approximately 45-foot-tall retaining wall is proposed along the southwest portion of the site (KWC, 2024). The proposed industrial buildings are anticipated to be at-grade concrete tilt-up structures with estimated maximum column and wall loads of approximately 150 kips and 10 kips per linear foot, respectively. Please note no structural loads were provided to us at the time of this report.

The preliminary recommendations given in this report are based upon the provided preliminary grading information and the estimated structural loads as indicated above. We understand that the project plans are currently being developed at this time. LGC

Geotechnical should be provided with updated project plans and the actual structural loads when they become available, in order to either confirm or modify the recommendations provided herein. This may include, but is not limited to, additional subsurface field work, laboratory testing, and analysis to provide a design level 40-scale grading plan review geotechnical report.

1.3 Field Evaluation

The field portion of our evaluation included excavation of three large-diameter borings, fourteen small-diameter hollow-stem auger borings, and fourteen exploratory test pits.

Three large-diameter, bucket-auger borings (BA-1, BA-1B, and BA-2,) were excavated on the site by Big Johnny & Pam's Drilling under subcontract to LGC Geotechnical (Sheet 1). The maximum depth of the bucket-auger borings was approximately 100 feet below existing grade. The bucket-auger borings were excavated to evaluate the geologic structure of the underlying bedrock materials and to obtain samples for laboratory testing. Samples were obtained at select locations for laboratory testing. The large-diameter boreholes were surface logged during excavation and downhole logged by an engineering geologist in order to obtain structural geologic information. Borings were subsequently backfilled with cuttings and tamped.

Fourteen exploratory hollow-stem borings (HS-1 through HS-8 and I-1 through I-6) were drilled to depths ranging from approximately 3 to 50 feet below existing grades. An LGC Geotechnical engineer observed the drilling operations, logged the borings, and collected soil samples for laboratory testing. The borings were excavated using a track-mounted CME 75 drill rig equipped with both a 6 and 8-inch-diameter hollow-stem auger. Driven soil samples were collected by means of the Standard Penetration Test (SPT) and Modified California Drive (MCD) sampler generally obtained at 2.5 to 5-foot vertical increments. The MCD is a split-barrel sampler with a tapered cutting tip and lined with a series of 1-inch-tall brass rings. The SPT sampler and MCD sampler were driven using a 140-pound automatic hammer falling 30 inches to advance the sampler a total depth of 18 inches. The raw blow counts for each 6-inch increment of penetration were recorded on the boring logs. Bulk samples were also collected and logged at select depths for laboratory testing. At the completion of drilling, the borings were backfilled with the native soil cuttings and tamped. Some settlement of the backfill soils may occur over time.

Fourteen exploratory test pits (TP-1 through TP-14) were excavated utilizing a standard backhoe with a 3-foot bucket in order to estimate removal depths, geologic materials, and obtain samples for laboratory testing. An engineering geologist observed the operation, logged the geotechnical test pits, and collected the soil samples. Subsequent to logging, the test pits were backfilled with native soils and compacted using a compaction wheel. Some settlement of the backfill soils may occur over time.

Infiltration testing was performed within five of the borings (I-2 through I-6) at depths ranging from approximately 3 to 12 feet below existing grade. Please note that infiltration test I-1 was abandoned due to groundwater that was encountered at a depth of approximately 11 feet, prior to the design depth of the infiltration test being reached. Test well installation consisted of placing a 3-inch diameter perforated PVC pipe in each excavated borehole and backfilling the

annulus with crushed rock including the placement of approximately 2 inches of crushed rock at the bottom of each borehole. Infiltration testing was performed in accordance with guidelines set forth by the County of Riverside (2011). The PVC pipes were removed, and the holes were subsequently backfilled with native soils at the completion of testing.

The approximate locations of our borings and test pits are shown on the Preliminary Geotechnical Map (Sheet 1). Boring and test pit logs are presented in Appendix B.

1.4 Laboratory Testing

Representative bulk and driven samples were retained for laboratory testing during our field evaluation. Laboratory testing included in-situ moisture content and in-situ dry density, grain size analysis, Atterberg Limits, expansion index, laboratory compaction, consolidation, direct shear, R-value, and corrosion testing.

The following is a summary of the laboratory test results.

- Dry density of the samples collected ranged from approximately 87 pounds per cubic foot (pcf) to 125 pcf, with an average of 110 pcf. Field moisture contents ranged from approximately 3 percent to 26 percent, with an average of 15 percent.
- Five fines content and sieve analysis tests indicated fines content (passing No. 200 sieve) ranging from 27 to 73 percent. According to the Unified Soils Classification System (USCS), the tested samples are classified as “coarse-grained” and “fine-grained” soil.
- Five Atterberg Limit (liquid limit and plastic limit) tests were performed. Results indicated Plasticity Index values ranging from 22 to 41.
- Two Expansion Index (EI) tests indicated EI values ranging from 71 to 99, corresponding to “Medium” to “High” expansion potential.
- Laboratory compaction testing of two bulk samples indicated a maximum dry density ranging from 113.5 to 116.5 pcf with an optimum moisture content ranging from 12.0 to 14.0 percent.
- One consolidation test was performed on select samples. The deformation versus vertical stress plot is provided in Appendix C.
- Four direct shear tests were performed on select relatively undisturbed and disturbed samples. The plots are provided in Appendix C.
- One R-value test performed on a representative bulk sample indicates an R-value of less than 5. The R-value plot is provided in Appendix C.
- Corrosion testing indicated soluble sulfate contents less than approximately 0.03 percent, chloride contents ranging from 180 to 220 part per million (ppm), pH values ranging from 6.57 to 7.91 and minimum resistivity values ranging from 735 to 1240 ohm-cm.

A summary of the results is presented in Appendix C. The moisture and dry density test results are presented on the boring logs in Appendix B.



LGC Geotechnical, Inc.	**FIGURE 1** **Site Location Map**

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	23160-01
ENG. / GEOL.	RLD / BPG
SCALE	Not to Scale
DATE	January 2024

2.0 GEOTECHNICAL CONDITIONS

2.1 Regional Geology

Regionally, the site is located on the western edge of the Perris Block within the Peninsular Ranges Geomorphic Province of California. The Peninsular Ranges are characterized by steep, elongated valleys that trend west to northwest. The northwest-trending topography is controlled by the Elsinore fault zone, which extends from the San Gabriel River Valley southeasterly to the United States/Mexico border. The Santa Ana Mountains lie along the western side of the Elsinore fault zone, while the Perris Block is located along the eastern side of the fault zone. The mountainous regions are underlain by Pre-Cretaceous, metasedimentary and metavolcanic rocks and Cretaceous plutonic rocks of the Southern California Batholith. Tertiary and Quaternary rocks are generally comprised of non-marine sediments consisting of sandstone, mudstones, conglomerates, and occasional volcanic units.

The site is not located within a mapped State of California Earthquake Fault-Rupture Hazard Zone per compiled maps released by the CGS (2018), nor a County of Riverside Fault Zone (Riverside County, 2019) and no known active or potentially active faults cross the site.

2.2 Site Specific Geology

Based on our field investigation and review of available geologic maps and reports, the primary bedrock unit underlying the site is the Tertiary Silverado Formation. Surficial units consisting of undocumented artificial fill, topsoil, colluvium, and alluvium overlie the bedrock. A brief description of the geologic units on the site is presented below and their approximate lateral extents are provided on the Preliminary Geotechnical Map (Sheet 1).

2.2.1 Undocumented Artificial Fill (afu)

Few relatively thin zones of undocumented artificial fill were observed in the northern portion of the site. Undocumented fill was not mapped across most of the site apart from an observed trash and soil pit approximately 9 feet in depth, located adjacent an old building pad (see TP-7, Appendix B and Sheet 1 Preliminary Geotechnical Map). The undocumented fill, as observed, consisted of loose, dry, sandy silt with some trash and debris. The undocumented fill is considered potentially compressible and will need to be removed as it is encountered throughout the site to competent formational material. Although the observed undocumented fill was found to be on the order of 9 feet, deeper undocumented fill requiring deeper removals may be encountered during site grading.

2.2.2 Topsoil/Colluvium (Qcol)

A relatively thin veneer of topsoil/colluvium mantles much of the site. Topsoil and colluvium were not mapped across most of the site due to their relatively thin nature (less than 1-2 feet) and variable lateral extent. However, a thicker area of colluvium (up to 15

feet) was mapped in the southeast portion of the site. The topsoil/colluvium, as observed, consists predominantly of red brown-to-light brown, dry to moist, loose to medium dense silty to clayey sand to sandy clay. These soils are typically massive, porous and contain scattered roots and organics. The topsoil/colluvium is considered potentially compressible and will need to be removed to competent formational material in areas of proposed development. The potentially compressible topsoil is estimated to be approximately 1 to 2 feet in thickness in the hillside portions of the site. Topsoil/colluvium soils on the lower portions of the hillsides and on the margins of the onsite drainages can be expected to be up to approximately 15 feet in thickness. However, deeper removals may be encountered during site grading.

2.2.3 Quaternary Alluvium (Map Symbol: Qal)

Quaternary-aged alluvium is present throughout the low-lying areas of the site. The areas underlain by alluvial soils have been mapped on the Preliminary Geotechnical Map (Sheet 1). These soils typically consist of brown, dry to very moist, medium dense silty sand and very stiff silt and clay with varying amounts of sand and gravel. The upper portion of the alluvium is porous and usually contains localized zones of moderate to abundant roots and other organic matter. The upper portion of the alluvium is considered potentially compressible and will need to be removed to competent alluvium or formational material in areas of proposed development. In general, unsuitable alluvial removals are estimated to be up to approximately 8 feet below the surface. However, deeper removals may be encountered during site grading.

2.2.4 Tertiary Silverado Formation (Map Symbol: Tsi)

The Santiago Formation was deposited in a shallow marine and a non-marine environment. Typically, this material consists of sandstone, siltstone, claystone and some cobble conglomerate. The Silverado Formation can also locally include clay, carbonaceous shale, and lignite beds. The majority of the Silverado Formation material encountered during our subsurface investigation of the site consisted of moderately bedded to massive material dipping predominantly to the south (~ 5 to 30 degrees). Minor amounts of what may be Quaternary Pauba formation "fanglomerate" material was encountered at the top of the northeast trending ridgelines but were not differentiated for the purposes of this report.

2.3 Geologic Structure

The Silverado Formation was found to be moderate to massively bedded, generally dipping variably to the south (~ 5 to 30 degrees). Some thicker units of siltstone interbedding were found predominately within LGC-BA-2, dipping moderately into slope (15-30 degrees). Some polished surfaces confined within siltstone beds indicate some internal tectonic shearing within the unit. A continuous clay bed up to ¼" thick was found dipping approximately 20 degrees to the south within boring LGC-BA-1B. In general, bedding was found to be consistent with information found on the regional geologic maps (USGS, 2003).

2.4 Groundwater

Groundwater was encountered at depths ranging from approximately 11 to 45 feet below existing grade. Based on nearby groundwater wells, elevation of the nearby creek bottom approximately 750 feet northeast of the site, and groundwater data gathered during our subsurface evaluation, historic high groundwater is estimated to be approximately 10 feet below existing grade.

Seasonal fluctuations of groundwater elevations should be expected over time. In general, groundwater levels fluctuate with the seasons and local zones of perched groundwater may be present within the near-surface deposits due to local seepage or during rainy seasons. Local perched groundwater conditions or surface seepage may develop once site development is completed and landscape irrigation commences.

2.5 Preliminary Field Infiltration Testing

Estimation of infiltration rates was performed in general accordance with guidelines set forth by the County of Riverside (2011). In general, 3-inch diameter perforated PVC pipes were placed in each borehole to be tested and the annulus was backfilled with gravel, including placement of about 2 inches of gravel at the bottom of the borehole. The infiltration wells were pre-soaked prior to testing. Based on the County of Riverside methodology, the calculated (observed) infiltration rates are provided in Table 1. The observed infiltration rates are considered representative of the site soils where tested. These observed infiltration rates do not include any factor of safety. Observed infiltration rates have been normalized to correct the 3-Dimensional flow that occurs within the field test to 1-Dimensional flow out of the bottom of the boring. The approximate infiltration test locations are shown on the Preliminary Geotechnical Map (Sheet 1) and the infiltration test data is summarized in Table 1. Infiltration test results are provided in Appendix E. Please note that infiltration test I-1 was abandoned due to groundwater that was encountered at a depth of approximately 11 feet, prior to reaching the design depth of the infiltration test.

TABLE 1

Summary of Infiltration Testing

Infiltration Test Location	Infiltration Test Depth Below Existing Grade (ft)	Observed Infiltration Rate* (Inch/Hr.)
I-2	3	0.01
I-3	10	0.02
I-4	3	0.07
I-5	12	0.01
I-6	3	0.14

*Normalized to One-Dimensional Flow, does not include any Factor of Safety.

The tested infiltration rates provided in this report are considered a general representation of the infiltration rates at the location of the infiltration boring. Please note, the testing of infiltration rates is highly dependent upon the materials encountered at the point of testing (i.e., location and depth of testing). Varying subsurface conditions may exist outside of the test locations which could alter the calculated infiltration rates indicated above. Please refer to Section 5.14 for preliminary subsurface water infiltration recommendations.

2.6 Seismicity and Faulting

California is located on the boundary between the Pacific and North American Lithospheric Plates. The average motion along this boundary is on the order of 50-mm/yr. in a right-lateral sense. The majority of the motion is expressed at the surface along the northwest trending San Andreas Fault Zone with lesser amounts of motion accommodated by sub-parallel faults located predominantly west of the San Andreas including the Elsinore, Newport-Inglewood, Rose Canyon, and Coronado Bank Faults. Within Southern California, a large bend in the San Andreas Fault north of the San Gabriel Mountains has resulted in a transfer of a portion of the right-lateral motion between the plates into left-lateral displacement and vertical uplift. Compression south and west of the bend has resulted in folding, left-lateral, reverse thrust faulting, and regional uplift creating the east-west trending Transverse Ranges and several east-west trending faults. Further south within the Los Angeles Basin, "blind thrust" faults are believed to have developed below the surface also as a result of this compression, which have resulted in earthquakes such as the 1994 Northridge event along faults with little to no surface expression.

Prompted by damaging earthquakes in Northern and Southern California, State legislation and policies concerning the classification and land-use criteria associated with faults have been developed. The Alquist-Priolo Earthquake Fault Zoning Act was implemented in 1972 to prevent the construction of urban developments across the trace of active faults. California Geologic Survey Special Publication 42 was created to provide guidance for following and implementing the law requirements. Special Publication 42 was most recently revised in 2018 (CGS, 2018). According to the State Geologist, an "active" fault is defined as one which has had surface displacement within Holocene time (roughly the last 11,700 years). Regulatory Earthquake Fault Zones have been delineated to encompass traces of known, Holocene-active faults to address hazards associated with surface fault rupture within California. Where developments for human occupation are proposed within these zones, the state requires detailed fault evaluations be performed so that engineering-geologists can identify the locations of active faults and recommend setbacks from locations of possible surface fault rupture.

The subject site is not located within a State of California Earthquake Fault-Rupture Hazard Zone (CGS, 2018), nor a County of Riverside Fault or Fault Zone (Riverside County, 2019), and there are no known active or potentially active faults known to cross the site. Therefore, the possibility of damage due to ground rupture is considered low since no active faults are known to cross the site. The closest known active fault zones are the Elsinore (approximately 0.8 miles away) and San Jacinto (approximately 19 miles away) fault zones.

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the Southern California region which may affect the site include ground lurching and shallow

ground rupture, soil liquefaction, dynamic settlement, seiches, and tsunamis. These secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and causative fault and the onsite geology. A discussion of these secondary effects is provided in the following sections.

2.6.1 Liquefaction and Dynamic Settlement

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions coexist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Studies indicate that saturated, loose near-surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential. In general, cohesive soils are not considered susceptible to liquefaction, depending on their plasticity and moisture content (Bray & Sancio, 2006). Effects of liquefaction on level ground include settlement, sand boils, and bearing capacity failures below structures. Dynamic settlement of dry loose sands can occur as the sand particles tend to settle and densify as a result of a seismic event.

Portions of the site, near Baker Street and Pierce Street, are located within a zone of low to moderate liquefaction potential based on the Riverside County liquefaction zones map (County, 2023). The site will ultimately consist of compacted fill over dense sandy and hard clayey materials, which are not considered susceptible to liquefaction. The potential for liquefaction is considered very low.

2.6.2 Lateral Spreading

Lateral spreading is a type of liquefaction-induced ground failure associated with the lateral displacement of surficial blocks of sediment resulting from liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluid mass, gravity plus the earthquake inertial forces may cause the mass to move downslope towards a free face (such as a river channel or an embankment). Lateral spreading may cause large horizontal displacements and such movement typically damages pipelines, utilities, bridges, and structures.

Due to very low potential for liquefaction the potential for lateral spreading is considered very low.

2.7 Rippability

In general, the onsite surficial materials, such as undocumented fill, topsoil, colluvium, and alluvium are anticipated to be easily to moderately rippable utilizing conventional heavy-duty earth moving equipment (Caterpillar D9 or equivalent). Based on our hollow-stem auger borings and bucket auger borings that were located in areas that are proposed to have some of

the deepest cuts throughout the site, we anticipate the bedrock (Silverado Formation) to be moderately difficult to difficult to excavate. Localized areas of the bedrock may be very difficult to excavate but are anticipated to be able to be excavated utilizing a multi-shank ripper (Caterpillar D9) or equivalent method.

2.8 Oversized Material

Oversized material (material larger than 8 inches in maximum dimension) should be expected during site grading. When encountered, these materials will require special handling during grading which may include offsite disposal, crushing/breaking, or incorporating oversized materials into "rock fills" to meet project requirements. See Appendix F for more details.

2.9 Expansive Soil Characteristics

Laboratory test results indicate that site soils should be anticipated to have "Medium" to "High" expansion potential. Final expansion potential of site soils should be determined at the completion of grading.

3.0 ENGINEERING ANALYSES

3.1 Seismic Parameters for Structural Design

The site seismic characteristics were evaluated per the guidelines set forth in Chapter 16, Section 1613 of the 2022 California Building Code (CBC) and applicable portions of ASCE 7-16 which has been adopted by the CBC. Please note that the following seismic parameters are only applicable for code-based acceleration response spectra and are not applicable for where site-specific ground motion procedures are required by ASCE 7-16. Representative site coordinates of latitude 33.6977 degrees north and longitude -117.3599 degrees west were utilized in our analyses. The maximum considered earthquake (MCE) spectral response accelerations (S_{MS} and S_{M1}) and adjusted design spectral response acceleration parameters (S_{DS} and S_{D1}) for Site Class C are provided in Table 2 below. The structural designer should contact the geotechnical consultant if structural conditions (e.g., number of stories, seismically isolated structures, etc.) require site-specific ground motions.

Section 1803.5.12 of the 2022 CBC (per Section 11.8.3 of ASCE 7) states that the maximum considered earthquake geometric mean (MCE_G) Peak Ground Acceleration (PGA) should be used for liquefaction potential. The PGA_M for the site is equal to 1.175g (SEAOC, 2023). The design PGA is equal to 0.783g (2/3 of PGA_M). The design PGA is applicable for retaining wall design.

A deaggregation of the PGA based on a 2,475-year average return period (MCE) indicates that an earthquake magnitude of 6.70 at a distance of 3.57 km from the site would contribute the most to this ground motion. A deaggregation of the PGA based on a 475-year average return period (Design Earthquake) indicates that an earthquake magnitude of 6.62 at a distance of 5.79 km from the site would contribute the most to this ground motion (USGS, 2014).

TABLE 2

Structural Seismic Design Parameters

Selected Parameters from 2022 CBC, Section 1613 - Earthquake Loads	Seismic Design Values	Notes/Exceptions
Distance to applicable faults classifies the site as a "Near-Fault" site.		Section 11.4.1 of ASCE 7
Site Class	C	Chapter 20 of ASCE 7
Ss (Risk-Targeted Spectral Acceleration for Short Periods)	2.306g	From SEAOC, 2023
S_1 (Risk-Targeted Spectral Accelerations for 1-Second Periods)	0.822g	From SEAOC, 2023
F_a (per Table 1613.2.3(1))	1.200	For Simplified Design Procedure of Section 12.14 of ASCE 7, F_a shall be taken as 1.4 (Section 12.14.8.1)
F_v (per Table 1613.2.3(2))	1.400	-
S_{MS} for Site Class C [Note: $S_{MS} = F_a S_S$]	2.767g	-
S_{M1} for Site Class C [Note: $S_{M1} = F_v S_1$]	1.151g	-
S_{DS} for Site Class C [Note: $S_{DS} = (^2/_3) S_{MS}$]	1.845g	-
S_{D1} for Site Class C [Note: $S_{D1} = (^2/_3) S_{M1}$]	0.767g	-
C_{RS} (Mapped Risk Coefficient at 0.2 sec)	0.896	ASCE 7 Chapter 22
C_{R1}(Mapped Risk Coefficient at 1 sec)	0.892	ASCE 7 Chapter 22

3.2 Soil Shear Strength Parameters

The soil shear strength parameters utilized in our slope stability analysis are primarily based on laboratory testing of the onsite materials. The shear strength of the along clay bedding was estimated from Atterberg Limits tests from clay materials obtained during downhole logging from our recent field evaluation (Stark, 2012). Where appropriate, soil shear strength parameters were increased for seismic loading conditions. Laboratory test results are provided in Appendix C.

TABLE 3

Soil Shear Strength Parameters

Soil Type	Static		Pseudo Static	
	ϕ (Degrees)	Cohesion (psf)	ϕ (Degrees)	Cohesion (psf)
Artificial Fill	32	100	32	200
Silverado Formation – Across Bedding	33	350	34	600
Silverado Formation – Clay Beds	18	100	18	200

3.3 Slope Stability Analyses

Slope stability analysis was performed for Cross Sections A-A,' B-B' and C-C.' This slope stability analysis was performed along a typical section of the relatively large slope and retaining wall combination in the western portion of the site (A-A'), the largest retaining wall height with an ascending slope behind it (B-B') and the largest cut slope within the southern portion of the site (C-C').

Slope stability analysis was performed using the computer program GEOSTASE, version 4.30.31 (Gregory Geotechnical Software, 2019). Potential block and rotational failure modes were analyzed using Janbu's Simplified Method and Bishop's Modified Method, respectively.

A minimum factor of safety of 1.5 is typically required for static loading conditions. Seismic slope stability analysis was performed in accordance with Special Publication 117A (CGS, 2008). Special Publication 117A requires a "screening" slope stability calculation based on modified horizontal seismic coefficient (Kh) derived from site-specific seismic parameters (i.e., Design PGA, earthquake magnitude and distance) based on a 15-cm threshold. If the resulting calculated factor of safety is equal to or greater than 1.0, the analysis passes the screening calculation and no further analysis is required. If the calculated factor of safety is less than 1.0, a displacement analysis is required in order to assess estimated slope movement during a seismic event. Based on the design peak ground acceleration of 0.783g, a horizontal seismic coefficient (Kh) of 0.261 was determined for a 15-cm threshold, see Appendix D.

Based on our slope stability analysis the site should be considered stable. Although, the slope stability analysis for Section B-B' indicated a single row of tieback anchors for the taller portions of the proposed soil nail retaining wall would be necessary to globally stabilize the slope and to construct the soil nail retaining wall. For this reason, we recommend the retaining wall at Cross Section B-B' be constructed as a soil nail retaining wall with one row of tiebacks anchors at the top of the retaining wall. Refer to Appendix D for preliminary results and Section 5.3 for preliminary tieback recommendations. Preliminary soil nail retaining wall recommendations are provided in Section 5.8. Updated design level analysis and recommendations should be provided during a 40-scale grading plan review evaluation. Preliminary slope stability analysis is provided in Appendix D.

3.4 Surficial Stability Analysis

A general surficial slope stability analysis was performed for the maximum proposed 2:1 (horizontal to vertical) cut slopes assuming a zone of saturation of 4-feet-deep parallel to the slope surface. The analysis indicated a surficial factor of safety greater than 1.5. Refer to Appendix D.

4.0 CONCLUSIONS

Based on the results of our geotechnical evaluation, it is our opinion that the proposed site development is feasible from a geotechnical standpoint, provided the following conclusions and recommendations are incorporated into the site design, grading, and construction.

The following is a summary of the primary geotechnical factors which may affect future development of the site.

- The near-surface loose and compressible soils are not suitable for the planned improvements in their present condition (refer to Section 5.1).
- Groundwater was encountered at depths ranging from approximately 11 to 45 feet below existing grade. Based on nearby groundwater wells and elevation of the nearby creek bottom approximately 750 feet northeast of the site, historic high groundwater should be expected to be found at approximately 10 feet below existing grade.
- The subject site is not located within a State of California Fault Rupture Hazard Zone and there are no known active or potentially active faults onsite (CGS, 2018). The possibility of damage due to ground rupture is considered low since no active faults are known to cross the site.
- The main seismic hazard that may affect the site is from ground shaking from one of the active regional faults. The subject site will likely experience strong seismic ground shaking during its design life.
- The site is located in a mapped zone for low to moderate liquefaction potential (County, 2023). However, due to the site ultimately consisting of compacted fill over dense/hard native materials, the potential for liquefaction is considered very low.
- It should be noted that the site contains clayey soils with high fines content and expansion potential that are not suitable for backfill of retaining walls. Therefore, select grading and stockpiling or import of select sandy soils meeting project requirements will be required.
- Site soils should be considered to have “Medium” to “High” expansion potential. Mitigation measures are required for foundations and site improvements like concrete flatwork to minimize the impacts of expansive soils.
- Pre-soaking of the subgrade for at-grade building slabs and flatwork will be required due to site expansive soils. The duration of this process varies greatly based on the chosen method and is also dependent on factors such as soil type and weather conditions. Time duration for presoaking should be accounted for in the construction schedule (typically, two to three weeks for high expansion). Additional time at the completion of presoaking may be necessary for the surface soils of the pad to dry back sufficiently to be capable of supporting trenching equipment.
- Preliminary rippability analysis suggest the onsite surficial materials, such as undocumented fill, topsoil, colluvium, and alluvium are anticipated to be easily to moderately rippable utilizing conventional heavy-duty earth moving equipment (Caterpillar D9 or equivalent). We anticipate the bedrock (Silverado Formation) to be moderately difficult to difficult to excavate. Localized areas of the bedrock may be very difficult to excavate but are anticipated to be able to be excavated utilizing a multi-shank ripper (Caterpillar D9) or equivalent method.
- From a geotechnical perspective, the existing onsite soils are considered suitable material for use as general fill (with the exception for retaining wall backfill), provided that they are relatively free

from rocks (larger than 8 inches in maximum dimension), construction debris, and significant organic material. Moisture conditioning of site soils will be required to obtain the required compaction.

- Oversized materials (greater than 8-inches in maximum dimension) should be anticipated to be generated during grading. These materials will require special handling during grading which may include offsite disposal, crushing/breaking, and/or specialty placement in deep fills to meet project requirements.
- Design cut and fill slopes are anticipated to be both grossly and surficially stable, as long as they are constructed in accordance with our geotechnical recommendations contained herein and are properly landscaped and maintained. Detailed slope stability analysis and recommendations should be provided in a future 40-scale grading plan review report.

Please note that the conclusions and recommendations contained herein are based on preliminary subsurface conditions, which have been interpreted from a limited number of subsurface excavations. These conclusions and recommendations should be verified during site grading and adjusted according to the actual exposed field conditions.

5.0 PRELIMINARY RECOMMENDATIONS

The following recommendations are to be considered preliminary and should be confirmed upon completion of grading and earthwork operations. In addition, they should be considered minimal from a geotechnical viewpoint, as there may be more restrictive requirements from the architect, structural engineer, building codes, governing agencies, or the owner.

It should be noted that the following geotechnical recommendations are intended to provide sufficient information to develop the site in general accordance with the 2022 CBC requirements. With regard to the possible occurrence of potentially catastrophic geotechnical hazards such as seismic shaking, earthquake-induced landslides, liquefaction, etc. the following geotechnical recommendations should provide adequate protection for the proposed development to the extent required to reduce seismic risk to an "acceptable level." The "acceptable level" of risk is defined by the California Code of Regulations as "that level that provides reasonable protection of the public safety, though it does not necessarily ensure continued structural integrity and functionality of the project" [Section 3721(a)]. Therefore, repair and remedial work of the proposed improvements may be required after a significant seismic event. With regards to the potential for less significant geologic hazards to the proposed development such as expansive soils, fill settlement, groundwater seepage, etc., the recommendations contained herein are intended as a reasonable protection against potential damaging effects. It should be understood, however, that our recommendations are intended to maintain the structural integrity of the proposed development and structures given the site geotechnical conditions but cannot preclude the potential for some cosmetic distress or nuisance issues to develop as a result of the site geotechnical conditions.

The geotechnical recommendations contained herein must be confirmed to be suitable or modified based on the actual conditions encountered during grading and construction.

5.1 Site Earthwork

We anticipate that earthwork at the site will consist of required earthwork removals, fill placement, subgrade preparation, precise grading, and construction of the proposed improvements.

We recommend that earthwork onsite be performed in accordance with the following recommendations, the 2022 CBC, the City of Lake Elsinore Grading Requirements, and the General Earthwork and Grading Specifications for Rough Grading included in Appendix F. In case of conflict, the following recommendations shall supersede all previous recommendations and those included as part of Appendix F. The following recommendations should be considered preliminary and may be revised based upon future evaluation and review of the project plans and/or based on the actual conditions encountered during site grading/construction.

5.1.1 Site Preparation

Prior to grading of areas to receive structural fill or engineered improvements, the areas should be cleared of existing building structures, asphalt, surface obstructions, vegetation,

topsoil, and demolition debris. Vegetation, trash, and debris should be removed and properly disposed of off-site. Holes resulting from the removal of buried obstructions, which extend below proposed finish grades, should be replaced with suitable compacted fill material. Any abandoned sewer or storm drain lines should be completely removed and replaced with properly placed compacted fill. Deeper demolition may be required in order to remove existing foundations. We recommend the trenches associated with demolition which extend below the remedial grading depth be backfilled and properly compacted prior to the demolition contractor leaving the site.

If cesspools or septic systems are encountered, they should be removed in their entirety. The resulting excavation should be backfilled with properly compacted fill soils. As an alternative, cesspools or septic systems can be backfilled with lean sand-cement slurry. Any encountered wells should be properly abandoned in accordance with regulatory requirements. At the conclusion of the clearing operations, a representative of LGC Geotechnical should observe and accept the site prior to further grading.

5.1.2 Remedial Grading

In order to provide a relatively uniform bearing condition for the planned improvements, we recommend the site soils be temporarily removed and recompacted as fill. Existing undocumented artificial fill, residual soils, topsoil, unsuitable portions of colluvial and old alluvial fan deposits, and weathered bedrock within the zone of influence of the proposed structures shall be removed to suitable, competent native materials prior to placement of fill to design grades. These unsuitable soils that are removed will then be placed as compacted fill once a suitable bottom is encountered. Updated remedial grading recommendations should be provided in the future 40-scale grading plan review report.

Building Areas: For preliminary planning purposes, estimated removal and recompaction depths range from approximately 5 to 9 feet below existing grade; however, deeper removal and recompaction may be required during grading. Preliminary estimated depths of temporary removal and recompaction are depicted on the Preliminary Geotechnical Map (Sheet 1). We recommend a minimum removal and recompaction depth of 5 feet below existing grade in design fill conditions for areas not identified on the Preliminary Geotechnical Map within the building influence.

Pavement and Hardscape Areas: Within pavement and hardscape areas, temporary removal and recompaction should extend to a depth of at least 2 feet below existing grade or 2 feet below the bottom of the pavement section, whichever is deeper. Pavement areas encountering undocumented fill materials may require deeper removal and recompaction and should be determined based on the conditions exposed during grading. In general, the envelope for removal and recompaction should extend laterally a minimum lateral distance of 2 feet beyond the edges of the proposed pavement or hardscape improvements.

It should be noted that over-excavation is recommended in design cut areas (see Section 5.1.3). In addition, local conditions may be encountered during excavation that could

require additional removals beyond the above-noted minimum in order to obtain an acceptable subgrade. The actual depths and lateral extents of grading will be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Removal areas should be accurately staked in the field by the Project Surveyor. Please note that perched groundwater may be encountered at localized areas during grading.

5.1.3 Over-Excavation of Pads and Streets

In order to provide a uniform fill blanket beneath proposed structures, it is recommended that design cut, and cut/fill transition pads be over-excavated a minimum of 4 feet below ultimate finish pad grade, or a minimum of 2-feet below planned footings, whichever is greater. A maximum 2:1 differential fill thickness, up to a maximum over-excavation depth of 15 feet, underneath the industrial buildings should be maintained in order to reduce the potential for future differential settlement. Over-excavation should extend laterally a minimum of 5 feet beyond proposed building footprints. The bottom of the over-excavation should be graded to flow towards deeper fill areas. The over-excavated material should then be replaced by compacted fill material to design grade.

It may be desirable to over-excavate the parts of the site where deeper utilities are planned in the building and street areas and replace the excavated material with compacted fill during mass grading rather than facing potentially difficult excavation during excavation for utility placement with lighter equipment.

As a minimum, streets in design cut should be over-excavated a minimum of 2 feet below subgrade elevations. Scattered zones of oversize materials should be anticipated in utility trenches within design cut areas.

Over-excavations/undercuts must be confirmed and mapped by the geotechnical consultant prior to subsequent fill placement. The actual depth and lateral extents of over-excavation should be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Over-excavation areas should be accurately staked in the field by the Project Surveyor. Please note that some estimated removals in the existing alluvial areas of the site may extend deeper than the recommended over-excavation in order to remove unsuitable materials (see Removals Section 5.1.2). Updated overexcavation recommendations should be provided in the future 40-scale grading plan review report.

5.1.4 Temporary Excavations

Temporary excavations should be performed in accordance with project plans, specifications, and all Occupational Safety and Health Administration (OSHA) requirements. Temporary excavations should be laid back or shored in accordance with OSHA requirements before personnel or equipment are allowed to enter. Temporary excavations on the order of 30 feet or less should be sloped back to 1:1 or flatter or be properly shored. Temporary excavations greater than approximately 30 feet should be

sloped back to 1.5:1 or flatter. Conditions should be regularly evaluated during construction to verify conditions are as anticipated. The contractor shall be responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination with the geotechnical consultant should be maintained to facilitate construction while providing safe excavations. Excavation safety is the sole responsibility of the contractor.

Vehicular traffic, stockpiles, and equipment storage should be set back from the perimeter of excavations a distance equivalent to a 1:1 projection from the bottom of the excavation. Once an excavation has been initiated, it should be backfilled as soon as practical. Prolonged exposure of temporary excavations may result in some localized instability. Excavations should be planned so that they are not initiated without sufficient time to shore/fill them prior to weekends, holidays, or forecasted rain.

It should be noted that any excavation that extends below a 1:1 (horizontal to vertical) projection of an existing foundation will remove existing support of the structure foundation. If requested, temporary shoring parameters will be provided.

5.1.5 Removal Bottoms and Subgrade Preparation

In general, removal bottom areas and any areas to receive compacted fill should be scarified to a minimum depth of 6 inches, brought to a near-optimum moisture condition (generally within optimum and 4 percent above optimum moisture content), and re-compacted per project recommendations.

Removal bottoms and areas to receive fill should be observed and accepted by the geotechnical consultant prior to subsequent fill placement.

5.1.6 Material for Fill

From a geotechnical perspective, the onsite soils are generally considered suitable for use as general compacted fill, provided they are relatively free of organic materials and construction debris and any oversized material (8 inches in greatest dimension).

From a geotechnical viewpoint, any required import soils for general fill (not retaining wall backfill) should consist of clean, soils of Low expansion potential (expansion index 50 or less based on ASTM D4829) or less and no particles larger than 6 inches in greatest dimension. Source samples of planned importation should be provided to the geotechnical consultant for laboratory testing a minimum of 3 working days prior to any planned importation for required laboratory testing.

Retaining wall backfill should consist of sandy soils with a maximum of 35 percent fines (passing the No. 200 sieve) per American Society for Testing and Materials (ASTM) Test Method D1140 (or ASTM D6913/D422) and a "Very Low" expansion potential (EI of 20 or less per ASTM D4829). Soils should also be screened of organic materials, construction debris, and any material greater than 3 inches in maximum dimension. The site contains

soils that are not suitable for retaining wall backfill due to their clay content and expansion potential; therefore, import and/or select grading and stockpiling of select sandy soils will be required by the contractor for obtaining suitable backfill soil. Refer to Figures 2A and 2B.

Aggregate base (crushed aggregate base or crushed miscellaneous base) should conform to the latest requirements of Section 200-2 of the Standard Specifications for Public Works Construction ("Greenbook") for untreated base materials (except processed miscellaneous base) or Caltrans Class 2 aggregate base.

5.1.7 Fill Placement and Compaction

Material to be placed as fill should be brought to a near-optimum moisture condition (generally within optimum and 4 percent above optimum moisture content) and recompacted to at least 90 percent relative compaction (per American Society for Testing and Materials [ASTM] Test Method D1557). Soils will require significant moisture conditioning (either adding water or drying back) in order to achieve adequate compaction. Soils are present that will require additional moisture in order to achieve the required compaction. Drying and/or mixing the very moist soils may also be required prior to reusing the materials in compacted fills.

The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts not exceeding 8 inches in compacted thickness. Each lift should be thoroughly compacted and accepted prior to subsequent lifts. Generally, placement and compaction of fill should be performed in accordance with local grading ordinances and under the observation and testing performed by the geotechnical consultant. Any encountered oversized material as previously defined must be appropriately handled (Appendix F).

Fill placed on any slopes greater than 5:1 (horizontal to vertical) should be properly keyed and benched into firm and competent soils as it is placed in lifts. During backfill of excavations, the fill should be properly benched into firm and competent soils of temporary backcut slopes as it is placed in lifts.

Aggregate base material should be compacted to a minimum of 95 percent relative compaction at or slightly above optimum moisture content per ASTM D1557. Subgrade below aggregate base should be compacted to a minimum of 90 percent relative compaction per ASTM D1557 at near-optimum moisture content (generally within optimum and 4 percent above optimum moisture content).

If gap-graded ¾-inch rock is used for backfill (around storm drain storage chambers, retaining wall backfill, etc.) it will require compaction. Rock shall be placed in thin lifts (typically not exceeding 6 inches) and mechanically compacted with observation by geotechnical consultant. Backfill rock shall meet the requirements of ASTM D2321. Gap-graded rock is required to be wrapped in filter fabric (Mirafi 140N or approved alternative) or at the very minimum to be vertically separated from the trench backfill with filter fabric to prevent the migration of fines into the rock backfill.

5.1.7.1 Oversized Placement

The "rock blanket fill" method for placement of oversized rock greater than 8 inches and up to 36 inches may be performed within sufficiently deep areas that are laterally extensive, generally deeper than 10 feet below finish grades, and in areas that will not conflict with proposed improvements (e.g., building foundations, underground utilities, etc.).

The total thickness of any single rock blanket layer shall not exceed 36 inches. Rock fill blankets may consist of a mixture of native soils (fines, sand, gravel) and rock to a maximum dimension of 36 inches. In general, rock blankets shall not exceed approximately 50 percent particles greater than 8 inches and shall contain approximately 50 percent or more material that is less than 8 inches in diameter, on a volumetric basis. This may require select grading or temporary stockpiling of materials. During placement and compaction, the rock blanket shall be heavily watered and repeatedly worked with dozers and pneumatic compaction equipment (or approved equivalent) so that the resulting fill is comprised of a mixture of the various particle sizes (not gap graded), is without significant voids, and forms a dense, compact fill matrix. A relatively large amount of water must be provided continuously during these operations.

Upon the completion of a 3-foot rock blanket, the surface should be generally level, compacted, moisture conditioned, and accepted by LGC Geotechnical prior to the placement of the next rock blanket or rock windrow.

The contractor shall periodically excavate test pits within the recently completed rock blanket at various random locations selected by the geotechnical consultant. These test pits will be used to either pass or fail the rock blanket fill.

Additional recommendations for construction of rock blankets will be provided by LGC Geotechnical based on observed field conditions. The construction of a rock blanket fill shall be continuously observed by LGC Geotechnical.

Disposal of oversized rock (greater than 36 inches in diameter) within sufficiently deep fill areas shall be performed using the windrow method. Windrowing of oversized rock shall be done in accordance with the "Oversize and Disposal Detail" in Appendix F.

5.1.8 Trench and Retaining Wall Backfill and Compaction

Bedding material used within the pipe zone should conform to the requirements of the current Greenbook and the pipe manufacturer. Where applicable, sand having a sand equivalent (SE) of 20 or greater (per Caltrans Test Method [CTM] 217) may be used to bed and shade the pipes within the bedding zone. Sand backfill should be densified by jetting or flooding and then tamped to ensure adequate compaction. Bedding sand should be from a natural source, manufactured sand from recycled material is not suitable for jetting. The onsite soils may generally be considered suitable as trench backfill (zone

defined as 12 inches above the pipe to subgrade), provided the soils are screened of rocks greater than 6 inches in maximum dimension, construction debris and organic material. Trench backfill should be compacted in uniform lifts (as outlined above in Section "Material for Fill") by mechanical means to at least 90 percent relative compaction (per ASTM D1557). If gap-graded rock is used for trench backfill, refer to above Section 5.1.7.

Retaining wall backfill should consist of sandy soils as outlined in preceding Section 5.1.6. The limits of select sandy backfill should extend at minimum ½ the height of the retaining wall or the width of the heel (if applicable), whichever is greater (Figures 2A and 2B). Retaining wall backfill soils should be compacted in relatively uniform thin lifts to at least 90 percent relative compaction (per ASTM D1557). Jetting or flooding of retaining wall backfill materials should not be permitted.

In backfill areas where mechanical compaction of soil backfill is impractical due to space constraints, flowable fill such as sand-cement slurry may be substituted for compacted backfill. The slurry should contain about one sack of cement per cubic yard. When set, such a mix typically has the consistency of compacted soil. Sand cement slurry placed near the surface within landscape areas should be evaluated for potential impacts on planned improvements.

A representative from LGC Geotechnical should observe, probe, and test the backfill to verify compliance with the project recommendations.

5.1.9 Preliminary Shrinkage and Bulking

Volumetric changes in earth quantities will occur when excavated onsite earth materials are replaced as properly compacted fill. The following is an estimate of shrinkage and bulking factors for the various geologic units found onsite. These preliminary estimates are based on in-place densities of the various materials and on the estimated average degree of relative compaction achieved during grading.

TABLE 4

Estimated Shrinkage and Bulking

Soil Type	Allowance	Estimated Range
Topsoil/Colluvium/Undocumented Fill	Shrinkage	10% to 20%
Alluvium	Shrinkage	5% to 15%
Silverado Formation	Bulking	0% to 10%

Subsidence due to earthwork equipment is expected to be on the order of 0.1 feet. It should be stressed that these values are only estimates and that actual shrinkage factors are extremely difficult to predict. The effective shrinkage of onsite soils will depend primarily on the type of compaction equipment and method of compaction used onsite by

the contractor. Additionally, the onsite geology is complex; the above estimates are generalized groupings of similar lithologies and should be expected to vary across the site and with depth. The above shrinkage estimates are intended as an aid for others in determining preliminary earthwork quantities. However, these estimates should be used with some caution since they are not absolute values. Contingencies should be made for balancing earthwork quantities based on actual shrinkage and subsidence that occurs during grading. Shrinkage and bulking are also expected to vary with accuracy of the topographic survey and survey accuracy during rough grading.

Updated shrink and bulk estimations should be provided in a future 40-scale grading plan review report.

5.2 Slope Stability

Global slope stability for the site has been evaluated utilizing critical cross sections throughout the site, refer to Appendix D. At this time, design cut slopes are recommended to remain as cut slopes without stabilization keyways except for the southern slope adjacent to the truck trailer parking lot, refer to Cross Section C-C' (Sheet 2). One row of global stabilization tiebacks are proposed for the 45-foot-tall soil nail retaining wall (refer to Cross Section B-B'). Preliminary recommendations for construction of slopes and mitigation systems are presented below.

5.2.1 Fill Slopes

Design fill slopes at the site are anticipated to be both grossly and surficially stable as designed provided they are constructed in accordance with the Standard Earthwork and Grading Specifications (Appendix F) and proper irrigation, landscaping and maintenance is implemented (refer to Section 5.2.4). Fill slopes should be constructed with a maximum slope ratio of 2:1 (horizontal to vertical). Slope faces should also be compacted to minimum project recommendations. This may require overbuilding of the slope face and trimming back to design grades. To improve surficial stability, vegetation specified by the landscape architect should be established on the slope face as soon as it is practical, refer to Section 5.2.4.

5.2.2 Cut Slopes

Cut slopes should be constructed with a maximum slope ratio of 2:1 (horizontal to vertical). All cut slopes should be observed by the engineering geologist during grading. The cut slope near Cross Sections B-B' and C-C' were found to have adverse geologic conditions and the cut slope near Cross Section A-A' was found to have favorable geologic conditions. In general, cut slopes are not anticipated to require stabilization keyways. However, this should be confirmed during a 40-scale grading plan review and in the field during grading.

Modifications to the recommendations presented herein may be necessary and should be based upon conditions exposed in the field at the time of grading. It should be

understood that graded cut slopes with bedrock at the surface may be difficult to plant and may also be prone to surficial stability and erosional issues. Fill over cut slopes should be constructed in accordance with the Standard Earthwork and Grading Specifications included in Appendix F. Recommendations for keyway design and construction can be provided during a 40-scale grading plan review evaluation, if necessary.

5.2.3 Existing Native Slopes

Natural slopes will be left in their existing condition above portions of the site. These slopes will be subject to "natural" phenomena such as erosion, sloughing and surficial instabilities. It is impossible to predict where or when this may happen. Should erosion or slippage occur, it should be promptly repaired. Paramount in reducing the potential for either erosion or slippage is to properly maintain these slopes (refer to Section 5.2.4).

5.2.4 Slope Maintenance Guidelines

We recommend that graded slopes be properly landscaped with deep-rooted drought-tolerant, slope stabilizing vegetation as soon as possible to minimize the potential for erosion and/or other instabilities. Slopes should not be allowed to be bare of vegetation. Landscape vegetation should not be "trimmed" to root structures leaving no protection of the slopes.

Irrigation at the site should be kept at the minimum level to support plant growth, overwatering must be avoided. Future landowners/property managers should be made aware that even though the site has been developed in accordance with the local standard of practice that includes a subdrain system, improper maintenance and particularly significant overwatering or poor surface drainage could possibly lead to a buildup in localized groundwater levels. This may result in nuisance type water-related issues to foundations, flatwork, walls, landscaping improvements, etc., and in extreme cases a decrease in the stability of slopes. To help reduce the potential for excessive erosion of graded slopes we recommend that protective measures be implemented in accordance with the latest City of Lake Elsinore grading ordinances and other governing codes. Design of surface drainage provisions are within the purview of the project civil engineer.

Subdrains and v-ditches must be properly maintained, and their outlets kept free draining and clear of any potential obstructions. Routine maintenance should be performed, especially prior to and during the rainy season. Failure to properly maintain these elements may result in slope failures, slumps, excessive erosion, localized saturated zones, nuisance type water issues, etc.

Any future trenches excavated on a slope face for utility or irrigation lines and/or for any purpose should be properly backfilled and compacted to the slope face. Observation/testing and acceptance by the geotechnical consultant during trench

backfill are recommended.

A program for the elimination of burrowing animals in both native and graded slope areas must be established and properly maintained to protect slope stability by reducing the potential for surface water to penetrate into the soil. Continuous erosion control, rodent control, and maintenance are essential to the long-term stability of all slopes.

5.3 Preliminary Tieback Anchor Retaining Wall Design for Slope Stability Mitigation

The tieback array as modeled is recommended to be spaced horizontally across the top of the proposed soil nail retaining wall near Cross Section B-B' (refer to Appendix D). Preliminary tieback anchor design parameters are shown below, corresponding to the slope stability analysis Cross Section B-B.' Waler reaction walls for the tieback anchor system should be assumed. Design of the waler reaction walls should be determined during our future 40-scale geotechnical evaluation, and by the tieback anchor system designer.

Summary of preliminary Tieback Anchor Design Parameters:

- Design Load: 300 kips
- Center to Center Horizontal Spacing: 5 feet
- Unbonded Length: 50 feet
- Allowable Bond Stress: 30 psi (with post-grouting)
- Approximate Angle from Horizontal: 30 degrees
- Bonded Length: 35 feet
- Tieback Anchor Diameter: 8 inches

In general, the obtained capacity of post-grouted tieback anchors is primarily a function of construction methods and experience of the specialty contractor along with local site conditions. The capacity of tieback anchors may ultimately be determined through a performance specification. It is the contractor's responsibility to obtain the required pullout capacity, which may require extensive post grouting and/or field modifications.

The design PGA applicable for tieback anchor design per the 2022 CBC is provided in Section 3.1. Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. Typically, a tieback anchor wall is provided with a composite drainage mat (e.g., Miradrain, etc.) installed between the temporary facing and the excavation and collected at the wall bottom and properly outletted to a suitable discharge point per the project civil engineer.

5.3.1 Testing of Tieback Anchors

Tiebacks should be tested to a minimum of 1.33 times the design load and meet the requirements of the Post Tensioning Institute Manual for soil anchors (PTI, 2014). The first two or three anchors, as determined by the engineer, should be performance tested. Thereafter, a minimum of 2 percent of remaining anchors should be performance tested. In addition, extended creep tests should be performed on at least two anchors per the PTI

manual. Tieback anchor testing should be performed by the contractor and observed by LGC Geotechnical. Project plans should clearly indicate required tieback testing criteria, including required loading increments and acceptance criteria.

The contractor shall provide all necessary test equipment, including an independent fixed reference point (i.e., tripod) for placement of the dial gauge for measuring anchor deflections during tensioning. Dial gauge measuring anchor deflections should read to 0.001-inch and have sufficient travel distance required for the entire test. A minimum of two working days prior to testing, the contractor shall supply current (i.e., within the last 9 months) calibration records from an approved testing laboratory of the hydraulic jack and gauges to be used for anchor tensioning/testing. Calibration certificates and graphs should be available at the job site.

5.4 Foundation Recommendations

Provided that the remedial grading recommendations provided herein are implemented, the site may be considered suitable for support of the structure using a conventional foundation system designed to resist the impacts of expansive soils. Please note that the following foundation recommendations are preliminary and must be confirmed by LGC Geotechnical at the completion of grading.

5.4.1 Preliminary Foundation Design Parameters

In consideration of site expansive soils, the following preliminary recommendations may be used:

- Minimum Footing Depth: 24 inches below lowest adjacent grade.
- Minimum Slab Thickness: 7 inches (Structural conditions may govern)
- Minimum Slab Reinforcement: No. 4 bars at maximum 18-inches on-center each way (Structural conditions may govern)
- Slab Subgrade Options:
    - Moisture-condition (presoak) slab subgrade to 140% of optimum moisture content to a minimum depth of 24 inches prior to trenching.
    - Alternatively, the upper 3 feet of the building pad could be constructed with non-expansive soils (soils with an EI less than 20).

Slab thickness and reinforcement should ultimately be determined by the structural engineer.

For elastic design of a foundation supporting sustained concentrated loads, a modulus of vertical subgrade reaction (k) of 100 pounds per cubic inch (pounds per square inch per inch of deflection) may be used. This value is for a 1-foot by 1-foot square loaded area and should be adjusted by the structural designer for the area of the proposed foundation using the following formula:

$k = 100[(B+1)/2B]^2$
k = modulus of vertical subgrade reaction, pounds per cubic inch (pci)
B = foundation width (feet)

It is recommended that moisture content of the subgrade soils below slabs be maintained up to the time of concrete placement. The recommended moisture content of the slab subgrade soils should be approximately 140% percent of optimum moisture content to a depth of approximately 24 inches. Pre-soaking of the subgrade for building slabs will be required due to site expansive soils. The duration of this process varies greatly based on the chosen method and is also dependent on factors such as soil type and weather conditions. Time duration for presoaking from completion of rough grading to trenching of foundations should be accounted for in the construction schedule (typically 2 to 3 weeks). The subgrade moisture condition of the building pad soils should be maintained at the recommended moisture content up to the time of concrete placement. This moisture content should be maintained around the immediate perimeter of the slab during construction and up to occupancy of the building structures. Additional time at the completion of presoaking may be necessary for the surface soils of the pad to dry back sufficiently to be capable of supporting trenching equipment.

Alternatively, the upper 3 feet of the building pad could be constructed with non-expansive soils (soils with and EI less than 20). The subgrade below the non-expansive building pad backfill should be kept at above optimum moisture content prior to placing non expansive building pad soils.

5.4.2 Slab Underlayment Guidelines

The following recommendations are for informational purposes only, as they are unrelated to the geotechnical performance of the foundation. The following recommendations may be superseded by the foundation engineer and/or owner. Some post-construction moisture migration should be expected below the foundation. In general, interior floor slabs with moisture sensitive floor coverings should be underlain by a minimum 10 mil thick polyolefin material vapor retarder, which has a water vapor transmission rate (permeance) of less than 0.03 perms. The need for sand and/or the sand thickness (above and/or below the vapor retarder) should be specified by the structural engineer, architect or concrete contactor. The selection and thickness of sand is not a geotechnical engineering issue and is therefore outside our purview.

5.4.3 Shallow Foundation Maintenance

The geotechnical parameters provided herein assume that if the areas adjacent to the foundation are planted and irrigated, these areas will be designed with proper drainage and adequately maintained so that ponding, which causes significant moisture changes below the foundation, does not occur. Our recommendations do not account for excessive irrigation and/or incorrect landscape design. Plants should only be provided with sufficient irrigation for life and not overwatered to saturate subgrade soils. Sunken

planters placed adjacent to the foundation should either be designed with an efficient drainage system or liners to prevent moisture infiltration below the foundation. Some lifting of the perimeter foundation beam should be expected even with properly constructed planters.

In addition to the factors mentioned above, roots that extend near the vicinity of foundations can cause distress to foundations. Trees/large shrubs should not be planted closer to the foundations than a distance equal to half the mature height of the tree or 20 feet, whichever is more conservative unless specifically provided with root barriers to prevent root growth below the building foundation.

5.5 Foundation Setback from Slopes

Foundations should have adequate setback from top and bottom of slopes. Per the 2022 CBC, the minimum top-of-slope setback is H/3, with a maximum required setback of 40 feet, where H is the total height of the slope. This distance is measured horizontally from the outside bottom edge of the footing to the slope face. The minimum bottom-of-slope setback is H/2, with a maximum required setback of 15 feet. Refer to Chapter 18 of the 2022 CBC.

5.6 Soil Bearing and Lateral Resistance

Provided our earthwork recommendations are implemented, the following minimum footing widths and embedments for isolated spread and continuous wall footings are recommended for the corresponding allowable soil bearing pressures.

TABLE 5

Allowable Soil Bearing Pressures

Allowable Static Bearing Pressure (psf)	Minimum Footing Width (feet)	Minimum Footing Embedment* (feet)
3,500	4	2
3,000	3	2
2,500	2	2
1,500	1	2

*Refers to minimum depth to the bottom of the footing below lowest adjacent finish grade.

These allowable bearing pressures are applicable for level (ground slope equal to or flatter than 5 horizontal feet to 1-foot vertical) conditions only. Bearing values indicated above are for total dead loads and live loads. The above vertical bearing may be increased by one-third for short durations of loading which will include the effect of wind or seismic loading. The increase of bearing capacity is based on a reduced factor of safety (seismic factor of safety equal to

three-fourths of the static factor of safety) for short duration loading. For any bearing pressure less than 1,500 psf, a minimum footing width of 1 feet and embedment depth of 2 feet below lowest adjacent grade should be used.

Soil settlement is a function of footing dimensions and applied soil bearing pressure. In utilizing the above-mentioned allowable bearing capacity, assumed structural loads, and provided our earthwork recommendations are implemented, foundation settlement due to structural loads is anticipated to be on the order of 1-inch. Differential settlement should be anticipated between nearby columns or walls where a large differential loading condition exists. Settlement estimates should be evaluated by LGC Geotechnical when foundation plans are available.

Resistance to lateral loads can be provided by friction acting at the base of foundations and by passive earth pressure. For concrete/soil frictional resistance, an allowable coefficient of friction of 0.30 may be assumed with dead-load forces. For slabs constructed over a moisture retarder, the allowable friction coefficient should be provided by the manufacturer. An allowable passive lateral earth pressure of 250 psf per foot of depth (or pcf) to a maximum of 2,500 psf may be used for the sides of footings poured against properly compacted fill. Allowable passive pressure may be increased to 340 pcf (maximum of 3,400 psf) for short duration seismic loading. These passive pressure values are applicable for level (ground slope equal to or flatter than 5H:1V) conditions. Frictional resistance and passive pressure may be used in combination without reduction. We recommend that the upper foot of passive resistance be neglected if finished grade will not be covered with concrete or asphalt. The provided allowable passive pressures are based on a factor of safety of 1.5 and 1.1 for static and seismic loading conditions, respectively.

5.7 Lateral Earth Pressures for Retaining Walls

Lateral earth pressures for approved native sandy soils or import soil meeting indicated project recommendations are provided below. Lateral earth pressures are provided as equivalent fluid unit weights, in psf per foot of depth (or pcf). These values do not contain an appreciable factor of safety, so the retaining wall designer should apply the applicable factors of safety and/or load factors during design. A soil unit weight of 125 pcf may be assumed for calculating the actual weight of soil over the wall footing.

The following lateral earth pressures are presented in Table 6 for approved select granular soils a maximum of 35 percent fines (passing the No. 200 sieve per ASTM D1140) and an Expansion Index of 20 or less per ASTM D4829. The retaining wall designer should clearly indicate on the retaining wall plans the required select sandy soil backfill.

TABLE 6

Lateral Earth Pressures – Approved Select Sandy Material

Conditions	Equivalent Fluid Unit Weight (pcf)	
	Level Backfill	2:1 Backfill Sloping Upwards
	Sandy Backfill	Sandy Backfill
Active	35	55
At-Rest	55	80

If the wall can yield enough to mobilize the full shear strength of the soil, it can be designed for "active" pressure. If the wall cannot yield under the applied load, the earth pressure will be higher. This would include 90-degree corners of retaining walls. Such walls should be designed for "at-rest." The equivalent fluid pressure values assume free-draining conditions. If conditions other than those assumed above are anticipated, the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical consultant.

Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. To reduce, but not eliminate, saturation of near-surface (upper approximate 1-foot) soils in front of the retaining walls, the perforated subdrain pipe should be located as low as possible behind the retaining wall. The outlet pipe should be sloped to drain to a suitable outlet. In general, we do not recommend retaining wall outlet pipes be connected to area drains. Typical retaining wall drainage is illustrated in Figure 2A & 2B. It should be noted that the recommended subdrain does not provide protection against seepage through the face of the wall and/or efflorescence. Efflorescence is generally a white crystalline powder (discoloration) that results when water containing soluble salts migrates over a period of time through the face of a retaining wall and evaporates. If such seepage or efflorescence is undesirable, retaining walls should be waterproofed to reduce this potential.

Surcharge loading effects from any adjacent structures should be evaluated by the basement/retaining wall designer. The amount of surcharge loading on a proposed retaining wall structure is primarily a function of the distance, magnitude and lateral extents of the surcharge loading and should be evaluated on a case-by-case basis. In addition to the recommended lateral earth pressure, retaining walls adjacent to streets should be designed to resist vehicular traffic if applicable. Uniform surcharges may be estimated using the applicable coefficient of lateral earth pressure using a rectangular distribution. A factor of 0.5 and 0.3 may be used for at-rest and active conditions, respectively for a level backfill. The vertical traffic surcharge may be determined by the structural designer. The structural designer should contact the geotechnical consultant for any required geotechnical input in estimating any applicable surcharge loads.

If required, the retaining wall designer may use a seismic lateral earth pressure increment of 15

pcf for a level backfill condition and 25 pcf for a sloping condition (up to an inclination of a 2:1). This increment should be applied in addition to the provided static lateral earth pressure using a triangular distribution with the resultant acting at H/3 in relation to the base of the retaining structure (where H is the retained height). For the restrained, at-rest condition, the seismic increment may be added to the applicable active lateral earth pressure (in lieu of the at-rest lateral earth pressure) when analyzing short duration seismic loading. Per Section 1803.5.12 of the 2022 CBC, the seismic lateral earth pressure is applicable to structures assigned to Seismic Design Category D through F for retaining wall structures supporting more than 6 feet of backfill height. The provided seismic lateral earth pressure should not be used for retaining walls exceeding 15 feet in height. If a retaining wall greater than 15 feet in height is proposed, the retaining wall designer should contact the geotechnical consultant for specific seismic lateral earth pressure increments based on the configuration of the planned retaining wall structures. Seismic lateral earth pressure recommendations for tieback anchor wall system and soil nail wall system are provided in Sections 5.3 and 5.8, respectively. This seismic lateral earth pressure is estimated using the procedure outlined by the Structural Engineers Association of California (Lew, et al, 2010) and the Federal Highway Administration (FHWA, 2011).

Soil bearing and lateral resistance (friction coefficient and passive resistance) are provided in Section 5.6. Earthwork considerations (temporary backcuts, backfill, compaction, etc.) for retaining walls are provided in Section 5.1 (Site Earthwork) and the subsequent earthwork related sub-sections.

5.8 Preliminary Soil Nail Wall Design Parameters

The proposed cut condition retaining wall along the southwestern edge of the subject site (Cross Section B-B') may be constructed as a top-down construction soil nail retaining wall up to approximately 45-feet in height. The following preliminary geotechnical parameters may be used for preliminary design of a soil nail wall. Updated global slope stability analysis should be performed once soil nail wall plans are in development to verify geologic stability is acceptable. One row of tieback anchors is proposed at the top of the soil nail retaining wall for global stability. Updated recommendations should be provided during a 40-scale grading plan review.

- Soil Friction Angle: 33 degrees
- Soil Cohesion: 350 pounds per square foot (psf)
- Soil Unit Weight: 120 pounds per cubic foot (pcf)
- Preliminary allowable Bond Stress: 7.5 psi (gravity grouting)

In general, the obtained capacity of gravity grouted soil nails is primarily a function of construction methods and experience of the specialty contractor along with local site conditions. The capacity of soil nails may ultimately be determined through a performance specification. It is the contractor's responsibility to obtain the required pullout capacity, which may require extensive post grouting and/or field modifications.

The design PGA applicable for soil nail wall design per the 2022 CBC is provided in Section 3.1. Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. Typically, a nail wall is provided with a composite drainage mat (e.g., Miradrain, etc.) installed between the temporary facing and the excavation and collected at the wall

bottom and properly outletted to a suitable discharge point per the project civil engineer.

Field pullout testing should be performed during construction to verify the estimated pullout resistance used in the design. Ultimately, it is the contractor's responsibility to obtain the required pullout capacity, which may require alternate construction techniques. Soil nail testing should be performed by the contractor and observed by LGC Geotechnical. Project plans should clearly indicate required soil nail testing criteria, including required loading increments and acceptance criteria.

The contractor shall provide all necessary test equipment, including an independent fixed reference point (i.e., tripod) for placement of the dial gauge for measuring anchor deflections during tensioning. Dial gauge measuring anchor deflections should read to 0.001-inch and have sufficient travel distance required for the entire test. A minimum of two working days prior to testing, the contractor shall supply current (i.e., within the last 9 months) calibration records from an approved testing laboratory of the hydraulic jack and gauges to be used for anchor tensioning/testing. Calibration certificates and graphs should be available at the job site.

5.9 Control of Surface Water and Drainage Control

From a geotechnical perspective, we recommend that compacted finished grade soils adjacent to proposed structures be sloped away from the proposed structures and towards an approved drainage device or unobstructed swale. Drainage swales, wherever feasible, should not be constructed within 5 feet of buildings. Where lot and building geometry necessitates that the drainage swales be routed closer than 5 feet to structural foundations, we recommend the use of area drains together with drainage swales. Drainage swales used in conjunction with area drains should be designed by the project civil engineer so that a properly constructed and maintained system will prevent ponding within 5 feet of the foundation. Code compliance of grades is not the purview of the geotechnical consultant.

Planters with open bottoms adjacent to buildings should be avoided. Planters should not be designed adjacent to buildings unless provisions for drainage, such as catch basins, liners, and/or area drains, are made. Overwatering must be avoided.

5.10 Preliminary Asphalt Concrete Pavement Sections

The following preliminary minimum asphalt concrete (AC) pavement sections are provided in Table 7 based on an assumed R-value of 5 and assumed Traffic Indices of 5.0, 6.0 and 7.0. These recommendations must be confirmed with R-value testing of representative near-surface soils at the completion of earthwork and after underground utilities have been installed and backfilled. Determination of the Traffic Index (TI) is not the purview of the geotechnical consultant. Final pavement sections should be confirmed by the project civil/transportation engineer or City Engineer based upon the final design Traffic Index. We are not responsible for selecting a design Traffic Index. If requested, LGC Geotechnical will provide sections for alternate TI values.

TABLE 7

Preliminary Asphalt Concrete Paving Section Options

Assumed Traffic Index	5.0	6.0	7.0
R-Value Subgrade	5	5	5
AC Thickness	4.0 inches	5.0 inches	6.0 inches
Aggregate Base Thickness	7.5 inches	9.5 inches	12.0 inches

It is common practice to only place the asphalt base course prior to the start of construction. The asphalt capping course often is not placed until after the industrial building construction is complete. Construction traffic including concrete trucks and delivery trucks can exceed the design limits of an asphalt base course only, increasing the potential for pavement distress. We recommend the full asphalt concrete section (base course and capping course) be placed prior to the street being subject to construction traffic or the base course thickness be increased to the recommended full asphalt concrete section.

The thicknesses shown are for minimum thicknesses. Increasing the thickness of any or all of the above layers will reduce the likelihood of the pavement/pavers experiencing distress during its service life. The above recommendations are based on the assumption that proper maintenance and irrigation of the areas adjacent to the roadway will occur throughout the design life of the pavement/pavers. Failure to maintain a proper maintenance and/or irrigation program may jeopardize the integrity of the pavement/pavers.

Earthwork recommendations regarding aggregate base and subgrade are provided in the previous section "Site Earthwork" and the related sub-sections of this report.

5.11 Preliminary Portland Cement Concrete Pavement Sections

The provided preliminary Portland Cement concrete (PCC) section options are based on the guidelines of the American Concrete Institute (ACI 330.2R-17). For the final design section, we recommend a traffic study be performed as LGC Geotechnical does not perform traffic engineering. Traffic study should include the design vehicle (number of axles and load per axle) and estimated number of daily repetitions/trips. LGC Geotechnical does not perform traffic engineering and determination of traffic loading is not the purview of the geotechnical consultant. The concrete should have a minimum compressive strength of 4,000 psi and a minimum flexural strength of 550 psi at the time the pavement is subjected to traffic. Steel reinforcement is not required (ACI, 2017). The provided pavement sections assume that edge restraints like a curb and gutter will be provided. To reduce the potential (but not eliminate) for cracking, paving should provide control joints at regular intervals in each direction not exceeding the maximum values provided below. Decreasing the spacing of these joints will further reduce, but not eliminate the potential for unsightly cracking.

The primary input for anticipated loadings over the lifetime of the concrete pavement is based on the Average Daily Truck Traffic (ADTT). Truck loading is defined one 16-kip axle and two 32-kip tandem axles. Other factor to be considered are potentially the use of industrial vehicles (e.g., lift trucks, mobile cranes, gantry cranes, reach stackers, etc.). Static loads from containers and

temporary structures stored on the pavement. If semi-trailers are to be disconnected from the tractors from dolly jacks the design should consider concentrated loads imposed on the concrete pavement. These loads typically exceed the axle loads of the semi-trailer combination and are applied to smaller contact areas, especially if applied near joint locations. If these irregular loadings are confined to specific areas of the site the pavement section required thickness can be economized. These and other factors (e.g., traffic patterns, irregular loading, doweled vs un-doweled joints, etc.) outlined in ACI, 2017 should be addressed for the final design.

TABLE 8

Preliminary Portland Cement Concrete Pavement Section Options

No. of Trucks per day design lane	Concrete Thickness* (inch)	Aggregate Base Thickness (inch)	Maximum Joint Spacing Thickness (inch)
≤ 10	5.5	4.0	12
50	6.5	4.0	14
100	7.0	4.0	15
300	7.5	4.0	15

*Minimum concrete compressive strength and Modulus of Rupture as indicated above.

The thicknesses shown are for minimum thicknesses. Increasing the thickness of any or all of the above layers will reduce the likelihood of the pavement/pavers experiencing distress during its service life. The above recommendations are based on the assumption that proper maintenance and irrigation of the areas adjacent to the roadway will occur throughout the design life of the pavement/pavers. Failure to maintain a proper maintenance and/or irrigation program may jeopardize the integrity of the pavement/pavers.

Earthwork recommendations regarding aggregate base and subgrade are provided in the previous section "Site Earthwork" and the related sub-sections of this report.

5.12 Soil Corrosivity

Although not corrosion engineers (LGC Geotechnical is not a corrosion consultant), several governing agencies in Southern California require the geotechnical consultant to determine the corrosion potential of soils to buried concrete and metal facilities. We therefore present the results of our testing with regard to corrosion for the use of the client and other consultants, as they determine necessary.

Corrosion testing indicated soluble sulfate content less than approximately 0.03 percent, chloride contents ranging from 180 to 220 parts per million (ppm), pH values from 6.6 to 7.9, and minimum resistivity values ranging from 735 to 1,240 ohm-centimeters. Based on Caltrans Corrosion Guidelines (2021), soils are considered corrosive if the pH is 5.5 or less, or the chloride concentration is 500 ppm or greater, or the sulfate concentration is 1,500 ppm (0.15 percent) or

greater.

Based on laboratory sulfate test results, the near surface soils are designated to a class "S0" per ACI 318, Table 19.3.1.1 with respect to sulfates. Concrete in direct contact with the onsite soils can be designed according to ACI 318, Table 19.3.2.1 using the "S0" sulfate classification.

Laboratory testing may need to be performed at the completion of grading by the project corrosion engineer to further evaluate the as-graded soil corrosivity characteristics. Accordingly, revision of the corrosion potential may be needed, should future test results differ substantially from the conditions reported herein. The client and/or other members of the development team should consider this during the design and planning phase of the project and formulate an appropriate course of action.

5.13 Nonstructural Concrete Flatwork

Nonstructural concrete (such as flatwork, sidewalks, etc.) has a potential for cracking due to changes in soil volume related to soil-moisture fluctuations. To reduce the potential for excessive cracking and lifting, concrete should be designed in accordance with the minimum guidelines outlined below. These guidelines will reduce the potential for irregular cracking and promote cracking along construction joints but will not eliminate all cracking or lifting. Thickening the concrete and/or adding additional reinforcement will further reduce cosmetic distress.

Nonstructural and non-vehicular concrete flatwork placed on compacted subgrade should be a minimum 4-inches in thickness with crack control joints spaced 8 feet apart for flatwork slabs/patios and 6 feet apart for flatwork sidewalks. Crack control joints should be sawcut or deep open tool joint to a minimum of 1/3 the concrete thickness. Reinforcement should consist of No. 3 bars spaced at 24 inches on center, both ways. Flatwork edges should be thickened to 8 inches by 8 inches where flatwork is adjacent to landscaping or unpaved areas. The compacted subgrade below the nonstructural and non-vehicular concrete flatwork should be presoaked to a depth of 12 inches prior to placing concrete.

To reduce the potential for nonstructural concrete flatwork to separate from entryways and doorways, the owner may elect to install dowels to tie these two elements together.

5.14 Subsurface Water Infiltration

Recent regulatory changes have occurred that mandate that storm water be infiltrated below grade rather than collected in a conventional storm drain system. Typically, a combination of methods are implemented to reduce surface water runoff and increase infiltration including; permeable pavements/pavers for roadways and walkways, directing surface water runoff to grass-lined swales, retention areas, and/or drywells, etc.

It should be noted that collecting and concentrating surface water for the purpose of intentional infiltration below grade, conflicts with the geotechnical engineering objective of directing surface water away from slopes, structures and other improvements. The geotechnical stability and

integrity of a site is reliant upon appropriately handling surface water. In general, the vast majority of geotechnical distress issues are directly related to improper drainage. In general, distress in the form of movement of improvements could occur as a result of soil saturation and loss of soil support, expansion, internal soil erosion, collapse and/or settlement.

The results of our filed infiltration testing indicated the observed 1-D infiltration rate for I-2 through I-6 (not including required factors of safety for design) ranged from approximately 0.01 to 0.14 inches per hour. The design infiltration rate is thereby equal to the Observed Infiltration Rate divided by the design factor of safety. The design factor of safety must be a minimum of 3.0 but may be increased at the discretion of the design engineer (Riverside County, 2011). Per the Riverside County infiltration guidelines (2011), infiltration of stormwater is not required when the factored infiltration rate (measured infiltration rate with safety factors applied) is less than 0.3 inches per hour in the vicinity of the BMPs.

Based on the results of field infiltration testing indicating extremely low infiltration rates, anticipated subsurface conditions consisting of compacted fill over dense native materials, and presence of shallow groundwater, we strongly recommend against the intentional infiltration of stormwater into the subsurface soils.

5.15 Geotechnical Plan Review

When available, the rough grading, precise grading, retaining wall, and foundation plans should be reviewed by LGC Geotechnical in order to update and/or verify our geotechnical recommendations. Updated recommendations and/or additional fieldwork may be necessary. A more detailed 40-scale grading plan review geotechnical evaluation and report should be performed once the rough grading plans are further in development.

5.16 Geotechnical Observation and Testing During Construction

The recommendations provided in this report are based on limited subsurface observations and geotechnical analysis. The interpolated subsurface conditions should be checked in the field during grading by a representative of LGC Geotechnical. Geotechnical observation and testing is required per Section 1705 of the 2022 California Building Code (CBC).

Geotechnical observation and/or testing should be performed by LGC Geotechnical at the following stages:

- During grading (key excavations, removal bottoms, remedial grading, fill placement, etc.);
- Geologic mapping of cut slopes;
- During retaining wall backfill and compaction;
- During utility trench backfill and compaction;
- During precise grading;
- After presoaking building pads and other concrete-flatwork subgrades, and prior to placement of aggregate base or concrete;
- Preparation of pavement subgrade and placement of aggregate base;

- After building and wall footing excavation and prior to placing reinforcement and/or concrete; and
- When any unusual soil conditions are encountered during any grading or construction operation subsequent to issuance of this report.

6.0 LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is based on data obtained from limited observations of the site, which have been extrapolated to characterize the site. While the scope of services performed is considered suitable to adequately characterize the site geotechnical conditions relative to the proposed development, no practical evaluation can completely eliminate uncertainty regarding the anticipated geotechnical conditions in connection with a subject site. Variations may exist and conditions not observed or described in this report may be encountered during grading and construction.

The findings of this report are valid as of the present date. However, changes in the conditions of a site can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. The findings and conclusions presented in this report can be relied upon only if LGC Geotechnical has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site. This report is intended exclusively for use by the client, any use of or reliance on this report by a third party shall be at such party's sole risk.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and modification.

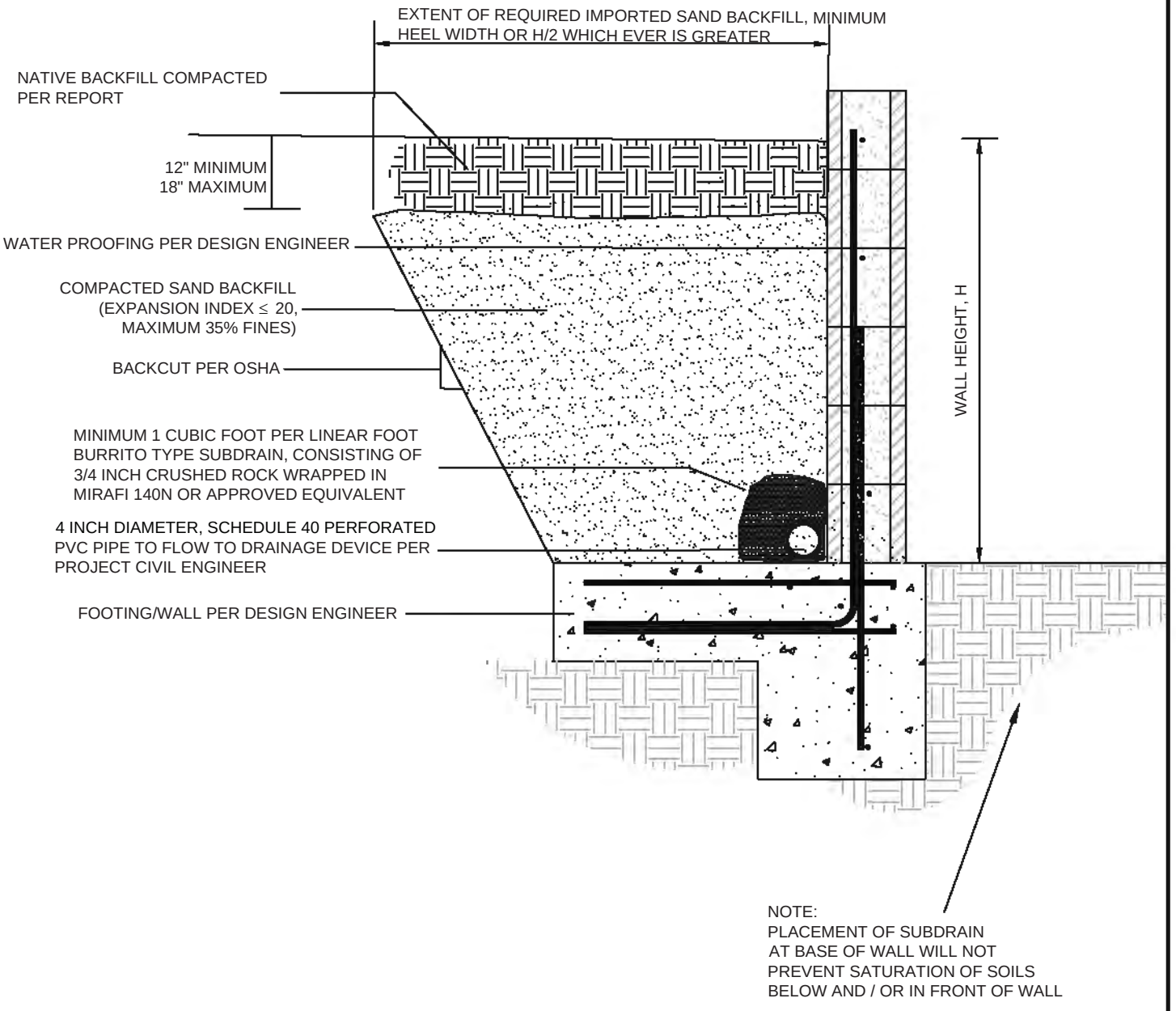
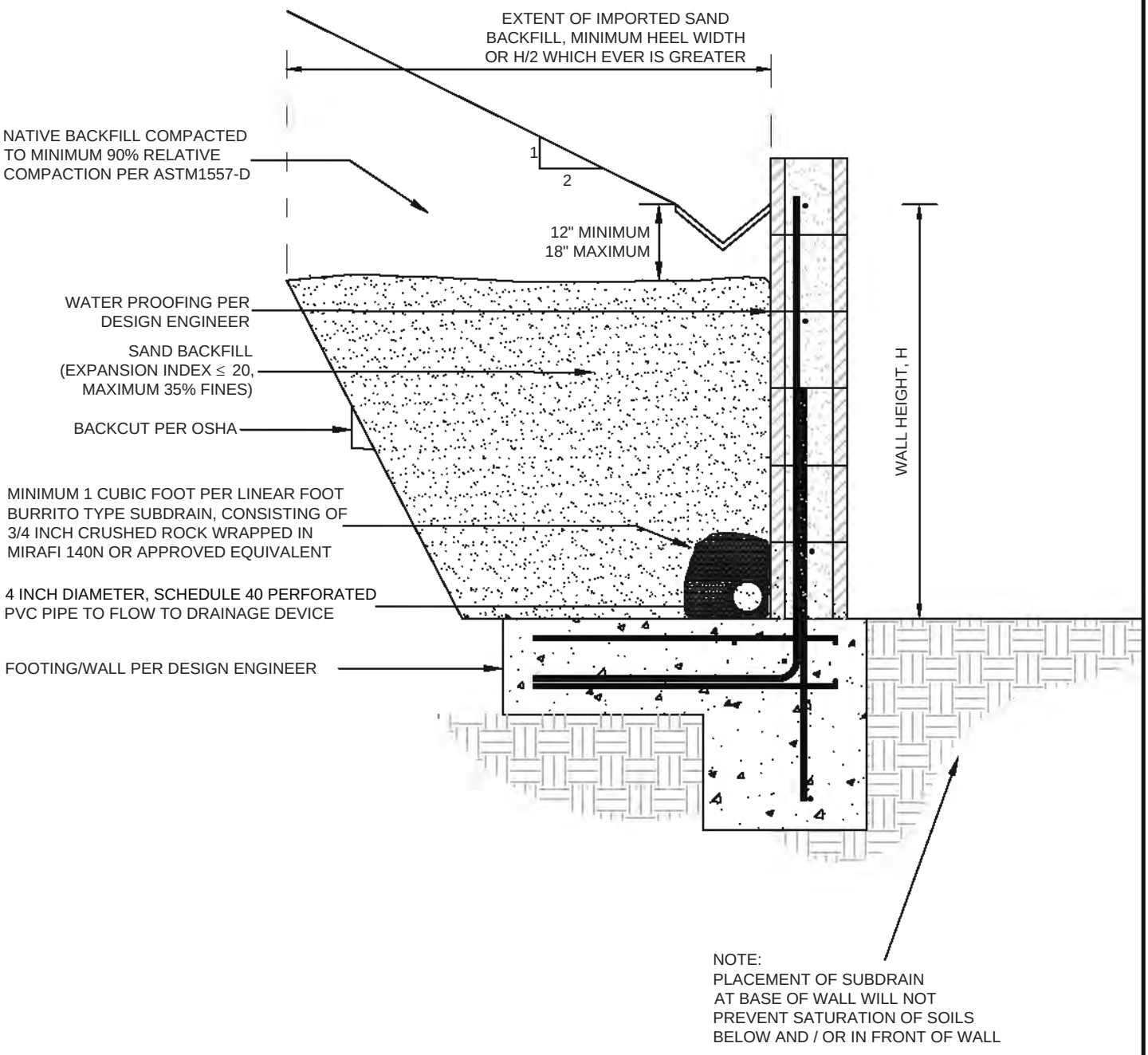


FIGURE 2A
Retaining Wall Backfill Detail (Level Condition)

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	23160-01
ENG. / GEOL.	RLD / BPG
SCALE	Not to Scale
DATE	January 2024



LGC Geotechnical, Inc.	**FIGURE 2B** ***Retaining Wall Backfill Detail*** ***2:1 Backfill***	*PROJECT NAME*	*EIP - Lake Elsinore*
		PROJECT NO.	*23160-01*
		ENG. / GEOL.	*RLD / BPG*
		SCALE	*Not to Scale*
		DATE	*January 2024*

Appendix A
References

APPENDIX A

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Appendix B
Boring and Test Pit Logs

Geotechnical Boring Log Borehole HS-1

Date: 9/25/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~1282' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1280	0							@ 0' - Dry vegetation/Topsoil: cobbles and gravels	
								@ 2.5' to TD - Tertiary Silverado Formation (Tsi)	
			R-1	10 24 50/5"	112.3	13.0	ML	@ 2.5' - Sandy SILT: yellowish brown, moist, hard	
	5		R-2	25 50/4"	104.6	18.8	SC	@ 5' - Clayey SAND: yellowish brown, very moist, very dense	
1275			R-3	25 50/3"	115.9	10.4	SM	@ 7.5' - Silty SAND: yellowish brown, moist, very dense	
	10		R-4	25 50/4"	112.1	10.2	SM/ML	@ 10' - Silty SAND/Sandy SILT: yellowish brown, moist, very dense/hard	
1270									
	15		SPT-1	11 22 34				@ 15' - No Recovery	
1265								Total Depth = 16.5' Groundwater Not Encountered Backfilled with Cuttings on 9/25/2023	
	20								
1260									
	25								
1255									
	30								

B-1

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-2

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1266' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1265	0							**@ 0 to 10' - Alluvium (Qal)**	
			R-1	28 16 16				@ 0' - Dry vegetation/Topsoil: cobbles and gravels @ 2.5' - No Recovery	
1260	5		R-2	10 12 13		23.3	CL	@ 5' - Sandy CLAY: grayish brown, very moist, very stiff	
			R-3	8 10 14	92.8	23.4	CH	@ 7.5' - Sandy FAT CLAY: reddish brown, very moist, very stiff	AL CN
1255	10		R-4	8 17 42	106.7	20.0	SC	**@ 10' to TD - Tertiary Silverado Formation (Tsi)** @ 10' - Clayey SAND: light yellowish brown, very moist, hard	
1250	15		R-5	17 27 29	99.8	23.6	CL	@ 15' - CLAY with Sand: pale brown, very moist, hard	
1245	20	▽	SPT-1	14 50/5"		15.1		@ 20' - CLAY: gray, moist, hard	
1240	25		R-6	36 50/4"	105.2	21.4	SM	@ 25' - Silty SAND: light olive, wet, very dense	
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

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CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-2

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1266' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1235	30		SPT-2	16 23 50/5"		17.0	CL	@ 30' - Sandy CLAY: gray, wet, hard	
1230	35		R-7	12 15 50/5"	108.1	18.9	SM	@ 35' - Silty SAND: gray, wet, very dense	
1225	40		SPT-3	16 29 50/5"		20.7	ML	@ 40' - Sandy SILT: gray, wet, hard	
1220	45		R-8	24 50/4"	104.7	22.7	SM	@ 45' - Silty SAND: gray, wet, very dense	
1215	50		SPT-4	26 50/5"		25.2		@ 50' - Silty SAND: dark gray, wet, very dense	
1210	55							Total Depth = 50.9' Groundwater Encountered at Approximately 23' Backfilled with Cuttings on 9/25/2023	
	60								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-3

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1266' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1265	0							**@ 0 to 7.5' - Alluvium (Qal)**	
			R-1	7 12 22				@ 0' - Vegetation/Topsoil @ 2.5' - No Recovery	
	5	B-1	R-2	7 11 13	105.7	16.7	CL	@ 5' - Sandy CLAY: yellowish brown, moist, very stiff	
1260								**@ 7.5' to TD - Tertiary Silverado Formation (Tsi)**	
			R-3	20 50/5"	123.8	8.2	SM	@ 7.5' - Silty SAND: light brown, moist, very dense	
	10		R-4	23 50/5"	115.6	11.7		@ 10' - Silty SAND: light reddish brown, moist, very dense	
1255									
	15		R-5	50/3"		13.9		@ 15' - Silty SAND: yellowish brown, very moist, very dense	
1250									
	20		SPT-1	8 13 20		17.0	SC	@ 20' - Clayey SAND: light yellowish brown, very moist, dense	
1245									
								Total Depth = 21.5' Groundwater Not Encountered Backfilled with Cuttings on 9/25/2023	
1240	25								
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-4

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1275' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@ 0 to 5' - Alluvium (Qal)**	
								@ 0' - Vegetation/Topsoil	
			R-1	8 11 13	108.1	8.0	CL	@ 2.5' - Sandy CLAY: reddish brown, slightly moist, very stiff	
1270	5	B-1	R-2	50/4"	88.6	10.0	CL	**@ 5' to TD - Tertiary Silverado Formation (Tsi)** @ 5' - Sandy CLAY: light brown, slightly moist, hard, weathered	
			R-3	26 50/6"	113.2	9.0	SC	@ 7.5' - Clayey SAND: light brown, moist, very dense	
1265	10		R-4	25 50/5"	106.2	7.9	SM	@ 10' - Silty SAND: light yellowish brown, moist, very dense	
1260	15		R-5	24 50/5"	111.7	15.9	ML	@ 15' - Sandy SILT: olive brown, very moist, hard	
1255	20		R-6	32 50/4"	102.0	10.2	SM	@ 20' - Silty SAND: yellowish brown, moist, very dense	
1250	25							Total Depth = 20.8' Groundwater Not Encountered Backfilled with Cuttings on 9/25/2023	
1245	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-5

Date: 9/26/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1277' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@ 0 to 7.5' - Alluvium (Qal)**	
1275								@ 0' - SILT with SAND: brown, dry, vegetation/topsoil	
			R-1	6 12 22	121.7	10.0	SC	@ 2.5' - Clayey SAND: pale brown, moist, medium dense	
	5		R-2	12 15 17	107.1	2.7	SP-SM/CL	@ 5' - SAND with Silt to Sandy CLAY: light brown, dry, medium dense/very stiff	
1270								**@ 7.5' to TD - Tertiary Silverado Formation (Tsi)**	
			R-3	26 50/5"	113.4	11.9	SM	@ 7.5' - Silty SAND: yellowish gray, moist, very dense	
	10		R-4	28 50/5"	114.6	10.1	SC	@ 10' - Clayey SAND: yellowish brown, moist, very dense	
1265									
	15		SPT-1	22 32 34		10.9		@ 15' - Clayey SAND: light brown, moist, very dense	
1260									
	20		R-5	28 50/3"	121.5	12.4	CL	@ 20' - Sandy CLAY: light gray, moist, hard	
1255									
	25		SPT-2	14 30 36		12.7	ML	@ 25' - SILT: grayish brown, moist, hard	
1250									
	30								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-5

Date: 9/26/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~1277' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1245	30		R-6	10 50/5"	119.1	14.4	CL	@ 30' - Sandy CLAY: grayish olive, moist, hard	
1240	35		SPT-3	13 24 50/5"		12.4	SC	@ 35' - Clayey SAND: olive gray, moist, very dense	
1235	40		R-7	42 50/5"	115.7	14.1	SM	@ 40' - Silty SAND: light gray, very moist, very dense	
1230	45	▽	SPT-4	50/3"		14.1	SC	@ 45' - Clayey SAND: yellowish gray, very moist, very dense	
1225	50		R-8	50/5"				@ 50' - No Recovery	
1220	55							Total Depth = 50.4' Groundwater Encountered at Approximately 45' Backfilled with Cuttings on 9/26/2023	
	60								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-6

Date: 9/26/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~1281' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1280	0							**@ 0 to 2.5' - Alluvium (Qal)**	CR EI #200 RV
								@ 0' - Sandy SILT: pale brown, dry	
								@ 2.5' to TD - Tertiary Silverado Formation (Tsi)	
			R-1	5 11 18	97.1	20.2	SM	@ 2.5' - Silty SAND: olive brown, very moist, medium dense, weathered	
	5	B-1	R-2	9 13 27	103.7	20.1	ML	@ 5' - Sandy SILT: grayish brown, very moist, hard	
1275			R-3	22 50/5"	104.3	19.5		@ 7.5' - Sandy SILT: grayish brown, very moist, hard	
	10		R-4	22 44 50/4"	113.2	14.5	SM	@ 10' - Silty SAND: grayish brown, very moist, very dense	
1270									
	15		R-5	15 23 50/6"	93.6	25.4		@ 15' - Silty SAND: brown, very moist, very dense	
1265									
	20		SPT-1	11 21 34		22.3		@ 20' - Silty SAND: brown, very moist, very dense	
1260									
								Total Depth = 21.5' Groundwater Not Encountered Backfilled with Cuttings on 9/26/2023	
1255	25								
	30								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-7

Date: 9/26/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1295' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0						**@ 0 to 2.5' - Alluvium (Qal)**	MD
							@ 0' - Silty SAND: dark brown, dry, vegetation/topsoil	
							@ 2.5' to TD - Tertiary Silverado Formation (Tsi)	
		R-1	4 13 10	108.8	12.6	SC	@ 2.5' - Clayey SAND: gray, moist, medium dense, weathered	
1290	5	R-2	9 27 50/4"	101.0	17.8	CL	@ 5' - Sandy CLAY: light yellowish gray, moist, hard	
		R-3	25 50/4"	110.0	13.3	ML	@ 7.5' - Sandy SILT: light yellowish gray, moist, hard	
1285	10	R-4	30 50/5"	108.0	16.4	SM	@ 10' - Silty SAND: grayish yellow, very moist, very dense	
1280	15	SPT-1	10 18 30		14.7	CL	@ 15' - Sandy CLAY: gray, moist, hard	
1275	20	R-5	47 50/5"	114.5	7.1	SM	@ 20' - Silty SAND: gray, slightly moist, very dense	
1270	25						Total Depth = 20.9' Groundwater Not Encountered Backfilled with Cuttings on 9/26/2023	
	30							

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-8

Date: 9/26/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1282' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1280	0		R-1	8 8 15	112.5	15.1	CL	**@ 0 to 15' - Colluvium (Qcol)** @ 0' - Silty SAND: brown, dry, vegetation/topsoil, cobbles and gravels visible on surface @ 2.5' - Sandy CLAY: dark brown, moist, very stiff	
1275	5	B-1	R-2	8 11 15	111.6	15.3		@ 5' - Sandy CLAY: brown, moist, very stiff	
1270	10		R-3	7 14 19	105.4	19.0		@ 7.5' - Sandy CLAY: brown, very moist, very stiff	
			R-4	7 12 16	101.1	22.9		@ 10' - Sandy CLAY: grayish brown, very moist, very stiff	
1265	15		R-5	10 20 29	109.8	15.0	CL	**@ 15' to TD - Tertiary Silverado Formation (Tsi)** @ 15' - CLAY with Sand: dark brown, moist, hard	-#200 DS
1260	20							Total Depth = 16.5' Groundwater Not Encountered Backfilled with Cuttings on 9/26/2023	
1255	25								
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-1

Date: 9/25/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0							**@ 0' to TD - Alluvium (Qal)**	
								@ 0' - Vegetation/topsoil	
	5	B-1	SPT-1	8 4 6		13.0	SC	@ 5' - Clayey SAND: dark brown, moist, medium dense	
1255									
	10		SPT-2	7 11 16		17.3	CL	@ 10' - Sandy CLAY: yellowish brown, moist, hard	
1250								Total Depth = 12' Groundwater Encountered at Approximately 11', percolation test could not be run Backfilled with Cuttings on 9/25/2023	
	15								
1245									
	20								
1240									
	25								
1235									
	30								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-2

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~1263' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@ 0' to TD - Alluvium (Qal)**	
								@ 0' - Vegetation/topsoil	
1260									
	5							Total Depth = 3'	
								Groundwater Not Encountered	
1255								3" Perforated Pipe with Filter Sock and Gravel installed	
								Pipe Removed and Backfilled with Cuttings on 9/27/2023	
	10								
1250									
	15								
1245									
	20								
1240									
	25								
1235									
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-3

Date: 9/25/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1262' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0							**@ 0' to TD - Alluvium (Qal)** @ 0' - SILT: dry, vegetation/topsoil	
1255	5		SPT-1	4 5 7		16.0	CL	@ 8' - Sandy CLAY: brown, moist, stiff	
1250	10							Total Depth = 10' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/27/2023	
1245	15								
1240	20								
1235	25								
	30								

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-4

Date: 9/25/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0		B-1					**@ 0' to TD - Alluvium (Qal)** @ 0' - SILT: brown, dry, vegetation/topsoil	
1255	5							Total Depth = 3' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/27/2023	
1250	10								
1245	15								
1240	20								
1235	25								
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-5

Date: 9/26/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0							**@ 0' to TD - Alluvium (Qal)**	
								@ 0' - Silty SAND: brown, dry, vegetation/topsoil	
	5	B-1	SPT-1	6 12 8		12.2	SP-SC	@ 5' - SAND with Clay: grayish brown, moist, medium dense	
1255									
	10		SPT-2	5 5 8		16.1	CL	@ 10' - Sandy CLAY: grayish brown, moist, very stiff	
1250								Total Depth = 12' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/28/2023	
	15								
1245									
	20								
1240									
	25								
1235									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-6

Date: 9/26/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@ 0' to TD - Alluvium (Qal)** @ 0' - Silty SAND: brown, dry, topsoil	
1260									
	5							Total Depth = 3' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/28/2023	
1255									
	10								
1250									
	15								
1245									
	20								
1240									
	25								
1235									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log LGC-BA-1

Date : 9/28/23 Page 1 of 3 | **Drilling Company :** Big Johnny's

Project Name : Baker St. - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" | **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							SM	**Quaternary Pauba Formation (Fanglomerate) - Qpf** @ 0-5' - Silty SANDSTONE: light to medium brown, dry to slightly moist, weathered, many cobbles to 6"diameter, some angular, some sub-rounded, metamorphic origin	
1380	5			R-1	12/10"	117.0	11.1		**Tertiary Silverado Formation - Tsi** @ 5' - Silty SANDSTONE: gray to olive green, slightly moist, dense, fine grained, oxidation staining throughout, mostly sub-horizontal, few vertical caliche stringers to 15' deep	
1375	10	B-1		R-2	16/12"	120.9	10.9		@ 10' - Silty SANDSTONE: gray to olive, slightly moist, dense to very dense, fine grained, some mottled dry white chalky Silt, caliche staining	
1370	15								@ 15' - increase in coarse Sand & gravel, massive, less staining, very dense	
1365	20		GB: @22' N60E, 8SE	R-3	12/10"	124.4	5.3		@ 20' - Silty SANDSTONE: gray to olive green, some brown & white mottling, slightly moist, very dense @ 22' - 1" thick red brown Sandy gravel lense, general bedding attitude around hole, hard white indurated, Silty SANDSTONE layer above, non-continous	
1360	25								@ 26-29' - Few infilled joints, white chalky infill	
1355	30									

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SAMPLE TYPES:

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R	RING SAMPLE
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RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1

Date : 9/28/23 Page 2 of 4 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" | **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		GB@31' N10E, 5W	R-4	13	121.3	10.7	SM	@ 30' - SANDSTONE: gray, olive, white & black mottled, slightly moist to dry, very dense, medium to coarse grained	
									@ 33' - 6-8" diameter white oval shaped concretionary nodule, laying on side(sub-horizontal), hard	
1350	35								@ 35' - Very dense, indurated	
1345	40			R-5	14	120.6	10.7		@ 40' - SANDSTONE: olive green to gray/white, slightly moist, very dense	
1340	45									
1335	50			R-6	22	111.6	16.5	ML	@ 50' - Clayey SILTSTONE: dark gray, slightly moist, very stiff, some fine sand, some polished surfaces	
			@ 52' B: N60E, 20 NW	G-1 @ 52'			15.2	MH	@ 52' to 54' - Very stiff to hard SILT/CLAYSTONE zone, with fine bedding attitude at upper transition, internally sheared with some polished surfaces, bedding attitudes	AL
			GB @54': N55E, 3-5 NW						@ 54' - Transitions to Clayey SAND, with fine undulatory sand beds, GB Attitude	
1330	55								@ 57' - Grades to massive SANDSTONE, olive green to gray/white, slightly moist, very dense, indistinct contact	
1325	60									

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Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1

Date : 9/28/23 Page 3 of 3

Project Name : Baker St - Lake Elsinore

Project Number : 23160-01

Elevation of Top of Hole : ~ 1385 ' MSL

Hole Location : See Geotechnical Map

Drilling Company : Big Johnny's

Type of Rig : Bucket Auger

Drop : 30" **Hole Diameter :** 24"

Drive Weight : 0'-25' - 3300 lbs.
25'-50' - 2200 lbs.
50'-80' - 1100 lbs.
80'-100' - 2200 lbs.

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
36	60			R-7	17	119.5	6.0	SM	@ 60' - SANDSTONE: gray to olive green, slightly moist, dense to very dense	DS +#200
									@ 62' - Concretionary nodule, white, hard, oval shaped, 6-8" (laying flat), subhorizontal, massive SANDSTONE below	
31	65									
	70			R-8	27	113.2	14.0		@ 70' - SANDSTONE: gray to olive green, slightly moist, very dense, fine to medium grained	
26									**Total Depth = 71'** **Backfilled with Cuttings on 9/28/2023**	
	75									
21										
	80									
16										
	85									
11										
	90									

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CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 1 of 4

Drilling Company : Big Johnny's

Project Name : Baker St. - Lake Elsinore

Type of Rig : Bucket Auger

Project Number : 23160-01

Drop : 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL

Drive Weight : 0'-25' - 3300 lbs.
25'-50' - 2200 lbs.
50'-80' - 1100 lbs.
80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1380	5	See Geotechnical Boring log LGC-BA-1 for Graphic Log							**Tertiary Santiago Formation (Tsi)** SANDSTONE: gray to olive green and white, slightly moist, medium grained, dense, thickly bedded to massive, primary logging begins at approximately 33', see Geotechnical Boring Log LGC-BA-1 for more information	
1375	10									
1370	15									
1365	20									
1360	25									
1355	30									

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SAMPLE TYPES:

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TEST TYPES:

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RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 2 of 4 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" | **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30								@ 33' - concretionary layer continuous around hole, concretions up to 8"	
1350	35		@36' B: N60E 9SE						@ 36' - finer grained SANDSTONE, distinct red/brown stained contact with coarser sandstone above, bedding attitude	
1345	40									
									@ 43' to 44' - SILTSTONE rip-up clast, ~1' thick and 1' wide, clayey and very dense, sandstone above & below	
1340	45		@47' B: N70E 20NW						@ 47 to 48.5' - faint zone of crossbedding, general bedding attitude taken	
			@48.5' C: N48E 12SE						@ 48.5' - SILTSTONE: dark gray, slightly moist, very stiff, fine gravel and cobble bed at contact with sandstone above, Siltstone is internally sheared, weathered, some polished surfaces, coarsens to 56'	
1335	50									
1330	55								@ 56' - SANDSTONE: gray to olive green, slightly moist, very dense, thickly bedded to massive	
1325	60									

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
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CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 3 of 4 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	60									
1323									@ 62' to 64' - concretionary nodules around hole, erratic, 3"-8" in size	
	65		@66.5' GB: N15E 9NW						@ 66.5' - general bedding attitude on fine gravel bed, continuous, 1"-2" thick	
1318										
	70		@69.5' B: N20E 10SE						@ 69.5' - Well defined transition to Sandy SILTSTONE, medium brown, rip up clast just above contact, general bedding attitude, coarsens to white to light brown sandstone by 72'	
1313			@72' B: N51W 9N						@ 72' - Another well defined transition to Sandy SILTSTONE, gray brown, coarsens to silty SANDSTONE by 75'	
	75									
1308			@77.5' CB: N40E 20SE						@ 77.5' - Claybed, 1/8-1/4" thick in Silty SANDSTONE, continuous around hole, dark gray, slightly plastic	
	80			R-9	20	118.9	93.9	20	@ 79' - medium gray SANDSTONE to clayey SANDSTONE, some $\frac{1}{4}$" white coarse sandstone inclusions, red oxide stains throughout @ 80' - Clayey SANDSTONE: grayish brown, slightly moist to dry, very dense/stiff	
1303										
	85								@ 86' - Zone of crossbedding visible to 90', small scale, barely discernable	
1298										
	90								@ 90' - white to light brown coarse sandstone, generally massive	

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SAMPLE TYPES:

B	BULK SAMPLE
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RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 4 of 4

Drilling Company : Big Johnny's

Project Name : Baker St - Lake Elsinore

Type of Rig : Bucket Auger

Project Number : 23160-01

Drop : 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL

Drive Weight : 0'-25' - 3300 lbs.
25'-50' - 2200 lbs.
50'-80' - 1100 lbs.
80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1293	90									
	95									
1288									@97.5' - End Visual Log	
	100								**Total Depth = 100'** **Backfilled with Cuttings on 1/09/2024**	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
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TEST TYPES:

DS	DIRECT SHEAR
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SA	SIEVE ANALYSIS
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AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-2

Date : 9/29/23 Page 1 of 3 | **Drilling Company :** Big Johnny's

Project Name : Baker St. - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" | **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1338 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0								**Quaternary Colluvium - Qcol** @ 0-2.5' - Clayey SAND: dark gray, dry/desiccated, roots	
1335									**Teritary Silverado Formation - Tsi** @ 2.5' - Highly weathered SILTSTONE, fractured,soft to medium stiff, slightly moist to dry, caliche stringers throughout	
	5			R-1	6	100.5	5.4		@ 5' - Silty Fine SANDSTONE to Sandy SILTSTONE: mottled gray, olive, white, reddish brown, slightly moist, dense to medium dense, very weathered	
1330									@ 8' - SILTSTONE: gray to reddish brown, dry to slightly moist, very stiff, highly weathered/fractured	
	10		GB: N80E, 19SE	R-2	8	121.6	4.9		@ 10' - Silty SANDSTONE: yellow brown to light olive green, slightly moist, dense, less weathered, medium to coarse grained Gradational contact to medium grained SANDSTONE: some gypsum or caliche lined joints(fine white powder) to 13', moderately well-cemented	
1325										
	15									
1320									@ 18' - 6-8" SILTSTONE rip up clasts	
	20			R-3	8	123.9	7.8		@ 20' - Interbedded SANDSTONE/SILTSTONE: olive green to gray and yellow brown, slightly moist, dense to very dense, gypsium filled joints	
1315			@ 23' GB: N75E, 17SW						@ 23' - General bedding attitude, along aligned rip up clasts, gradation to finer grained Sand	
	25									
1310			@ 27' B: N55W, 30SW @ 28' GB: N45W 28SW						@ 27' - Bedding attitude on indurated SANDSTONE bed @ 28' - SILTSTONE, dark gray, very stiff, slightly weathered/jointed, FeO staining, general bedding attitude	
	30									

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-2

Date : 9/28/23 Page 2 of 3 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1338 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30			R-4	10	108.5	16.4	SC-ML	@ 30' - SANDSTONE: gray, olive, white, black mottled, slightly moist to dry, very dense, medium to coarse grained, Clayey	
1305									@ 32' - SANDSTONE, less stiff, massive	
	35								@ 35' - Pisolitic Zone, very stiff SILTSTONE to 36'	
1300										
	40	B-1	GB @39' N45W, 30SW	R-5	8	87.2	24.1	SC	@ 39' - Some internal polished surfaces, general bedding attitude @ 40' - Clayey SANDSTONE: olive gray to dark gray, slightly moist, very stiff to stiff, polished surfaces, fractured	
			CB @42' N28W, 15SW	GB-1 @ 42'				CH	@ 42' - Clay Bed: dark gray, slightly moist, slightly plastic, around hole, pinches and swells from 1-3" thick	AL
1295									@ 44' - CLAY bed: dark gray, slightly moist, approximately 1" thick around hole, very stiff to hard below	
	45		CB @44' N50W, 26SW	GB-2 @ 44'					@ 45' - very hard drilling	
1290										
	50			R-6	31	111.6	6.4	SM	@ 50' - Silty SANDSTONE: light brown to olive gray, slightly moist, hard	DS #200
1285									@ 55' - Silty SANDSTONE: very dense, massive	
	55								@ 56' - Transtion from SANDSTONE to SILTSTONE, bedding attitude	
1280			@ 56' B: N70W, 31S J: N20E, S75 J: N20W, 79S J: N45W, 50N						@ 57' - Joints along polished surfaces, belled out along jointing on north side of hole up to 18", unsafe below, SILTSTONE to 60', very stiff to hard	
	60									

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-2

Date : 9/28/23 Page 3 of 3

Drilling Company : Big Johnny's

Project Name : Baker St - Lake Elsinore

Type of Rig : Bucket Auger

Project Number : 23160-01

Drop : 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1338 ' MSL

Drive Weight : 0'-25' - 3300 lbs.
25'-50' - 2200 lbs.
50'-80' - 1100 lbs.
80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	60			R-7	17	102.4	19.8	ML	@ 60' - Clayey SILTSTONE: dark gray, slightly moist, very stiff, fractured	
1275										
	65									
1270										
	70			R-8	27	100.1	15.9	SM-ML	@ 70' - Sandy SILTSTONE: light brown to gray brown, dry to slightly moist, very stiff	
1265										
	75									
1260										
	80			R-8	27	120.3	13.7		@ 80' - Sandy SILTSTONE: olive green to gray, dry to slightly moist, very stiff	
1255									**Total Depth = 80'** **Backfilled with Cuttings on 9/29/2023**	
	85									
1250										
	90									

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

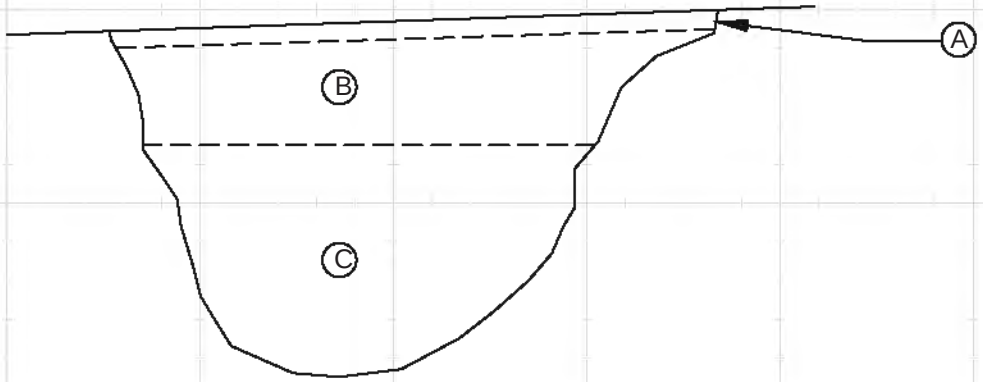
DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-1	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: light brown, dry, loose to medium dense, dead vegetation, desiccated	Qal				
	B	@ 0.5' to 3.5' - Silty CLAY: dark brown, dry to slightly moist, med dense					
		Tertiary Silverado Formation (Tsi)					
@ 4' GB: S50E 20SW	C	@ 3.5' to T.D. - Interbedded SILTSTONE and SANDSTONE, gray and mottled light brown, dry, medium dense to dense, general bedding attitude taken	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1274 ' MSL Surface Slope: 2 deg. Trend: S34W



Total Depth: 9.5'
Groundwater: None
Backfilled: 9/26/2023

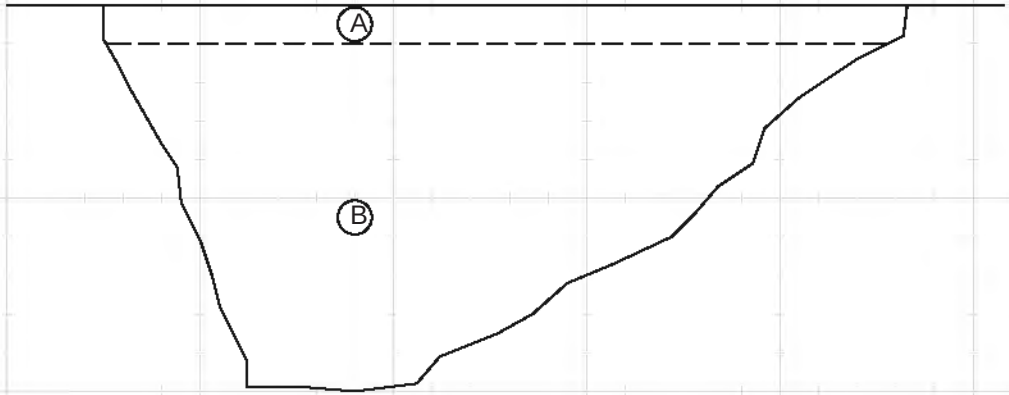
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Last Edited: 10/11/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-2	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A B	Quaternary Young Alluvial Channel Deposits (Qal) @ 0' to 1' - SILT: light brown to gray, dry, loose to medium dense, dead vegetation, @ 1' to T.D. - Clayey SAND: brownish gray overall, dry and indurated to 3.5', then slightly moist and medium dense from 3.5' to 10'.	Qal				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1268 ' MSL Surface Slope: 0 deg. Trend: E-W



Total Depth: 10'
Groundwater: None
Backfilled: 9/26/2023

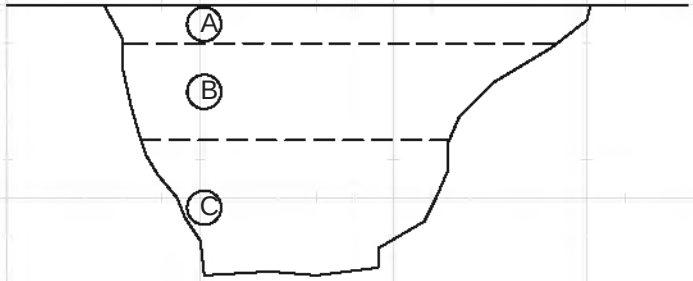
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Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-3	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Artificial Fill, Undocumented (afu)					
	A	@ 0' to 1' - SILT: dark brown to gray, loose, moist, vegetation at surface	afu		B-1 @ 0'-5'		
	B	@ 1' to 3.5' - Sandy CLAY: dark brown, moist, medium dense					
		Quaternary Young Alluvial Channel Deposits (Qal)					
	C	@ 3.5' to T.D. - Silty SAND: gray to brown, dry, very dense, indurated	Qal				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1270 ' MSL Surface Slope: 0 deg. Trend: N45E



Total Depth: 7'
Groundwater: None
Backfilled: 9/26/2023

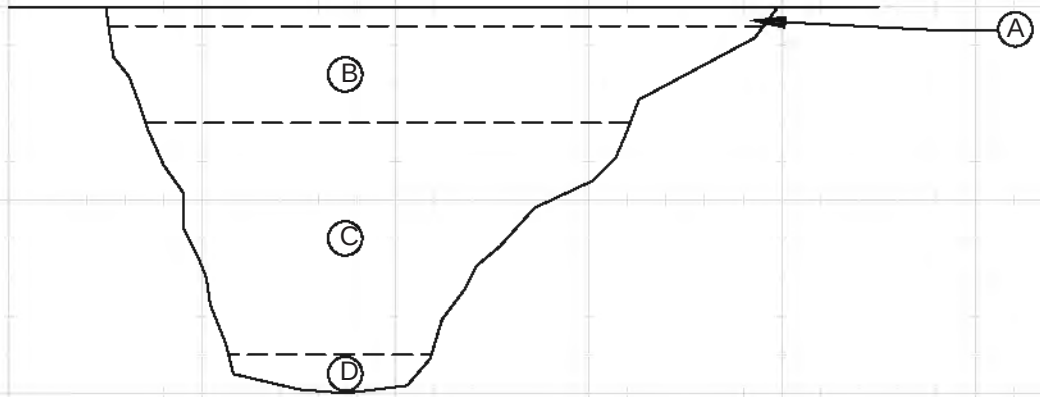
scale : 1 in = 5 ft

Last Edited: 10/12/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-4	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: dark gray to brown, dry, loose to medium dense, dead vegetation at surface	Qal				
	B	@ 0.5' to 3' - Sandy CLAY: dark brown, gray, dense, slightly moist					
		Tertiary Silverado Formation (Tsi)					
	C	@ 3' to 9'- SANDSTONE: white to light brown with red mottle, dry, dense	Tsi				
	D	@ 9' to T.D. - SILTSTONE: olive gray, dry, medium dense to dense					

GRAPHICAL REPRESENTATION BELOW: Elevation : 1274 ' MSL Surface Slope: 0 deg. Trend: S75E



Total Depth: 10'
Groundwater: None
Backfilled: 9/26/2023

scale : 1 in = 5 ft

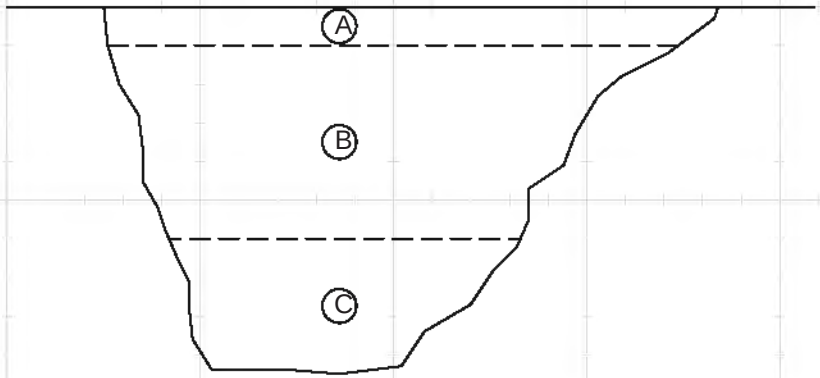
Last Edited: 10/12/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-5
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:
Equipment: Backhoe	Location: See Geotechnical Map	

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Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 1' - SILT: dark brown and gray, slightly moist to dry, loose	Qal		B-1 @ 0'-9.5'		
	B	@ 1' to 6' - SILT/CLAY: dark brown, slightly moist dense					
		Tertiary Silverado Formation (Tsi)					
	C	@ 6' to T.D. - SILTSTONE: gray, mottled, slightly moist, medium dense to dense, weathered	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1271 ' MSL Surface Slope: 0 deg. Trend: S55E



Total Depth: 9.5'
Groundwater: None
Backfilled: 9/26/2023

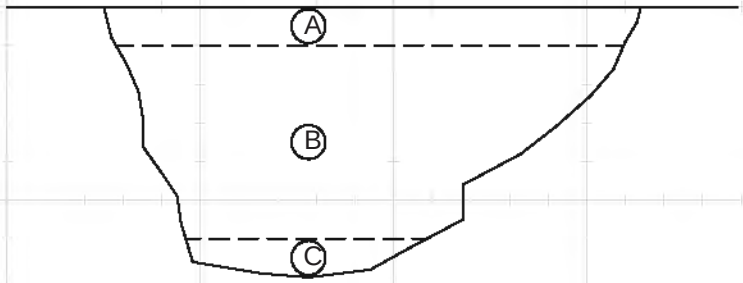
scale : 1 in = 5 ft

Last Edited: 10/12/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-6
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:
Equipment: Backhoe	Location: See Geotechnical Map	

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary young alluvial channel deposits (Qal)					
	A	@ 0' to 1' - SILT: light brown, dry, medium dense, some 1" to 6" cobbles (subrounded to angular)	Qal				
	B	@ 1' to 6' - Silty SAND: dark reddish brown, dry, dense to very dense, indurated					
		Tertiary Silverado Formation (Tsi)					
	C	@ 6' to T.D. - SANDSTONE: white, dry, dense, some iron oxide	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1289 ' MSL Surface Slope: 0 deg. Trend: E-W



Total Depth: 7'
Groundwater: None
Backfilled: 9/26/2023

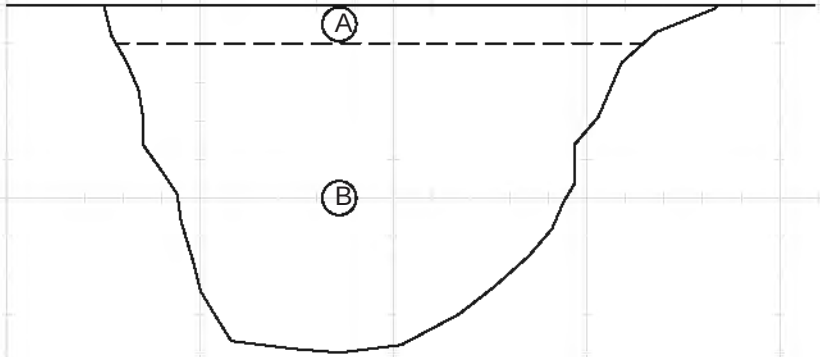
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Last Edited: 10/13/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-7	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A B	Artificial Fill, Undocumented (afu) @ 0' to 1' - SILT: light grayish brown, loose, dry, dead grass, some trash, rounded cobbles 2"-6" in diameter @ 1' to 9' - SILT: grayish brown, dry, trash (roof tiles) random rounded cobbles (some are nested, creating voids), krotovina, medium dense, tan sandy layer from 3'-4' than back to brown gray silt	afu				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1270 ' MSL Surface Slope: 0 deg. Trend: S50E



Total Depth: 9'
Groundwater: None
Backfilled: 9/26/2023

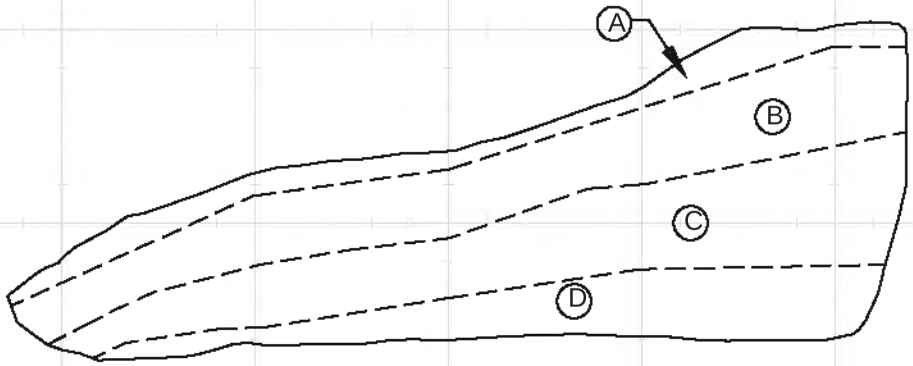
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-8	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)	Qal				
	A	@ 0' to 0.5 - SILT: light brown to gray, dry, loose, dry grass, some 2"-3" sub rounded cobbles					
	B	@ 0.5' to 4' - Sandy CLAY/Clayey SAND: dark brown, slightly moist to dry, dense					
		Tertiary Silverado Formation (Tsi)	Tsi				
	C	@ 4' to 6' - SANDSTONE: white, slightly moist, medium dense, some iron oxide					
B:S75E 25S	D	@ 6' to 8' - SILTSTONE: mottled gray, medium dense to dense, dry to slightly moist, heavily weathered					

GRAPHICAL REPRESENTATION BELOW: Elevation : 1313 ' MSL Surface Slope: 35 deg. Trend: S34W



Total Depth: 8'
Groundwater: None
Backfilled: 9/26/2023

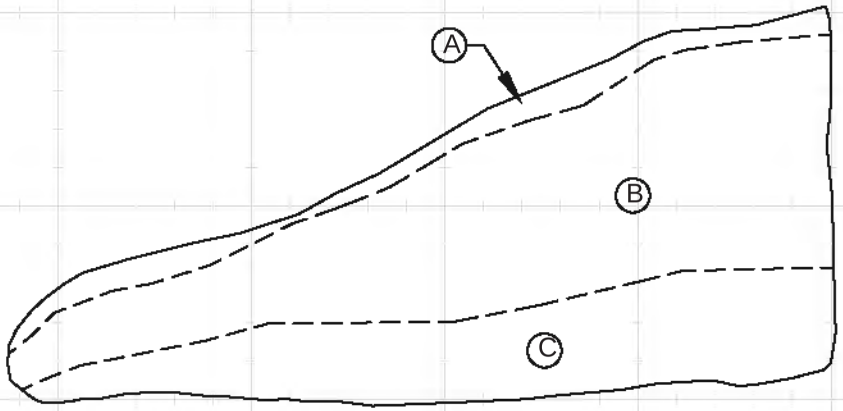
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-9	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: gray, loose, dry, dead grass	Qal				
	B	@ 0.5' to 5' - Sandy CLAY/Clayey SAND: brown to dark brown, dry, very dense, indurated					
		Tertiary Silverado Formation (Tsi)					
S35E 50SW	C	@ 5' to 9' - mottled SANDSTONE and SILTSTONE: gray overall, dry, dense, some rip up clasts of siltstone within sandstone areas, contact blends with unit B, intact contact between sandstone and siltstone beds in rear of trench, attitude taken	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1311 ' MSL Surface Slope: 25 deg. Trend: S46W



Total Depth: 9'
Groundwater: None
Backfilled: 9/26/2023

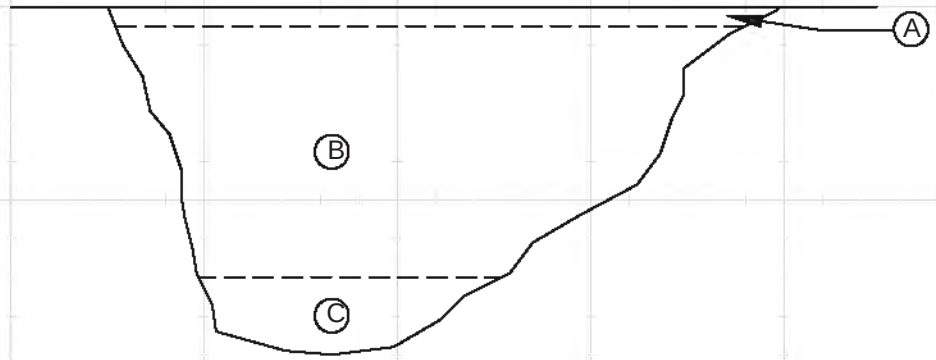
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-10	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: light gray, dry, loose to medium dense, dead grass	Qal				
	B	@ 0.5' to 7' - Clayey SAND: brownish gray, slightly moist, dense, indurated, 2" to 3" subrounded cobbles					
	C	@ 7' to 9' - SAND with trace CLAY, brownish gray, slightly moist, medium dense, 2" to 3" subrounded cobbles					

GRAPHICAL REPRESENTATION BELOW: Elevation : 1291 ' MSL Surface Slope: 0 deg. Trend: N-S



Total Depth: 9'
Groundwater: None
Backfilled: 9/26/2023

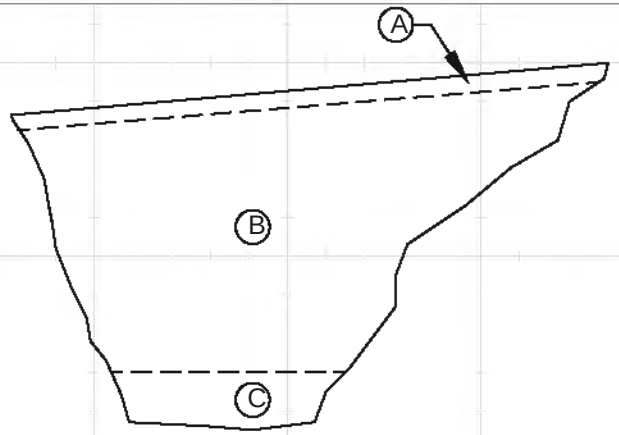
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-11
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:
Equipment: Backhoe	Location: See Geotechnical Map	

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: light gray overall, dry, medium dense	Qal				
	B	@ 0.5' to 8' - Clayey SAND/Sandy CLAY: dark brownish gray, dry, dense, rootlets, indurated					
	C	@ 8' to 9' - Clayey SAND: olive gray, slightly moist, medium dense to dense					

GRAPHICAL REPRESENTATION BELOW: Elevation : 1273 ' MSL Surface Slope: 5 deg. Trend: N60W



Total Depth: 9.5'
Groundwater: None
Backfilled: 9/26/2023

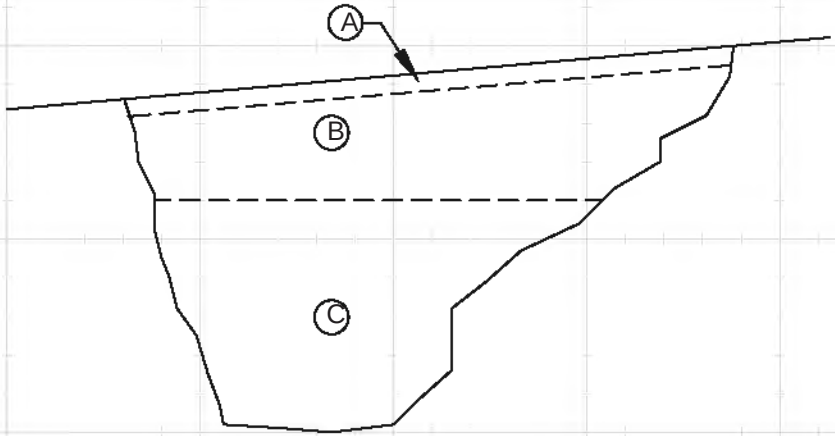
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-12	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Colluvium (Qcol)					
	A	@ 0' to 0.5' - SILT and Sandy CLAY: brownish gray, dry, medium dense to dense, dead grass, rounded 2"-3" cobbles	Qcol				
	B	@ 0.5' to 4' - Clayey SAND: light brown, dry, dense, cracked/desiccated			B-1 @ 4'-10'		
		Tertiary Silverado Formation (Tsi)					
	C	@ 4' to 10' - SANDSTONE: white, dense, dry, some minor root fractures, krotovina, some iron oxide	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1310 ' MSL Surface Slope: 5 deg. Trend: N50W



Total Depth: 10'
Groundwater: None
Backfilled: 9/26/2023

scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-13
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:
Equipment: Backhoe	Location: See Geotechnical Map	

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A	Quaternary Colluvium (Qcol) @ 0' to 4' - Clayey SAND: brownish gray, dry, medium dense, 2"-1' rounded clasts, some angular clasts as well	Qcol				
	B	Tertiary Silverado Formation (Tsi) @ 4' to 9' - Clayey SAND: olive gray to light brown, around 7' changes to heavily fractured claystone/siltstone, contact is undulatory, both units oxidized and very mottled, rip up clasts of siltstone present in clayey sand, all units dense and slightly moist	Tsi		B-1 @ 4' - 9'		

GRAPHICAL REPRESENTATION BELOW: Elevation : 1304 ' MSL Surface Slope: 25 deg. Trend: S15E



Total Depth: 9'
Groundwater: None
Backfilled: 9/26/2023

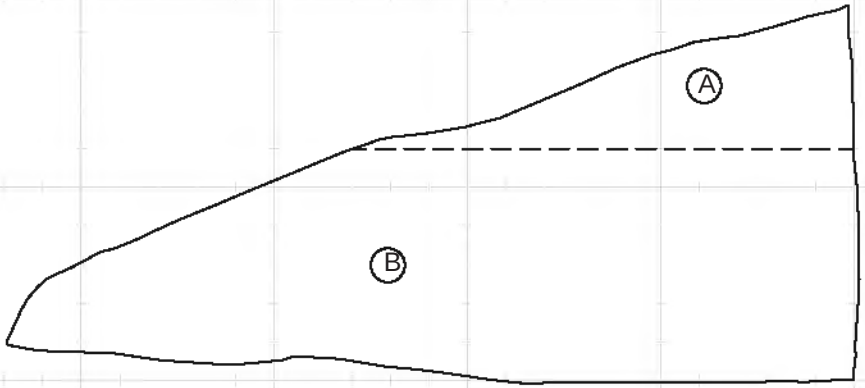
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-14	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A	Quaternary Colluvium (Qcol) @ 0' to 4' - Clayey SAND: grayish brown, medium dense, dry, 2"-3" cobbles	Qcol				
N69E 5SE	B	Tertiary Silverado Formation (Tsi) @ 4' to 10' - SILTSTONE: gray overall with red and black mottle, dense, dry to slightly moist, red banding seems to vaguely outline bedding, bands are not continuous, some sandy patches with gray and red mottle, general bedding attitude	Tsi				

GRAPHICAL REPRESENTATION BELOW: Elevation : 1333 ' MSL Surface Slope: 25 deg. Trend: S10E



Total Depth: 10'
Groundwater: None
Backfilled: 9/26/2023

scale : 1 in = 5 ft

Last Edited: 10/25/2023

Appendix C
Laboratory Test Results

APPENDIX C

Laboratory Testing Procedures and Test Results

The laboratory testing program was formulated towards providing data relating to the relevant engineering properties of the soils with respect to residential construction. Samples considered representative of site conditions were tested in general accordance with American Society for Testing and Materials (ASTM) procedure and/or California Test Methods (CTM), where applicable. The following summary is a brief outline of the test type and a table summarizing the test results.

Moisture and Density Determination Tests: Moisture content (ASTM D2216) and dry density determinations (ASTM D2937) were performed on relatively undisturbed samples obtained from the test borings and/or trenches. The results of these tests are presented in the boring logs. Where applicable, only moisture content was determined from undisturbed or disturbed samples.

Expansion Index: The expansion potential of selected samples was evaluated by the Expansion Index Test, Standard ASTM D4829. Specimens are molded under a given compactive energy to approximately the optimum moisture content and approximately 50 percent saturation or approximately 90 percent relative compaction. The prepared 1-inch-thick by 4-inch-diameter specimens are loaded to an equivalent 144 psf surcharge and are inundated with tap water until volumetric equilibrium is reached. The results of these tests are presented in the table below.

Sample Location	Expansion Index	Expansion Potential*
HS-6 @ 0-5 feet	99	High
TP-3 @ 0-5 feet	71	Medium

* ASTM D4829

Grain Size Distibution/Fines Content: Representative samples were dried, weighed and soaked in water until individual soil particles were separated (per ASTM D421) and then washed on a No. 200 sieve (ASTM D1140). Where applicable, the portion retained on the No. 200 sieve and dried and then sieved on a U.S. Standard brass sieve set in accordance with ASTM D6913 (sieve).

Sample Location	Description	% Passing # 200 Sieve
HS-6 @ 0-5 feet	Sandy Silt	51
HS-8 @ 15 feet	Clay with Sand	73
TP-3 @ 0-5 feet	Sandy Clay	59
BA-1 @ 60 feet	Silty/Clayey Sand	27
BA-2 @ 50 feet	Silty Sand	44

Laboratory Testing Procedures and Test Results

Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined in accordance with ASTM Test Method D4318 for engineering classification of fine-grained material and presented in the table below. The USCS soil classification indicated in the table below is based on the portion of sample passing the No. 40 sieve and may not necessarily be representative of the entire sample. The plot is provided in this Appendix.

Sample Location	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	USCS Soil Classification
HS-2, R-3 @ 7.5 ft	62	30	32	CH
TP-11, B-1 @ 0-5 ft	41	19	22	CL
BA-1, GB-1 @ 52 ft	53	31	22	MH
BA-2, GB-1 @ 42 ft	74	33	41	CH
BA-1B, GB-1 @ 77.5'	62	30	32	CH

Direct Shear: Four direct shear tests were performed on remolded and relatively undisturbed samples, which was soaked for a minimum of 24 hours prior to testing. The samples were tested under various normal loads using a motor-driven, strain-controlled, direct-shear testing apparatus (ASTM D3080). The plot is provided in this Appendix.

Consolidation: One consolidation test was performed per ASTM D2435. A sample (2.4 inches in diameter and 1 inch in height) was placed in a consolidometer and increasing loads were applied. The sample was allowed to consolidate under "double drainage" and total deformation for each loading step was recorded. The percent consolidation for each load step was recorded as the ration of the amount of vertical compression to the original sample height. The consolidation pressure curves are provided in this Appendix.

Maximum Density Tests: The maximum dry density and optimum moisture content of typical materials were determined in accordance with ASTM D1557. The results of these tests are presented in the table below:

Sample Location	Sample Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
HS-7 @ 0-5 feet	Grayish Brown Sandy Clay	113.5	14.0
TP-3 @ 0-5 feet	Grayish Brown Sandy Clay	116.5	12.0

Laboratory Testing Procedures and Test Results

R-value Test: R-value test was performed in general accordance with California Test Method 301. The plot is included in the Appendix.

Sample Location	R-value
HS-6 @ 0-5 ft	<5

Chloride Content: Chloride content was tested in accordance with Caltrans Test Method (CTM) 422. The results are presented below.

Sample Location	Chloride Content, ppm
HS-6 @ 0-5 feet	180
TP-3 @ 0-5 feet	220

Soluble Sulfates: The soluble sulfate contents of selected samples were determined by standard geochemical methods (CTM 417). The soluble sulfate content is used to determine the appropriate cement type and maximum water-cement ratios. The test results are presented in the table below.

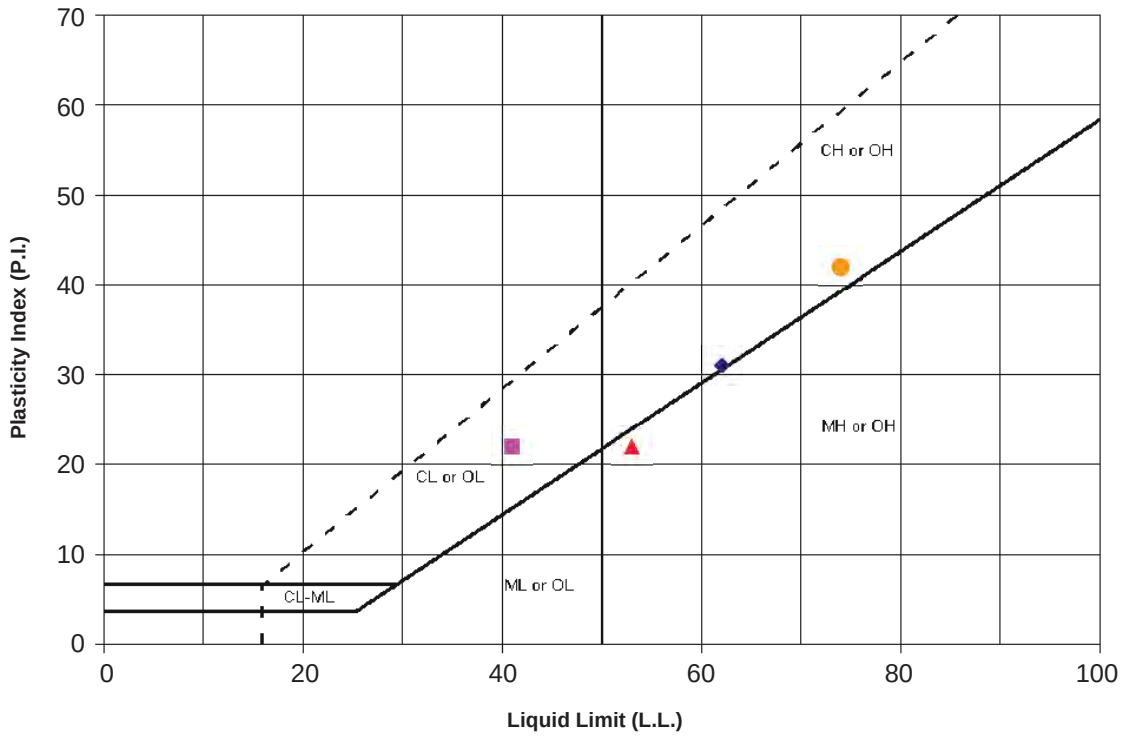
Sample Location	Sulfate Content (ppm)	Sulfate Exposure Class *
HS-6 @ 0-5 feet	86	S0
TP-3 @ 0-5 feet	226	S0

*Based on ACI 318R-14, Table 19.3.1.1

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed in general accordance with CTM 643 and standard geochemical methods. The results are presented in the table below.

Sample Location	pH	Minimum Resistivity (ohms-cm)
HS-6 @ 0-5 feet	7.91	735
TP-3 @ 0-5 feet	6.57	1240

PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS



Symbol	Location.:	Sample No.:	Depth (ft)	Passing No. 200 Sieve (%)	Liquid Limit (%) LL	Plastic Limit (%) PL	Plasticity Index (%) PI	USCS
◆	HS-2	R-3	7.5'	-	62	30	32	CH
■	TP-11	B-1	0-5'	-	41	19	22	CL
▲	BA-1	GB-1	52'	-	53	31	22	MH
●	BA-2	GB-1	42'	-	74	33	41	CH

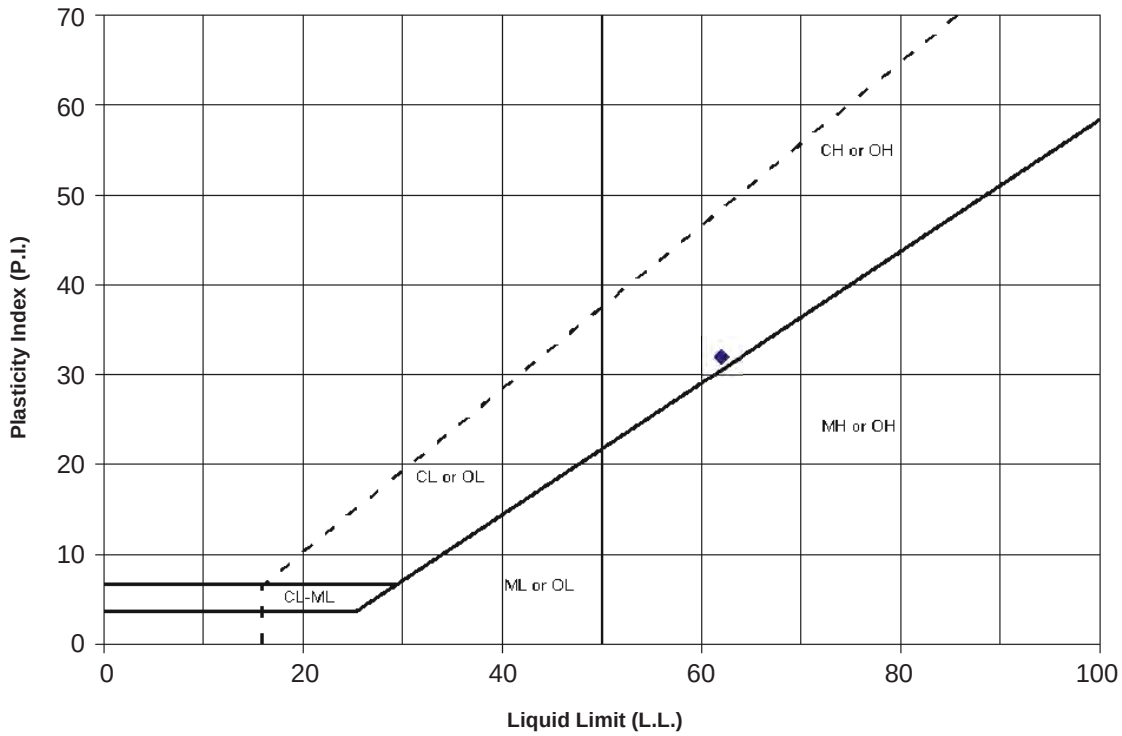
LGC Geotechnical, Inc.

ATTERBERG LIMITS
(ASTM D 4318)

Project Number: 23160-01
Date: Oct-23

EIP Lake Elsinore

PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS



Symbol	Location.:	Sample No.:	Depth (ft)	Passing No. 200 Sieve (%)	Liquid Limit (%) LL	Plastic Limit (%) PL	Plasticity Index (%) PI	USCS
◆	BA-1B	GB-1	77.5'	-	62	30	32	CH

LGC Geotechnical, Inc.

ATTERBERG LIMITS
(ASTM D 4318)

Project Number: 23160-01
Date: Jan-24

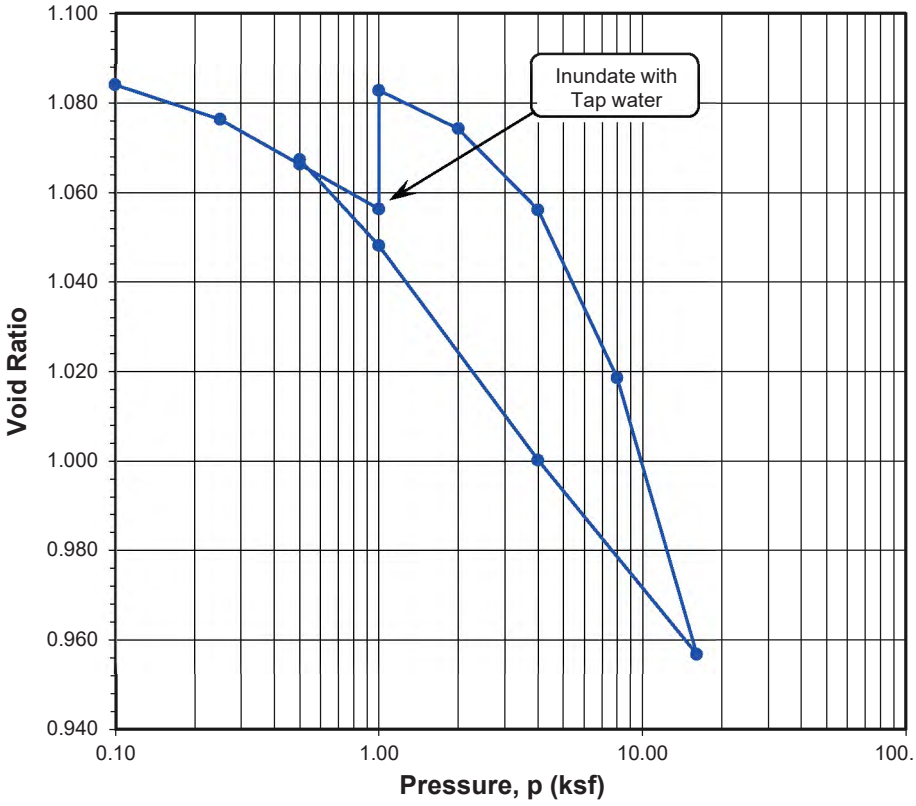
Baker St, Lake Elsinore

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name:	EIP Lake Elsinore	Tested By: GB/JD	Date: 10/11/23
Project No.:	23160-01	Checked By: J. Ward	Date: 10/20/23
Boring No.:	HS-2	Depth (ft.): 7.5	
Sample No.:	R-3	Sample Type: Ring	
Soil Identification:	Yellowish brown lean clay (CL)		

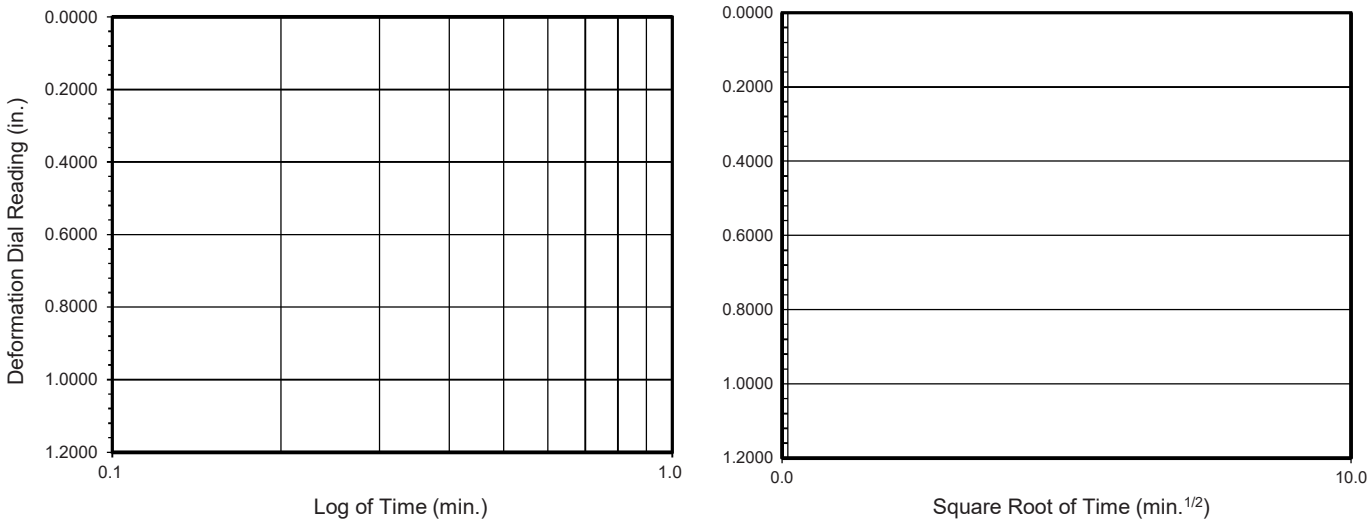
Sample Diameter (in.):	2.415
Sample Thickness (in.):	1.000
Weight of Sample + ring (g):	178.31
Weight of Ring (g):	45.07
Height after consol. (in.):	0.9913
Before Test	
Wt. of Wet Sample+Cont. (g):	155.80
Wt. of Dry Sample+Cont. (g):	129.30
Weight of Container (g):	57.87
Initial Moisture Content (%)	37.1
Initial Dry Density (pcf)	80.8
Initial Saturation (%):	92
Initial Vertical Reading (in.)	0.0781
After Test	
Wt. of Wet Sample+Cont. (g):	236.81
Wt. of Dry Sample+Cont. (g):	199.10
Weight of Container (g):	57.18
Final Moisture Content (%)	38.94
Final Dry Density (pcf):	81.3
Final Saturation (%):	98
Final Vertical Reading (in.)	0.0905
Specific Gravity (assumed):	2.70
Water Density (pcf):	62.43

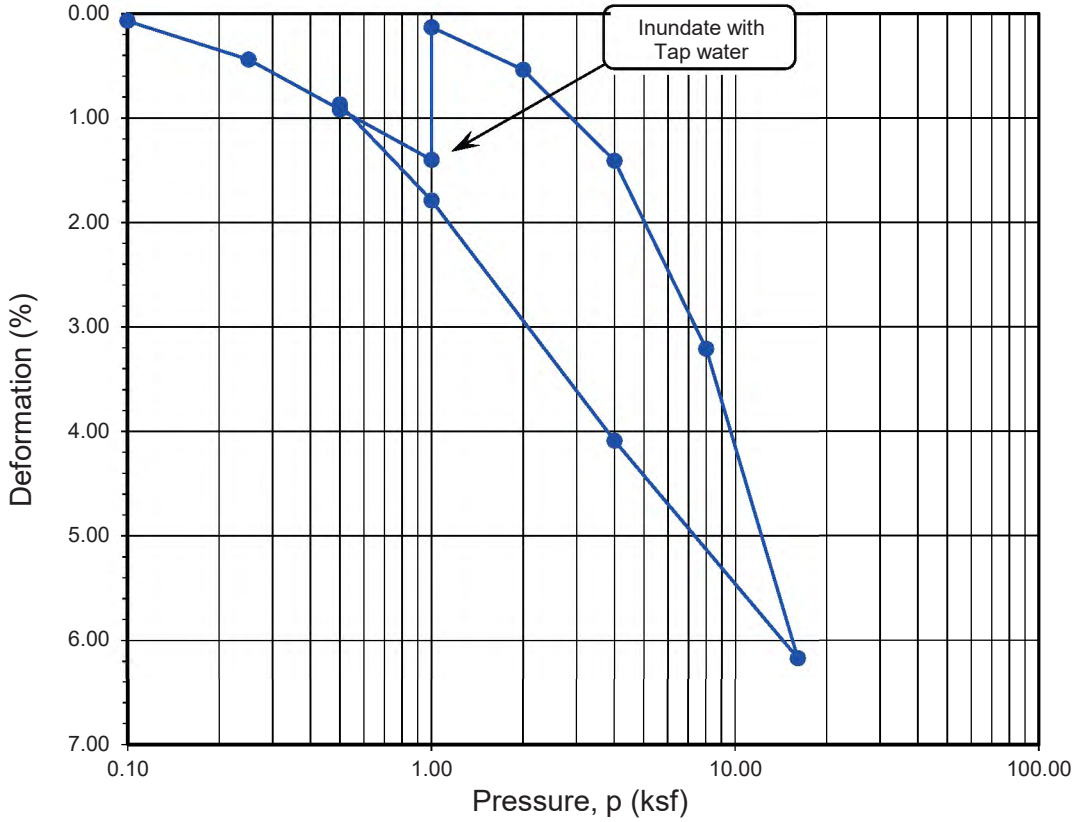


Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.10	0.0788	0.9993	0.00	0.07	1.084	0.07
0.25	0.0829	0.9952	0.04	0.48	1.076	0.44
0.50	0.0882	0.9899	0.09	1.01	1.066	0.92
1.00	0.0937	0.9844	0.16	1.56	1.056	1.40
1.00	0.0810	0.9971	0.16	0.29	1.083	0.13
2.00	0.0859	0.9922	0.24	0.78	1.074	0.54
4.00	0.0955	0.9826	0.33	1.74	1.056	1.41
8.00	0.1147	0.9634	0.45	3.66	1.019	3.21
16.00	0.1455	0.9326	0.57	6.74	0.957	6.17
4.00	0.1237	0.9544	0.47	4.56	1.000	4.09
1.00	0.1000	0.9781	0.40	2.19	1.048	1.79
0.50	0.0905	0.9876	0.37	1.24	1.067	0.87

Time Readings				
Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)

Time Readings





Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-2	**R-3**	**7.5**	**37.1**	**38.9**	**80.8**	**81.3**	**1.086**	**1.067**	**92**	**98**

Soil Identification: Yellowish brown lean clay (CL)

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 23160-01

EIP Lake Elsinore

10-23

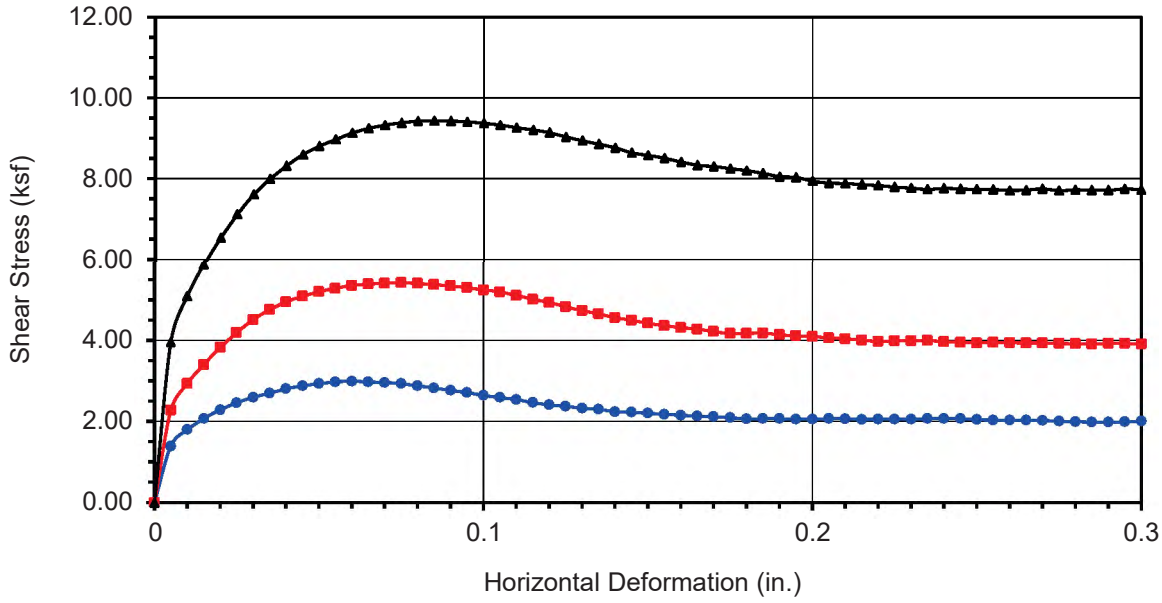
DIRECT SHEAR TEST

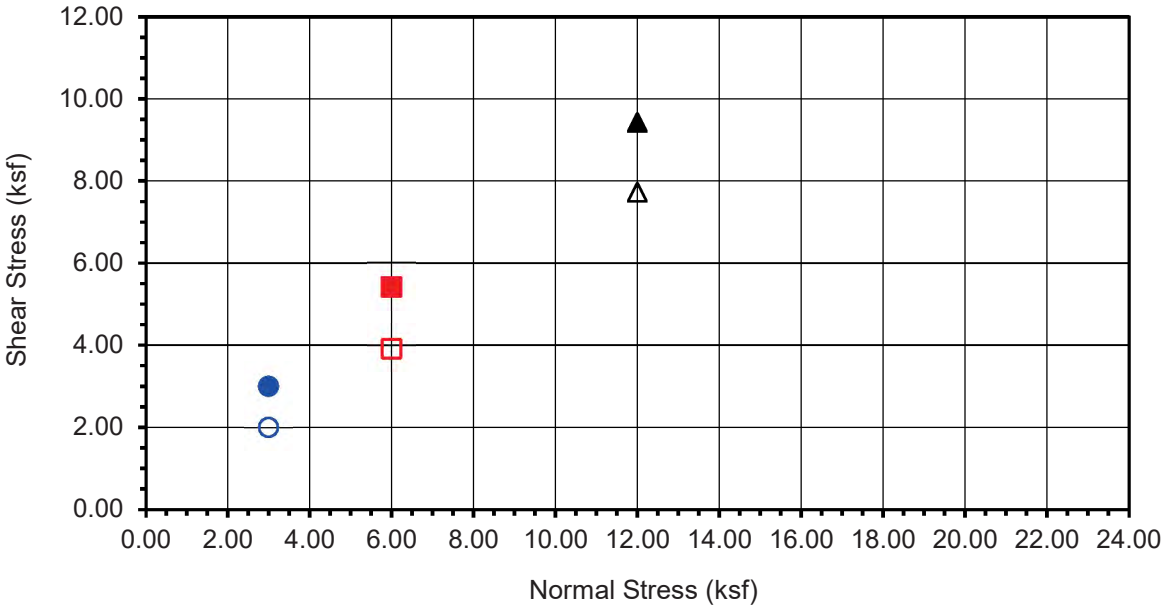
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/17/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	BA-1	Sample Type:	Ring		
Sample No.:	R-7	Depth (ft.):	60.0		

Soil Identification: Olive gray silty, clayey sand (SC-SM)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	199.94	202.18	207.73
Weight of Ring(gm):	44.67	45.19	44.54
Before Shearing			
Weight of Wet Sample+Cont.(gm):	198.81	198.81	198.81
Weight of Dry Sample+Cont.(gm):	187.08	187.08	187.08
Weight of Container(gm):	38.30	38.30	38.30
Vertical Rdg.(in): Initial	0.2501	0.2473	0.0000
Vertical Rdg.(in): Final	0.2607	0.2660	-0.0308
After Shearing			
Weight of Wet Sample+Cont.(gm):	201.66	225.21	224.54
Weight of Dry Sample+Cont.(gm):	180.76	204.98	205.31
Weight of Container(gm):	39.72	61.47	58.54
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**BA-1**
Sample No.	**R-7**
Depth (ft)	**60**

Sample Type:

Ring

Soil Identification:

Olive gray silty, clayey sand (SC-SM)

Normal Stress (kip/ft²)	3.000	6.000	12.000
Peak Shear Stress (kip/ft²)	● 2.993	■ 5.423	▲ 9.434
Shear Stress @ End of Test (ksf)	○ 2.009	□ 3.914	△ 7.727
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	7.88	7.88	7.88
Dry Density (pcf)	119.7	121.0	125.8
Saturation (%)	52.1	54.2	62.6
Soil Height Before Shearing (in.)	0.9894	0.9813	0.9692
Final Moisture Content (%)	14.8	14.1	13.1

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

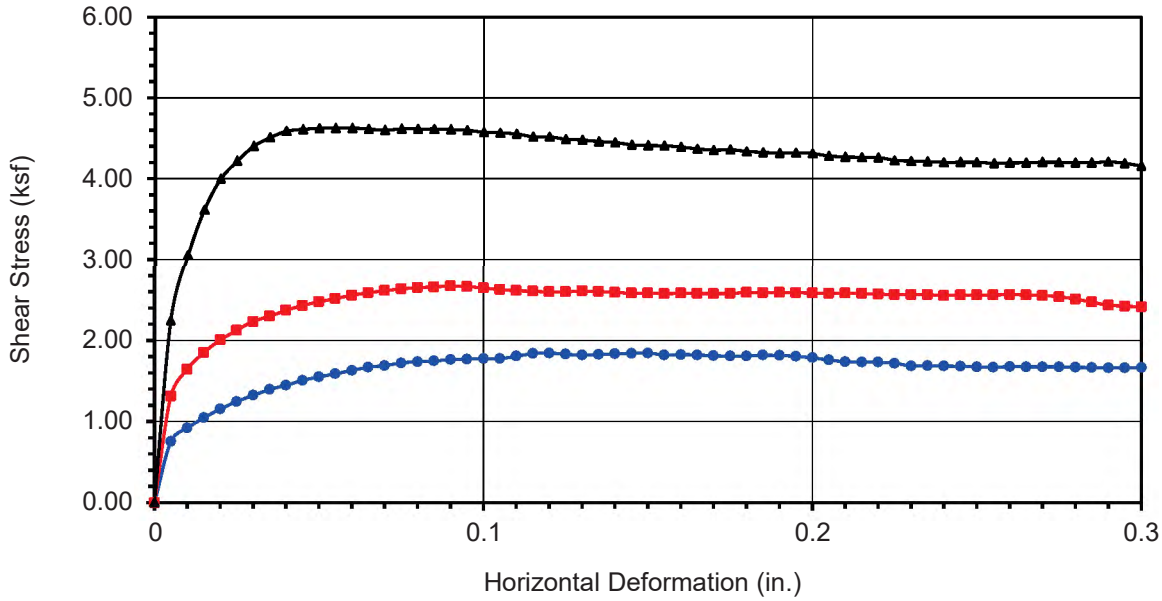
DIRECT SHEAR TEST

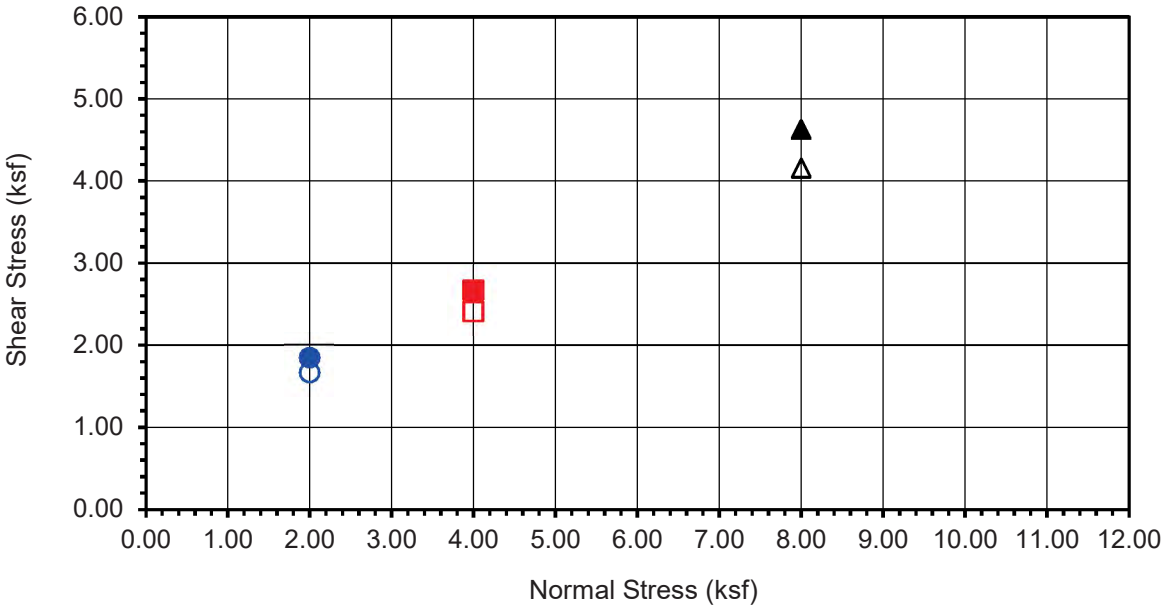
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/18/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	BA-2	Sample Type:	Ring		
Sample No.:	R-6	Depth (ft.):	50.0		

Soil Identification: Olive lean clay with sand (CL)s

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	187.72	196.06	200.28
Weight of Ring(gm):	43.30	45.54	45.73
Before Shearing			
Weight of Wet Sample+Cont.(gm):	158.08	158.08	158.08
Weight of Dry Sample+Cont.(gm):	149.98	149.98	149.98
Weight of Container(gm):	60.38	60.38	60.38
Vertical Rdg.(in): Initial	0.0000	0.2446	0.2771
Vertical Rdg.(in): Final	-0.0124	0.2644	0.3048
After Shearing			
Weight of Wet Sample+Cont.(gm):	223.40	220.51	191.08
Weight of Dry Sample+Cont.(gm):	202.49	198.99	169.49
Weight of Container(gm):	72.44	64.76	36.58
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**BA-2**
Sample No.	**R-6**
Depth (ft)	**50**

Sample Type:

Ring

Soil Identification:

Olive lean clay with sand (CL)s

Normal Stress (kip/ft²)	2.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 1.845	■ 2.672	▲ 4.628
Shear Stress @ End of Test (ksf)	○ 1.666	□ 2.414	△ 4.159
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	9.04	9.04	9.04
Dry Density (pcf)	110.2	114.8	117.9
Saturation (%)	46.0	52.1	56.8
Soil Height Before Shearing (in.)	0.9876	0.9802	0.9723
Final Moisture Content (%)	16.1	16.0	16.2

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

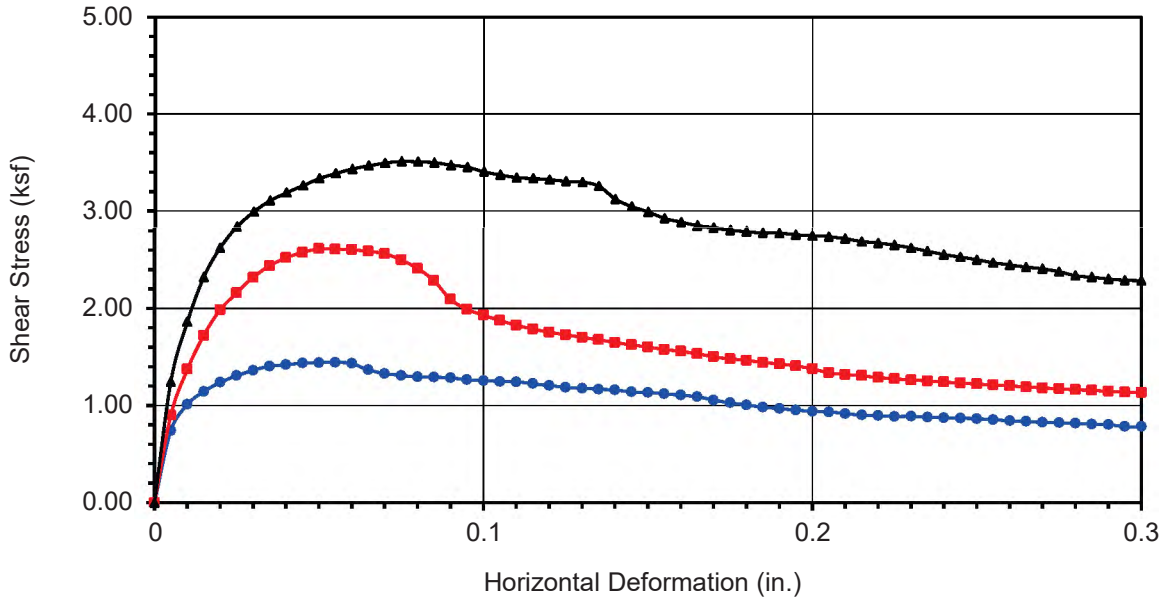
DIRECT SHEAR TEST

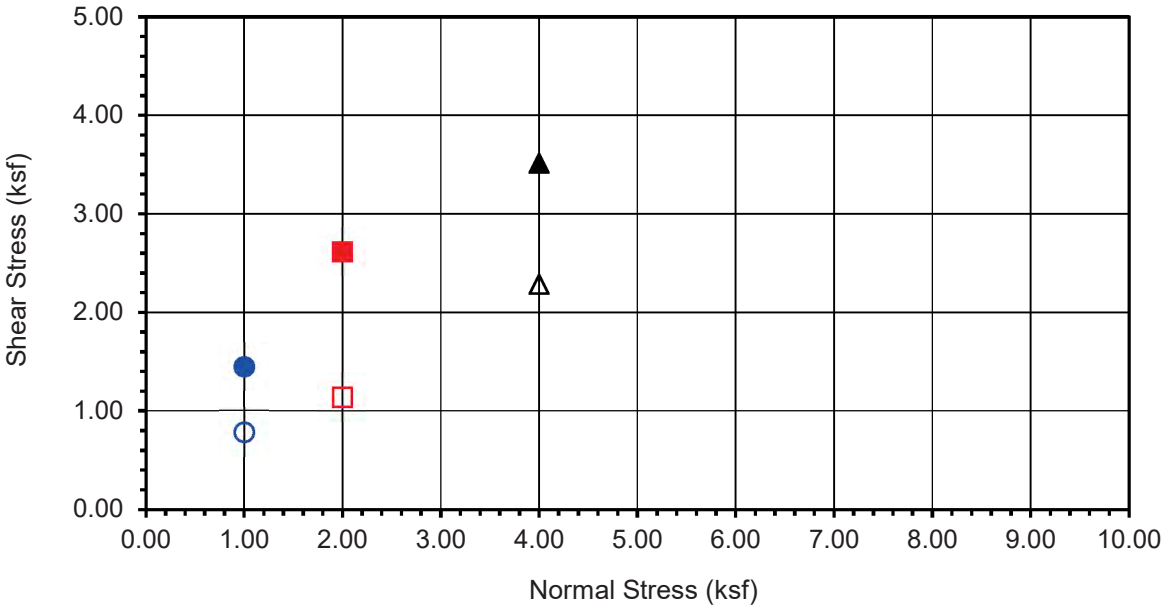
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/17/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	HS-8	Sample Type:	Ring		
Sample No.:	R-5	Depth (ft.):	15.0		

Soil Identification: Strong brown lean clay (CL)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	191.30	193.56	199.29
Weight of Ring(gm):	45.11	43.65	46.57
Before Shearing			
Weight of Wet Sample+Cont.(gm):	171.02	171.02	171.02
Weight of Dry Sample+Cont.(gm):	148.22	148.22	148.22
Weight of Container(gm):	38.48	38.48	38.48
Vertical Rdg.(in): Initial	0.0000	0.2387	0.2494
Vertical Rdg.(in): Final	0.0079	0.2342	0.2566
After Shearing			
Weight of Wet Sample+Cont.(gm):	206.19	217.29	222.68
Weight of Dry Sample+Cont.(gm):	175.08	187.36	192.76
Weight of Container(gm):	55.99	64.16	68.09
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**HS-8**
Sample No.	**R-5**
Depth (ft)	**15**
Sample Type:	
Ring	
Soil Identification:	
Strong brown lean clay (CL)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.446	■ 2.616	▲ 3.512
Shear Stress @ End of Test (ksf)	○ 0.783	□ 1.135	△ 2.286
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	20.78	20.78	20.78
Dry Density (pcf)	100.7	103.2	105.2
Saturation (%)	83.2	88.6	93.0
Soil Height Before Shearing (in.)	1.0079	1.0045	0.9928
Final Moisture Content (%)	26.1	24.3	24.0

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

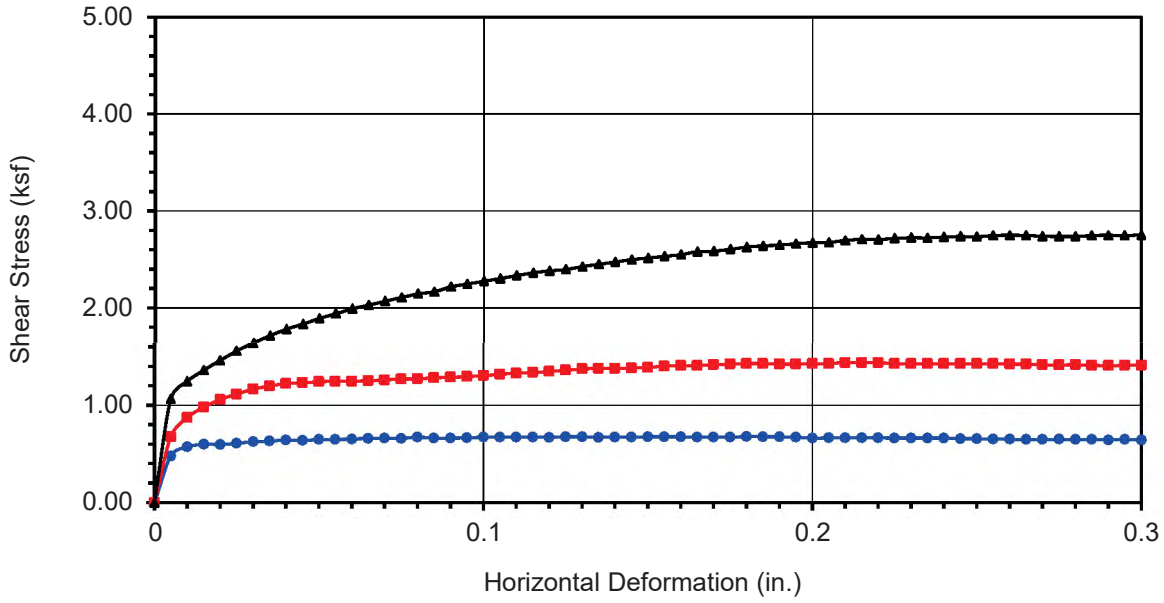
DIRECT SHEAR TEST

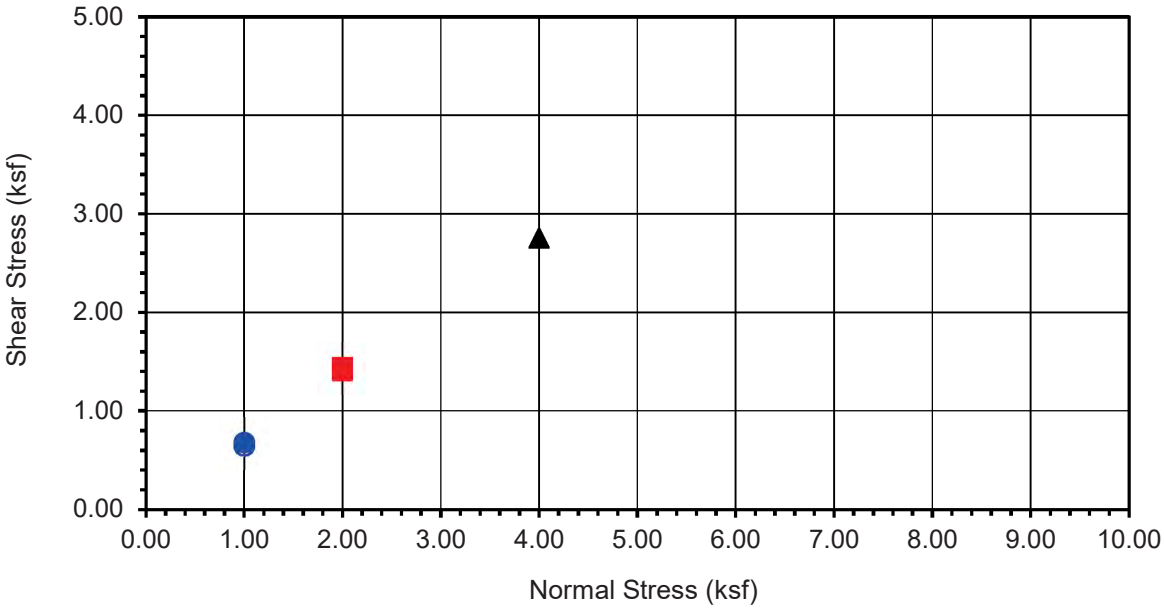
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/16/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	TP-3	Sample Type:	90% Remold		
Sample No.:	B-1	Depth (ft.):	0-5		

Soil Identification: Grayish brown sandy lean clay s(CL)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	187.13	187.27	186.75
Weight of Ring(gm):	45.47	45.31	44.53
Before Shearing			
Weight of Wet Sample+Cont.(gm):	167.70	167.70	167.70
Weight of Dry Sample+Cont.(gm):	155.43	155.43	155.43
Weight of Container(gm):	55.15	55.15	55.15
Vertical Rdg.(in): Initial	0.2666	0.2294	0.0000
Vertical Rdg.(in): Final	0.2597	0.2287	-0.0232
After Shearing			
Weight of Wet Sample+Cont.(gm):	211.00	208.20	209.21
Weight of Dry Sample+Cont.(gm):	184.84	184.00	187.16
Weight of Container(gm):	59.18	59.15	61.49
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**TP-3**
Sample No.	**B-1**
Depth (ft)	**0-5**
Sample Type: 90% Remold	
Soil Identification: Grayish brown sandy lean clay s(CL)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 0.679	■ 1.440	▲ 2.754
Shear Stress @ End of Test (ksf)	○ 0.644	□ 1.412	△ 2.754
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	12.24	12.24	12.24
Dry Density (pcf)	105.0	105.2	105.4
Saturation (%)	54.5	54.8	55.1
Soil Height Before Shearing (in.)	1.0069	1.0007	0.9768
Final Moisture Content (%)	20.8	19.4	17.5

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

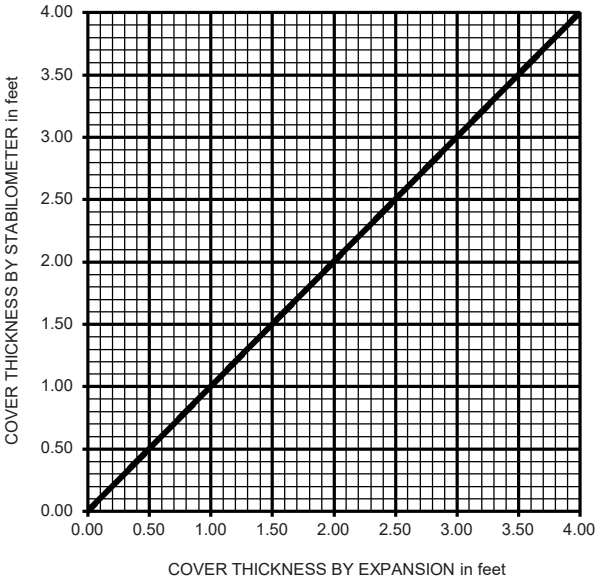
R-VALUE TEST RESULTS
DOT CA Test 301

PROJECT NAME:	EIP Lake Elsinore	PROJECT NUMBER:	23160-01
BORING NUMBER:	HS-6	DEPTH (FT.):	0-5
SAMPLE NUMBER:	B-1	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Olive brown lean clay (CL)	DATE COMPLETED:	10/12/2023

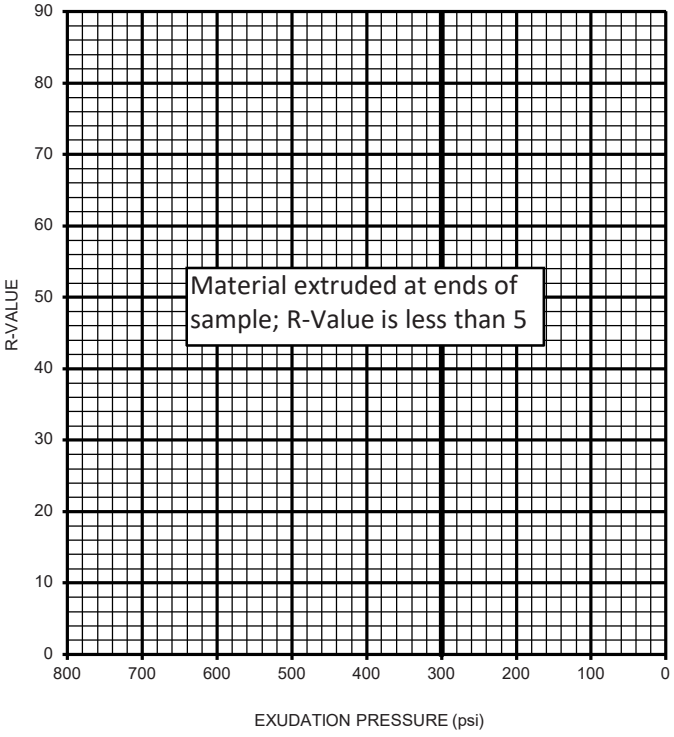
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %			
HEIGHT OF SAMPLE, Inches			
DRY DENSITY, pcf			
COMPACTOR PRESSURE, psi			
EXUDATION PRESSURE, psi			
EXPANSION, Inches x 10exp-4			
STABILITY Ph 2,000 lbs (160 psi)			
TURNS DISPLACEMENT			
R-VALUE UNCORRECTED	N/A	N/A	N/A
R-VALUE CORRECTED	N/A	N/A	N/A

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.	N/A	N/A	N/A
EXPANSION PRESSURE THICKNESS, ft.	N/A	N/A	N/A

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	N/A
R-VALUE BY EXUDATION:	N/A
EQUILIBRIUM R-VALUE:	< 5

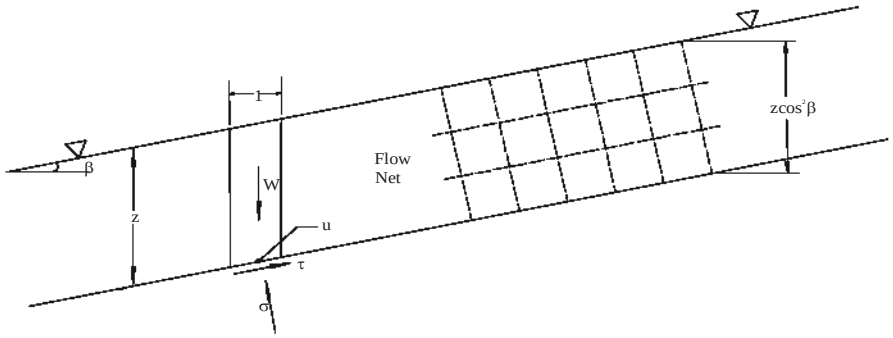
Appendix D
Slope Stability Analysis

Summary of Slope Stability Analysis

Cross-Section	Factor of Safety	Description
A-A'	2.13	Static (Rotational)
	1.37	Seismic - 117A (Rotational)
B-B'	1.94	Static (Block)
	1.05	Seismic - 117A (Block)
	1.76	Static (Rotational)
	1.22	Seismic - 117A (Rotational)
C-C'	1.92	Static (Block)
	1.04	Seismic-117A (Block)

MANUFACTURED 3H:1V FILL SLOPE

INFINITE SLOPE CONDITION



ASSUMPTION

Depth of Saturation (ft), z (and steady seepage parallel to slope face)	4

SOIL PARAMETERS

Angle of Internal Friction, ϕ	33
Cohesion (psf), c	350
Saturated Unit Weight of Soil (pcf), γ_{sat}	120
Unit Weight of Water (pcf), γ_w	62.4
Slope Angle (2H:1V), β	26.6

CALCULATIONS

Normal Stress Along Failure Plane

$$\sigma = \gamma_{sat} * z * \cos^2 \beta \qquad \sigma = 383.766 \text{ lb/ft}^2$$

Shear Stress Along Failure Plane

$$\tau_d = \gamma_{sat} * z * \sin \beta * \cos \beta \qquad \tau_d = 192.176 \text{ lb/ft}^2$$

Pore Pressure Along Failure Plane

$$u = \gamma_w * z * \cos^2 \beta \qquad u = 199.558 \text{ lb/ft}^2$$

Resisting Shear Stress Along Failure Plane

$$\tau_r = c + (\sigma - u) \tan \phi \qquad \tau_r = 469.626 \text{ lb/ft}^2$$

FACTOR OF SAFETY

$$\mathbf{FS} = \frac{\tau_r}{\tau_d}$$

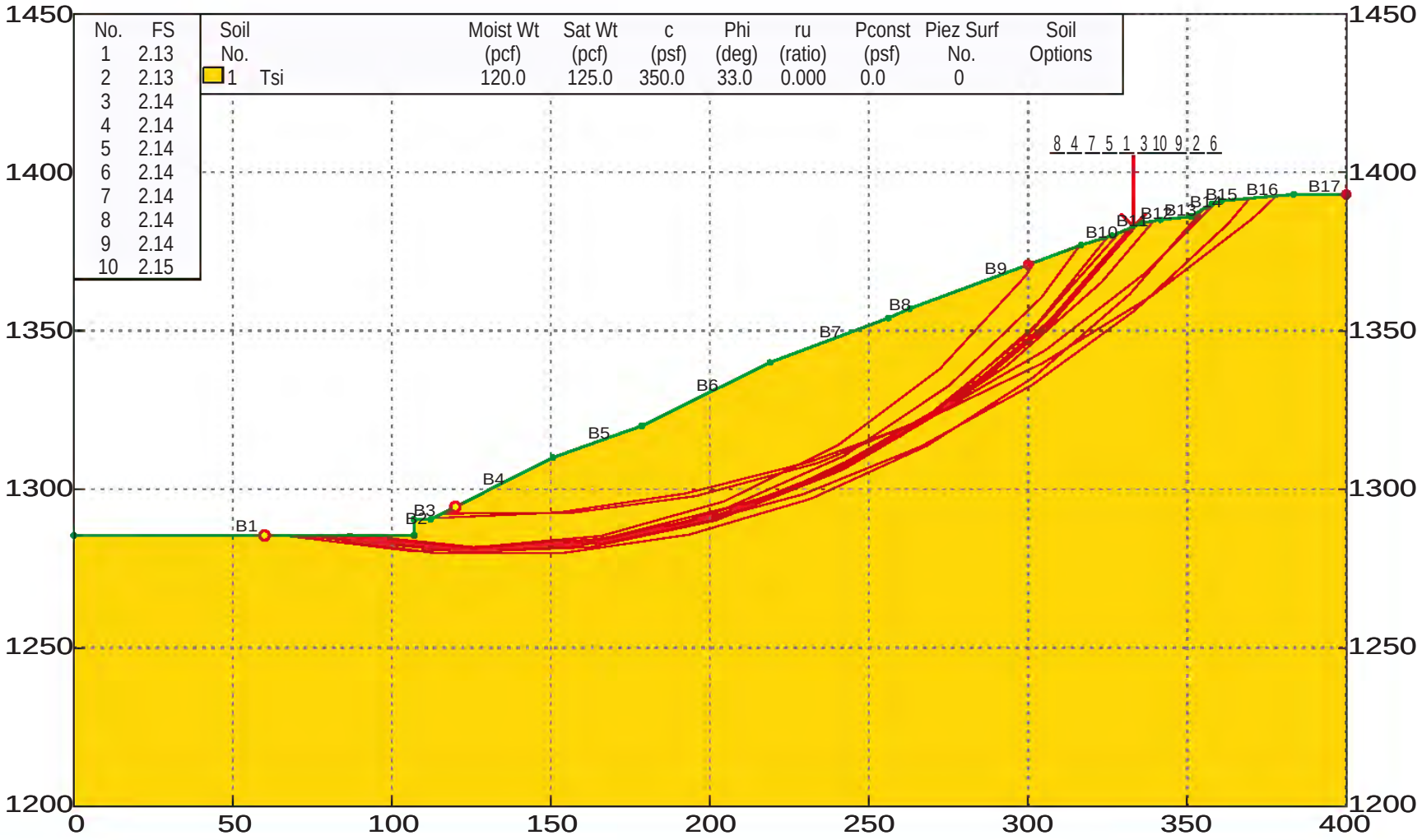
FS = 2.44

LGC Geotechnical, Inc.	SURFICIAL STABILITY	Project Name : Project Number : Designed/Checked : Date:	Baker Street 23160-01 RLD November 2023

EIP - Lake Elsinore
Section A-A' - Rotational (Static)

LGC Geotechnical / BPP

\Section A - Static - Rotational.gsd



GEOSTASE FS = 2.13

Simplified Bishop Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Static - Rotational.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Static - Rotational.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section A-A' - Rotational (Static)

BOUNDARY DATA

17 Surface Boundaries

17 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1285.400	107.000	1285.400	1
2	107.000	1285.400	107.000	1290.500	1
3	107.000	1290.500	112.200	1290.500	1
4	112.200	1290.500	150.600	1310.000	1
5	150.600	1310.000	178.600	1320.000	1
6	178.600	1320.000	218.900	1340.000	1
7	218.900	1340.000	256.100	1354.000	1
8	256.100	1354.000	262.800	1357.000	1
9	262.800	1357.000	316.600	1377.000	1
10	316.600	1377.000	326.400	1380.000	1
11	326.400	1380.000	336.000	1384.000	1
12	336.000	1384.000	341.600	1385.000	1
13	341.600	1385.000	351.100	1386.000	1
14	351.100	1386.000	357.700	1390.000	1
15	357.700	1390.000	360.800	1391.000	1
16	360.800	1391.000	383.500	1393.000	1
17	383.500	1393.000	400.000	1393.000	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1200.000(ft)

MOHR-COULOMB SOIL PARAMETERS

1 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 Tsi	120.0	125.0	350.00	33.00	0.000	0.0	0	0

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load Stress No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress Deflection (psf) (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000 0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 60.00(ft)
and X = 120.00(ft)

Each Surface Enters within a Range Between X = 300.00(ft)
and X = 400.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1200.00(ft)

Specified Maximum Radius = 10000.000(ft)

40.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 4.084 FS Min = 2.130 FS Ave = 2.805

Standard Deviation = 0.455 Coefficient of Variation = 16.22 %

Critical Surface is Sequence Number 432 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 131.553149(ft) ; Y = 1532.002283(ft); and Radius = 250.795106(ft)

Circular Trial Failure Surface Generated With 8 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	85.886	1285.400
2	125.673	1281.276
3	165.609	1283.530
4	204.679	1292.105
5	241.889	1306.782
6	276.292	1327.188
7	307.014	1352.805
8	333.113	1382.797

Factor Of Safety For The Critical or Specified Surface = 2.130

Table 1 - Geometry Data on the 53 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	5.28	0.27	88.53	1285.13	1285.40	-5.92	0.00	5.31
2	5.28	0.82	93.80	1284.58	1285.40	-5.92	0.00	5.31
3	5.28	1.37	99.08	1284.03	1285.40	-5.92	0.00	5.31
4	5.28	1.91	104.36	1283.49	1285.40	-5.92	0.00	5.31
5	2.60	7.42	108.30	1283.08	1290.50	-5.92	0.00	

2.61							
6	2.60	7.69	110.90	1282.81	1290.50	-5.92	0.00
2.61							
7	4.49	9.20	114.45	1282.44	1291.64	-5.92	26.92
4.51							
8	4.49	11.95	118.94	1281.97	1293.92	-5.92	26.92
4.51							
9	4.49	14.69	123.43	1281.51	1296.20	-5.92	26.92
4.51							
10	4.99	17.19	128.17	1281.42	1298.61	3.23	26.92
4.99							
11	4.99	19.44	133.15	1281.70	1301.14	3.23	26.92
4.99							
12	4.99	21.69	138.14	1281.98	1303.67	3.23	26.92
4.99							
13	4.99	23.94	143.12	1282.26	1306.20	3.23	26.92
4.99							
14	4.99	26.19	148.11	1282.54	1308.73	3.23	26.92
4.99							
15	5.00	28.07	153.10	1282.82	1310.89	3.23	19.65
5.01							
16	5.00	29.57	158.10	1283.11	1312.68	3.23	19.65
5.01							
17	5.00	31.08	163.11	1283.39	1314.47	3.23	19.65
5.01							
18	4.33	32.13	167.77	1284.01	1316.13	12.38	19.65
4.43							
19	4.33	32.72	172.10	1284.96	1317.68	12.38	19.65
4.43							
20	4.33	33.32	176.43	1285.91	1319.23	12.38	19.65
4.43							
21	5.22	34.34	181.21	1286.95	1321.29	12.38	26.39
5.34							
22	5.22	35.78	186.42	1288.10	1323.88	12.38	26.39
5.34							
23	5.22	37.23	191.64	1289.24	1326.47	12.38	26.39
5.34							
24	5.22	38.67	196.86	1290.39	1329.06	12.38	26.39
5.34							
25	5.22	40.12	202.07	1291.53	1331.65	12.38	26.39
5.34							
26	4.74	41.08	207.05	1293.04	1334.12	21.53	26.39
5.10							
27	4.74	41.56	211.79	1294.91	1336.47	21.53	26.39
5.10							
28	4.74	42.04	216.53	1296.78	1338.82	21.53	26.39
5.10							
29	2.90	42.26	220.35	1298.29	1340.55	21.53	20.62
3.12							
30	2.90	42.21	223.25	1299.43	1341.64	21.53	20.62

3.12							
31	5.73	42.13	227.56	1301.13	1343.26	21.53	20.62
6.16							
32	5.73	42.03	233.29	1303.39	1345.42	21.53	20.62
6.16							
33	5.73	41.92	239.02	1305.65	1347.57	21.53	20.62
6.16							
34	4.74	41.36	244.26	1308.19	1349.54	30.67	20.62
5.51							
35	4.74	40.33	248.99	1311.00	1351.33	30.67	20.62
5.51							
36	4.74	39.30	253.73	1313.81	1353.11	30.67	20.62
5.51							
37	3.35	38.55	257.78	1316.20	1354.75	30.67	24.12
3.89							
38	3.35	38.06	261.12	1318.19	1356.25	30.67	24.12
3.89							
39	4.50	37.32	265.05	1320.52	1357.84	30.67	20.39
5.23							
40	4.50	36.32	269.55	1323.19	1359.51	30.67	20.39
5.23							
41	4.50	35.33	274.04	1325.85	1361.18	30.67	20.39
5.23							
42	4.61	33.76	278.60	1329.11	1362.87	39.82	20.39
6.00							
43	5.22	31.49	283.51	1333.21	1364.70	39.82	20.39
6.80							
44	5.22	29.08	288.73	1337.56	1366.64	39.82	20.39
6.80							
45	5.22	26.66	293.96	1341.92	1368.58	39.82	20.39
6.80							
46	5.22	24.25	299.18	1346.27	1370.52	39.82	20.39
6.80							
47	5.22	21.84	304.40	1350.63	1372.47	39.82	20.39
6.80							
48	4.79	18.77	309.41	1355.56	1374.33	48.97	20.39
7.30							
49	4.79	15.04	314.20	1361.07	1376.11	48.97	20.39
7.30							
50	4.90	11.11	319.05	1366.64	1377.75	48.97	17.02
7.46							
51	4.90	6.98	323.95	1372.27	1379.25	48.97	17.02
7.46							
52	3.36	3.69	328.08	1377.01	1380.70	48.97	22.62
5.11							
53	3.36	1.23	331.43	1380.87	1382.10	48.97	22.62
5.11							

Table 2 - Force Data On The 53 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	173.3	0.0	0.0	0.0	0.0	0.0
2	519.8	0.0	0.0	0.0	0.0	0.0
3	866.4	0.0	0.0	0.0	0.0	0.0
4	1212.9	0.0	0.0	0.0	0.0	0.0
5	2316.0	0.0	0.0	0.0	0.0	0.0
6	2400.1	0.0	0.0	0.0	0.0	0.0
7	4958.2	0.0	0.0	0.0	0.0	0.0
8	6438.1	0.0	0.0	0.0	0.0	0.0
9	7917.9	0.0	0.0	0.0	0.0	0.0
10	10284.4	0.0	0.0	0.0	0.0	0.0
11	11630.6	0.0	0.0	0.0	0.0	0.0
12	12976.9	0.0	0.0	0.0	0.0	0.0
13	14323.1	0.0	0.0	0.0	0.0	0.0
14	15669.4	0.0	0.0	0.0	0.0	0.0
15	16851.8	0.0	0.0	0.0	0.0	0.0
16	17755.0	0.0	0.0	0.0	0.0	0.0
17	18658.2	0.0	0.0	0.0	0.0	0.0
18	16694.9	0.0	0.0	0.0	0.0	0.0
19	17004.7	0.0	0.0	0.0	0.0	0.0
20	17314.5	0.0	0.0	0.0	0.0	0.0
21	21493.9	0.0	0.0	0.0	0.0	0.0
22	22397.6	0.0	0.0	0.0	0.0	0.0
23	23301.2	0.0	0.0	0.0	0.0	0.0
24	24204.9	0.0	0.0	0.0	0.0	0.0
25	25108.6	0.0	0.0	0.0	0.0	0.0
26	23366.9	0.0	0.0	0.0	0.0	0.0
27	23641.5	0.0	0.0	0.0	0.0	0.0
28	23916.1	0.0	0.0	0.0	0.0	0.0
29	14706.3	0.0	0.0	0.0	0.0	0.0
30	14688.1	0.0	0.0	0.0	0.0	0.0
31	28966.6	0.0	0.0	0.0	0.0	0.0
32	28895.3	0.0	0.0	0.0	0.0	0.0
33	28824.0	0.0	0.0	0.0	0.0	0.0
34	23508.1	0.0	0.0	0.0	0.0	0.0
35	22924.4	0.0	0.0	0.0	0.0	0.0
36	22340.6	0.0	0.0	0.0	0.0	0.0
37	15495.2	0.0	0.0	0.0	0.0	0.0
38	15299.4	0.0	0.0	0.0	0.0	0.0
39	20139.8	0.0	0.0	0.0	0.0	0.0
40	19602.4	0.0	0.0	0.0	0.0	0.0
41	19065.0	0.0	0.0	0.0	0.0	0.0
42	18667.6	0.0	0.0	0.0	0.0	0.0
43	19736.8	0.0	0.0	0.0	0.0	0.0

44	18224.3	0.0	0.0	0.0	0.0	0.0
45	16711.8	0.0	0.0	0.0	0.0	0.0
46	15199.2	0.0	0.0	0.0	0.0	0.0
47	13686.7	0.0	0.0	0.0	0.0	0.0
48	10795.1	0.0	0.0	0.0	0.0	0.0
49	8651.8	0.0	0.0	0.0	0.0	0.0
50	6534.8	0.0	0.0	0.0	0.0	0.0
51	4105.8	0.0	0.0	0.0	0.0	0.0
52	1485.4	0.0	0.0	0.0	0.0	0.0
53	495.1	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 792146.76(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 792146.76(lbs)

TOTAL AREA OF SLIDING MASS = 6601.22(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 53 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	350.00	33.00	
2	1	350.00	33.00	
3	1	350.00	33.00	
4	1	350.00	33.00	
5	1	350.00	33.00	
6	1	350.00	33.00	
7	1	350.00	33.00	
8	1	350.00	33.00	
9	1	350.00	33.00	
10	1	350.00	33.00	
11	1	350.00	33.00	
12	1	350.00	33.00	
13	1	350.00	33.00	
14	1	350.00	33.00	
15	1	350.00	33.00	
16	1	350.00	33.00	
17	1	350.00	33.00	
18	1	350.00	33.00	
19	1	350.00	33.00	
20	1	350.00	33.00	
21	1	350.00	33.00	
22	1	350.00	33.00	
23	1	350.00	33.00	
24	1	350.00	33.00	
25	1	350.00	33.00	
26	1	350.00	33.00	
27	1	350.00	33.00	
28	1	350.00	33.00	

29	1	350.00	33.00
30	1	350.00	33.00
31	1	350.00	33.00
32	1	350.00	33.00
33	1	350.00	33.00
34	1	350.00	33.00
35	1	350.00	33.00
36	1	350.00	33.00
37	1	350.00	33.00
38	1	350.00	33.00
39	1	350.00	33.00
40	1	350.00	33.00
41	1	350.00	33.00
42	1	350.00	33.00
43	1	350.00	33.00
44	1	350.00	33.00
45	1	350.00	33.00
46	1	350.00	33.00
47	1	350.00	33.00
48	1	350.00	33.00
49	1	350.00	33.00
50	1	350.00	33.00
51	1	350.00	33.00
52	1	350.00	33.00
53	1	350.00	33.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 53 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-5.92	88.53	5.31	51.49	383.44	180.01
1	-5.92	88.53	5.31	51.49	383.44	180.01
2	-5.92	93.80	5.31	119.29	427.47	200.68
2	-5.92	93.80	5.31	119.29	427.47	

200.68
   3   -5.92   99.08   5.31   187.09   471.50
221.35
   3   -5.92   99.08   5.31   187.09   471.50
221.35
   4   -5.92   104.36   5.31   254.88   515.52
242.02
   4   -5.92   104.36   5.31   254.88   515.52
242.02
   5   -5.92   108.30   2.61   937.46   958.79
450.12
   5   -5.92   108.30   2.61   937.46   958.79
450.12
   6   -5.92   110.90   2.61   970.85   980.48
460.30
   6   -5.92   110.90   2.61   970.85   980.48
460.30
   7   -5.92   114.45   4.51   1157.69   1101.81
517.26
   7   -5.92   114.45   4.51   1157.69   1101.81
517.26
   8   -5.92   118.94   4.51   1497.97   1322.79
621.00
   8   -5.92   118.94   4.51   1497.97   1322.79
621.00
   9   -5.92   123.43   4.51   1838.25   1543.77
724.75
   9   -5.92   123.43   4.51   1838.25   1543.77
724.75
  10   3.23   128.17   4.99   2018.84   1661.05
779.80
  10   3.23   128.17   4.99   2018.84   1661.05
779.80
  11   3.23   133.15   4.99   2284.31   1833.45
860.74
  11   3.23   133.15   4.99   2284.31   1833.45
860.74
  12   3.23   138.14   4.99   2549.77   2005.84
941.67
  12   3.23   138.14   4.99   2549.77   2005.84
941.67
  13   3.23   143.12   4.99   2815.24   2178.24
1022.60
  13   3.23   143.12   4.99   2815.24   2178.24
1022.60
  14   3.23   148.11   4.99   3080.70   2350.63
1103.54
  14   3.23   148.11   4.99   3080.70   2350.63
1103.54
  15   3.23   153.10   5.01   3302.17   2494.45

1171.06					
15	3.23	153.10	5.01	3302.17	2494.45
1171.06					
16	3.23	158.10	5.01	3479.65	2609.71
1225.16					
16	3.23	158.10	5.01	3479.65	2609.71
1225.16					
17	3.23	163.11	5.01	3657.12	2724.96
1279.27					
17	3.23	163.11	5.01	3657.12	2724.96
1279.27					
18	12.38	167.77	4.43	3579.69	2674.68
1255.66					
18	12.38	167.77	4.43	3579.69	2674.68
1255.66					
19	12.38	172.10	4.43	3646.74	2718.22
1276.11					
19	12.38	172.10	4.43	3646.74	2718.22
1276.11					
20	12.38	176.43	4.43	3713.79	2761.76
1296.55					
20	12.38	176.43	4.43	3713.79	2761.76
1296.55					
21	12.38	181.21	5.34	3828.51	2836.26
1331.52					
21	12.38	181.21	5.34	3828.51	2836.26
1331.52					
22	12.38	186.42	5.34	3990.90	2941.72
1381.03					
22	12.38	186.42	5.34	3990.90	2941.72
1381.03					
23	12.38	191.64	5.34	4153.28	3047.17
1430.54					
23	12.38	191.64	5.34	4153.28	3047.17
1430.54					
24	12.38	196.86	5.34	4315.67	3152.63
1480.04					
24	12.38	196.86	5.34	4315.67	3152.63
1480.04					
25	12.38	202.07	5.34	4478.05	3258.08
1529.55					
25	12.38	202.07	5.34	4478.05	3258.08
1529.55					
26	21.53	207.05	5.10	4342.23	3169.88
1488.14					
26	21.53	207.05	5.10	4342.23	3169.88
1488.14					
27	21.53	211.79	5.10	4393.94	3203.46
1503.90					
27	21.53	211.79	5.10	4393.94	3203.46

1503.90					
28	21.53	216.53	5.10	4445.64	3237.03
1519.67					
28	21.53	216.53	5.10	4445.64	3237.03
1519.67					
29	21.53	220.35	3.12	4468.68	3252.00
1526.69					
29	21.53	220.35	3.12	4468.68	3252.00
1526.69					
30	21.53	223.25	3.12	4463.06	3248.35
1524.98					
30	21.53	223.25	3.12	4463.06	3248.35
1524.98					
31	21.53	227.56	6.16	4454.70	3242.91
1522.43					
31	21.53	227.56	6.16	4454.70	3242.91
1522.43					
32	21.53	233.29	6.16	4443.59	3235.70
1519.04					
32	21.53	233.29	6.16	4443.59	3235.70
1519.04					
33	21.53	239.02	6.16	4432.48	3228.49
1515.66					
33	21.53	239.02	6.16	4432.48	3228.49
1515.66					
34	30.67	244.26	5.51	4119.88	3025.48
1420.35					
34	30.67	244.26	5.51	4119.88	3025.48
1420.35					
35	30.67	248.99	5.51	4015.52	2957.71
1388.54					
35	30.67	248.99	5.51	4015.52	2957.71
1388.54					
36	30.67	253.73	5.51	3911.16	2889.94
1356.72					
36	30.67	253.73	5.51	3911.16	2889.94
1356.72					
37	30.67	257.78	3.89	3834.24	2839.98
1333.27					
37	30.67	257.78	3.89	3834.24	2839.98
1333.27					
38	30.67	261.12	3.89	3784.74	2807.84
1318.18					
38	30.67	261.12	3.89	3784.74	2807.84
1318.18					
39	30.67	265.05	5.23	3709.41	2758.92
1295.21					
39	30.67	265.05	5.23	3709.41	2758.92
1295.21					
40	30.67	269.55	5.23	3608.22	2693.21

1264.36					
40	30.67	269.55	5.23	3608.22	2693.21
1264.36					
41	30.67	274.04	5.23	3507.03	2627.49
1233.51					
41	30.67	274.04	5.23	3507.03	2627.49
1233.51					
42	39.82	278.60	6.00	3120.77	2376.65
1115.75					
42	39.82	278.60	6.00	3120.77	2376.65
1115.75					
43	39.82	283.51	6.80	2903.49	2235.55
1049.51					
43	39.82	283.51	6.80	2903.49	2235.55
1049.51					
44	39.82	288.73	6.80	2672.60	2085.61
979.12					
44	39.82	288.73	6.80	2672.60	2085.61
979.12					
45	39.82	293.96	6.80	2441.72	1935.67
908.73					
45	39.82	293.96	6.80	2441.72	1935.67
908.73					
46	39.82	299.18	6.80	2210.84	1785.74
838.34					
46	39.82	299.18	6.80	2210.84	1785.74
838.34					
47	39.82	304.40	6.80	1979.96	1635.80
767.95					
47	39.82	304.40	6.80	1979.96	1635.80
767.95					
48	48.97	309.41	7.30	1527.80	1342.16
630.10					
48	48.97	309.41	7.30	1527.80	1342.16
630.10					
49	48.97	314.20	7.30	1196.70	1127.15
529.15					
49	48.97	314.20	7.30	1196.70	1127.15
529.15					
50	48.97	319.05	7.46	847.63	900.46
422.73					
50	48.97	319.05	7.46	847.63	900.46
422.73					
51	48.97	323.95	7.46	480.57	662.09
310.83					
51	48.97	323.95	7.46	480.57	662.09
310.83					
52	48.97	328.08	5.11	187.82	471.97
221.57					
52	48.97	328.08	5.11	187.82	471.97

221.57
  53   48.97   331.43   5.11   109.23   70.94
33.30
  53   48.97   331.43   5.11   109.23   70.94
33.30

Table 4 - Base Force Data on the   53 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.92	88.53	5.31	273.27	2034.84	955.28
1	-5.92	88.53	5.31	273.27	2034.84	955.28
2	-5.92	93.80	5.31	633.05	2268.49	1064.97
2	-5.92	93.80	5.31	633.05	2268.49	1064.97
3	-5.92	99.08	5.31	992.84	2502.14	1174.66
3	-5.92	99.08	5.31	992.84	2502.14	1174.66
4	-5.92	104.36	5.31	1352.62	2735.79	1284.35
4	-5.92	104.36	5.31	1352.62	2735.79	1284.35
5	-5.92	108.30	2.61	2450.45	2506.22	1176.58
5	-5.92	108.30	2.61	2450.45	2506.22	1176.58
6	-5.92	110.90	2.61	2537.74	2562.91	1203.19
6	-5.92	110.90	2.61	2537.74	2562.91	1203.19
7	-5.92	114.45	4.51	5226.95	4974.66	2335.42
7	-5.92	114.45	4.51	5226.95	4974.66	2335.42
8	-5.92	118.94	4.51	6763.30	5972.38	2803.81
8	-5.92	118.94	4.51	6763.30	5972.38	2803.81
9	-5.92	123.43	4.51	8299.66	6970.10	

3272.21					
9	-5.92	123.43	4.51	8299.66	6970.10
3272.21					
10	3.23	128.17	4.99	10080.87	8294.28
3893.86					
10	3.23	128.17	4.99	10080.87	8294.28
3893.86					
11	3.23	133.15	4.99	11406.43	9155.11
4297.99					
11	3.23	133.15	4.99	11406.43	9155.11
4297.99					
12	3.23	138.14	4.99	12732.00	10015.94
4702.12					
12	3.23	138.14	4.99	12732.00	10015.94
4702.12					
13	3.23	143.12	4.99	14057.57	10876.78
5106.25					
13	3.23	143.12	4.99	14057.57	10876.78
5106.25					
14	3.23	148.11	4.99	15383.13	11737.61
5510.38					
14	3.23	148.11	4.99	15383.13	11737.61
5510.38					
15	3.23	153.10	5.01	16547.25	12499.77
5868.18					
15	3.23	153.10	5.01	16547.25	12499.77
5868.18					
16	3.23	158.10	5.01	17436.59	13077.31
6139.32					
16	3.23	158.10	5.01	17436.59	13077.31
6139.32					
17	3.23	163.11	5.01	18325.92	13654.85
6410.45					
17	3.23	163.11	5.01	18325.92	13654.85
6410.45					
18	12.38	167.77	4.43	15869.97	11857.74
5566.78					
18	12.38	167.77	4.43	15869.97	11857.74
5566.78					
19	12.38	172.10	4.43	16167.23	12050.79
5657.40					
19	12.38	172.10	4.43	16167.23	12050.79
5657.40					
20	12.38	176.43	4.43	16464.49	12243.83
5748.03					
20	12.38	176.43	4.43	16464.49	12243.83
5748.03					
21	12.38	181.21	5.34	20444.24	15145.64
7110.33					
21	12.38	181.21	5.34	20444.24	15145.64

7110.33					
22	12.38	186.42	5.34	21311.37	15708.77
7374.69					
22	12.38	186.42	5.34	21311.37	15708.77
7374.69					
23	12.38	191.64	5.34	22178.51	16271.89
7639.06					
23	12.38	191.64	5.34	22178.51	16271.89
7639.06					
24	12.38	196.86	5.34	23045.65	16835.02
7903.42					
24	12.38	196.86	5.34	23045.65	16835.02
7903.42					
25	12.38	202.07	5.34	23912.78	17398.14
8167.79					
25	12.38	202.07	5.34	23912.78	17398.14
8167.79					
26	21.53	207.05	5.10	22126.54	16152.62
7583.07					
26	21.53	207.05	5.10	22126.54	16152.62
7583.07					
27	21.53	211.79	5.10	22390.01	16323.73
7663.39					
27	21.53	211.79	5.10	22390.01	16323.73
7663.39					
28	21.53	216.53	5.10	22653.49	16494.83
7743.72					
28	21.53	216.53	5.10	22653.49	16494.83
7743.72					
29	21.53	220.35	3.12	13930.88	10137.93
4759.38					
29	21.53	220.35	3.12	13930.88	10137.93
4759.38					
30	21.53	223.25	3.12	13913.35	10126.54
4754.04					
30	21.53	223.25	3.12	13913.35	10126.54
4754.04					
31	21.53	227.56	6.16	27438.14	19974.32
9377.21					
31	21.53	227.56	6.16	27438.14	19974.32
9377.21					
32	21.53	233.29	6.16	27369.72	19929.89
9356.35					
32	21.53	233.29	6.16	27369.72	19929.89
9356.35					
33	21.53	239.02	6.16	27301.31	19885.46
9335.49					
33	21.53	239.02	6.16	27301.31	19885.46
9335.49					
34	30.67	244.26	5.51	22690.37	16662.93

7822.64					
34	30.67	244.26	5.51	22690.37	16662.93
7822.64					
35	30.67	248.99	5.51	22115.61	16289.68
7647.41					
35	30.67	248.99	5.51	22115.61	16289.68
7647.41					
36	30.67	253.73	5.51	21540.84	15916.42
7472.18					
36	30.67	253.73	5.51	21540.84	15916.42
7472.18					
37	30.67	257.78	3.89	14934.29	11061.69
5193.06					
37	30.67	257.78	3.89	14934.29	11061.69
5193.06					
38	30.67	261.12	3.89	14741.52	10936.50
5134.29					
38	30.67	261.12	3.89	14741.52	10936.50
5134.29					
39	30.67	265.05	5.23	19397.03	14426.78
6772.85					
39	30.67	265.05	5.23	19397.03	14426.78
6772.85					
40	30.67	269.55	5.23	18867.92	14083.17
6611.53					
40	30.67	269.55	5.23	18867.92	14083.17
6611.53					
41	30.67	274.04	5.23	18338.81	13739.56
6450.22					
41	30.67	274.04	5.23	18338.81	13739.56
6450.22					
42	39.82	278.60	6.00	18721.89	14257.83
6693.53					
42	39.82	278.60	6.00	18721.89	14257.83
6693.53					
43	39.82	283.51	6.80	19744.21	15202.10
7136.83					
43	39.82	283.51	6.80	19744.21	15202.10
7136.83					
44	39.82	288.73	6.80	18174.17	14182.51
6658.17					
44	39.82	288.73	6.80	18174.17	14182.51
6658.17					
45	39.82	293.96	6.80	16604.14	13162.91
6179.51					
45	39.82	293.96	6.80	16604.14	13162.91
6179.51					
46	39.82	299.18	6.80	15034.10	12143.32
5700.84					
46	39.82	299.18	6.80	15034.10	12143.32

```
5700.84
  47      39.82     304.40       6.80        13464.06        11123.72
5222.18
  47      39.82     304.40       6.80        13464.06        11123.72
5222.18
  48      48.97     309.41       7.30        11155.26         9799.85
4600.67
  48      48.97     309.41       7.30        11155.26         9799.85
4600.67
  49      48.97     314.20       7.30         8737.75         8229.90
3863.64
  49      48.97     314.20       7.30         8737.75         8229.90
3863.64
  50      48.97     319.05       7.46         6327.02         6721.35
3155.43
  50      48.97     319.05       7.46         6327.02         6721.35
3155.43
  51      48.97     323.95       7.46         3587.19         4942.08
2320.13
  51      48.97     323.95       7.46         3587.19         4942.08
2320.13
  52      48.97     328.08       5.11          960.32         2413.23
1132.92
  52      48.97     328.08       5.11          960.32         2413.23
1132.92
  53      48.97     331.43       5.11          558.51          362.70
170.28
  53      48.97     331.43       5.11          558.51          362.70
170.28

     SUM OF MOMENTS =  -0.956843E+00 (ft/lbs);Imbalance (Fraction of Total Weight)
=  -0.1207912E-05

     Sum of the Resisting Forces =  594034.52 (lbs)

     Average Available Shear Strength =   2123.39(psf)

     Sum of the Driving Forces =   278877.47 (lbs)

     Average Mobilized Shear Stress =     996.85(psf)

     Total length of the failure surface =     279.76(ft)


     Factor of Safety Balance Check: FS =  2.13009

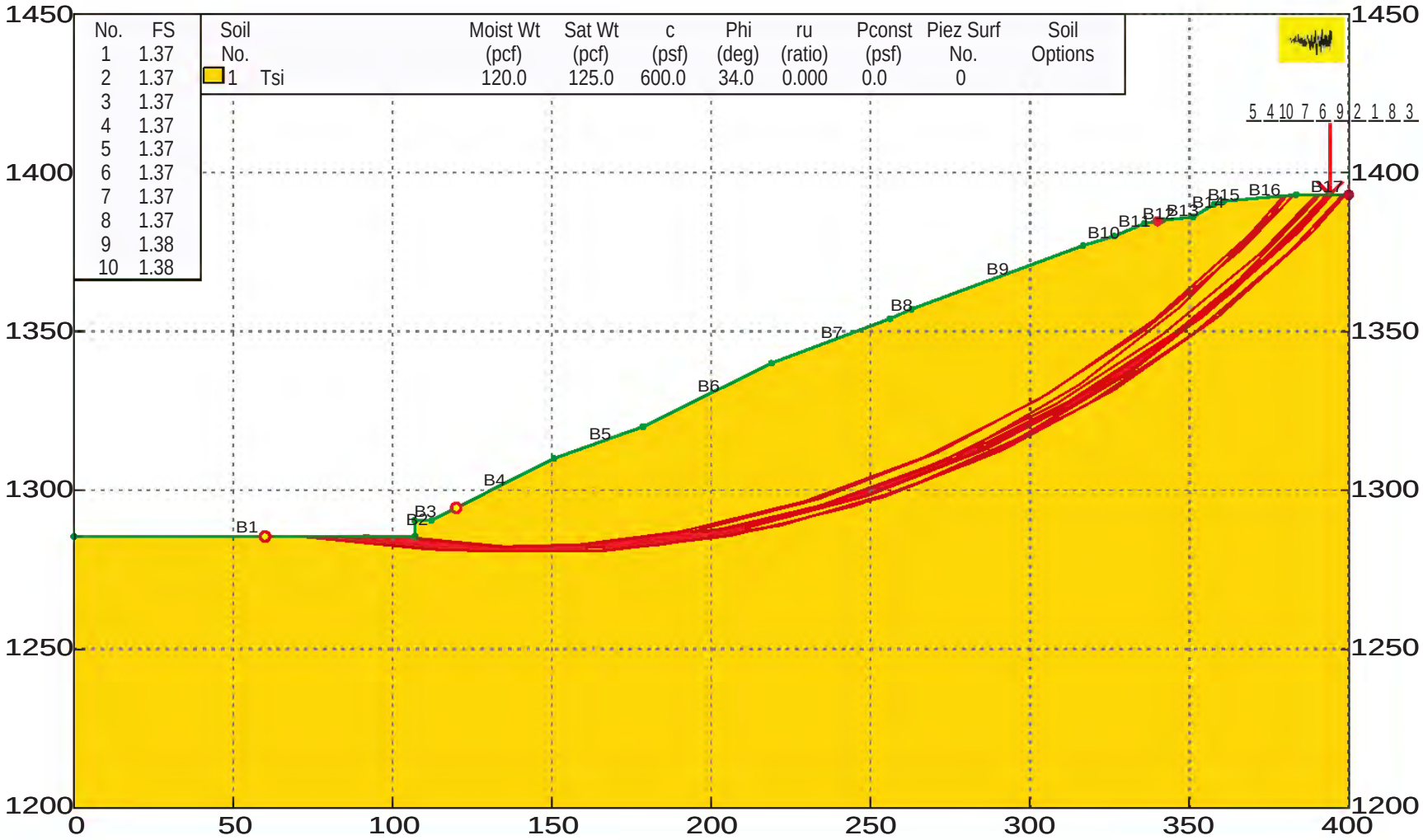

           CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop
                     Method. This Method Is Valid Only If The Failure Surface
                     Approximates A Circular Arc.
```

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section A-A' - Rotational (Seismic (117A))

LGC Geotechnical / BPP

\Section A - Seismic (117A)- Rotational.gsd



GEOSTASE FS = 1.37

Simplified Bishop Method

kh = 0.26000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Seismic (117A)- Rotational.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Seismic (117A)- Rotational.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section A-A' - Rotational (Seismic (117A))

BOUNDARY DATA

17 Surface Boundaries

17 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1285.400	107.000	1285.400	1
2	107.000	1285.400	107.000	1290.500	1
3	107.000	1290.500	112.200	1290.500	1
4	112.200	1290.500	150.600	1310.000	1
5	150.600	1310.000	178.600	1320.000	1
6	178.600	1320.000	218.900	1340.000	1
7	218.900	1340.000	256.100	1354.000	1
8	256.100	1354.000	262.800	1357.000	1
9	262.800	1357.000	316.600	1377.000	1
10	316.600	1377.000	326.400	1380.000	1
11	326.400	1380.000	336.000	1384.000	1
12	336.000	1384.000	341.600	1385.000	1
13	341.600	1385.000	351.100	1386.000	1
14	351.100	1386.000	357.700	1390.000	1
15	357.700	1390.000	360.800	1391.000	1
16	360.800	1391.000	383.500	1393.000	1
17	383.500	1393.000	400.000	1393.000	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1200.000(ft)

MOHR-COULOMB SOIL PARAMETERS

1 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 Tsi	120.0	125.0	600.00	34.00	0.000	0.0	0	0

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load Stress No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Load Stress (psf)	BND No. Deflection (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000	0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 60.00(ft)
and X = 120.00(ft)

Each Surface Enters within a Range Between X = 340.00(ft)
and X = 400.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1200.00(ft)

Specified Maximum Radius = 10000.000(ft)

40.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 3.071 FS Min = 1.368 FS Ave = 1.776
Standard Deviation = 0.299 Coefficient of Variation = 16.84 %

Critical Surface is Sequence Number 513 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 141.933613(ft) ; Y = 1624.295962(ft); and Radius = 342.739199(ft)

Circular Trial Failure Surface Generated With 10 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	90.751	1285.400
2	130.583	1281.745
3	170.571	1282.755
4	210.168	1288.418
5	248.836	1298.655
6	286.047	1313.327
7	321.296	1332.236
8	354.102	1355.122
9	384.018	1381.674
10	394.115	1393.000

Factor Of Safety For The Critical or Specified Surface = 1.368

Table 1 - Geometry Data on the 70 Slices

Slice	Width	Height	X-Cntr	Y-Cntr-Base	Y-Cntr-Top	Alpha	Beta	Base

Length No.	(ft)	(ft)	(ft)	(ft)	(ft)	(deg)	(deg)	(ft)
1	5.42	0.25	93.46	1285.15	1285.40	-5.24	0.00	5.44
2	5.42	0.75	98.88	1284.65	1285.40	-5.24	0.00	5.44
3	5.42	1.24	104.29	1284.16	1285.40	-5.24	0.00	5.44
4	2.60	6.71	108.30	1283.79	1290.50	-5.24	0.00	2.61
5	2.60	6.95	110.90	1283.55	1290.50	-5.24	0.00	2.61
6	4.60	8.45	114.50	1283.22	1291.67	-5.24	26.92	4.62
7	4.60	11.20	119.09	1282.80	1294.00	-5.24	26.92	4.62
8	4.60	13.96	123.69	1282.38	1296.33	-5.24	26.92	4.62
9	4.60	16.71	128.29	1281.96	1298.67	-5.24	26.92	4.62
10	5.00	19.30	133.09	1281.81	1301.11	1.45	26.92	5.01
11	5.00	21.71	138.09	1281.93	1303.65	1.45	26.92	5.01
12	5.00	24.13	143.09	1282.06	1306.19	1.45	26.92	5.01
13	5.00	26.54	148.10	1282.19	1308.73	1.45	26.92	5.01
14	4.99	28.58	153.10	1282.31	1310.89	1.45	19.65	4.99
15	4.99	30.23	158.09	1282.44	1312.67	1.45	19.65	4.99
16	4.99	31.89	163.08	1282.57	1314.46	1.45	19.65	4.99
17	4.99	33.55	168.07	1282.69	1316.24	1.45	19.65	4.99
18	4.01	34.81	172.58	1283.04	1317.85	8.14	19.65	4.06
19	4.01	35.67	176.59	1283.62	1319.28	8.14	19.65	4.06
20	5.26	37.03	181.23	1284.28	1321.31	8.14	26.39	5.31
21	5.26	38.88	186.49	1285.03	1323.92	8.14	26.39	5.31
22	5.26	40.74	191.75	1285.78	1326.53	8.14	26.39	5.31
23	5.26	42.60	197.01	1286.54	1329.14	8.14	26.39	5.31

24	5.26	44.46	202.28	1287.29	1331.75	8.14	26.39 5.31
25	5.26	46.32	207.54	1288.04	1334.36	8.14	26.39 5.31
26	4.37	47.75	212.35	1289.00	1336.75	14.83	26.39 4.52
27	4.37	48.77	216.72	1290.15	1338.92	14.83	26.39 4.52
28	2.90	49.43	220.35	1291.11	1340.55	14.83	20.62 3.00
29	2.90	49.76	223.25	1291.88	1341.64	14.83	20.62 3.00
30	4.83	50.19	227.11	1292.90	1343.09	14.83	20.62 4.99
31	4.83	50.73	231.94	1294.18	1344.91	14.83	20.62 4.99
32	4.83	51.26	236.77	1295.46	1346.72	14.83	20.62 4.99
33	4.83	51.80	241.59	1296.74	1348.54	14.83	20.62 4.99
34	4.83	52.34	246.42	1298.02	1350.36	14.83	20.62 4.99
35	3.63	52.58	250.65	1299.37	1351.95	21.52	20.62 3.90
36	3.63	52.51	254.28	1300.80	1353.32	21.52	20.62 3.90
37	3.35	52.57	257.78	1302.18	1354.75	21.52	24.12 3.60
38	3.35	52.75	261.12	1303.50	1356.25	21.52	24.12 3.60
39	4.52	52.79	265.06	1305.05	1357.84	21.52	20.39 4.86
40	4.53	52.69	269.59	1306.84	1359.52	21.52	20.39 4.86
41	4.52	52.58	274.11	1308.62	1361.21	21.52	20.39 4.86
42	4.52	52.48	278.64	1310.41	1362.89	21.52	20.39 4.86
43	2.57	52.40	282.19	1311.81	1364.21	21.52	20.39 2.77
44	2.57	52.34	284.76	1312.82	1365.16	21.52	20.39 2.77
45	5.09	51.90	288.59	1314.69	1366.59	28.21	20.39 5.78
46	5.09	51.06	293.69	1317.42	1368.48	28.21	20.39 5.78
47	5.09	50.22	298.78	1320.16	1370.37	28.21	20.39 5.78
48	5.09	49.38	303.87	1322.89	1372.27	28.21	20.39 5.78

49	5.09	48.54	308.96	1325.62	1374.16	28.21	20.39
5.78							
50	5.09	47.70	314.05	1328.35	1376.05	28.21	20.39
5.78							
51	4.70	46.74	318.95	1330.98	1377.72	28.21	17.02
5.33							
52	2.55	45.70	322.57	1333.13	1378.83	34.90	17.02
3.11							
53	2.55	44.70	325.12	1334.91	1379.61	34.90	17.02
3.11							
54	4.80	43.53	328.80	1337.47	1381.00	34.90	22.62
5.85							
55	4.80	42.18	333.60	1340.82	1383.00	34.90	22.62
5.85							
56	2.80	40.78	337.40	1343.47	1384.25	34.90	10.12
3.41							
57	2.80	39.33	340.20	1345.42	1384.75	34.90	10.12
3.41							
58	4.75	37.19	343.98	1348.06	1385.25	34.90	6.01
5.79							
59	4.75	34.38	348.73	1351.37	1385.75	34.90	6.01
5.79							
60	3.00	32.84	352.60	1354.07	1386.91	34.90	31.22
3.66							
61	3.60	32.19	355.90	1356.72	1388.91	41.59	31.22
4.81							
62	3.10	30.81	359.25	1359.69	1390.50	41.59	17.88
4.14							
63	4.54	28.12	363.07	1363.08	1391.20	41.59	5.04
6.07							
64	4.54	24.49	367.61	1367.11	1391.60	41.59	5.04
6.07							
65	4.54	20.86	372.15	1371.14	1392.00	41.59	5.04
6.07							
66	4.54	17.23	376.69	1375.17	1392.40	41.59	5.04
6.07							
67	4.54	13.60	381.23	1379.20	1392.80	41.59	5.04
6.07							
68	0.52	11.56	383.76	1381.44	1393.00	41.59	0.00
0.69							
69	5.05	8.49	386.54	1384.51	1393.00	48.28	0.00
7.59							
70	5.05	2.83	391.59	1390.17	1393.00	48.28	0.00
7.59							

Table 2 - Force Data On The 70 Slices (Excluding Reinforcement)

	Ubeta	Ualpha	Earthquake

Slice No.	Weight (lbs)	Force Top (lbs)	Force Bot (lbs)	Force Hor (lbs)	Force Ver (lbs)	Distributed Load (lbs)
1	161.5	0.0	0.0	42.0	0.0	0.0
2	484.6	0.0	0.0	126.0	0.0	0.0
3	807.6	0.0	0.0	210.0	0.0	0.0
4	2093.6	0.0	0.0	544.3	0.0	0.0
5	2168.1	0.0	0.0	563.7	0.0	0.0
6	4658.0	0.0	0.0	1211.1	0.0	0.0
7	6177.7	0.0	0.0	1606.2	0.0	0.0
8	7697.4	0.0	0.0	2001.3	0.0	0.0
9	9217.1	0.0	0.0	2396.5	0.0	0.0
10	11588.4	0.0	0.0	3013.0	0.0	0.0
11	13038.4	0.0	0.0	3390.0	0.0	0.0
12	14488.4	0.0	0.0	3767.0	0.0	0.0
13	15938.5	0.0	0.0	4144.0	0.0	0.0
14	17121.6	0.0	0.0	4451.6	0.0	0.0
15	18114.3	0.0	0.0	4709.7	0.0	0.0
16	19106.9	0.0	0.0	4967.8	0.0	0.0
17	20099.6	0.0	0.0	5225.9	0.0	0.0
18	16768.7	0.0	0.0	4359.9	0.0	0.0
19	17182.9	0.0	0.0	4467.6	0.0	0.0
20	23376.5	0.0	0.0	6077.9	0.0	0.0
21	24550.1	0.0	0.0	6383.0	0.0	0.0
22	25723.6	0.0	0.0	6688.1	0.0	0.0
23	26897.1	0.0	0.0	6993.2	0.0	0.0
24	28070.6	0.0	0.0	7298.3	0.0	0.0
25	29244.1	0.0	0.0	7603.5	0.0	0.0
26	25019.9	0.0	0.0	6505.2	0.0	0.0
27	25549.6	0.0	0.0	6642.9	0.0	0.0
28	17202.5	0.0	0.0	4472.6	0.0	0.0
29	17315.1	0.0	0.0	4501.9	0.0	0.0
30	29071.1	0.0	0.0	7558.5	0.0	0.0
31	29383.2	0.0	0.0	7639.6	0.0	0.0
32	29695.2	0.0	0.0	7720.8	0.0	0.0
33	30007.2	0.0	0.0	7801.9	0.0	0.0
34	30319.3	0.0	0.0	7883.0	0.0	0.0
35	22917.1	0.0	0.0	5958.4	0.0	0.0
36	22888.7	0.0	0.0	5951.1	0.0	0.0
37	21133.3	0.0	0.0	5494.6	0.0	0.0
38	21205.3	0.0	0.0	5513.4	0.0	0.0
39	28663.8	0.0	0.0	7452.6	0.0	0.0
40	28608.4	0.0	0.0	7438.2	0.0	0.0
41	28553.0	0.0	0.0	7423.8	0.0	0.0
42	28497.6	0.0	0.0	7409.4	0.0	0.0
43	16183.8	0.0	0.0	4207.8	0.0	0.0
44	16165.9	0.0	0.0	4203.1	0.0	0.0
45	31710.8	0.0	0.0	8244.8	0.0	0.0
46	31198.4	0.0	0.0	8111.6	0.0	0.0

47	30686.0	0.0	0.0	7978.4	0.0	0.0
48	30173.7	0.0	0.0	7845.2	0.0	0.0
49	29661.3	0.0	0.0	7711.9	0.0	0.0
50	29148.9	0.0	0.0	7578.7	0.0	0.0
51	26341.6	0.0	0.0	6848.8	0.0	0.0
52	13995.3	0.0	0.0	3638.8	0.0	0.0
53	13689.4	0.0	0.0	3559.2	0.0	0.0
54	25073.0	0.0	0.0	6519.0	0.0	0.0
55	24296.2	0.0	0.0	6317.0	0.0	0.0
56	13702.1	0.0	0.0	3562.5	0.0	0.0
57	13213.7	0.0	0.0	3435.6	0.0	0.0
58	21200.0	0.0	0.0	5512.0	0.0	0.0
59	19596.2	0.0	0.0	5095.0	0.0	0.0
60	11828.7	0.0	0.0	3075.5	0.0	0.0
61	13898.7	0.0	0.0	3613.7	0.0	0.0
62	11461.0	0.0	0.0	2979.8	0.0	0.0
63	15319.0	0.0	0.0	3982.9	0.0	0.0
64	13341.6	0.0	0.0	3468.8	0.0	0.0
65	11364.2	0.0	0.0	2954.7	0.0	0.0
66	9386.8	0.0	0.0	2440.6	0.0	0.0
67	7409.4	0.0	0.0	1926.5	0.0	0.0
68	718.4	0.0	0.0	186.8	0.0	0.0
69	5146.2	0.0	0.0	1338.0	0.0	0.0
70	1715.4	0.0	0.0	446.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1278431.25(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1278431.25(lbs)

TOTAL AREA OF SLIDING MASS = 10653.59(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 70 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	600.00	34.00	
2	1	600.00	34.00	
3	1	600.00	34.00	
4	1	600.00	34.00	
5	1	600.00	34.00	
6	1	600.00	34.00	
7	1	600.00	34.00	
8	1	600.00	34.00	
9	1	600.00	34.00	
10	1	600.00	34.00	
11	1	600.00	34.00	
12	1	600.00	34.00	
13	1	600.00	34.00	
14	1	600.00	34.00	

15	1	600.00	34.00
16	1	600.00	34.00
17	1	600.00	34.00
18	1	600.00	34.00
19	1	600.00	34.00
20	1	600.00	34.00
21	1	600.00	34.00
22	1	600.00	34.00
23	1	600.00	34.00
24	1	600.00	34.00
25	1	600.00	34.00
26	1	600.00	34.00
27	1	600.00	34.00
28	1	600.00	34.00
29	1	600.00	34.00
30	1	600.00	34.00
31	1	600.00	34.00
32	1	600.00	34.00
33	1	600.00	34.00
34	1	600.00	34.00
35	1	600.00	34.00
36	1	600.00	34.00
37	1	600.00	34.00
38	1	600.00	34.00
39	1	600.00	34.00
40	1	600.00	34.00
41	1	600.00	34.00
42	1	600.00	34.00
43	1	600.00	34.00
44	1	600.00	34.00
45	1	600.00	34.00
46	1	600.00	34.00
47	1	600.00	34.00
48	1	600.00	34.00
49	1	600.00	34.00
50	1	600.00	34.00
51	1	600.00	34.00
52	1	600.00	34.00
53	1	600.00	34.00
54	1	600.00	34.00
55	1	600.00	34.00
56	1	600.00	34.00
57	1	600.00	34.00
58	1	600.00	34.00
59	1	600.00	34.00
60	1	600.00	34.00
61	1	600.00	34.00
62	1	600.00	34.00
63	1	600.00	34.00
64	1	600.00	34.00

65	1	600.00	34.00
66	1	600.00	34.00
67	1	600.00	34.00
68	1	600.00	34.00
69	1	600.00	34.00
70	1	600.00	34.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 70 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-5.24	93.46	5.44	71.47	648.21	473.97
1	-5.24	93.46	5.44	71.47	648.21	473.97
2	-5.24	98.88	5.44	133.81	690.26	504.72
2	-5.24	98.88	5.44	133.81	690.26	504.72
3	-5.24	104.29	5.44	196.16	732.31	535.47
3	-5.24	104.29	5.44	196.16	732.31	535.47
4	-5.24	108.30	2.61	882.02	1194.93	873.74
4	-5.24	108.30	2.61	882.02	1194.93	873.74
5	-5.24	110.90	2.61	911.95	1215.12	888.50
5	-5.24	110.90	2.61	911.95	1215.12	888.50
6	-5.24	114.50	4.62	1099.73	1341.78	981.12
6	-5.24	114.50	4.62	1099.73	1341.78	981.12
7	-5.24	119.09	4.62	1445.38	1574.92	1151.59

7	-5.24	119.09	4.62	1445.38	1574.92
1151.59					
8	-5.24	123.69	4.62	1791.03	1808.06
1322.07					
8	-5.24	123.69	4.62	1791.03	1808.06
1322.07					
9	-5.24	128.29	4.62	2136.67	2041.21
1492.54					
9	-5.24	128.29	4.62	2136.67	2041.21
1492.54					
10	1.45	133.09	5.01	2277.95	2136.50
1562.22					
10	1.45	133.09	5.01	2277.95	2136.50
1562.22					
11	1.45	138.09	5.01	2564.30	2329.64
1703.45					
11	1.45	138.09	5.01	2564.30	2329.64
1703.45					
12	1.45	143.09	5.01	2850.65	2522.79
1844.68					
12	1.45	143.09	5.01	2850.65	2522.79
1844.68					
13	1.45	148.10	5.01	3137.00	2715.93
1985.91					
13	1.45	148.10	5.01	3137.00	2715.93
1985.91					
14	1.45	153.10	4.99	3378.42	2878.77
2104.97					
14	1.45	153.10	4.99	3378.42	2878.77
2104.97					
15	1.45	158.09	4.99	3574.90	3011.30
2201.88					
15	1.45	158.09	4.99	3574.90	3011.30
2201.88					
16	1.45	163.08	4.99	3771.39	3143.83
2298.79					
16	1.45	163.08	4.99	3771.39	3143.83
2298.79					
17	1.45	168.07	4.99	3967.88	3276.37
2395.70					
17	1.45	168.07	4.99	3967.88	3276.37
2395.70					
18	8.14	172.58	4.06	3856.35	3201.14
2340.69					
18	8.14	172.58	4.06	3856.35	3201.14
2340.69					
19	8.14	176.59	4.06	3952.99	3266.32
2388.36					
19	8.14	176.59	4.06	3952.99	3266.32
2388.36					

20	8.14	181.23	5.31	4105.78	3369.38
2463.71					
20	8.14	181.23	5.31	4105.78	3369.38
2463.71					
21	8.14	186.49	5.31	4314.71	3510.31
2566.76					
21	8.14	186.49	5.31	4314.71	3510.31
2566.76					
22	8.14	191.75	5.31	4523.65	3651.24
2669.81					
22	8.14	191.75	5.31	4523.65	3651.24
2669.81					
23	8.14	197.01	5.31	4732.58	3792.17
2772.85					
23	8.14	197.01	5.31	4732.58	3792.17
2772.85					
24	8.14	202.28	5.31	4941.51	3933.09
2875.90					
24	8.14	202.28	5.31	4941.51	3933.09
2875.90					
25	8.14	207.54	5.31	5150.45	4074.02
2978.95					
25	8.14	207.54	5.31	5150.45	4074.02
2978.95					
26	14.83	212.35	4.52	4994.82	3969.05
2902.19					
26	14.83	212.35	4.52	4994.82	3969.05
2902.19					
27	14.83	216.72	4.52	5102.64	4041.78
2955.37					
27	14.83	216.72	4.52	5102.64	4041.78
2955.37					
28	14.83	220.35	3.00	5173.81	4089.78
2990.47					
28	14.83	220.35	3.00	5173.81	4089.78
2990.47					
29	14.83	223.25	3.00	5208.33	4113.07
3007.50					
29	14.83	223.25	3.00	5208.33	4113.07
3007.50					
30	14.83	227.11	4.99	5254.32	4144.09
3030.18					
30	14.83	227.11	4.99	5254.32	4144.09
3030.18					
31	14.83	231.94	4.99	5311.78	4182.84
3058.52					
31	14.83	231.94	4.99	5311.78	4182.84
3058.52					
32	14.83	236.77	4.99	5369.24	4221.60
3086.86					

32	14.83	236.77	4.99	5369.24	4221.60
3086.86					
33	14.83	241.59	4.99	5426.70	4260.35
3115.20					
33	14.83	241.59	4.99	5426.70	4260.35
3115.20					
34	14.83	246.42	4.99	5484.16	4299.11
3143.54					
34	14.83	246.42	4.99	5484.16	4299.11
3143.54					
35	21.52	250.65	3.90	5179.38	4093.53
2993.22					
35	21.52	250.65	3.90	5179.38	4093.53
2993.22					
36	21.52	254.28	3.90	5172.78	4089.08
2989.96					
36	21.52	254.28	3.90	5172.78	4089.08
2989.96					
37	21.52	257.78	3.60	5178.54	4092.97
2992.80					
37	21.52	257.78	3.60	5178.54	4092.97
2992.80					
38	21.52	261.12	3.60	5196.66	4105.19
3001.74					
38	21.52	261.12	3.60	5196.66	4105.19
3001.74					
39	21.52	265.06	4.86	5200.55	4107.82
3003.66					
39	21.52	265.06	4.86	5200.55	4107.82
3003.66					
40	21.52	269.59	4.86	5190.23	4100.85
2998.57					
40	21.52	269.59	4.86	5190.23	4100.85
2998.57					
41	21.52	274.11	4.86	5179.90	4093.89
2993.48					
41	21.52	274.11	4.86	5179.90	4093.89
2993.48					
42	21.52	278.64	4.86	5169.58	4086.93
2988.38					
42	21.52	278.64	4.86	5169.58	4086.93
2988.38					
43	21.52	282.19	2.77	5161.48	4081.46
2984.39					
43	21.52	282.19	2.77	5161.48	4081.46
2984.39					
44	21.52	284.76	2.77	5155.61	4077.50
2981.49					
44	21.52	284.76	2.77	5155.61	4077.50
2981.49					

45	28.21	288.59	5.78	4788.98	3830.21
2800.67					
45	28.21	288.59	5.78	4788.98	3830.21
2800.67					
46	28.21	293.69	5.78	4708.69	3776.05
2761.07					
46	28.21	293.69	5.78	4708.69	3776.05
2761.07					
47	28.21	298.78	5.78	4628.41	3721.90
2721.47					
47	28.21	298.78	5.78	4628.41	3721.90
2721.47					
48	28.21	303.87	5.78	4548.12	3667.75
2681.88					
48	28.21	303.87	5.78	4548.12	3667.75
2681.88					
49	28.21	308.96	5.78	4467.83	3613.59
2642.28					
49	28.21	308.96	5.78	4467.83	3613.59
2642.28					
50	28.21	314.05	5.78	4387.55	3559.44
2602.68					
50	28.21	314.05	5.78	4387.55	3559.44
2602.68					
51	28.21	318.95	5.33	4295.63	3497.44
2557.35					
51	28.21	318.95	5.33	4295.63	3497.44
2557.35					
52	34.90	322.57	3.11	3904.81	3233.83
2364.60					
52	34.90	322.57	3.11	3904.81	3233.83
2364.60					
53	34.90	325.12	3.11	3814.63	3173.00
2320.12					
53	34.90	325.12	3.11	3814.63	3173.00
2320.12					
54	34.90	328.80	5.85	3708.68	3101.54
2267.86					
54	34.90	328.80	5.85	3708.68	3101.54
2267.86					
55	34.90	333.60	5.85	3586.95	3019.43
2207.82					
55	34.90	333.60	5.85	3586.95	3019.43
2207.82					
56	34.90	337.40	3.41	3460.49	2934.13
2145.46					
56	34.90	337.40	3.41	3460.49	2934.13
2145.46					
57	34.90	340.20	3.41	3329.31	2845.65
2080.76					

57	34.90	340.20	3.41	3329.31	2845.65	2080.76
58	34.90	343.98	5.79	3136.73	2715.75	1985.77
58	34.90	343.98	5.79	3136.73	2715.75	1985.77
59	34.90	348.73	5.79	2882.76	2544.44	1860.51
59	34.90	348.73	5.79	2882.76	2544.44	1860.51
60	34.90	352.60	3.66	2743.36	2450.42	1791.76
60	34.90	352.60	3.66	2743.36	2450.42	1791.76
61	41.59	355.90	4.81	2459.30	2258.82	1651.66
61	41.59	355.90	4.81	2459.30	2258.82	1651.66
62	41.59	359.25	4.14	2342.43	2179.99	1594.02
62	41.59	359.25	4.14	2342.43	2179.99	1594.02
63	41.59	363.07	6.07	2114.92	2026.53	1481.81
63	41.59	363.07	6.07	2114.92	2026.53	1481.81
64	41.59	367.61	6.07	1808.02	1819.52	1330.45
64	41.59	367.61	6.07	1808.02	1819.52	1330.45
65	41.59	372.15	6.07	1501.11	1612.51	1179.08
65	41.59	372.15	6.07	1501.11	1612.51	1179.08
66	41.59	376.69	6.07	1194.20	1405.50	1027.71
66	41.59	376.69	6.07	1194.20	1405.50	1027.71
67	41.59	381.23	6.07	887.29	1198.49	876.34
67	41.59	381.23	6.07	887.29	1198.49	876.34
68	41.59	383.76	0.69	714.40	1081.87	791.07
68	41.59	383.76	0.69	714.40	1081.87	791.07
69	48.28	386.54	7.59	358.33	841.70	615.45
69	48.28	386.54	7.59	358.33	841.70	615.45

70	48.28	391.59	7.59	222.12	149.82
109.55					
70	48.28	391.59	7.59	222.12	149.82
109.55					

Table 4 - Base Force Data on the 70 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.24	93.46	5.44	388.72	3525.70	2578.01
1	-5.24	93.46	5.44	388.72	3525.70	2578.01
2	-5.24	98.88	5.44	727.84	3754.44	2745.27
2	-5.24	98.88	5.44	727.84	3754.44	2745.27
3	-5.24	104.29	5.44	1066.95	3983.17	2912.52
3	-5.24	104.29	5.44	1066.95	3983.17	2912.52
4	-5.24	108.30	2.61	2302.89	3119.87	2281.27
4	-5.24	108.30	2.61	2302.89	3119.87	2281.27
5	-5.24	110.90	2.61	2381.02	3172.58	2319.81
5	-5.24	110.90	2.61	2381.02	3172.58	2319.81
6	-5.24	114.50	4.62	5075.45	6192.53	4528.01
6	-5.24	114.50	4.62	5075.45	6192.53	4528.01
7	-5.24	119.09	4.62	6670.66	7268.51	5314.78
7	-5.24	119.09	4.62	6670.66	7268.51	5314.78
8	-5.24	123.69	4.62	8265.87	8344.50	6101.55
8	-5.24	123.69	4.62	8265.87	8344.50	6101.55
9	-5.24	128.29	4.62	9861.09	9420.48	6888.31

9	-5.24	128.29	4.62	9861.09	9420.48
6888.31					
10	1.45	133.09	5.01	11402.86	10694.77
7820.08					
10	1.45	133.09	5.01	11402.86	10694.77
7820.08					
11	1.45	138.09	5.01	12836.25	11661.61
8527.04					
11	1.45	138.09	5.01	12836.25	11661.61
8527.04					
12	1.45	143.09	5.01	14269.64	12628.44
9234.00					
12	1.45	143.09	5.01	14269.64	12628.44
9234.00					
13	1.45	148.10	5.01	15703.03	13595.28
9940.95					
13	1.45	148.10	5.01	15703.03	13595.28
9940.95					
14	1.45	153.10	4.99	16872.66	14377.30
10512.77					
14	1.45	153.10	4.99	16872.66	14377.30
10512.77					
15	1.45	158.09	4.99	17853.96	15039.20
10996.75					
15	1.45	158.09	4.99	17853.96	15039.20
10996.75					
16	1.45	163.08	4.99	18835.27	15701.10
11480.74					
16	1.45	163.08	4.99	18835.27	15701.10
11480.74					
17	1.45	168.07	4.99	19816.57	16362.99
11964.72					
17	1.45	168.07	4.99	19816.57	16362.99
11964.72					
18	8.14	172.58	4.06	15639.53	12982.32
9492.75					
18	8.14	172.58	4.06	15639.53	12982.32
9492.75					
19	8.14	176.59	4.06	16031.46	13246.67
9686.05					
19	8.14	176.59	4.06	16031.46	13246.67
9686.05					
20	8.14	181.23	5.31	21821.48	17907.67
13094.20					
20	8.14	181.23	5.31	21821.48	17907.67
13094.20					
21	8.14	186.49	5.31	22931.93	18656.67
13641.87					
21	8.14	186.49	5.31	22931.93	18656.67
13641.87					

22	8.14	191.75	5.31	24042.38	19405.68
14189.55					
22	8.14	191.75	5.31	24042.38	19405.68
14189.55					
23	8.14	197.01	5.31	25152.83	20154.69
14737.23					
23	8.14	197.01	5.31	25152.83	20154.69
14737.23					
24	8.14	202.28	5.31	26263.28	20903.70
15284.91					
24	8.14	202.28	5.31	26263.28	20903.70
15284.91					
25	8.14	207.54	5.31	27373.73	21652.71
15832.59					
25	8.14	207.54	5.31	27373.73	21652.71
15832.59					
26	14.83	212.35	4.52	22559.18	17926.27
13107.80					
26	14.83	212.35	4.52	22559.18	17926.27
13107.80					
27	14.83	216.72	4.52	23046.17	18254.75
13347.98					
27	14.83	216.72	4.52	23046.17	18254.75
13347.98					
28	14.83	220.35	3.00	15520.99	12268.99
8971.16					
28	14.83	220.35	3.00	15520.99	12268.99
8971.16					
29	14.83	223.25	3.00	15624.54	12338.84
9022.23					
29	14.83	223.25	3.00	15624.54	12338.84
9022.23					
30	14.83	227.11	4.99	26237.09	20693.20
15130.99					
30	14.83	227.11	4.99	26237.09	20693.20
15130.99					
31	14.83	231.94	4.99	26524.00	20886.72
15272.50					
31	14.83	231.94	4.99	26524.00	20886.72
15272.50					
32	14.83	236.77	4.99	26810.92	21080.25
15414.01					
32	14.83	236.77	4.99	26810.92	21080.25
15414.01					
33	14.83	241.59	4.99	27097.83	21273.78
15555.52					
33	14.83	241.59	4.99	27097.83	21273.78
15555.52					
34	14.83	246.42	4.99	27384.75	21467.30
15697.02					

34	14.83	246.42	4.99	27384.75	21467.30
15697.02					
35	21.52	250.65	3.90	20222.11	15982.59
11686.57					
35	21.52	250.65	3.90	20222.11	15982.59
11686.57					
36	21.52	254.28	3.90	20196.35	15965.22
11673.86					
36	21.52	254.28	3.90	20196.35	15965.22
11673.86					
37	21.52	257.78	3.60	18647.99	14738.83
10777.12					
37	21.52	257.78	3.60	18647.99	14738.83
10777.12					
38	21.52	261.12	3.60	18713.23	14782.84
10809.30					
38	21.52	261.12	3.60	18713.23	14782.84
10809.30					
39	21.52	265.06	4.86	25295.77	19980.65
14609.97					
39	21.52	265.06	4.86	25295.77	19980.65
14609.97					
40	21.52	269.59	4.86	25245.56	19946.78
14585.20					
40	21.52	269.59	4.86	25245.56	19946.78
14585.20					
41	21.52	274.11	4.86	25195.34	19912.90
14560.44					
41	21.52	274.11	4.86	25195.34	19912.90
14560.44					
42	21.52	278.64	4.86	25145.12	19879.03
14535.67					
42	21.52	278.64	4.86	25145.12	19879.03
14535.67					
43	21.52	282.19	2.77	14279.36	11291.46
8256.39					
43	21.52	282.19	2.77	14279.36	11291.46
8256.39					
44	21.52	284.76	2.77	14263.11	11280.51
8248.37					
44	21.52	284.76	2.77	14263.11	11280.51
8248.37					
45	28.21	288.59	5.78	27672.94	22132.71
16183.57					
45	28.21	288.59	5.78	27672.94	22132.71
16183.57					
46	28.21	293.69	5.78	27209.01	21819.79
15954.76					
46	28.21	293.69	5.78	27209.01	21819.79
15954.76					

47	28.21	298.78	5.78	26745.08	21506.87
15725.95					
47	28.21	298.78	5.78	26745.08	21506.87
15725.95					
48	28.21	303.87	5.78	26281.15	21193.94
15497.14					
48	28.21	303.87	5.78	26281.15	21193.94
15497.14					
49	28.21	308.96	5.78	25817.23	20881.02
15268.33					
49	28.21	308.96	5.78	25817.23	20881.02
15268.33					
50	28.21	314.05	5.78	25353.30	20568.10
15039.52					
50	28.21	314.05	5.78	25353.30	20568.10
15039.52					
51	28.21	318.95	5.33	22892.28	18638.56
13628.63					
51	28.21	318.95	5.33	22892.28	18638.56
13628.63					
52	34.90	322.57	3.11	12149.89	10062.11
7357.48					
52	34.90	322.57	3.11	12149.89	10062.11
7357.48					
53	34.90	325.12	3.11	11869.29	9872.85
7219.09					
53	34.90	325.12	3.11	11869.29	9872.85
7219.09					
54	34.90	328.80	5.85	21705.48	18152.10
13272.93					
54	34.90	328.80	5.85	21705.48	18152.10
13272.93					
55	34.90	333.60	5.85	20993.05	17671.56
12921.55					
55	34.90	333.60	5.85	20993.05	17671.56
12921.55					
56	34.90	337.40	3.41	11814.22	10017.21
7324.64					
56	34.90	337.40	3.41	11814.22	10017.21
7324.64					
57	34.90	340.20	3.41	11366.35	9715.12
7103.75					
57	34.90	340.20	3.41	11366.35	9715.12
7103.75					
58	34.90	343.98	5.79	18166.85	15728.69
11500.91					
58	34.90	343.98	5.79	18166.85	15728.69
11500.91					
59	34.90	348.73	5.79	16695.92	14736.53
10775.44					

59	34.90	348.73	5.79	16695.92	14736.53
10775.44					
60	34.90	352.60	3.66	10041.76	8969.48
6558.54					
60	34.90	352.60	3.66	10041.76	8969.48
6558.54					
61	41.59	355.90	4.81	11831.04	10866.58
7945.71					
61	41.59	355.90	4.81	11831.04	10866.58
7945.71					
62	41.59	359.25	4.14	9709.21	9035.91
6607.11					
62	41.59	359.25	4.14	9709.21	9035.91
6607.11					
63	41.59	363.07	6.07	12838.28	12301.73
8995.10					
63	41.59	363.07	6.07	12838.28	12301.73
8995.10					
64	41.59	367.61	6.07	10975.25	11045.09
8076.24					
64	41.59	367.61	6.07	10975.25	11045.09
8076.24					
65	41.59	372.15	6.07	9112.21	9788.46
7157.38					
65	41.59	372.15	6.07	9112.21	9788.46
7157.38					
66	41.59	376.69	6.07	7249.18	8531.83
6238.53					
66	41.59	376.69	6.07	7249.18	8531.83
6238.53					
67	41.59	381.23	6.07	5386.15	7275.20
5319.67					
67	41.59	381.23	6.07	5386.15	7275.20
5319.67					
68	41.59	383.76	0.69	494.85	749.39
547.96					
68	41.59	383.76	0.69	494.85	749.39
547.96					
69	48.28	386.54	7.59	2718.53	6385.64
4669.22					
69	48.28	386.54	7.59	2718.53	6385.64
4669.22					
70	48.28	391.59	7.59	1685.13	1136.63
831.11					
70	48.28	391.59	7.59	1685.13	1136.63
831.11					

SUM OF MOMENTS = 0.290472E+01 (ft/lbs);Imbalance (Fraction of Total Weight) = 0.2272097E-05

Sum of the Resisting Forces = 972486.56 (lbs)

Average Available Shear Strength = 2901.44(psf)

Sum of the Driving Forces = 711088.12 (lbs)

Average Mobilized Shear Stress = 2121.55(psf)

Total length of the failure surface = 335.17(ft)

Factor of Safety Balance Check: FS = 1.36760

CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.49891(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 1330.136(ft)

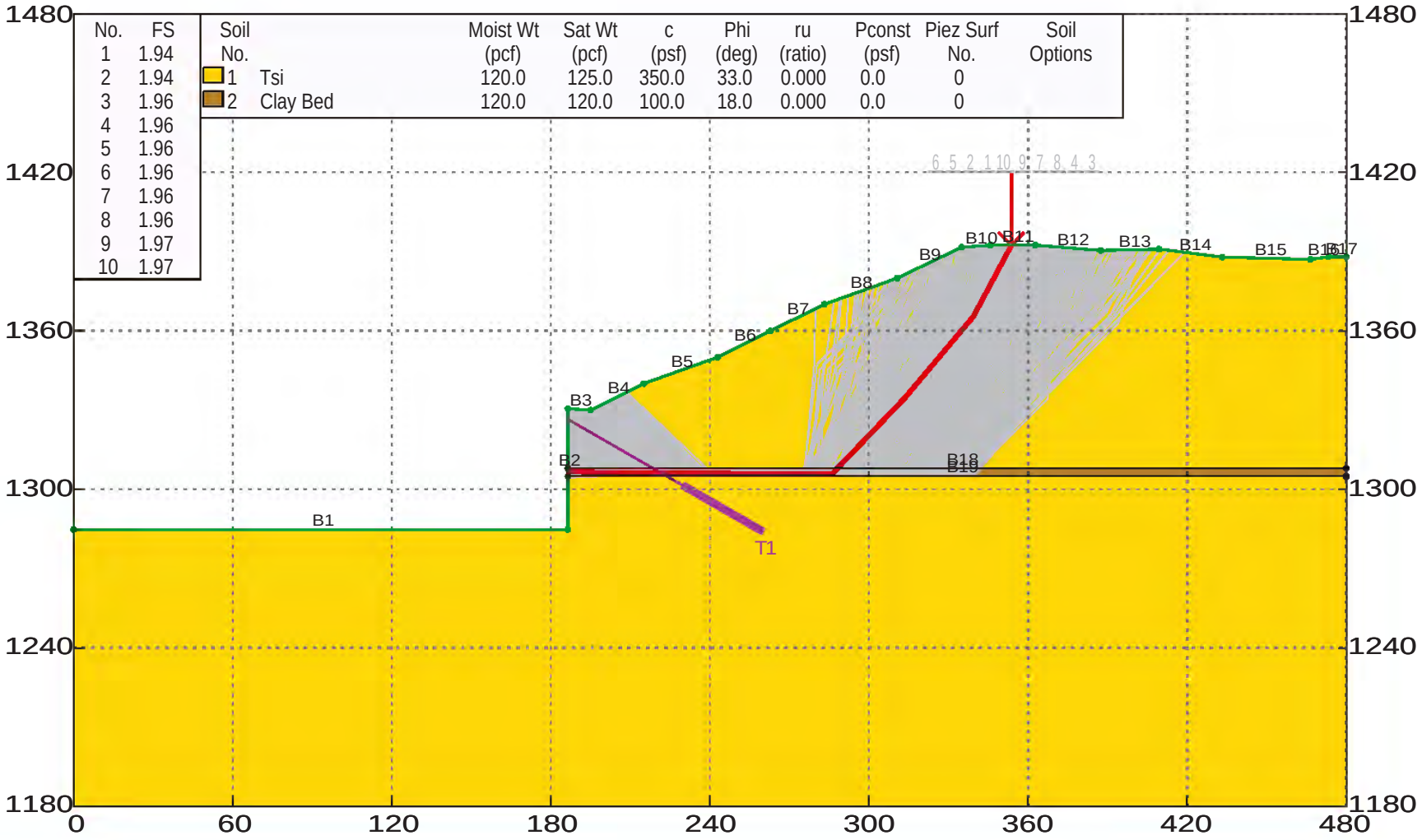
Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Block (Static)

LGC Geotechnical / BPP

\Section B - Static - Block - Tieback.gsd



GEOSTASE FS = 1.94

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Block - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Block - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Block (Static)

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface Option	Water Pressure Constant (psf)
1 Tsi	120.0	125.0	350.00	33.00	0.000	0	0.0
2 Clay Bed	120.0	120.0	100.00	18.00	0.000	0	0.0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

EARTHQUAKE DATA HAS BEEN SUPPRESSED

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of
Non-Circular Zone Search = 40.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	186.50	1306.40	240.00	1306.40	3.00
2	275.00	1306.40	340.00	1306.40	3.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 263

Number of Trial Surfaces With Valid FS = 737

Percentage of Trial Surfaces With Non-Converged and/or

Non-Valid FS Solutions of the Total Attempted = 26.3 %

Statistical Data On All Valid FS Values:
FS Max = 8.492 FS Min = 1.943 FS Ave = 2.720
Standard Deviation = 0.581 Coefficient of Variation = 21.35 %

Critical Surface is Sequence Number 193 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	221.46	1306.26

Factor Of Safety For The Critical or Specified Surface = 1.943

Table 1 - Geometry Data on the 38 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	3.45	23.49	188.13	1306.91	1330.40	-5.02	-3.33	3.46
2	3.45	23.59	191.58	1306.61	1330.20	-5.02	-3.33	3.46
3	1.70	23.60	194.15	1306.45	1330.05	-0.40	-3.33	1.70
4	5.00	24.82	197.50	1306.43	1331.25	-0.40	26.57	5.00
5	5.00	27.36	202.50	1306.39	1333.75	-0.40	26.57	5.00
6	5.00	29.89	207.50	1306.36	1336.25	-0.40	26.57	5.00
7	5.00	32.43	212.50	1306.32	1338.75	-0.40	26.57	5.00
8	4.65	34.55	217.32	1306.29	1340.83	-0.40	19.72	4.65
9	4.65	36.24	221.98	1306.26	1342.50	-0.40	19.72	4.65

10	4.65	37.94	226.62	1306.22	1344.17	-0.40	19.72
4.65							
11	4.65	39.64	231.27	1306.19	1345.83	-0.40	19.72
4.65							
12	4.65	41.34	235.93	1306.16	1347.50	-0.40	19.72
4.65							
13	4.65	43.04	240.57	1306.13	1349.17	-0.40	19.72
4.65							
14	4.95	45.14	245.38	1306.09	1351.24	-0.40	26.57
4.95							
15	4.95	47.65	250.32	1306.06	1353.71	-0.40	26.57
4.95							
16	4.95	50.16	255.28	1306.03	1356.19	-0.40	26.57
4.95							
17	4.95	52.67	260.23	1305.99	1358.66	-0.40	26.57
4.95							
18	5.10	55.21	265.25	1305.96	1361.16	-0.40	26.34
5.10							
19	5.10	57.77	270.35	1305.92	1363.69	-0.40	26.34
5.10							
20	5.10	60.33	275.45	1305.89	1366.21	-0.40	26.34
5.10							
21	5.10	62.89	280.55	1305.85	1368.74	-0.40	26.34
5.10							
22	2.93	64.70	284.56	1305.82	1370.53	-0.40	19.80
2.93							
23	1.99	64.55	287.02	1306.86	1371.41	46.35	19.80
2.88							
24	4.52	62.32	290.27	1310.27	1372.58	46.35	19.80
6.54							
25	4.52	59.21	294.79	1315.00	1374.21	46.35	19.80
6.54							
26	4.52	56.10	299.31	1319.74	1375.83	46.35	19.80
6.54							
27	4.52	52.99	303.82	1324.47	1377.46	46.35	19.80
6.54							
28	4.52	49.88	308.34	1329.21	1379.09	46.35	19.80
6.54							
29	3.04	47.47	312.12	1333.16	1380.63	46.35	25.71
4.40							
30	5.32	44.72	316.29	1337.92	1382.64	50.00	25.71
8.27							
31	5.32	40.94	321.61	1344.26	1385.20	50.00	25.71
8.27							
32	5.32	37.17	326.93	1350.60	1387.76	50.00	25.71
8.27							
33	5.32	33.39	332.24	1356.93	1390.32	50.00	25.71
8.27							
34	4.45	29.01	337.12	1362.75	1391.76	50.00	4.20
6.92							

35	3.23	23.62	340.96	1368.43	1392.04	61.96	4.20
6.86							
36	3.23	17.79	344.19	1374.49	1392.28	61.96	4.20
6.86							
37	3.96	11.16	347.78	1381.24	1392.40	61.96	0.00
8.43							
38	3.96	3.72	351.74	1388.68	1392.40	61.96	0.00
8.43							

Table 2 - Force Data On The 38 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	9727.8	0.0	0.0	0.0	0.0	0.0
2	9770.2	0.0	0.0	0.0	0.0	0.0
3	4809.6	0.0	0.0	0.0	0.0	0.0
4	14895.0	0.0	0.0	0.0	0.0	0.0
5	16415.7	0.0	0.0	0.0	0.0	0.0
6	17936.4	0.0	0.0	0.0	0.0	0.0
7	19457.1	0.0	0.0	0.0	0.0	0.0
8	19276.2	0.0	0.0	0.0	0.0	0.0
9	20224.1	0.0	0.0	0.0	0.0	0.0
10	21172.0	0.0	0.0	0.0	0.0	0.0
11	22119.9	0.0	0.0	0.0	0.0	0.0
12	23067.9	0.0	0.0	0.0	0.0	0.0
13	24015.8	0.0	0.0	0.0	0.0	0.0
14	26814.9	0.0	0.0	0.0	0.0	0.0
15	28305.4	0.0	0.0	0.0	0.0	0.0
16	29795.8	0.0	0.0	0.0	0.0	0.0
17	31286.3	0.0	0.0	0.0	0.0	0.0
18	33785.6	0.0	0.0	0.0	0.0	0.0
19	35352.4	0.0	0.0	0.0	0.0	0.0
20	36919.3	0.0	0.0	0.0	0.0	0.0
21	38486.1	0.0	0.0	0.0	0.0	0.0
22	22711.3	0.0	0.0	0.0	0.0	0.0
23	15417.5	0.0	0.0	0.0	0.0	0.0
24	33776.9	0.0	0.0	0.0	0.0	0.0
25	32092.0	0.0	0.0	0.0	0.0	0.0
26	30407.2	0.0	0.0	0.0	0.0	0.0
27	28722.3	0.0	0.0	0.0	0.0	0.0
28	27037.4	0.0	0.0	0.0	0.0	0.0
29	17295.9	0.0	0.0	0.0	0.0	0.0
30	28526.1	0.0	0.0	0.0	0.0	0.0
31	26117.1	0.0	0.0	0.0	0.0	0.0
32	23708.1	0.0	0.0	0.0	0.0	0.0

33	21299.2	0.0	0.0	0.0	0.0	0.0
34	15481.0	0.0	0.0	0.0	0.0	0.0
35	9144.8	0.0	0.0	0.0	0.0	0.0
36	6890.3	0.0	0.0	0.0	0.0	0.0
37	5308.5	0.0	0.0	0.0	0.0	0.0
38	1769.5	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 829338.52(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 829338.52(lbs)

TOTAL AREA OF SLIDING MASS = 6911.15(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 38 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	2	100.00	18.00	
2	2	100.00	18.00	
3	2	100.00	18.00	
4	2	100.00	18.00	
5	2	100.00	18.00	
6	2	100.00	18.00	
7	2	100.00	18.00	
8	2	100.00	18.00	
9	2	100.00	18.00	
10	2	100.00	18.00	
11	2	100.00	18.00	
12	2	100.00	18.00	
13	2	100.00	18.00	
14	2	100.00	18.00	
15	2	100.00	18.00	
16	2	100.00	18.00	
17	2	100.00	18.00	
18	2	100.00	18.00	
19	2	100.00	18.00	
20	2	100.00	18.00	
21	2	100.00	18.00	
22	2	100.00	18.00	
23	2	100.00	18.00	
24	1	350.00	33.00	
25	1	350.00	33.00	
26	1	350.00	33.00	
27	1	350.00	33.00	
28	1	350.00	33.00	
29	1	350.00	33.00	
30	1	350.00	33.00	
31	1	350.00	33.00	
32	1	350.00	33.00	

33	1	350.00	33.00
34	1	350.00	33.00
35	1	350.00	33.00
36	1	350.00	33.00
37	1	350.00	33.00
38	1	350.00	33.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 38 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-5.02	188.13	3.46	2869.29	1032.29	530.27
1	-5.02	188.13	3.46	2869.29	1032.29	530.27
2	-5.02	191.58	3.46	2881.79	1036.35	532.36
2	-5.02	191.58	3.46	2881.79	1036.35	532.36
3	-0.40	194.15	1.70	2836.06	1021.49	524.73
3	-0.40	194.15	1.70	2836.06	1021.49	524.73
4	-0.40	197.50	5.00	2983.10	1069.27	549.27
4	-0.40	197.50	5.00	2983.10	1069.27	549.27
5	-0.40	202.50	5.00	3287.62	1168.21	600.10
5	-0.40	202.50	5.00	3287.62	1168.21	600.10
6	-0.40	207.50	5.00	3592.14	1267.16	650.92
6	-0.40	207.50	5.00	3592.14	1267.16	650.92
7	-0.40	212.50	5.00	3896.66	1366.10	701.75

7	-0.40	212.50	5.00	3896.66	1366.10	701.75
8	-0.40	217.32	4.65	4150.98	1448.73	744.20
8	-0.40	217.32	4.65	4150.98	1448.73	744.20
9	-0.40	221.98	4.65	10814.74	3613.92	1856.43
9	-0.40	221.98	4.65	10814.74	3613.92	1856.43
10	-0.40	226.62	4.65	4559.19	1581.37	812.33
10	-0.40	226.62	4.65	4559.19	1581.37	812.33
11	-0.40	231.27	4.65	4763.30	1647.69	846.40
11	-0.40	231.27	4.65	4763.30	1647.69	846.40
12	-0.40	235.93	4.65	4967.40	1714.01	880.47
12	-0.40	235.93	4.65	4967.40	1714.01	880.47
13	-0.40	240.57	4.65	5171.51	1780.33	914.53
13	-0.40	240.57	4.65	5171.51	1780.33	914.53
14	-0.40	245.38	4.95	5424.30	1862.46	956.73
14	-0.40	245.38	4.95	5424.30	1862.46	956.73
15	-0.40	250.32	4.95	5725.78	1960.42	1007.05
15	-0.40	250.32	4.95	5725.78	1960.42	1007.05
16	-0.40	255.28	4.95	6027.25	2058.37	1057.36
16	-0.40	255.28	4.95	6027.25	2058.37	1057.36
17	-0.40	260.23	4.95	6328.73	2156.33	1107.68
17	-0.40	260.23	4.95	6328.73	2156.33	1107.68
18	-0.40	265.25	5.10	6633.27	2255.28	1158.51
18	-0.40	265.25	5.10	6633.27	2255.28	1158.51
19	-0.40	270.35	5.10	6940.88	2355.23	1209.86
19	-0.40	270.35	5.10	6940.88	2355.23	1209.86

20	-0.40	275.45	5.10	7248.49	2455.18
1261.20					
20	-0.40	275.45	5.10	7248.49	2455.18
1261.20					
21	-0.40	280.55	5.10	7556.10	2555.12
1312.54					
21	-0.40	280.55	5.10	7556.10	2555.12
1312.54					
22	-0.40	284.56	2.93	7774.38	2626.05
1348.97					
22	-0.40	284.56	2.93	7774.38	2626.05
1348.97					
23	46.35	287.02	2.88	6465.18	2200.67
1130.46					
23	46.35	287.02	2.88	6465.18	2200.67
1130.46					
24	46.35	290.27	6.54	5278.25	3777.74
1940.58					
24	46.35	290.27	6.54	5278.25	3777.74
1940.58					
25	46.35	294.79	6.54	5007.59	3601.96
1850.29					
25	46.35	294.79	6.54	5007.59	3601.96
1850.29					
26	46.35	299.31	6.54	4736.92	3426.19
1760.00					
26	46.35	299.31	6.54	4736.92	3426.19
1760.00					
27	46.35	303.82	6.54	4466.25	3250.42
1669.70					
27	46.35	303.82	6.54	4466.25	3250.42
1669.70					
28	46.35	308.34	6.54	4195.58	3074.64
1579.41					
28	46.35	308.34	6.54	4195.58	3074.64
1579.41					
29	46.35	312.12	4.40	3985.33	2938.10
1509.27					
29	46.35	312.12	4.40	3985.33	2938.10
1509.27					
30	50.00	316.29	8.27	3590.65	2681.80
1377.61					
30	50.00	316.29	8.27	3590.65	2681.80
1377.61					
31	50.00	321.61	8.27	3273.74	2475.99
1271.89					
31	50.00	321.61	8.27	3273.74	2475.99
1271.89					
32	50.00	326.93	8.27	2956.83	2270.19
1166.17					

32	50.00	326.93	8.27	2956.83	2270.19	1166.17
33	50.00	332.24	8.27	2639.92	2064.38	1060.45
33	50.00	332.24	8.27	2639.92	2064.38	1060.45
34	50.00	337.12	6.92	2272.79	1825.97	937.98
34	50.00	337.12	6.92	2272.79	1825.97	937.98
35	61.96	340.96	6.86	1471.90	1305.86	670.81
35	61.96	340.96	6.86	1471.90	1305.86	670.81
36	61.96	344.19	6.86	1055.37	1035.37	531.86
36	61.96	344.19	6.86	1055.37	1035.37	531.86
37	61.96	347.78	8.43	580.92	727.25	373.58
37	61.96	347.78	8.43	580.92	727.25	373.58
38	61.96	351.74	8.43	48.54	381.52	195.98
38	61.96	351.74	8.43	48.54	381.52	195.98

Table 4 - Base Force Data on the 38 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.02	188.13	3.46	9939.74	3576.04	1836.97
1	-5.02	188.13	3.46	9939.74	3576.04	1836.97
2	-5.02	191.58	3.46	9983.05	3590.11	1844.20
2	-5.02	191.58	3.46	9983.05	3590.11	1844.20
3	-0.40	194.15	1.70	4816.35	1734.75	891.12
3	-0.40	194.15	1.70	4816.35	1734.75	891.12

4	-0.40	197.50	5.00	14915.84	5346.46
2746.42					
4	-0.40	197.50	5.00	14915.84	5346.46
2746.42					
5	-0.40	202.50	5.00	16438.48	5841.20
3000.56					
5	-0.40	202.50	5.00	16438.48	5841.20
3000.56					
6	-0.40	207.50	5.00	17961.13	6335.94
3254.70					
6	-0.40	207.50	5.00	17961.13	6335.94
3254.70					
7	-0.40	212.50	5.00	19483.77	6830.67
3508.84					
7	-0.40	212.50	5.00	19483.77	6830.67
3508.84					
8	-0.40	217.32	4.65	19302.50	6736.77
3460.61					
8	-0.40	217.32	4.65	19302.50	6736.77
3460.61					
9	-0.40	221.98	4.65	50289.76	16805.14
8632.62					
9	-0.40	221.98	4.65	50289.76	16805.14
8632.62					
10	-0.40	226.62	4.65	21200.73	7353.55
3777.44					
10	-0.40	226.62	4.65	21200.73	7353.55
3777.44					
11	-0.40	231.27	4.65	22149.85	7661.93
3935.85					
11	-0.40	231.27	4.65	22149.85	7661.93
3935.85					
12	-0.40	235.93	4.65	23098.97	7970.32
4094.27					
12	-0.40	235.93	4.65	23098.97	7970.32
4094.27					
13	-0.40	240.57	4.65	24048.09	8278.71
4252.68					
13	-0.40	240.57	4.65	24048.09	8278.71
4252.68					
14	-0.40	245.38	4.95	26850.93	9219.41
4735.91					
14	-0.40	245.38	4.95	26850.93	9219.41
4735.91					
15	-0.40	250.32	4.95	28343.27	9704.30
4984.99					
15	-0.40	250.32	4.95	28343.27	9704.30
4984.99					
16	-0.40	255.28	4.95	29835.62	10189.19
5234.08					

16	-0.40	255.28	4.95	29835.62	10189.19 5234.08
17	-0.40	260.23	4.95	31327.96	10674.08 5483.16
17	-0.40	260.23	4.95	31327.96	10674.08 5483.16
18	-0.40	265.25	5.10	33830.49	11502.21 5908.56
18	-0.40	265.25	5.10	33830.49	11502.21 5908.56
19	-0.40	270.35	5.10	35399.33	12011.95 6170.41
19	-0.40	270.35	5.10	35399.33	12011.95 6170.41
20	-0.40	275.45	5.10	36968.18	12521.70 6432.26
20	-0.40	275.45	5.10	36968.18	12521.70 6432.26
21	-0.40	280.55	5.10	38537.02	13031.45 6694.11
21	-0.40	280.55	5.10	38537.02	13031.45 6694.11
22	-0.40	284.56	2.93	22741.25	7681.60 3945.95
22	-0.40	284.56	2.93	22741.25	7681.60 3945.95
23	46.35	287.02	2.88	18640.57	6345.01 3259.36
23	46.35	287.02	2.88	18640.57	6345.01 3259.36
24	46.35	290.27	6.54	34538.67	24719.93 12698.36
24	46.35	290.27	6.54	34538.67	24719.93 12698.36
25	46.35	294.79	6.54	32767.54	23569.74 12107.52
25	46.35	294.79	6.54	32767.54	23569.74 12107.52
26	46.35	299.31	6.54	30996.40	22419.55 11516.68
26	46.35	299.31	6.54	30996.40	22419.55 11516.68
27	46.35	303.82	6.54	29225.26	21269.36 10925.84
27	46.35	303.82	6.54	29225.26	21269.36 10925.84
28	46.35	308.34	6.54	27454.13	20119.17 10335.00
28	46.35	308.34	6.54	27454.13	20119.17 10335.00

29	46.35	312.12	4.40	17530.97	12924.35 6639.10
29	46.35	312.12	4.40	17530.97	12924.35 6639.10
30	50.00	316.29	8.27	29696.72	22179.97 11393.61
30	50.00	316.29	8.27	29696.72	22179.97 11393.61
31	50.00	321.61	8.27	27075.69	20477.86 10519.25
31	50.00	321.61	8.27	27075.69	20477.86 10519.25
32	50.00	326.93	8.27	24454.66	18775.74 9644.90
32	50.00	326.93	8.27	24454.66	18775.74 9644.90
33	50.00	332.24	8.27	21833.63	17073.63 8770.54
33	50.00	332.24	8.27	21833.63	17073.63 8770.54
34	50.00	337.12	6.92	15722.57	12631.56 6488.70
34	50.00	337.12	6.92	15722.57	12631.56 6488.70
35	61.96	340.96	6.86	10104.30	8964.49 4604.96
35	61.96	340.96	6.86	10104.30	8964.49 4604.96
36	61.96	344.19	6.86	7244.91	7107.58 3651.08
36	61.96	344.19	6.86	7244.91	7107.58 3651.08
37	61.96	347.78	8.43	4897.77	6131.53 3149.70
37	61.96	347.78	8.43	4897.77	6131.53 3149.70
38	61.96	351.74	8.43	409.27	3216.66 1652.37
38	61.96	351.74	8.43	409.27	3216.66 1652.37

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 38 Slices (Only Applicable Slices Listed)

Slice	Horiz Force	Vert Force	Result Force	Inclin(deg)	Moment@Base Cntr

No.	(lbs)	(lbs)	(lbs)		(ft/lbs)
9	51961.5	30000.0	60000.0	30.00	0.153442E+05

Sum of the Resisting Forces = 345774.51 (lbs)

Average Available Shear Strength = 1644.62(psf)

Sum of the Driving Forces = 192023.48 (lbs)

Average Mobilized Shear Stress = 913.33(psf)

Total length of the failure surface = 210.25(ft)

Factor of Safety Balance Check: FS = 1.80069

Janbu's Correction Factor (fo) = 1.0790

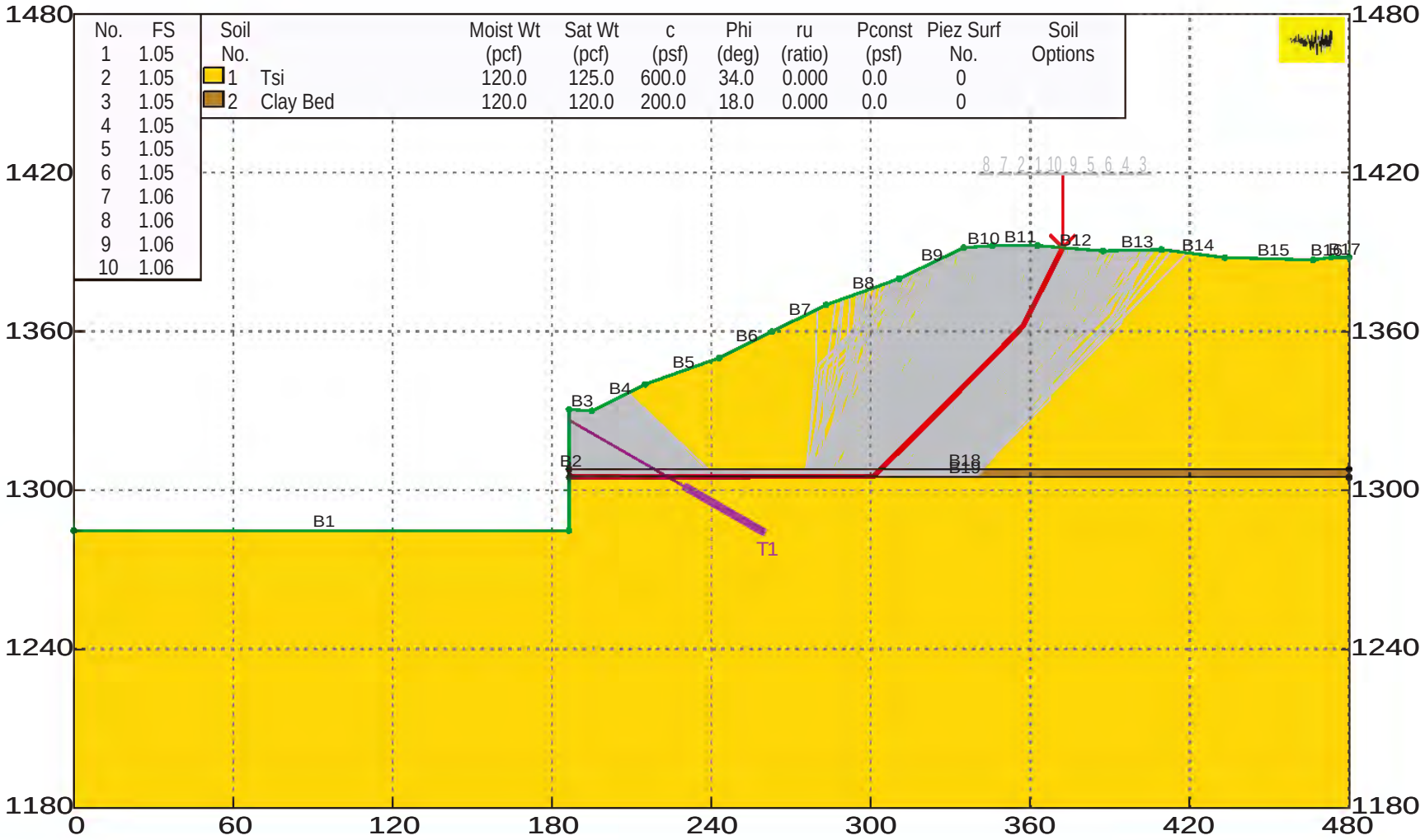
Janub's FS Corrected = 1.94290

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Block (Seismic (117A))

LGC Geotechnical / BPP

\Section B - Seismic (117A) - Block - Tieback.gsd



GEOSTASE FS = 1.05

Simplified Janbu (Corrected) Method

kh = 0.26000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

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SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Block - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Block - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Block (Seismic (117A))

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface Option	Water Pressure Constant (psf)
1 Tsi	120.0	125.0	600.00	34.00	0.000	0	0.0
2 Clay Bed	120.0	120.0	200.00	18.00	0.000	0	0.0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of
Non-Circular Zone Search = 40.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	186.50	1306.40	240.00	1306.40	3.00
2	275.00	1306.40	340.00	1306.40	3.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 105

Number of Trial Surfaces With Valid FS = 895

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 10.5 %

Statistical Data On All Valid FS Values:
FS Max = 4.074 FS Min = 1.047 FS Ave = 1.525
Standard Deviation = 0.367 Coefficient of Variation = 24.08 %

Critical Surface is Sequence Number 333 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	223.49	1305.09

Factor Of Safety For The Critical or Specified Surface = 1.047

Table 1 - Geometry Data on the 42 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	1.13	25.00	186.96	1305.47	1330.47	-39.23	-3.33	1.46
2	3.74	25.31	189.40	1305.02	1330.33	0.12	-3.33	3.74
3	3.74	25.09	193.13	1305.02	1330.11	0.12	-3.33	3.74
4	5.00	26.22	197.50	1305.03	1331.25	0.12	26.57	5.00
5	5.00	28.71	202.50	1305.04	1333.75	0.12	26.57	5.00
6	5.00	31.20	207.50	1305.05	1336.25	0.12	26.57	5.00
7	5.00	33.69	212.50	1305.06	1338.75	0.12	26.57	5.00
8	4.65	35.76	217.32	1305.07	1340.83	0.12	19.72	4.65
9	4.65	37.42	221.98	1305.08	1342.50	0.12	19.72	4.65
10	4.65	39.07	226.62	1305.09	1344.17	0.12	19.72	4.65

11	4.65	40.73	231.27	1305.10	1345.83	0.12	19.72
4.65							
12	4.65	42.39	235.93	1305.11	1347.50	0.12	19.72
4.65							
13	4.65	44.04	240.57	1305.12	1349.17	0.12	19.72
4.65							
14	4.95	46.10	245.38	1305.13	1351.24	0.12	26.57
4.95							
15	4.95	48.57	250.32	1305.14	1353.71	0.12	26.57
4.95							
16	4.95	51.03	255.28	1305.15	1356.19	0.12	26.57
4.95							
17	4.95	53.50	260.23	1305.16	1358.66	0.12	26.57
4.95							
18	5.10	55.99	265.25	1305.17	1361.16	0.12	26.34
5.10							
19	5.10	58.50	270.35	1305.19	1363.69	0.12	26.34
5.10							
20	5.10	61.02	275.45	1305.20	1366.21	0.12	26.34
5.10							
21	5.10	63.53	280.55	1305.21	1368.74	0.12	26.34
5.10							
22	4.50	65.59	285.35	1305.22	1370.81	0.12	19.80
4.50							
23	4.50	67.20	289.85	1305.23	1372.43	0.12	19.80
4.50							
24	4.50	68.81	294.35	1305.24	1374.05	0.12	19.80
4.50							
25	4.50	70.43	298.85	1305.25	1375.67	0.12	19.80
4.50							
26	2.64	70.38	302.42	1306.57	1376.96	45.06	19.80
3.74							
27	3.43	68.43	305.46	1309.62	1378.05	45.06	19.80
4.85							
28	3.43	66.23	308.89	1313.05	1379.28	45.06	19.80
4.85							
29	4.69	63.91	312.94	1317.12	1381.03	45.06	25.71
6.64							
30	4.69	61.47	317.63	1321.82	1383.29	45.06	25.71
6.64							
31	4.69	59.03	322.32	1326.52	1385.54	45.06	25.71
6.64							
32	4.69	56.59	327.01	1331.21	1387.80	45.06	25.71
6.64							
33	2.77	54.62	330.74	1334.97	1389.60	45.52	25.71
3.96							
34	2.77	53.14	333.51	1337.80	1390.93	45.52	25.71
3.96							
35	5.45	49.82	337.62	1341.98	1391.80	45.52	4.20
7.78							

36	5.45	44.67	343.08	1347.53	1392.20	45.52	4.20
7.78							
37	5.79	39.14	348.70	1353.26	1392.40	45.52	0.00
8.27							
38	5.79	33.25	354.49	1359.15	1392.40	45.52	0.00
8.27							
39	2.66	27.64	358.71	1364.76	1392.40	63.38	0.00
5.93							
40	2.66	22.34	361.37	1370.06	1392.40	63.38	0.00
5.93							
41	4.74	14.76	365.07	1377.44	1392.21	63.38	-4.63
10.58							
42	4.74	4.92	369.81	1386.90	1391.82	63.38	-4.63
10.58							

Table 2 - Force Data On The 42 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	3385.2	0.0	0.0	880.1	0.0	0.0
2	11346.4	0.0	0.0	2950.1	0.0	0.0
3	11245.5	0.0	0.0	2923.8	0.0	0.0
4	15730.7	0.0	0.0	4090.0	0.0	0.0
5	17224.4	0.0	0.0	4478.4	0.0	0.0
6	18718.1	0.0	0.0	4866.7	0.0	0.0
7	20211.8	0.0	0.0	5255.1	0.0	0.0
8	19953.8	0.0	0.0	5188.0	0.0	0.0
9	20878.4	0.0	0.0	5428.4	0.0	0.0
10	21802.9	0.0	0.0	5668.8	0.0	0.0
11	22727.5	0.0	0.0	5909.1	0.0	0.0
12	23652.0	0.0	0.0	6149.5	0.0	0.0
13	24576.6	0.0	0.0	6389.9	0.0	0.0
14	27386.2	0.0	0.0	7120.4	0.0	0.0
15	28850.2	0.0	0.0	7501.0	0.0	0.0
16	30314.2	0.0	0.0	7881.7	0.0	0.0
17	31778.1	0.0	0.0	8262.3	0.0	0.0
18	34264.6	0.0	0.0	8908.8	0.0	0.0
19	35803.4	0.0	0.0	9308.9	0.0	0.0
20	37342.1	0.0	0.0	9708.9	0.0	0.0
21	38880.8	0.0	0.0	10109.0	0.0	0.0
22	35421.9	0.0	0.0	9209.7	0.0	0.0
23	36291.6	0.0	0.0	9435.8	0.0	0.0
24	37161.4	0.0	0.0	9662.0	0.0	0.0
25	38031.2	0.0	0.0	9888.1	0.0	0.0
26	22336.3	0.0	0.0	5807.4	0.0	0.0

27	28144.3	0.0	0.0	7317.5	0.0	0.0
28	27239.3	0.0	0.0	7082.2	0.0	0.0
29	35961.6	0.0	0.0	9350.0	0.0	0.0
30	34588.2	0.0	0.0	8992.9	0.0	0.0
31	33214.7	0.0	0.0	8635.8	0.0	0.0
32	31841.2	0.0	0.0	8278.7	0.0	0.0
33	18169.6	0.0	0.0	4724.1	0.0	0.0
34	17674.6	0.0	0.0	4595.4	0.0	0.0
35	32579.8	0.0	0.0	8470.8	0.0	0.0
36	29211.7	0.0	0.0	7595.0	0.0	0.0
37	27201.0	0.0	0.0	7072.3	0.0	0.0
38	23102.8	0.0	0.0	6006.7	0.0	0.0
39	8820.6	0.0	0.0	2293.4	0.0	0.0
40	7127.8	0.0	0.0	1853.2	0.0	0.0
41	8399.6	0.0	0.0	2183.9	0.0	0.0
42	2799.9	0.0	0.0	728.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1031391.96(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1031391.96(lbs)

TOTAL AREA OF SLIDING MASS = 8594.93(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 42 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	2	200.00	18.00	
2	2	200.00	18.00	
3	2	200.00	18.00	
4	2	200.00	18.00	
5	2	200.00	18.00	
6	2	200.00	18.00	
7	2	200.00	18.00	
8	2	200.00	18.00	
9	2	200.00	18.00	
10	2	200.00	18.00	
11	2	200.00	18.00	
12	2	200.00	18.00	
13	2	200.00	18.00	
14	2	200.00	18.00	
15	2	200.00	18.00	
16	2	200.00	18.00	
17	2	200.00	18.00	
18	2	200.00	18.00	
19	2	200.00	18.00	
20	2	200.00	18.00	
21	2	200.00	18.00	
22	2	200.00	18.00	

23	2	200.00	18.00
24	2	200.00	18.00
25	2	200.00	18.00
26	2	200.00	18.00
27	1	600.00	34.00
28	1	600.00	34.00
29	1	600.00	34.00
30	1	600.00	34.00
31	1	600.00	34.00
32	1	600.00	34.00
33	1	600.00	34.00
34	1	600.00	34.00
35	1	600.00	34.00
36	1	600.00	34.00
37	1	600.00	34.00
38	1	600.00	34.00
39	1	600.00	34.00
40	1	600.00	34.00
41	1	600.00	34.00
42	1	600.00	34.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 42 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-39.23	186.96	1.46	4358.74	1616.24	1539.27
1	-39.23	186.96	1.46	4358.74	1616.24	1539.27
2	0.12	189.40	3.74	3034.72	1186.04	1129.56
2	0.12	189.40	3.74	3034.72	1186.04	1129.56
3	0.12	193.13	3.74	3007.73	1177.27	1121.20
3	0.12	193.13	3.74	3007.73	1177.27	1121.20

4	0.12	197.50	5.00	3143.50	1221.39
1163.22					
4	0.12	197.50	5.00	3143.50	1221.39
1163.22					
5	0.12	202.50	5.00	3442.03	1318.38
1255.60					
5	0.12	202.50	5.00	3442.03	1318.38
1255.60					
6	0.12	207.50	5.00	3740.56	1415.38
1347.97					
6	0.12	207.50	5.00	3740.56	1415.38
1347.97					
7	0.12	212.50	5.00	4039.09	1512.38
1440.35					
7	0.12	212.50	5.00	4039.09	1512.38
1440.35					
8	0.12	217.32	4.65	4287.70	1593.16
1517.28					
8	0.12	217.32	4.65	4287.70	1593.16
1517.28					
9	0.12	221.98	4.65	10933.46	3752.50
3573.79					
9	0.12	221.98	4.65	10933.46	3752.50
3573.79					
10	0.12	226.62	4.65	4685.07	1722.27
1640.25					
10	0.12	226.62	4.65	4685.07	1722.27
1640.25					
11	0.12	231.27	4.65	4883.76	1786.83
1701.73					
11	0.12	231.27	4.65	4883.76	1786.83
1701.73					
12	0.12	235.93	4.65	5082.44	1851.39
1763.22					
12	0.12	235.93	4.65	5082.44	1851.39
1763.22					
13	0.12	240.57	4.65	5281.13	1915.94
1824.70					
13	0.12	240.57	4.65	5281.13	1915.94
1824.70					
14	0.12	245.38	4.95	5528.25	1996.24
1901.17					
14	0.12	245.38	4.95	5528.25	1996.24
1901.17					
15	0.12	250.32	4.95	5823.79	2092.26
1992.62					
15	0.12	250.32	4.95	5823.79	2092.26
1992.62					
16	0.12	255.28	4.95	6119.33	2188.29
2084.08					

16	0.12	255.28	4.95	6119.33	2188.29	2084.08
17	0.12	260.23	4.95	6414.88	2284.32	2175.53
17	0.12	260.23	4.95	6414.88	2284.32	2175.53
18	0.12	265.25	5.10	6713.40	2381.32	2267.91
18	0.12	265.25	5.10	6713.40	2381.32	2267.91
19	0.12	270.35	5.10	7014.90	2479.28	2361.21
19	0.12	270.35	5.10	7014.90	2479.28	2361.21
20	0.12	275.45	5.10	7316.40	2577.24	2454.50
20	0.12	275.45	5.10	7316.40	2577.24	2454.50
21	0.12	280.55	5.10	7617.90	2675.21	2547.80
21	0.12	280.55	5.10	7617.90	2675.21	2547.80
22	0.12	285.35	4.50	7865.22	2755.56	2624.33
22	0.12	285.35	4.50	7865.22	2755.56	2624.33
23	0.12	289.85	4.50	8058.36	2818.32	2684.10
23	0.12	289.85	4.50	8058.36	2818.32	2684.10
24	0.12	294.35	4.50	8251.49	2881.07	2743.86
24	0.12	294.35	4.50	8251.49	2881.07	2743.86
25	0.12	298.85	4.50	8444.63	2943.83	2803.63
25	0.12	298.85	4.50	8444.63	2943.83	2803.63
26	45.06	302.42	3.74	6169.98	2204.75	2099.75
26	45.06	302.42	3.74	6169.98	2204.75	2099.75
27	45.06	305.46	4.85	4476.09	3619.16	3446.80
27	45.06	305.46	4.85	4476.09	3619.16	3446.80
28	45.06	308.89	4.85	4320.41	3514.16	3346.80
28	45.06	308.89	4.85	4320.41	3514.16	3346.80

29	45.06	312.94	6.64	4156.24	3403.42
3241.33					
29	45.06	312.94	6.64	4156.24	3403.42
3241.33					
30	45.06	317.63	6.64	3983.55	3286.94
3130.40					
30	45.06	317.63	6.64	3983.55	3286.94
3130.40					
31	45.06	322.32	6.64	3810.87	3170.46
3019.47					
31	45.06	322.32	6.64	3810.87	3170.46
3019.47					
32	45.06	327.01	6.64	3638.19	3053.99
2908.54					
32	45.06	327.01	6.64	3638.19	3053.99
2908.54					
33	45.52	330.74	3.96	3470.08	2940.60
2800.55					
33	45.52	330.74	3.96	3470.08	2940.60
2800.55					
34	45.52	333.51	3.96	3365.50	2870.06
2733.37					
34	45.52	333.51	3.96	3365.50	2870.06
2733.37					
35	45.52	337.62	7.78	3132.24	2712.73
2583.53					
35	45.52	337.62	7.78	3132.24	2712.73
2583.53					
36	45.52	343.08	7.78	2770.32	2468.61
2351.04					
36	45.52	343.08	7.78	2770.32	2468.61
2351.04					
37	45.52	348.70	8.27	2382.15	2206.78
2101.68					
37	45.52	348.70	8.27	2382.15	2206.78
2101.68					
38	45.52	354.49	8.27	1967.71	1927.24
1835.46					
38	45.52	354.49	8.27	1967.71	1927.24
1835.46					
39	63.38	358.71	5.93	873.35	1189.08
1132.45					
39	63.38	358.71	5.93	873.35	1189.08
1132.45					
40	63.38	361.37	5.93	606.56	1009.13
961.07					
40	63.38	361.37	5.93	606.56	1009.13
961.07					
41	63.38	365.07	10.58	225.68	752.23
716.40					

41	63.38	365.07	10.58	225.68	752.23	716.40
42	63.38	369.81	10.58	247.49	166.93	158.98
42	63.38	369.81	10.58	247.49	166.93	158.98

Table 4 - Base Force Data on the 42 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-39.23	186.96	1.46	6350.56	2354.82	2242.67
1	-39.23	186.96	1.46	6350.56	2354.82	2242.67
2	0.12	189.40	3.74	11336.83	4430.70	4219.69
2	0.12	189.40	3.74	11336.83	4430.70	4219.69
3	0.12	193.13	3.74	11236.01	4397.94	4188.50
3	0.12	193.13	3.74	11236.01	4397.94	4188.50
4	0.12	197.50	5.00	15717.54	6106.94	5816.10
4	0.12	197.50	5.00	15717.54	6106.94	5816.10
5	0.12	202.50	5.00	17210.19	6591.93	6278.00
5	0.12	202.50	5.00	17210.19	6591.93	6278.00
6	0.12	207.50	5.00	18702.84	7076.92	6739.89
6	0.12	207.50	5.00	18702.84	7076.92	6739.89
7	0.12	212.50	5.00	20195.48	7561.91	7201.78
7	0.12	212.50	5.00	20195.48	7561.91	7201.78
8	0.12	217.32	4.65	19937.83	7408.19	7055.39
8	0.12	217.32	4.65	19937.83	7408.19	7055.39

9	0.12	221.98	4.65	50840.69	17449.14	16618.14
9	0.12	221.98	4.65	50840.69	17449.14	16618.14
10	0.12	226.62	4.65	21785.62	8008.58	7627.18
10	0.12	226.62	4.65	21785.62	8008.58	7627.18
11	0.12	231.27	4.65	22709.52	8308.77	7913.07
11	0.12	231.27	4.65	22709.52	8308.77	7913.07
12	0.12	235.93	4.65	23633.41	8608.96	8198.97
12	0.12	235.93	4.65	23633.41	8608.96	8198.97
13	0.12	240.57	4.65	24557.31	8909.16	8484.87
13	0.12	240.57	4.65	24557.31	8909.16	8484.87
14	0.12	245.38	4.95	27364.88	9881.39	9410.80
14	0.12	245.38	4.95	27364.88	9881.39	9410.80
15	0.12	250.32	4.95	28827.82	10356.73	9863.50
15	0.12	250.32	4.95	28827.82	10356.73	9863.50
16	0.12	255.28	4.95	30290.76	10832.07	10316.20
16	0.12	255.28	4.95	30290.76	10832.07	10316.20
17	0.12	260.23	4.95	31753.70	11307.41	10768.90
17	0.12	260.23	4.95	31753.70	11307.41	10768.90
18	0.12	265.25	5.10	34238.40	12144.73	11566.35
18	0.12	265.25	5.10	34238.40	12144.73	11566.35
19	0.12	270.35	5.10	35776.06	12644.35	12042.17
19	0.12	270.35	5.10	35776.06	12644.35	12042.17
20	0.12	275.45	5.10	37313.72	13143.97	12518.00
20	0.12	275.45	5.10	37313.72	13143.97	12518.00
21	0.12	280.55	5.10	38851.38	13643.58	12993.82

21	0.12	280.55	5.10	38851.38	13643.58	12993.82
22	0.12	285.35	4.50	35395.08	12400.60	11810.03
22	0.12	285.35	4.50	35395.08	12400.60	11810.03
23	0.12	289.85	4.50	36264.24	12683.01	12078.99
23	0.12	289.85	4.50	36264.24	12683.01	12078.99
24	0.12	294.35	4.50	37133.39	12965.41	12347.94
24	0.12	294.35	4.50	37133.39	12965.41	12347.94
25	0.12	298.85	4.50	38002.55	13247.82	12616.90
25	0.12	298.85	4.50	38002.55	13247.82	12616.90
26	45.06	302.42	3.74	23100.16	8254.49	7861.38
26	45.06	302.42	3.74	23100.16	8254.49	7861.38
27	45.06	305.46	4.85	21717.36	17559.66	16723.40
27	45.06	305.46	4.85	21717.36	17559.66	16723.40
28	45.06	308.89	4.85	20962.06	17050.21	16238.20
28	45.06	308.89	4.85	20962.06	17050.21	16238.20
29	45.06	312.94	6.64	27589.42	22592.14	21516.21
29	45.06	312.94	6.64	27589.42	22592.14	21516.21
30	45.06	317.63	6.64	26443.13	21818.96	20779.85
30	45.06	317.63	6.64	26443.13	21818.96	20779.85
31	45.06	322.32	6.64	25296.84	21045.78	20043.49
31	45.06	322.32	6.64	25296.84	21045.78	20043.49
32	45.06	327.01	6.64	24150.56	20272.60	19307.14
32	45.06	327.01	6.64	24150.56	20272.60	19307.14
33	45.52	330.74	3.96	13728.51	11633.75	11079.71
33	45.52	330.74	3.96	13728.51	11633.75	11079.71

34	45.52	333.51	3.96	13314.76	11354.67
10813.92					
34	45.52	333.51	3.96	13314.76	11354.67
10813.92					
35	45.52	337.62	7.78	24364.23	21101.00
20096.08					
35	45.52	337.62	7.78	24364.23	21101.00
20096.08					
36	45.52	343.08	7.78	21549.03	19202.12
18287.64					
36	45.52	343.08	7.78	21549.03	19202.12
18287.64					
37	45.52	348.70	8.27	19688.98	18239.52
17370.88					
37	45.52	348.70	8.27	19688.98	18239.52
17370.88					
38	45.52	354.49	8.27	16263.60	15929.07
15170.46					
38	45.52	354.49	8.27	16263.60	15929.07
15170.46					
39	63.38	358.71	5.93	5182.74	7056.41
6720.36					
39	63.38	358.71	5.93	5182.74	7056.41
6720.36					
40	63.38	361.37	5.93	3599.55	5988.53
5703.33					
40	63.38	361.37	5.93	3599.55	5988.53
5703.33					
41	63.38	365.07	10.58	2387.89	7959.07
7580.03					
41	63.38	365.07	10.58	2387.89	7959.07
7580.03					
42	63.38	369.81	10.58	2618.57	1766.25
1682.13					
42	63.38	369.81	10.58	2618.57	1766.25
1682.13					

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 42 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
9	51961.5	30000.0	60000.0	30.00	-0.455807E+05

Sum of the Resisting Forces = 411258.18 (lbs)

Average Available Shear Strength = 1803.29(psf)

Sum of the Driving Forces = 423432.20 (lbs)

Average Mobilized Shear Stress = 1856.67(psf)

Total length of the failure surface = 228.06(ft)

Factor of Safety Balance Check: FS = 0.97125

Janbu's Correction Factor (fo) = 1.0777

Janub's FS Corrected = 1.04669

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.28253(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 1319.722(ft)

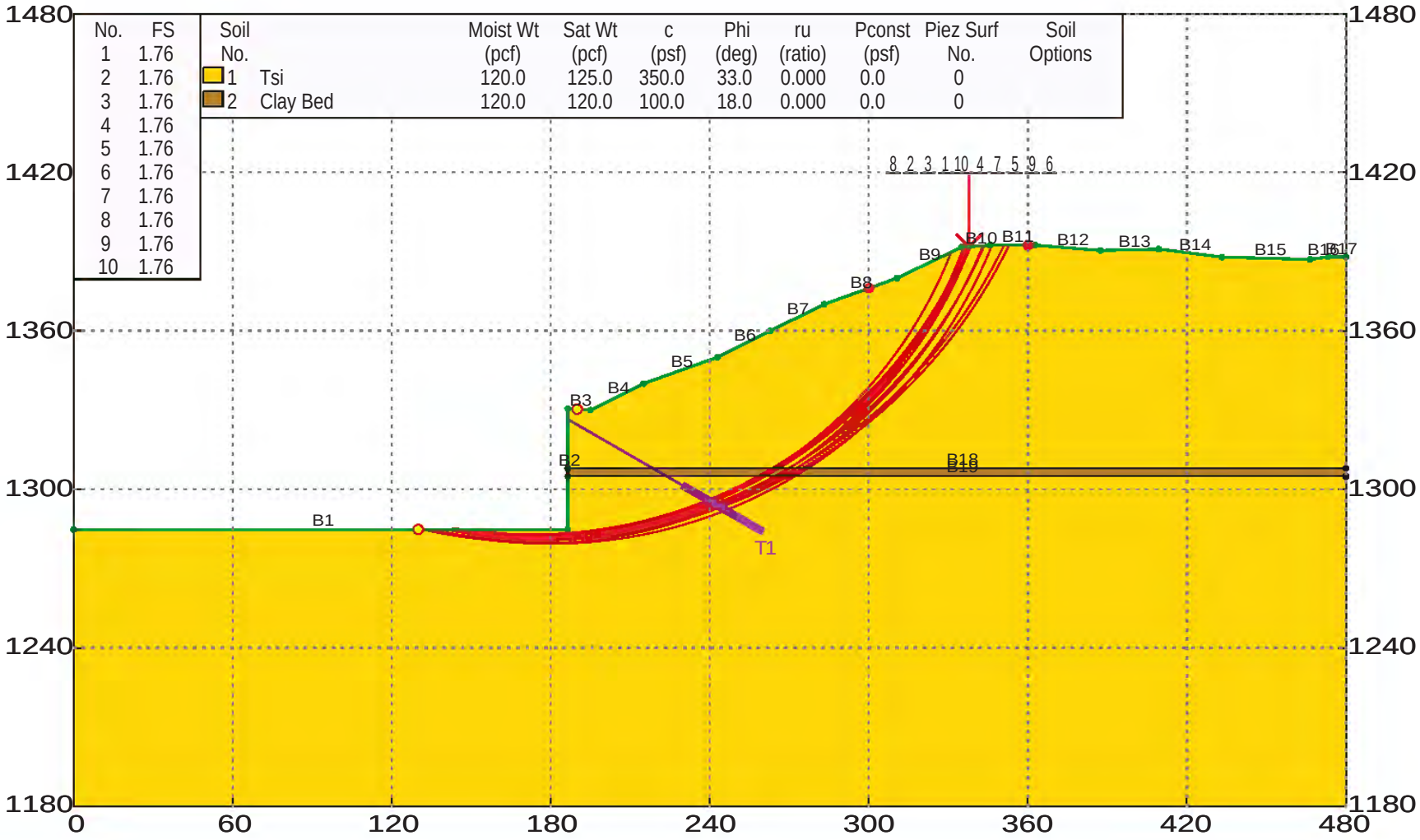
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Rotational (Static)

LGC Geotechnical / BPP

\Section B - Static - Rotational - Tieback.gsd



GEOSTASE FS = 1.76

Simplified Bishop Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Rotational - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Rotational - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Rotational (Static)

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface Option	Water Pressure Constant (psf)
1 Tsi	120.0	125.0	350.00	33.00	0.000	0	0.0
2 Clay Bed	120.0	120.0	100.00	18.00	0.000	0	0.0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

EARTHQUAKE DATA HAS BEEN SUPPRESSED

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 130.00(ft)
and X = 190.00(ft)

Each Surface Enters within a Range Between X = 300.00(ft)
and X = 360.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1180.00(ft)

Specified Maximum Radius = 10000.000(ft)

3.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 3.252 FS Min = 1.756 FS Ave = 2.115
Standard Deviation = 0.299 Coefficient of Variation = 14.15 %

Critical Surface is Sequence Number 215 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 172.573835(ft) ; Y = 1461.728997(ft); and Radius = 179.407934(ft)

Circular Trial Failure Surface Generated With 81 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	142.853	1284.800
2	145.815	1284.328
3	148.786	1283.905
4	151.762	1283.532
5	154.745	1283.209
6	157.732	1282.936
7	160.724	1282.713
8	163.719	1282.540
9	166.717	1282.417
10	169.716	1282.344
11	172.716	1282.321
12	175.715	1282.349
13	178.714	1282.426
14	181.712	1282.554
15	184.706	1282.732
16	187.698	1282.960
17	190.685	1283.238
18	193.667	1283.565
19	196.643	1283.943
20	199.612	1284.370
21	202.574	1284.847
22	205.528	1285.374
23	208.472	1285.949
24	211.406	1286.574
25	214.330	1287.248
26	217.241	1287.970
27	220.140	1288.742
28	223.026	1289.561
29	225.898	1290.429
30	228.755	1291.344
31	231.596	1292.308
32	234.421	1293.318

33	237.228	1294.376
34	240.017	1295.480
35	242.788	1296.631
36	245.539	1297.829
37	248.269	1299.072
38	250.978	1300.360
39	253.666	1301.694
40	256.330	1303.072
41	258.971	1304.495
42	261.588	1305.961
43	264.181	1307.471
44	266.747	1309.025
45	269.287	1310.621
46	271.801	1312.259
47	274.286	1313.939
48	276.743	1315.661
49	279.171	1317.423
50	281.569	1319.225
51	283.936	1321.068
52	286.273	1322.950
53	288.578	1324.870
54	290.850	1326.829
55	293.089	1328.826
56	295.294	1330.859
57	297.465	1332.930
58	299.602	1335.036
59	301.702	1337.178
60	303.767	1339.354
61	305.795	1341.565
62	307.785	1343.809
63	309.738	1346.087
64	311.653	1348.397
65	313.528	1350.738
66	315.365	1353.110
67	317.161	1355.513
68	318.917	1357.946
69	320.632	1360.407
70	322.305	1362.897
71	323.937	1365.415
72	325.526	1367.959
73	327.073	1370.530
74	328.576	1373.126
75	330.036	1375.747
76	331.451	1378.392
77	332.823	1381.060
78	334.149	1383.751
79	335.430	1386.463
80	336.666	1389.197
81	337.796	1391.813

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	240.08	1295.51

Factor Of Safety For The Critical or Specified Surface = 1.756

Table 1 - Geometry Data on the 90 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.96	0.24	144.33	1284.56	1284.80	-9.06	0.00	3.00
2	2.97	0.68	147.30	1284.12	1284.80	-8.10	0.00	3.00
3	2.98	1.08	150.27	1283.72	1284.80	-7.14	0.00	3.00
4	2.98	1.43	153.25	1283.37	1284.80	-6.18	0.00	3.00
5	2.99	1.73	156.24	1283.07	1284.80	-5.22	0.00	3.00
6	2.99	1.98	159.23	1282.82	1284.80	-4.27	0.00	3.00
7	3.00	2.17	162.22	1282.63	1284.80	-3.31	0.00	3.00
8	3.00	2.32	165.22	1282.48	1284.80	-2.35	0.00	3.00
9	3.00	2.42	168.22	1282.38	1284.80	-1.39	0.00	3.00
10	3.00	2.47	171.22	1282.33	1284.80	-0.43	0.00	3.00
11	3.00	2.47	174.22	1282.33	1284.80	0.52	0.00	3.00
12	3.00	2.41	177.21	1282.39	1284.80	1.48	0.00	3.00
13	3.00	2.31	180.21	1282.49	1284.80	2.44	0.00	3.00
14	2.99	2.16	183.21	1282.64	1284.80	3.40	0.00	3.00
15	1.69	2.00	185.55	1282.80	1284.80	4.36	0.00	1.70
16	1.30	47.55	187.05	1282.91	1330.46	4.36	-3.33	

1.30
17 2.99 47.24 189.19 1283.10 1330.34 5.31 -3.33
3.00
18 2.98 46.76 192.18 1283.40 1330.16 6.27 -3.33
3.00
19 1.33 46.39 194.33 1283.65 1330.04 7.23 -3.33
1.34
20 1.64 46.57 195.82 1283.84 1330.41 7.23 26.57
1.66
21 2.97 47.41 198.13 1284.16 1331.56 8.19 26.57
3.00
22 2.96 48.44 201.09 1284.61 1333.05 9.15 26.57
3.00
23 2.95 49.42 204.05 1285.11 1334.53 10.11 26.57
3.00
24 2.94 50.34 207.00 1285.66 1336.00 11.06 26.57
3.00
25 2.93 51.21 209.94 1286.26 1337.47 12.02 26.57
3.00
26 2.92 52.02 212.87 1286.91 1338.93 12.98 26.57
3.00
27 0.67 52.50 214.66 1287.33 1339.83 13.94 26.57
0.69
28 2.24 52.71 216.12 1287.69 1340.40 13.94 19.72
2.31
29 2.90 52.97 218.69 1288.36 1341.32 14.90 19.72
3.00
30 2.89 53.21 221.58 1289.15 1342.36 15.85 19.72
3.00
31 2.87 53.40 224.46 1290.00 1343.39 16.81 19.72
3.00
32 2.86 53.53 227.33 1290.89 1344.42 17.77 19.72
3.00
33 2.84 53.61 230.18 1291.83 1345.44 18.73 19.72
3.00
34 2.82 53.64 233.01 1292.81 1346.45 19.69 19.72
3.00
35 2.81 53.62 235.82 1293.85 1347.46 20.64 19.72
3.00
36 2.79 53.54 238.62 1294.93 1348.47 21.60 19.72
3.00
37 2.77 53.41 241.40 1296.06 1349.46 22.56 19.72
3.00
38 0.11 53.32 242.84 1296.66 1349.98 23.52 19.72
0.12
39 2.64 53.41 244.22 1297.25 1350.66 23.52 26.57
2.88
40 2.73 53.55 246.90 1298.45 1352.00 24.48 26.57
3.00
41 2.71 53.65 249.62 1299.72 1353.36 25.43 26.57

3.00							
42	2.69	53.68	252.32	1301.03	1354.71	26.39	26.57
3.00							
43	2.66	53.67	255.00	1302.38	1356.05	27.35	26.57
3.00							
44	2.64	53.59	257.65	1303.78	1357.38	28.31	26.57
3.00							
45	0.72	53.52	259.33	1304.70	1358.22	29.27	26.57
0.83							
46	1.89	53.44	260.64	1305.43	1358.87	29.27	26.57
2.17							
47	1.11	53.34	262.14	1306.29	1359.62	30.23	26.57
1.29							
48	1.48	53.23	263.44	1307.04	1360.27	30.23	26.34
1.71							
49	0.71	53.12	264.53	1307.69	1360.81	31.18	26.34
0.83							
50	1.86	52.98	265.82	1308.46	1361.44	31.18	26.34
2.17							
51	2.54	52.71	268.02	1309.82	1362.53	32.14	26.34
3.00							
52	2.51	52.34	270.54	1311.44	1363.78	33.10	26.34
3.00							
53	2.49	51.92	273.04	1313.10	1365.02	34.06	26.34
3.00							
54	2.46	51.44	275.51	1314.80	1366.24	35.02	26.34
3.00							
55	2.43	50.91	277.96	1316.54	1367.45	35.97	26.34
3.00							
56	2.40	50.32	280.37	1318.32	1368.65	36.93	26.34
3.00							
57	1.53	49.80	282.33	1319.82	1369.62	37.89	26.34
1.94							
58	0.84	49.41	283.52	1320.74	1370.15	37.89	19.80
1.06							
59	2.34	48.71	285.10	1322.01	1370.72	38.85	19.80
3.00							
60	2.30	47.65	287.43	1323.91	1371.56	39.81	19.80
3.00							
61	2.27	46.53	289.71	1325.85	1372.38	40.76	19.80
3.00							
62	2.24	45.37	291.97	1327.83	1373.19	41.72	19.80
3.00							
63	2.21	44.15	294.19	1329.84	1373.99	42.68	19.80
3.00							
64	2.17	42.89	296.38	1331.89	1374.78	43.64	19.80
3.00							
65	2.14	41.57	298.53	1333.98	1375.56	44.60	19.80
3.00							
66	2.10	40.21	300.65	1336.11	1376.32	45.55	19.80

3.00
67 2.06 38.80 302.73 1338.27 1377.07 46.51 19.80
3.00
68 2.03 37.35 304.78 1340.46 1377.81 47.47 19.80
3.00
69 1.99 35.84 306.79 1342.69 1378.53 48.43 19.80
3.00
70 1.95 34.29 308.76 1344.95 1379.24 49.39 19.80
3.00
71 0.86 33.14 310.17 1346.61 1379.74 50.35 19.80
1.35
72 1.05 32.39 311.13 1347.76 1380.15 50.35 25.71
1.65
73 1.88 31.29 312.59 1349.57 1380.86 51.30 25.71
3.00
74 1.84 29.83 314.45 1351.92 1381.75 52.26 25.71
3.00
75 1.80 28.31 316.26 1354.31 1382.63 53.22 25.71
3.00
76 1.76 26.75 318.04 1356.73 1383.48 54.18 25.71
3.00
77 1.71 25.14 319.77 1359.18 1384.32 55.14 25.71
3.00
78 1.67 23.48 321.47 1361.65 1385.13 56.09 25.71
3.00
79 1.63 21.77 323.12 1364.16 1385.93 57.05 25.71
3.00
80 1.59 20.02 324.73 1366.69 1386.70 58.01 25.71
3.00
81 1.55 18.21 326.30 1369.24 1387.46 58.97 25.71
3.00
82 1.50 16.37 327.82 1371.83 1388.19 59.93 25.71
3.00
83 1.46 14.47 329.31 1374.44 1388.91 60.88 25.71
3.00
84 1.42 12.53 330.74 1377.07 1389.60 61.84 25.71
3.00
85 1.37 10.54 332.14 1379.73 1390.27 62.80 25.71
3.00
86 1.33 8.51 333.49 1382.41 1390.92 63.76 25.71
3.00
87 0.75 6.87 334.52 1384.55 1391.42 64.72 25.71
1.76
88 0.53 5.72 335.17 1385.90 1391.62 64.72 4.20
1.24
89 1.24 3.85 336.05 1387.83 1391.68 65.67 4.20
3.00
90 1.13 1.27 337.23 1390.50 1391.77 66.63 4.20
2.85

Table 2 - Force Data On The 90 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	83.9	0.0	0.0	0.0	0.0	0.0
2	243.6	0.0	0.0	0.0	0.0	0.0
3	386.3	0.0	0.0	0.0	0.0	0.0
4	511.6	0.0	0.0	0.0	0.0	0.0
5	619.3	0.0	0.0	0.0	0.0	0.0
6	709.2	0.0	0.0	0.0	0.0	0.0
7	781.2	0.0	0.0	0.0	0.0	0.0
8	835.1	0.0	0.0	0.0	0.0	0.0
9	870.8	0.0	0.0	0.0	0.0	0.0
10	888.3	0.0	0.0	0.0	0.0	0.0
11	887.4	0.0	0.0	0.0	0.0	0.0
12	868.3	0.0	0.0	0.0	0.0	0.0
13	830.8	0.0	0.0	0.0	0.0	0.0
14	775.2	0.0	0.0	0.0	0.0	0.0
15	407.2	0.0	0.0	0.0	0.0	0.0
16	7405.3	0.0	0.0	0.0	0.0	0.0
17	16933.0	0.0	0.0	0.0	0.0	0.0
18	16733.8	0.0	0.0	0.0	0.0	0.0
19	7420.9	0.0	0.0	0.0	0.0	0.0
20	9182.4	0.0	0.0	0.0	0.0	0.0
21	16892.6	0.0	0.0	0.0	0.0	0.0
22	17215.9	0.0	0.0	0.0	0.0	0.0
23	17513.5	0.0	0.0	0.0	0.0	0.0
24	17785.1	0.0	0.0	0.0	0.0	0.0
25	18030.6	0.0	0.0	0.0	0.0	0.0
26	18249.8	0.0	0.0	0.0	0.0	0.0
27	4223.8	0.0	0.0	0.0	0.0	0.0
28	14176.1	0.0	0.0	0.0	0.0	0.0
29	18427.3	0.0	0.0	0.0	0.0	0.0
30	18426.3	0.0	0.0	0.0	0.0	0.0
31	18401.1	0.0	0.0	0.0	0.0	0.0
32	18351.9	0.0	0.0	0.0	0.0	0.0
33	18278.8	0.0	0.0	0.0	0.0	0.0
34	18182.3	0.0	0.0	0.0	0.0	0.0
35	18062.6	0.0	0.0	0.0	0.0	0.0
36	17920.2	0.0	0.0	0.0	0.0	0.0
37	17755.3	0.0	0.0	0.0	0.0	0.0
38	717.6	0.0	0.0	0.0	0.0	0.0
39	16910.1	0.0	0.0	0.0	0.0	0.0
40	17546.1	0.0	0.0	0.0	0.0	0.0
41	17440.7	0.0	0.0	0.0	0.0	0.0

42	17311.9	0.0	0.0	0.0	0.0	0.0
43	17160.1	0.0	0.0	0.0	0.0	0.0
44	16985.8	0.0	0.0	0.0	0.0	0.0
45	4646.2	0.0	0.0	0.0	0.0	0.0
46	12143.3	0.0	0.0	0.0	0.0	0.0
47	7114.4	0.0	0.0	0.0	0.0	0.0
48	9457.0	0.0	0.0	0.0	0.0	0.0
49	4514.3	0.0	0.0	0.0	0.0	0.0
50	11815.2	0.0	0.0	0.0	0.0	0.0
51	16067.3	0.0	0.0	0.0	0.0	0.0
52	15785.8	0.0	0.0	0.0	0.0	0.0
53	15485.8	0.0	0.0	0.0	0.0	0.0
54	15167.8	0.0	0.0	0.0	0.0	0.0
55	14832.9	0.0	0.0	0.0	0.0	0.0
56	14481.6	0.0	0.0	0.0	0.0	0.0
57	9150.0	0.0	0.0	0.0	0.0	0.0
58	4959.3	0.0	0.0	0.0	0.0	0.0
59	13657.8	0.0	0.0	0.0	0.0	0.0
60	13177.2	0.0	0.0	0.0	0.0	0.0
61	12687.5	0.0	0.0	0.0	0.0	0.0
62	12189.6	0.0	0.0	0.0	0.0	0.0
63	11684.6	0.0	0.0	0.0	0.0	0.0
64	11173.4	0.0	0.0	0.0	0.0	0.0
65	10657.1	0.0	0.0	0.0	0.0	0.0
66	10136.7	0.0	0.0	0.0	0.0	0.0
67	9613.3	0.0	0.0	0.0	0.0	0.0
68	9087.9	0.0	0.0	0.0	0.0	0.0
69	8561.7	0.0	0.0	0.0	0.0	0.0
70	8035.6	0.0	0.0	0.0	0.0	0.0
71	3426.6	0.0	0.0	0.0	0.0	0.0
72	4092.3	0.0	0.0	0.0	0.0	0.0
73	7042.8	0.0	0.0	0.0	0.0	0.0
74	6572.3	0.0	0.0	0.0	0.0	0.0
75	6103.3	0.0	0.0	0.0	0.0	0.0
76	5636.7	0.0	0.0	0.0	0.0	0.0
77	5173.7	0.0	0.0	0.0	0.0	0.0
78	4715.4	0.0	0.0	0.0	0.0	0.0
79	4263.1	0.0	0.0	0.0	0.0	0.0
80	3817.7	0.0	0.0	0.0	0.0	0.0
81	3380.4	0.0	0.0	0.0	0.0	0.0
82	2952.4	0.0	0.0	0.0	0.0	0.0
83	2534.7	0.0	0.0	0.0	0.0	0.0
84	2128.6	0.0	0.0	0.0	0.0	0.0
85	1735.1	0.0	0.0	0.0	0.0	0.0
86	1355.2	0.0	0.0	0.0	0.0	0.0
87	619.3	0.0	0.0	0.0	0.0	0.0
88	364.0	0.0	0.0	0.0	0.0	0.0
89	571.5	0.0	0.0	0.0	0.0	0.0
90	171.7	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 812279.25(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 812279.25(lbs)

TOTAL AREA OF SLIDING MASS = 6768.99(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 90 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	350.00	33.00	
2	1	350.00	33.00	
3	1	350.00	33.00	
4	1	350.00	33.00	
5	1	350.00	33.00	
6	1	350.00	33.00	
7	1	350.00	33.00	
8	1	350.00	33.00	
9	1	350.00	33.00	
10	1	350.00	33.00	
11	1	350.00	33.00	
12	1	350.00	33.00	
13	1	350.00	33.00	
14	1	350.00	33.00	
15	1	350.00	33.00	
16	1	350.00	33.00	
17	1	350.00	33.00	
18	1	350.00	33.00	
19	1	350.00	33.00	
20	1	350.00	33.00	
21	1	350.00	33.00	
22	1	350.00	33.00	
23	1	350.00	33.00	
24	1	350.00	33.00	
25	1	350.00	33.00	
26	1	350.00	33.00	
27	1	350.00	33.00	
28	1	350.00	33.00	
29	1	350.00	33.00	
30	1	350.00	33.00	
31	1	350.00	33.00	
32	1	350.00	33.00	
33	1	350.00	33.00	
34	1	350.00	33.00	
35	1	350.00	33.00	
36	1	350.00	33.00	
37	1	350.00	33.00	
38	1	350.00	33.00	
39	1	350.00	33.00	

40	1	350.00	33.00
41	1	350.00	33.00
42	1	350.00	33.00
43	1	350.00	33.00
44	1	350.00	33.00
45	1	350.00	33.00
46	2	100.00	18.00
47	2	100.00	18.00
48	2	100.00	18.00
49	2	100.00	18.00
50	1	350.00	33.00
51	1	350.00	33.00
52	1	350.00	33.00
53	1	350.00	33.00
54	1	350.00	33.00
55	1	350.00	33.00
56	1	350.00	33.00
57	1	350.00	33.00
58	1	350.00	33.00
59	1	350.00	33.00
60	1	350.00	33.00
61	1	350.00	33.00
62	1	350.00	33.00
63	1	350.00	33.00
64	1	350.00	33.00
65	1	350.00	33.00
66	1	350.00	33.00
67	1	350.00	33.00
68	1	350.00	33.00
69	1	350.00	33.00
70	1	350.00	33.00
71	1	350.00	33.00
72	1	350.00	33.00
73	1	350.00	33.00
74	1	350.00	33.00
75	1	350.00	33.00
76	1	350.00	33.00
77	1	350.00	33.00
78	1	350.00	33.00
79	1	350.00	33.00
80	1	350.00	33.00
81	1	350.00	33.00
82	1	350.00	33.00
83	1	350.00	33.00
84	1	350.00	33.00
85	1	350.00	33.00
86	1	350.00	33.00
87	1	350.00	33.00
88	1	350.00	33.00
89	1	350.00	33.00

90 1 350.00 33.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 90 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-9.06	144.33	3.00	63.87	391.48	222.91
1	-9.06	144.33	3.00	63.87	391.48	222.91
2	-8.10	147.30	3.00	116.52	425.67	242.38
2	-8.10	147.30	3.00	116.52	425.67	242.38
3	-7.14	150.27	3.00	162.24	455.36	259.29
3	-7.14	150.27	3.00	162.24	455.36	259.29
4	-6.18	153.25	3.00	201.17	480.64	273.68
4	-6.18	153.25	3.00	201.17	480.64	273.68
5	-5.22	156.24	3.00	233.41	501.58	285.61
5	-5.22	156.24	3.00	233.41	501.58	285.61
6	-4.27	159.23	3.00	259.09	518.25	295.10
6	-4.27	159.23	3.00	259.09	518.25	295.10
7	-3.31	162.22	3.00	278.32	530.74	302.21
7	-3.31	162.22	3.00	278.32	530.74	302.21
8	-2.35	165.22	3.00	291.21	539.12	306.98
8	-2.35	165.22	3.00	291.21	539.12	

306.98
9 -1.39 168.22 3.00 297.89 543.45
309.45
9 -1.39 168.22 3.00 297.89 543.45
309.45
10 -0.43 171.22 3.00 298.45 543.81
309.66
10 -0.43 171.22 3.00 298.45 543.81
309.66
11 0.52 174.22 3.00 293.00 540.28
307.64
11 0.52 174.22 3.00 293.00 540.28
307.64
12 1.48 177.21 3.00 281.66 532.91
303.45
12 1.48 177.21 3.00 281.66 532.91
303.45
13 2.44 180.21 3.00 264.53 521.79
297.11
13 2.44 180.21 3.00 264.53 521.79
297.11
14 3.40 183.21 3.00 241.71 506.97
288.68
14 3.40 183.21 3.00 241.71 506.97
288.68
15 4.36 185.55 1.70 219.09 492.28
280.31
15 4.36 185.55 1.70 219.09 492.28
280.31
16 4.36 187.05 1.30 5535.11 3944.54
2246.08
16 4.36 187.05 1.30 5535.11 3944.54
2246.08
17 5.31 189.19 3.00 5462.23 3897.21
2219.14
17 5.31 189.19 3.00 5462.23 3897.21
2219.14
18 6.27 192.18 3.00 5371.27 3838.14
2185.50
18 6.27 192.18 3.00 5371.27 3838.14
2185.50
19 7.23 194.33 1.34 5293.01 3787.32
2156.56
19 7.23 194.33 1.34 5293.01 3787.32
2156.56
20 7.23 195.82 1.66 5314.01 3800.96
2164.33
20 7.23 195.82 1.66 5314.01 3800.96
2164.33
21 8.19 198.13 3.00 5374.18 3840.03

2186.57					
21	8.19	198.13	3.00	5374.18	3840.03
2186.57					
22	9.15	201.09	3.00	5455.59	3892.90
2216.68					
22	9.15	201.09	3.00	5455.59	3892.90
2216.68					
23	10.11	204.05	3.00	5529.83	3941.11
2244.13					
23	10.11	204.05	3.00	5529.83	3941.11
2244.13					
24	11.06	207.00	3.00	5596.94	3984.69
2268.95					
24	11.06	207.00	3.00	5596.94	3984.69
2268.95					
25	12.02	209.94	3.00	5657.00	4023.70
2291.16					
25	12.02	209.94	3.00	5657.00	4023.70
2291.16					
26	12.98	212.87	3.00	5710.09	4058.17
2310.79					
26	12.98	212.87	3.00	5710.09	4058.17
2310.79					
27	13.94	214.66	0.69	5725.24	4068.01
2316.39					
27	13.94	214.66	0.69	5725.24	4068.01
2316.39					
28	13.94	216.12	2.31	5748.10	4082.86
2324.84					
28	13.94	216.12	2.31	5748.10	4082.86
2324.84					
29	14.90	218.69	3.00	5738.49	4076.62
2321.29					
29	14.90	218.69	3.00	5738.49	4076.62
2321.29					
30	15.85	221.58	3.00	5726.92	4069.11
2317.01					
30	15.85	221.58	3.00	5726.92	4069.11
2317.01					
31	16.81	224.46	3.00	5709.39	4057.72
2310.53					
31	16.81	224.46	3.00	5709.39	4057.72
2310.53					
32	17.77	227.33	3.00	5685.98	4042.52
2301.87					
32	17.77	227.33	3.00	5685.98	4042.52
2301.87					
33	18.73	230.18	3.00	5656.77	4023.55
2291.07					
33	18.73	230.18	3.00	5656.77	4023.55

2291.07					
34	19.69	233.01	3.00	5621.84	4000.86
2278.15					
34	19.69	233.01	3.00	5621.84	4000.86
2278.15					
35	20.64	235.82	3.00	5581.27	3974.52
2263.15					
35	20.64	235.82	3.00	5581.27	3974.52
2263.15					
36	21.60	238.62	3.00	5535.15	3944.57
2246.10					
36	21.60	238.62	3.00	5535.15	3944.57
2246.10					
37	22.56	241.40	3.00	11655.62	7919.25
4509.34					
37	22.56	241.40	3.00	11655.62	7919.25
4509.34					
38	23.52	242.84	0.12	5437.07	3880.88
2209.83					
38	23.52	242.84	0.12	5437.07	3880.88
2209.83					
39	23.52	244.22	2.88	5445.47	3886.33
2212.94					
39	23.52	244.22	2.88	5445.47	3886.33
2212.94					
40	24.48	246.90	3.00	5422.57	3871.46
2204.47					
40	24.48	246.90	3.00	5422.57	3871.46
2204.47					
41	25.43	249.62	3.00	5394.04	3852.93
2193.92					
41	25.43	249.62	3.00	5394.04	3852.93
2193.92					
42	26.39	252.32	3.00	5359.58	3830.55
2181.18					
42	26.39	252.32	3.00	5359.58	3830.55
2181.18					
43	27.35	255.00	3.00	5319.29	3804.39
2166.28					
43	27.35	255.00	3.00	5319.29	3804.39
2166.28					
44	28.31	257.65	3.00	5273.25	3774.49
2149.25					
44	28.31	257.65	3.00	5273.25	3774.49
2149.25					
45	29.27	259.33	0.83	5227.24	3744.61
2132.24					
45	29.27	259.33	0.83	5227.24	3744.61
2132.24					
46	29.27	260.64	2.17	5781.40	1978.49

1126.58
  46 29.27 260.64 2.17 5781.40 1978.49
1126.58
  47 30.23 262.14 1.29 5747.67 1967.53
1120.34
  47 30.23 262.14 1.29 5747.67 1967.53
1120.34
  48 30.23 263.44 1.71 5735.68 1963.64
1118.13
  48 30.23 263.44 1.71 5735.68 1963.64
1118.13
  49 31.18 264.53 0.83 5701.74 1952.61
1111.84
  49 31.18 264.53 0.83 5701.74 1952.61
1111.84
  50 31.18 265.82 2.17 5096.43 3659.66
2083.87
  50 31.18 265.82 2.17 5096.43 3659.66
2083.87
  51 32.14 268.02 3.00 5030.95 3617.14
2059.66
  51 32.14 268.02 3.00 5030.95 3617.14
2059.66
  52 33.10 270.54 3.00 4956.42 3568.74
2032.09
  52 33.10 270.54 3.00 4956.42 3568.74
2032.09
  53 34.06 273.04 3.00 4876.76 3517.00
2002.64
  53 34.06 273.04 3.00 4876.76 3517.00
2002.64
  54 35.02 275.51 3.00 4792.07 3462.01
1971.32
  54 35.02 275.51 3.00 4792.07 3462.01
1971.32
  55 35.97 277.96 3.00 4702.48 3403.82
1938.19
  55 35.97 277.96 3.00 4702.48 3403.82
1938.19
  56 36.93 280.37 3.00 4608.08 3342.52
1903.29
  56 36.93 280.37 3.00 4608.08 3342.52
1903.29
  57 37.89 282.33 1.94 4520.04 3285.35
1870.73
  57 37.89 282.33 1.94 4520.04 3285.35
1870.73
  58 37.89 283.52 1.06 4483.55 3261.65
1857.23
  58 37.89 283.52 1.06 4483.55 3261.65

1857.23					
59	38.85	285.10	3.00	4380.33	3194.62
1819.07					
59	38.85	285.10	3.00	4380.33	3194.62
1819.07					
60	39.81	287.43	3.00	4243.70	3105.89
1768.54					
60	39.81	287.43	3.00	4243.70	3105.89
1768.54					
61	40.76	289.71	3.00	4103.63	3014.93
1716.75					
61	40.76	289.71	3.00	4103.63	3014.93
1716.75					
62	41.72	291.97	3.00	3960.24	2921.81
1663.73					
62	41.72	291.97	3.00	3960.24	2921.81
1663.73					
63	42.68	294.19	3.00	3813.70	2826.64
1609.54					
63	42.68	294.19	3.00	3813.70	2826.64
1609.54					
64	43.64	296.38	3.00	3664.14	2729.52
1554.23					
64	43.64	296.38	3.00	3664.14	2729.52
1554.23					
65	44.60	298.53	3.00	3511.72	2630.54
1497.87					
65	44.60	298.53	3.00	3511.72	2630.54
1497.87					
66	45.55	300.65	3.00	3356.61	2529.81
1440.51					
66	45.55	300.65	3.00	3356.61	2529.81
1440.51					
67	46.51	302.73	3.00	3198.95	2427.42
1382.21					
67	46.51	302.73	3.00	3198.95	2427.42
1382.21					
68	47.47	304.78	3.00	3038.93	2323.51
1323.04					
68	47.47	304.78	3.00	3038.93	2323.51
1323.04					
69	48.43	306.79	3.00	2876.73	2218.17
1263.06					
69	48.43	306.79	3.00	2876.73	2218.17
1263.06					
70	49.39	308.76	3.00	2712.52	2111.53
1202.34					
70	49.39	308.76	3.00	2712.52	2111.53
1202.34					
71	50.35	310.17	1.35	2583.47	2027.73

1154.62					
71	50.35	310.17	1.35	2583.47	2027.73
1154.62					
72	50.35	311.13	1.65	2521.55	1987.51
1131.72					
72	50.35	311.13	1.65	2521.55	1987.51
1131.72					
73	51.30	312.59	3.00	2398.72	1907.75
1086.30					
73	51.30	312.59	3.00	2398.72	1907.75
1086.30					
74	52.26	314.45	3.00	2247.78	1809.72
1030.48					
74	52.26	314.45	3.00	2247.78	1809.72
1030.48					
75	53.22	316.26	3.00	2094.84	1710.40
973.93					
75	53.22	316.26	3.00	2094.84	1710.40
973.93					
76	54.18	318.04	3.00	1940.12	1609.93
916.72					
76	54.18	318.04	3.00	1940.12	1609.93
916.72					
77	55.14	319.77	3.00	1783.87	1508.46
858.94					
77	55.14	319.77	3.00	1783.87	1508.46
858.94					
78	56.09	321.47	3.00	1626.32	1406.14
800.68					
78	56.09	321.47	3.00	1626.32	1406.14
800.68					
79	57.05	323.12	3.00	1467.72	1303.15
742.03					
79	57.05	323.12	3.00	1467.72	1303.15
742.03					
80	58.01	324.73	3.00	1308.35	1199.65
683.10					
80	58.01	324.73	3.00	1308.35	1199.65
683.10					
81	58.97	326.30	3.00	1148.48	1095.83
623.99					
81	58.97	326.30	3.00	1148.48	1095.83
623.99					
82	59.93	327.82	3.00	988.42	991.89
564.80					
82	59.93	327.82	3.00	988.42	991.89
564.80					
83	60.88	329.31	3.00	828.47	888.01
505.65					
83	60.88	329.31	3.00	828.47	888.01

505.65
  84 61.84 330.74 3.00 668.96 784.43
446.67
  84 61.84 330.74 3.00 668.96 784.43
446.67
  85 62.80 332.14 3.00 510.26 681.37
387.98
  85 62.80 332.14 3.00 510.26 681.37
387.98
  86 63.76 333.49 3.00 352.73 579.07
329.73
  86 63.76 333.49 3.00 352.73 579.07
329.73
  87 64.72 334.52 1.76 225.97 496.74
282.85
  87 64.72 334.52 1.76 225.97 496.74
282.85
  88 64.72 335.17 1.24 148.16 446.21
254.08
  88 64.72 335.17 1.24 148.16 446.21
254.08
  89 65.67 336.05 3.00 254.39 165.20
94.07
  89 65.67 336.05 3.00 254.39 165.20
94.07
  90 66.63 337.23 2.85 81.88 53.17
30.28
  90 66.63 337.23 2.85 81.88 53.17
30.28

Table 4 - Base Force Data on the 90 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-9.06	144.33	3.00	191.61	1174.43	668.74
1	-9.06	144.33	3.00	191.61	1174.43	668.74
2	-8.10	147.30	3.00	349.56	1277.00	727.15
2	-8.10	147.30	3.00	349.56	1277.00	727.15
3	-7.14	150.27	3.00	486.73	1366.09	

777.87					
3	-7.14	150.27	3.00	486.73	1366.09
777.87					
4	-6.18	153.25	3.00	603.50	1441.92
821.05					
4	-6.18	153.25	3.00	603.50	1441.92
821.05					
5	-5.22	156.24	3.00	700.22	1504.73
856.82					
5	-5.22	156.24	3.00	700.22	1504.73
856.82					
6	-4.27	159.23	3.00	777.26	1554.76
885.30					
6	-4.27	159.23	3.00	777.26	1554.76
885.30					
7	-3.31	162.22	3.00	834.95	1592.22
906.64					
7	-3.31	162.22	3.00	834.95	1592.22
906.64					
8	-2.35	165.22	3.00	873.64	1617.35
920.94					
8	-2.35	165.22	3.00	873.64	1617.35
920.94					
9	-1.39	168.22	3.00	893.66	1630.35
928.35					
9	-1.39	168.22	3.00	893.66	1630.35
928.35					
10	-0.43	171.22	3.00	895.34	1631.44
928.97					
10	-0.43	171.22	3.00	895.34	1631.44
928.97					
11	0.52	174.22	3.00	879.01	1620.84
922.93					
11	0.52	174.22	3.00	879.01	1620.84
922.93					
12	1.48	177.21	3.00	844.98	1598.74
910.35					
12	1.48	177.21	3.00	844.98	1598.74
910.35					
13	2.44	180.21	3.00	793.59	1565.36
891.34					
13	2.44	180.21	3.00	793.59	1565.36
891.34					
14	3.40	183.21	3.00	725.14	1520.91
866.03					
14	3.40	183.21	3.00	725.14	1520.91
866.03					
15	4.36	185.55	1.70	372.12	836.12
476.10					
15	4.36	185.55	1.70	372.12	836.12

476.10
  16   4.36   187.05   1.30   7204.05   5133.89
2923.32
  16   4.36   187.05   1.30   7204.05   5133.89
2923.32
  17   5.31   189.19   3.00   16386.70   11691.64
6657.41
  17   5.31   189.19   3.00   16386.70   11691.64
6657.41
  18   6.27   192.18   3.00   16113.81   11514.43
6556.50
  18   6.27   192.18   3.00   16113.81   11514.43
6556.50
  19   7.23   194.33   1.34   7112.69   5089.36
2897.96
  19   7.23   194.33   1.34   7112.69   5089.36
2897.96
  20   7.23   195.82   1.66   8801.13   6295.19
3584.58
  20   7.23   195.82   1.66   8801.13   6295.19
3584.58
  21   8.19   198.13   3.00   16122.53   11520.09
6559.72
  21   8.19   198.13   3.00   16122.53   11520.09
6559.72
  22   9.15   201.09   3.00   16366.78   11678.71
6650.04
  22   9.15   201.09   3.00   16366.78   11678.71
6650.04
  23   10.11   204.05   3.00   16589.48   11823.33
6732.39
  23   10.11   204.05   3.00   16589.48   11823.33
6732.39
  24   11.06   207.00   3.00   16790.82   11954.08
6806.84
  24   11.06   207.00   3.00   16790.82   11954.08
6806.84
  25   12.02   209.94   3.00   16971.01   12071.10
6873.48
  25   12.02   209.94   3.00   16971.01   12071.10
6873.48
  26   12.98   212.87   3.00   17130.26   12174.52
6932.36
  26   12.98   212.87   3.00   17130.26   12174.52
6932.36
  27   13.94   214.66   0.69   3954.81   2810.05
1600.09
  27   13.94   214.66   0.69   3954.81   2810.05
1600.09
  28   13.94   216.12   2.31   13273.69   9428.27

5368.60
  28   13.94   216.12   2.31   13273.69   9428.27
5368.60
  29   14.90   218.69   3.00   17215.48   12229.87
6963.88
  29   14.90   218.69   3.00   17215.48   12229.87
6963.88
  30   15.85   221.58   3.00   17180.76   12207.32
6951.04
  30   15.85   221.58   3.00   17180.76   12207.32
6951.04
  31   16.81   224.46   3.00   17128.16   12173.16
6931.59
  31   16.81   224.46   3.00   17128.16   12173.16
6931.59
  32   17.77   227.33   3.00   17057.93   12127.55
6905.62
  32   17.77   227.33   3.00   17057.93   12127.55
6905.62
  33   18.73   230.18   3.00   16970.30   12070.64
6873.21
  33   18.73   230.18   3.00   16970.30   12070.64
6873.21
  34   19.69   233.01   3.00   16865.51   12002.59
6834.46
  34   19.69   233.01   3.00   16865.51   12002.59
6834.46
  35   20.64   235.82   3.00   16743.81   11923.56
6789.46
  35   20.64   235.82   3.00   16743.81   11923.56
6789.46
  36   21.60   238.62   3.00   16605.46   11833.71
6738.30
  36   21.60   238.62   3.00   16605.46   11833.71
6738.30
  37   22.56   241.40   3.00   34966.85   23757.74
13528.03
  37   22.56   241.40   3.00   34966.85   23757.74
13528.03
  38   23.52   242.84   0.12   664.99   474.65
270.28
  38   23.52   242.84   0.12   664.99   474.65
270.28
  39   23.52   244.22   2.88   15670.39   11183.66
6368.15
  39   23.52   244.22   2.88   15670.39   11183.66
6368.15
  40   24.48   246.90   3.00   16267.71   11614.37
6613.41
  40   24.48   246.90   3.00   16267.71   11614.37

6613.41
41 25.43 249.62 3.00 16182.12 11558.79
6581.76
41 25.43 249.62 3.00 16182.12 11558.79
6581.76
42 26.39 252.32 3.00 16078.75 11491.66
6543.53
42 26.39 252.32 3.00 16078.75 11491.66
6543.53
43 27.35 255.00 3.00 15957.88 11413.17
6498.84
43 27.35 255.00 3.00 15957.88 11413.17
6498.84
44 28.31 257.65 3.00 15819.76 11323.47
6447.76
44 28.31 257.65 3.00 15819.76 11323.47
6447.76
45 29.27 259.33 0.83 4335.01 3105.45
1768.29
45 29.27 259.33 0.83 4335.01 3105.45
1768.29
46 29.27 260.64 2.17 12549.63 4294.69
2445.46
46 29.27 260.64 2.17 12549.63 4294.69
2445.46
47 30.23 262.14 1.29 7393.97 2531.09
1441.24
47 30.23 262.14 1.29 7393.97 2531.09
1441.24
48 30.23 263.44 1.71 9828.50 3364.83
1915.99
48 30.23 263.44 1.71 9828.50 3364.83
1915.99
49 31.18 264.53 0.83 4719.64 1616.28
920.34
49 31.18 264.53 0.83 4719.64 1616.28
920.34
50 31.18 265.82 2.17 11070.69 7949.67
4526.67
50 31.18 265.82 2.17 11070.69 7949.67
4526.67
51 32.14 268.02 3.00 15092.86 10851.42
6178.97
51 32.14 268.02 3.00 15092.86 10851.42
6178.97
52 33.10 270.54 3.00 14869.26 10706.21
6096.28
52 33.10 270.54 3.00 14869.26 10706.21
6096.28
53 34.06 273.04 3.00 14630.27 10551.01

6007.91					
53	34.06	273.04	3.00	14630.27	10551.01
6007.91					
54	35.02	275.51	3.00	14376.22	10386.02
5913.97					
54	35.02	275.51	3.00	14376.22	10386.02
5913.97					
55	35.97	277.96	3.00	14107.43	10211.47
5814.57					
55	35.97	277.96	3.00	14107.43	10211.47
5814.57					
56	36.93	280.37	3.00	13824.24	10027.57
5709.86					
56	36.93	280.37	3.00	13824.24	10027.57
5709.86					
57	37.89	282.33	1.94	8769.38	6373.94
3629.42					
57	37.89	282.33	1.94	8769.38	6373.94
3629.42					
58	37.89	283.52	1.06	4752.06	3456.98
1968.46					
58	37.89	283.52	1.06	4752.06	3456.98
1968.46					
59	38.85	285.10	3.00	13140.99	9583.86
5457.20					
59	38.85	285.10	3.00	13140.99	9583.86
5457.20					
60	39.81	287.43	3.00	12731.10	9317.67
5305.63					
60	39.81	287.43	3.00	12731.10	9317.67
5305.63					
61	40.76	289.71	3.00	12310.88	9044.78
5150.24					
61	40.76	289.71	3.00	12310.88	9044.78
5150.24					
62	41.72	291.97	3.00	11880.73	8765.44
4991.18					
62	41.72	291.97	3.00	11880.73	8765.44
4991.18					
63	42.68	294.19	3.00	11441.10	8479.93
4828.61					
63	42.68	294.19	3.00	11441.10	8479.93
4828.61					
64	43.64	296.38	3.00	10992.42	8188.56
4662.70					
64	43.64	296.38	3.00	10992.42	8188.56
4662.70					
65	44.60	298.53	3.00	10535.17	7891.62
4493.61					
65	44.60	298.53	3.00	10535.17	7891.62

4493.61
  66 45.55 300.65 3.00 10069.82 7589.42
4321.53
  66 45.55 300.65 3.00 10069.82 7589.42
4321.53
  67 46.51 302.73 3.00 9596.86 7282.27
4146.64
  67 46.51 302.73 3.00 9596.86 7282.27
4146.64
  68 47.47 304.78 3.00 9116.80 6970.52
3969.12
  68 47.47 304.78 3.00 9116.80 6970.52
3969.12
  69 48.43 306.79 3.00 8630.19 6654.51
3789.18
  69 48.43 306.79 3.00 8630.19 6654.51
3789.18
  70 49.39 308.76 3.00 8137.57 6334.60
3607.02
  70 49.39 308.76 3.00 8137.57 6334.60
3607.02
  71 50.35 310.17 1.35 3488.38 2737.97
1559.04
  71 50.35 310.17 1.35 3488.38 2737.97
1559.04
  72 50.35 311.13 1.65 4159.88 3278.87
1867.04
  72 50.35 311.13 1.65 4159.88 3278.87
1867.04
  73 51.30 312.59 3.00 7196.17 5723.25
3258.91
  73 51.30 312.59 3.00 7196.17 5723.25
3258.91
  74 52.26 314.45 3.00 6743.33 5429.17
3091.45
  74 52.26 314.45 3.00 6743.33 5429.17
3091.45
  75 53.22 316.26 3.00 6284.51 5131.21
2921.79
  75 53.22 316.26 3.00 6284.51 5131.21
2921.79
  76 54.18 318.04 3.00 5820.37 4829.79
2750.16
  76 54.18 318.04 3.00 5820.37 4829.79
2750.16
  77 55.14 319.77 3.00 5351.61 4525.38
2576.82
  77 55.14 319.77 3.00 5351.61 4525.38
2576.82
  78 56.09 321.47 3.00 4878.96 4218.43

2402.04					
78	56.09	321.47	3.00	4878.96	4218.43
2402.04					
79	57.05	323.12	3.00	4403.17	3909.45
2226.10					
79	57.05	323.12	3.00	4403.17	3909.45
2226.10					
80	58.01	324.73	3.00	3925.05	3598.96
2049.30					
80	58.01	324.73	3.00	3925.05	3598.96
2049.30					
81	58.97	326.30	3.00	3445.45	3287.50
1871.96					
81	58.97	326.30	3.00	3445.45	3287.50
1871.96					
82	59.93	327.82	3.00	2965.26	2975.66
1694.39					
82	59.93	327.82	3.00	2965.26	2975.66
1694.39					
83	60.88	329.31	3.00	2485.40	2664.04
1516.95					
83	60.88	329.31	3.00	2485.40	2664.04
1516.95					
84	61.84	330.74	3.00	2006.89	2353.29
1340.00					
84	61.84	330.74	3.00	2006.89	2353.29
1340.00					
85	62.80	332.14	3.00	1530.78	2044.10
1163.94					
85	62.80	332.14	3.00	1530.78	2044.10
1163.94					
86	63.76	333.49	3.00	1058.19	1737.20
989.19					
86	63.76	333.49	3.00	1058.19	1737.20
989.19					
87	64.72	334.52	1.76	397.25	873.29
497.26					
87	64.72	334.52	1.76	397.25	873.29
497.26					
88	64.72	335.17	1.24	184.01	554.18
315.56					
88	64.72	335.17	1.24	184.01	554.18
315.56					
89	65.67	336.05	3.00	763.17	495.61
282.21					
89	65.67	336.05	3.00	763.17	495.61
282.21					
90	66.63	337.23	2.85	233.30	151.51
86.27					
90	66.63	337.23	2.85	233.30	151.51

86.27

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 90 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
37	34167.1	19726.4	39452.7	30.00	0.000000E+00

SUM OF MOMENTS = -0.364769E+00 (ft/lbs);Imbalance (Fraction of Total Weight) = -0.4490679E-06

Sum of the Resisting Forces = 586551.51 (lbs)

Average Available Shear Strength = 2445.50(psf)

Sum of the Driving Forces = 333991.66 (lbs)

Average Mobilized Shear Stress = 1392.51(psf)

Total length of the failure surface = 239.85(ft)

Factor of Safety Balance Check: FS = 1.75619

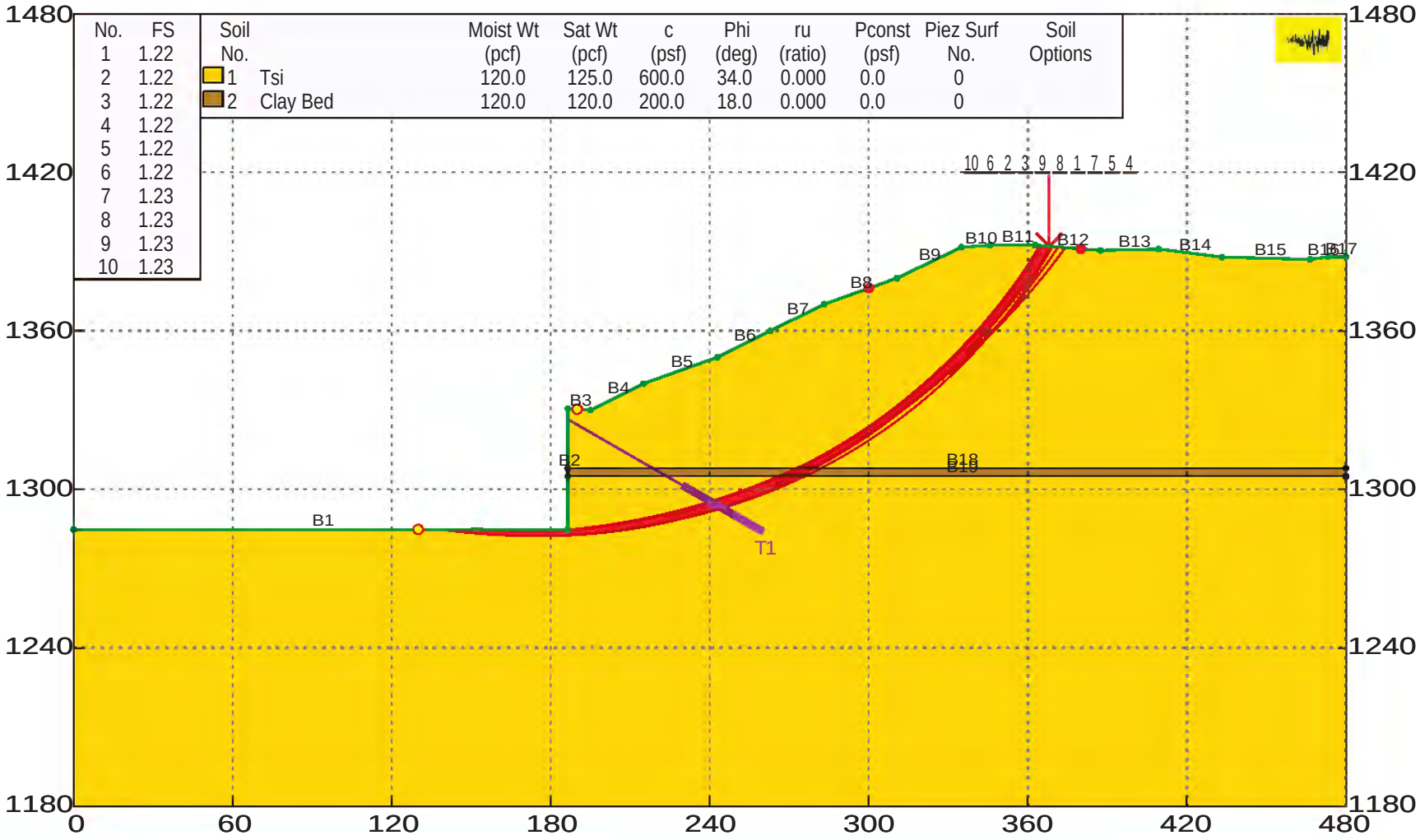
CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Rotational (Seismic (117A))

LGC Geotechnical / BPP

\Section B - Seismic (117A) - Rotational - Tieback.gsd



GEOSTASE FS = 1.22

Simplified Bishop Method

kh = 0.26000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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** Current Version 4.30.31-Double Precision, August 2019 **
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SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Rotational - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Rotational - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Rotational (Seismic (117A))

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface Option	Water Pressure Constant (psf)
1 Tsi	120.0	125.0	600.00	34.00	0.000	0	0.0
2 Clay Bed	120.0	120.0	200.00	18.00	0.000	0	0.0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 130.00(ft)
and X = 190.00(ft)

Each Surface Enters within a Range Between X = 300.00(ft)
and X = 380.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1180.00(ft)

Specified Maximum Radius = 10000.000(ft)

3.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 3.988 FS Min = 1.220 FS Ave = 1.613
Standard Deviation = 0.337 Coefficient of Variation = 20.91 %

Critical Surface is Sequence Number 334 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 172.877784(ft) ; Y = 1513.603127(ft); and Radius = 229.944045(ft)

Circular Trial Failure Surface Generated With 87 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	150.000	1284.800
2	152.987	1284.521
3	155.977	1284.281
4	158.971	1284.080
5	161.966	1283.918
6	164.964	1283.795
7	167.963	1283.712
8	170.962	1283.667
9	173.962	1283.662
10	176.962	1283.695
11	179.961	1283.768
12	182.959	1283.880
13	185.955	1284.031
14	188.949	1284.221
15	191.940	1284.451
16	194.928	1284.719
17	197.913	1285.026
18	200.893	1285.372
19	203.868	1285.757
20	206.838	1286.181
21	209.802	1286.643
22	212.760	1287.144
23	215.711	1287.684
24	218.655	1288.262
25	221.591	1288.878
26	224.518	1289.533
27	227.437	1290.226
28	230.347	1290.956
29	233.247	1291.725
30	236.136	1292.532
31	239.015	1293.376
32	241.883	1294.257
33	244.738	1295.176
34	247.582	1296.132

35	250.413	1297.125
36	253.231	1298.155
37	256.034	1299.222
38	258.824	1300.325
39	261.599	1301.465
40	264.360	1302.640
41	267.104	1303.852
42	269.833	1305.099
43	272.545	1306.382
44	275.240	1307.699
45	277.917	1309.052
46	280.577	1310.440
47	283.218	1311.863
48	285.841	1313.319
49	288.444	1314.810
50	291.028	1316.335
51	293.591	1317.893
52	296.134	1319.484
53	298.657	1321.109
54	301.157	1322.766
55	303.636	1324.456
56	306.093	1326.178
57	308.526	1327.932
58	310.937	1329.718
59	313.324	1331.535
60	315.688	1333.382
61	318.027	1335.261
62	320.341	1337.170
63	322.631	1339.109
64	324.894	1341.077
65	327.132	1343.075
66	329.344	1345.102
67	331.529	1347.158
68	333.687	1349.242
69	335.818	1351.354
70	337.920	1353.493
71	339.995	1355.660
72	342.042	1357.854
73	344.059	1360.074
74	346.048	1362.320
75	348.007	1364.592
76	349.936	1366.890
77	351.835	1369.212
78	353.703	1371.559
79	355.541	1373.931
80	357.348	1376.326
81	359.123	1378.744
82	360.867	1381.185
83	362.578	1383.649
84	364.257	1386.135

85	365.904	1388.643
86	367.518	1391.172
87	368.013	1391.970

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	242.12	1294.33

Factor Of Safety For The Critical or Specified Surface = 1.220

Table 1 - Geometry Data on the 98 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.99	0.14	151.49	1284.66	1284.80	-5.34	0.00	3.00
2	2.99	0.40	154.48	1284.40	1284.80	-4.59	0.00	3.00
3	2.99	0.62	157.47	1284.18	1284.80	-3.84	0.00	3.00
4	3.00	0.80	160.47	1284.00	1284.80	-3.09	0.00	3.00
5	3.00	0.94	163.47	1283.86	1284.80	-2.35	0.00	3.00
6	3.00	1.05	166.46	1283.75	1284.80	-1.60	0.00	3.00
7	3.00	1.11	169.46	1283.69	1284.80	-0.85	0.00	3.00
8	3.00	1.14	172.46	1283.66	1284.80	-0.10	0.00	3.00
9	3.00	1.12	175.46	1283.68	1284.80	0.64	0.00	3.00
10	3.00	1.07	178.46	1283.73	1284.80	1.39	0.00	3.00
11	3.00	0.98	181.46	1283.82	1284.80	2.14	0.00	3.00
12	3.00	0.84	184.46	1283.96	1284.80	2.89	0.00	3.00
13	0.44	0.75	186.18	1284.05	1284.80	3.63	0.00	0.45
14	2.55	46.29	187.67	1284.14	1330.43	3.63	-3.33	

2.55
15 2.99 45.93 190.44 1284.34 1330.26 4.38 -3.33
3.00
16 2.99 45.51 193.43 1284.58 1330.09 5.13 -3.33
3.00
17 0.07 45.28 194.96 1284.72 1330.00 5.88 -3.33
0.07
18 2.91 45.85 196.46 1284.88 1330.73 5.88 26.57
2.93
19 2.98 47.00 199.40 1285.20 1332.20 6.62 26.57
3.00
20 2.98 48.13 202.38 1285.56 1333.69 7.37 26.57
3.00
21 2.97 49.21 205.35 1285.97 1335.18 8.12 26.57
3.00
22 2.96 50.25 208.32 1286.41 1336.66 8.87 26.57
3.00
23 2.96 51.25 211.28 1286.89 1338.14 9.61 26.57
3.00
24 2.24 52.09 213.88 1287.35 1339.44 10.36 26.57
2.28
25 0.71 52.51 215.36 1287.62 1340.13 10.36 19.72
0.72
26 2.94 52.81 217.18 1287.97 1340.78 11.11 19.72
3.00
27 2.94 53.27 220.12 1288.57 1341.84 11.86 19.72
3.00
28 2.93 53.68 223.05 1289.21 1342.89 12.60 19.72
3.00
29 2.92 54.06 225.98 1289.88 1343.93 13.35 19.72
3.00
30 2.91 54.39 228.89 1290.59 1344.98 14.10 19.72
3.00
31 2.90 54.68 231.80 1291.34 1346.02 14.85 19.72
3.00
32 2.89 54.93 234.69 1292.13 1347.06 15.59 19.72
3.00
33 2.88 55.14 237.58 1292.95 1348.09 16.34 19.72
3.00
34 2.87 55.30 240.45 1293.82 1349.12 17.09 19.72
3.00
35 1.02 55.40 242.39 1294.42 1349.82 17.84 19.72
1.07
36 1.84 55.58 243.82 1294.88 1350.46 17.84 26.57
1.93
37 2.84 55.98 246.16 1295.65 1351.63 18.58 26.57
3.00
38 2.83 56.42 249.00 1296.63 1353.05 19.33 26.57
3.00
39 2.82 56.82 251.82 1297.64 1354.46 20.08 26.57

3.00
40 2.80 57.18 254.63 1298.69 1355.87 20.83 26.57
3.00
41 2.79 57.49 257.43 1299.77 1357.26 21.57 26.57
3.00
42 2.78 57.76 260.21 1300.89 1358.66 22.32 26.57
3.00
43 1.10 57.93 262.15 1301.70 1359.62 23.07 26.57
1.20
44 1.66 58.02 263.53 1302.29 1360.31 23.07 26.34
1.80
45 2.74 58.16 265.73 1303.25 1361.40 23.82 26.34
3.00
46 2.29 58.27 268.25 1304.38 1362.65 24.56 26.34
2.52
47 0.44 58.32 269.62 1305.00 1363.32 24.56 26.34
0.48
48 2.71 58.36 271.19 1305.74 1364.10 25.31 26.34
3.00
49 2.70 58.40 273.89 1307.04 1365.44 26.06 26.34
3.00
50 0.40 58.41 275.44 1307.80 1366.21 26.81 26.34
0.44
51 2.28 58.39 276.78 1308.48 1366.87 26.81 26.34
2.56
52 2.66 58.35 279.25 1309.75 1368.09 27.55 26.34
3.00
53 2.52 58.26 281.84 1311.12 1369.38 28.30 26.34
2.87
54 0.12 58.19 283.16 1311.83 1370.02 28.30 19.80
0.13
55 2.62 57.92 284.53 1312.59 1370.51 29.05 19.80
3.00
56 2.60 57.39 287.14 1314.06 1371.46 29.80 19.80
3.00
57 2.58 56.82 289.74 1315.57 1372.39 30.54 19.80
3.00
58 2.56 56.20 292.31 1317.11 1373.32 31.29 19.80
3.00
59 2.54 55.55 294.86 1318.69 1374.23 32.04 19.80
3.00
60 2.52 54.85 297.40 1320.30 1375.15 32.79 19.80
3.00
61 2.50 54.11 299.91 1321.94 1376.05 33.54 19.80
3.00
62 2.48 53.34 302.40 1323.61 1376.95 34.28 19.80
3.00
63 2.46 52.52 304.86 1325.32 1377.84 35.03 19.80
3.00
64 2.43 51.66 307.31 1327.06 1378.72 35.78 19.80

3.00
65 2.07 50.83 309.56 1328.70 1379.53 36.53 19.80
2.58
66 0.34 50.39 310.77 1329.59 1379.98 36.53 25.71
0.42
67 2.39 50.01 312.13 1330.63 1380.64 37.27 25.71
3.00
68 2.36 49.32 314.51 1332.46 1381.78 38.02 25.71
3.00
69 2.34 48.59 316.86 1334.32 1382.91 38.77 25.71
3.00
70 2.31 47.82 319.18 1336.22 1384.03 39.52 25.71
3.00
71 2.29 47.00 321.49 1338.14 1385.14 40.26 25.71
3.00
72 2.26 46.14 323.76 1340.09 1386.24 41.01 25.71
3.00
73 2.24 45.25 326.01 1342.08 1387.32 41.76 25.71
3.00
74 2.21 44.30 328.24 1344.09 1388.39 42.51 25.71
3.00
75 2.19 43.32 330.44 1346.13 1389.45 43.25 25.71
3.00
76 2.16 42.30 332.61 1348.20 1390.50 44.00 25.71
3.00
77 1.21 41.47 334.29 1349.84 1391.31 44.75 25.71
1.71
78 0.92 40.73 335.36 1350.90 1391.63 44.75 4.20
1.29
79 2.10 39.32 336.87 1352.42 1391.74 45.50 4.20
3.00
80 2.07 37.32 338.96 1354.58 1391.90 46.24 4.20
3.00
81 2.05 35.29 341.02 1356.76 1392.05 46.99 4.20
3.00
82 2.02 33.23 343.05 1358.96 1392.20 47.74 4.20
3.00
83 1.74 31.28 344.93 1361.06 1392.34 48.49 4.20
2.63
84 0.25 30.22 345.92 1362.18 1392.40 48.49 0.00
0.37
85 1.96 28.94 347.03 1363.46 1392.40 49.23 0.00
3.00
86 1.93 26.66 348.97 1365.74 1392.40 49.98 0.00
3.00
87 1.90 24.35 350.89 1368.05 1392.40 50.73 0.00
3.00
88 1.87 22.01 352.77 1370.39 1392.40 51.48 0.00
3.00
89 1.84 19.65 354.62 1372.75 1392.40 52.22 0.00

3.00							
90	1.81	17.27	356.44	1375.13	1392.40	52.97	0.00
3.00							
91	1.78	14.87	358.24	1377.53	1392.40	53.72	0.00
3.00							
92	1.74	12.44	359.99	1379.96	1392.40	54.47	0.00
3.00							
93	1.71	9.98	361.72	1382.42	1392.40	55.21	0.00
3.00							
94	0.12	8.66	362.64	1383.74	1392.40	55.96	0.00
0.22							
95	1.56	7.35	363.48	1384.98	1392.34	55.96	-4.63
2.78							
96	1.65	4.82	365.08	1387.39	1392.21	56.71	-4.63
3.00							
97	1.61	2.17	366.71	1389.91	1392.08	57.46	-4.63
3.00							
98	0.49	0.42	367.77	1391.57	1391.99	58.20	-4.63
0.94							

Table 2 - Force Data On The 98 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	50.0	0.0	0.0	13.0	0.0	0.0
2	143.2	0.0	0.0	37.2	0.0	0.0
3	222.5	0.0	0.0	57.9	0.0	0.0
4	287.9	0.0	0.0	74.9	0.0	0.0
5	339.3	0.0	0.0	88.2	0.0	0.0
6	376.6	0.0	0.0	97.9	0.0	0.0
7	399.8	0.0	0.0	103.9	0.0	0.0
8	408.8	0.0	0.0	106.3	0.0	0.0
9	403.7	0.0	0.0	105.0	0.0	0.0
10	384.4	0.0	0.0	100.0	0.0	0.0
11	351.0	0.0	0.0	91.3	0.0	0.0
12	303.6	0.0	0.0	78.9	0.0	0.0
13	40.3	0.0	0.0	10.5	0.0	0.0
14	14159.2	0.0	0.0	3681.4	0.0	0.0
15	16486.1	0.0	0.0	4286.4	0.0	0.0
16	16316.7	0.0	0.0	4242.3	0.0	0.0
17	388.7	0.0	0.0	101.1	0.0	0.0
18	16026.4	0.0	0.0	4166.9	0.0	0.0
19	16807.9	0.0	0.0	4370.0	0.0	0.0
20	17182.0	0.0	0.0	4467.3	0.0	0.0
21	17537.2	0.0	0.0	4559.7	0.0	0.0

22	17873.1	0.0	0.0	4647.0	0.0	0.0
23	18189.7	0.0	0.0	4729.3	0.0	0.0
24	14003.2	0.0	0.0	3640.8	0.0	0.0
25	4479.4	0.0	0.0	1164.6	0.0	0.0
26	18655.2	0.0	0.0	4850.4	0.0	0.0
27	18766.7	0.0	0.0	4879.3	0.0	0.0
28	18859.6	0.0	0.0	4903.5	0.0	0.0
29	18934.0	0.0	0.0	4922.8	0.0	0.0
30	18989.9	0.0	0.0	4937.4	0.0	0.0
31	19027.5	0.0	0.0	4947.1	0.0	0.0
32	19046.7	0.0	0.0	4952.1	0.0	0.0
33	19047.7	0.0	0.0	4952.4	0.0	0.0
34	19030.7	0.0	0.0	4948.0	0.0	0.0
35	6762.9	0.0	0.0	1758.4	0.0	0.0
36	12261.5	0.0	0.0	3188.0	0.0	0.0
37	19100.5	0.0	0.0	4966.1	0.0	0.0
38	19165.9	0.0	0.0	4983.1	0.0	0.0
39	19212.0	0.0	0.0	4995.1	0.0	0.0
40	19238.9	0.0	0.0	5002.1	0.0	0.0
41	19246.7	0.0	0.0	5004.2	0.0	0.0
42	19235.7	0.0	0.0	5001.3	0.0	0.0
43	7649.8	0.0	0.0	1988.9	0.0	0.0
44	11555.4	0.0	0.0	3004.4	0.0	0.0
45	19152.9	0.0	0.0	4979.8	0.0	0.0
46	16037.3	0.0	0.0	4169.7	0.0	0.0
47	3044.7	0.0	0.0	791.6	0.0	0.0
48	18993.3	0.0	0.0	4938.3	0.0	0.0
49	18886.8	0.0	0.0	4910.6	0.0	0.0
50	2782.1	0.0	0.0	723.3	0.0	0.0
51	15980.9	0.0	0.0	4155.0	0.0	0.0
52	18622.0	0.0	0.0	4841.7	0.0	0.0
53	17638.7	0.0	0.0	4586.1	0.0	0.0
54	825.5	0.0	0.0	214.6	0.0	0.0
55	18229.2	0.0	0.0	4739.6	0.0	0.0
56	17929.0	0.0	0.0	4661.6	0.0	0.0
57	17615.6	0.0	0.0	4580.1	0.0	0.0
58	17289.3	0.0	0.0	4495.2	0.0	0.0
59	16950.6	0.0	0.0	4407.2	0.0	0.0
60	16600.0	0.0	0.0	4316.0	0.0	0.0
61	16238.0	0.0	0.0	4221.9	0.0	0.0
62	15865.0	0.0	0.0	4124.9	0.0	0.0
63	15481.6	0.0	0.0	4025.2	0.0	0.0
64	15088.2	0.0	0.0	3922.9	0.0	0.0
65	12647.2	0.0	0.0	3288.3	0.0	0.0
66	2039.0	0.0	0.0	530.1	0.0	0.0
67	14326.9	0.0	0.0	3725.0	0.0	0.0
68	13988.1	0.0	0.0	3636.9	0.0	0.0
69	13639.0	0.0	0.0	3546.1	0.0	0.0
70	13280.2	0.0	0.0	3452.8	0.0	0.0
71	12912.1	0.0	0.0	3357.1	0.0	0.0

72	12535.3	0.0	0.0	3259.2	0.0	0.0
73	12150.5	0.0	0.0	3159.1	0.0	0.0
74	11758.1	0.0	0.0	3057.1	0.0	0.0
75	11358.8	0.0	0.0	2953.3	0.0	0.0
76	10953.2	0.0	0.0	2847.8	0.0	0.0
77	6036.0	0.0	0.0	1569.4	0.0	0.0
78	4485.2	0.0	0.0	1166.2	0.0	0.0
79	9922.6	0.0	0.0	2579.9	0.0	0.0
80	9292.1	0.0	0.0	2415.9	0.0	0.0
81	8666.5	0.0	0.0	2253.3	0.0	0.0
82	8046.3	0.0	0.0	2092.0	0.0	0.0
83	6534.0	0.0	0.0	1698.8	0.0	0.0
84	898.0	0.0	0.0	233.5	0.0	0.0
85	6803.9	0.0	0.0	1769.0	0.0	0.0
86	6171.4	0.0	0.0	1604.6	0.0	0.0
87	5548.6	0.0	0.0	1442.6	0.0	0.0
88	4936.1	0.0	0.0	1283.4	0.0	0.0
89	4334.5	0.0	0.0	1127.0	0.0	0.0
90	3744.6	0.0	0.0	973.6	0.0	0.0
91	3166.8	0.0	0.0	823.4	0.0	0.0
92	2601.8	0.0	0.0	676.5	0.0	0.0
93	2050.4	0.0	0.0	533.1	0.0	0.0
94	126.7	0.0	0.0	32.9	0.0	0.0
95	1374.5	0.0	0.0	357.4	0.0	0.0
96	952.1	0.0	0.0	247.6	0.0	0.0
97	419.9	0.0	0.0	109.2	0.0	0.0
98	24.9	0.0	0.0	6.5	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1033924.20(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1033924.20(lbs)

TOTAL AREA OF SLIDING MASS = 8616.03(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 98 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	600.00	34.00	
2	1	600.00	34.00	
3	1	600.00	34.00	
4	1	600.00	34.00	
5	1	600.00	34.00	
6	1	600.00	34.00	
7	1	600.00	34.00	
8	1	600.00	34.00	
9	1	600.00	34.00	
10	1	600.00	34.00	
11	1	600.00	34.00	

12	1	600.00	34.00
13	1	600.00	34.00
14	1	600.00	34.00
15	1	600.00	34.00
16	1	600.00	34.00
17	1	600.00	34.00
18	1	600.00	34.00
19	1	600.00	34.00
20	1	600.00	34.00
21	1	600.00	34.00
22	1	600.00	34.00
23	1	600.00	34.00
24	1	600.00	34.00
25	1	600.00	34.00
26	1	600.00	34.00
27	1	600.00	34.00
28	1	600.00	34.00
29	1	600.00	34.00
30	1	600.00	34.00
31	1	600.00	34.00
32	1	600.00	34.00
33	1	600.00	34.00
34	1	600.00	34.00
35	1	600.00	34.00
36	1	600.00	34.00
37	1	600.00	34.00
38	1	600.00	34.00
39	1	600.00	34.00
40	1	600.00	34.00
41	1	600.00	34.00
42	1	600.00	34.00
43	1	600.00	34.00
44	1	600.00	34.00
45	1	600.00	34.00
46	1	600.00	34.00
47	2	200.00	18.00
48	2	200.00	18.00
49	2	200.00	18.00
50	2	200.00	18.00
51	1	600.00	34.00
52	1	600.00	34.00
53	1	600.00	34.00
54	1	600.00	34.00
55	1	600.00	34.00
56	1	600.00	34.00
57	1	600.00	34.00
58	1	600.00	34.00
59	1	600.00	34.00
60	1	600.00	34.00
61	1	600.00	34.00

62	1	600.00	34.00
63	1	600.00	34.00
64	1	600.00	34.00
65	1	600.00	34.00
66	1	600.00	34.00
67	1	600.00	34.00
68	1	600.00	34.00
69	1	600.00	34.00
70	1	600.00	34.00
71	1	600.00	34.00
72	1	600.00	34.00
73	1	600.00	34.00
74	1	600.00	34.00
75	1	600.00	34.00
76	1	600.00	34.00
77	1	600.00	34.00
78	1	600.00	34.00
79	1	600.00	34.00
80	1	600.00	34.00
81	1	600.00	34.00
82	1	600.00	34.00
83	1	600.00	34.00
84	1	600.00	34.00
85	1	600.00	34.00
86	1	600.00	34.00
87	1	600.00	34.00
88	1	600.00	34.00
89	1	600.00	34.00
90	1	600.00	34.00
91	1	600.00	34.00
92	1	600.00	34.00
93	1	600.00	34.00
94	1	600.00	34.00
95	1	600.00	34.00
96	1	600.00	34.00
97	1	600.00	34.00
98	1	600.00	34.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 98 Slices

Slice	Alpha	X-Coord.	Base	Effective	Available	Mobilized

No.	(deg)	Slice Cntr (ft)	Leng. (ft)	Normal Stress (psf)	Shear Strength (psf)	Shear Stress * (psf)
1	-5.34	151.49	3.00	63.80	643.03	527.08
1	-5.34	151.49	3.00	63.80	643.03	527.08
2	-4.59	154.48	3.00	89.40	660.30	541.23
2	-4.59	154.48	3.00	89.40	660.30	541.23
3	-3.84	157.47	3.00	109.80	674.06	552.51
3	-3.84	157.47	3.00	109.80	674.06	552.51
4	-3.09	160.47	3.00	125.09	684.37	560.97
4	-3.09	160.47	3.00	125.09	684.37	560.97
5	-2.35	163.47	3.00	135.38	691.32	566.66
5	-2.35	163.47	3.00	135.38	691.32	566.66
6	-1.60	166.46	3.00	140.78	694.96	569.64
6	-1.60	166.46	3.00	140.78	694.96	569.64
7	-0.85	169.46	3.00	141.37	695.36	569.97
7	-0.85	169.46	3.00	141.37	695.36	569.97
8	-0.10	172.46	3.00	137.26	692.58	567.69
8	-0.10	172.46	3.00	137.26	692.58	567.69
9	0.64	175.46	3.00	128.53	686.70	562.87
9	0.64	175.46	3.00	128.53	686.70	562.87
10	1.39	178.46	3.00	115.29	677.76	555.55
10	1.39	178.46	3.00	115.29	677.76	555.55
11	2.14	181.46	3.00	97.61	665.84	545.77
11	2.14	181.46	3.00	97.61	665.84	545.77
12	2.89	184.46	3.00	75.60	650.99	

533.60
  12 2.89 184.46 3.00 75.60 650.99
533.60
  13 3.63 186.18 0.45 58.73 639.61
524.28
  13 3.63 186.18 0.45 58.73 639.61
524.28
  14 3.63 187.67 2.55 5345.01 4205.25
3446.95
  14 3.63 187.67 2.55 5345.01 4205.25
3446.95
  15 4.38 190.44 3.00 5262.36 4149.51
3401.26
  15 4.38 190.44 3.00 5262.36 4149.51
3401.26
  16 5.13 193.43 3.00 5173.18 4089.36
3351.96
  16 5.13 193.43 3.00 5173.18 4089.36
3351.96
  17 5.88 194.96 0.07 5107.37 4044.96
3315.57
  17 5.88 194.96 0.07 5107.37 4044.96
3315.57
  18 5.88 196.46 2.93 5172.53 4088.91
3351.59
  18 5.88 196.46 2.93 5172.53 4088.91
3351.59
  19 6.62 199.40 3.00 5262.72 4149.75
3401.46
  19 6.62 199.40 3.00 5262.72 4149.75
3401.46
  20 7.37 202.38 3.00 5348.59 4207.67
3448.93
  20 7.37 202.38 3.00 5348.59 4207.67
3448.93
  21 8.12 205.35 3.00 5428.59 4261.63
3493.17
  21 8.12 205.35 3.00 5428.59 4261.63
3493.17
  22 8.87 208.32 3.00 5502.80 4311.68
3534.19
  22 8.87 208.32 3.00 5502.80 4311.68
3534.19
  23 9.61 211.28 3.00 5571.28 4357.88
3572.06
  23 9.61 211.28 3.00 5571.28 4357.88
3572.06
  24 10.36 213.88 2.28 5621.78 4391.94
3599.97
  24 10.36 213.88 2.28 5621.78 4391.94

3599.97

25	10.36	215.36	0.72	5667.48	4422.76

3625.24

25	10.36	215.36	0.72	5667.48	4422.76

3625.24

26	11.11	217.18	3.00	5657.77	4416.21

3619.87

26	11.11	217.18	3.00	5657.77	4416.21

3619.87

27	11.86	220.12	3.00	5664.77	4420.94

3623.74

27	11.86	220.12	3.00	5664.77	4420.94

3623.74

28	12.60	223.05	3.00	5667.03	4422.46

3624.99

28	12.60	223.05	3.00	5667.03	4422.46

3624.99

29	13.35	225.98	3.00	5664.61	4420.83

3623.66

29	13.35	225.98	3.00	5664.61	4420.83

3623.66

30	14.10	228.89	3.00	5657.59	4416.09

3619.77

30	14.10	228.89	3.00	5657.59	4416.09

3619.77

31	14.85	231.80	3.00	5646.02	4408.29

3613.38

31	14.85	231.80	3.00	5646.02	4408.29

3613.38

32	15.59	234.69	3.00	5629.99	4397.47

3604.51

32	15.59	234.69	3.00	5629.99	4397.47

3604.51

33	16.34	237.58	3.00	5609.54	4383.68

3593.21

33	16.34	237.58	3.00	5609.54	4383.68

3593.21

34	17.09	240.45	3.00	5584.75	4366.96

3579.50

34	17.09	240.45	3.00	5584.75	4366.96

3579.50

35	17.84	242.39	1.07	20432.57	14381.94

11788.56

35	17.84	242.39	1.07	20432.57	14381.94

11788.56

36	17.84	243.82	1.93	5570.95	4357.65

3571.87

36	17.84	243.82	1.93	5570.95	4357.65

3571.87

37	18.58	246.16	3.00	5569.45	4356.64

3571.04					
37	18.58	246.16	3.00	5569.45	4356.64
3571.04					
38	19.33	249.00	3.00	5572.40	4358.63
3572.67					
38	19.33	249.00	3.00	5572.40	4358.63
3572.67					
39	20.08	251.82	3.00	5570.55	4357.38
3571.65					
39	20.08	251.82	3.00	5570.55	4357.38
3571.65					
40	20.83	254.63	3.00	5563.99	4352.96
3568.02					
40	20.83	254.63	3.00	5563.99	4352.96
3568.02					
41	21.57	257.43	3.00	5552.77	4345.39
3561.82					
41	21.57	257.43	3.00	5552.77	4345.39
3561.82					
42	22.32	260.21	3.00	5536.96	4334.73
3553.08					
42	22.32	260.21	3.00	5536.96	4334.73
3553.08					
43	23.07	262.15	1.20	5510.62	4316.96
3538.52					
43	23.07	262.15	1.20	5510.62	4316.96
3538.52					
44	23.07	263.53	1.80	5520.23	4323.44
3543.83					
44	23.07	263.53	1.80	5520.23	4323.44
3543.83					
45	23.82	265.73	3.00	5490.42	4303.33
3527.35					
45	23.82	265.73	3.00	5490.42	4303.33
3527.35					
46	24.56	268.25	2.52	5459.17	4282.26
3510.07					
46	24.56	268.25	2.52	5459.17	4282.26
3510.07					
47	24.56	269.62	0.48	6205.26	2216.21
1816.58					
47	24.56	269.62	0.48	6205.26	2216.21
1816.58					
48	25.31	271.19	3.00	6184.77	2209.55
1811.12					
48	25.31	271.19	3.00	6184.77	2209.55
1811.12					
49	26.06	273.89	3.00	6164.12	2202.84
1805.62					
49	26.06	273.89	3.00	6164.12	2202.84

1805.62					
50	26.81	275.44	0.44	6139.89	2194.97
1799.17					
50	26.81	275.44	0.44	6139.89	2194.97
1799.17					
51	26.81	276.78	2.56	5342.97	4203.88
3445.83					
51	26.81	276.78	2.56	5342.97	4203.88
3445.83					
52	27.55	279.25	3.00	5295.98	4172.18
3419.84					
52	27.55	279.25	3.00	5295.98	4172.18
3419.84					
53	28.30	281.84	2.87	5245.02	4137.81
3391.67					
53	28.30	281.84	2.87	5245.02	4137.81
3391.67					
54	28.30	283.16	0.13	5238.92	4133.69
3388.30					
54	28.30	283.16	0.13	5238.92	4133.69
3388.30					
55	29.05	284.53	3.00	5171.72	4088.37
3351.15					
55	29.05	284.53	3.00	5171.72	4088.37
3351.15					
56	29.80	287.14	3.00	5080.33	4026.72
3300.62					
56	29.80	287.14	3.00	5080.33	4026.72
3300.62					
57	30.54	289.74	3.00	4985.84	3962.99
3248.37					
57	30.54	289.74	3.00	4985.84	3962.99
3248.37					
58	31.29	292.31	3.00	4888.33	3897.22
3194.46					
58	31.29	292.31	3.00	4888.33	3897.22
3194.46					
59	32.04	294.86	3.00	4787.87	3829.46
3138.93					
59	32.04	294.86	3.00	4787.87	3829.46
3138.93					
60	32.79	297.40	3.00	4684.56	3759.77
3081.80					
60	32.79	297.40	3.00	4684.56	3759.77
3081.80					
61	33.54	299.91	3.00	4578.45	3688.21
3023.14					
61	33.54	299.91	3.00	4578.45	3688.21
3023.14					
62	34.28	302.40	3.00	4469.64	3614.81

2962.98					
62	34.28	302.40	3.00	4469.64	3614.81
2962.98					
63	35.03	304.86	3.00	4358.21	3539.65
2901.37					
63	35.03	304.86	3.00	4358.21	3539.65
2901.37					
64	35.78	307.31	3.00	4244.23	3462.77
2838.35					
64	35.78	307.31	3.00	4244.23	3462.77
2838.35					
65	36.53	309.56	2.58	4133.32	3387.96
2777.04					
65	36.53	309.56	2.58	4133.32	3387.96
2777.04					
66	36.53	310.77	0.42	4095.52	3362.46
2756.14					
66	36.53	310.77	0.42	4095.52	3362.46
2756.14					
67	37.27	312.13	3.00	4024.89	3314.82
2717.09					
67	37.27	312.13	3.00	4024.89	3314.82
2717.09					
68	38.02	314.51	3.00	3928.17	3249.59
2663.61					
68	38.02	314.51	3.00	3928.17	3249.59
2663.61					
69	38.77	316.86	3.00	3828.62	3182.43
2608.57					
69	38.77	316.86	3.00	3828.62	3182.43
2608.57					
70	39.52	319.18	3.00	3726.32	3113.43
2552.01					
70	39.52	319.18	3.00	3726.32	3113.43
2552.01					
71	40.26	321.49	3.00	3621.36	3042.64
2493.99					
71	40.26	321.49	3.00	3621.36	3042.64
2493.99					
72	41.01	323.76	3.00	3513.85	2970.12
2434.54					
72	41.01	323.76	3.00	3513.85	2970.12
2434.54					
73	41.76	326.01	3.00	3403.86	2895.93
2373.73					
73	41.76	326.01	3.00	3403.86	2895.93
2373.73					
74	42.51	328.24	3.00	3291.50	2820.15
2311.61					
74	42.51	328.24	3.00	3291.50	2820.15

2311.61					
75	43.25	330.44	3.00	3176.87	2742.82
2248.23					
75	43.25	330.44	3.00	3176.87	2742.82
2248.23					
76	44.00	332.61	3.00	3060.05	2664.03
2183.65					
76	44.00	332.61	3.00	3060.05	2664.03
2183.65					
77	44.75	334.29	1.71	2959.58	2596.26
2128.10					
77	44.75	334.29	1.71	2959.58	2596.26
2128.10					
78	44.75	335.36	1.29	2902.08	2557.47
2096.31					
78	44.75	335.36	1.29	2902.08	2557.47
2096.31					
79	45.50	336.87	3.00	2757.60	2460.03
2016.43					
79	45.50	336.87	3.00	2757.60	2460.03
2016.43					
80	46.24	338.96	3.00	2569.54	2333.17
1912.45					
80	46.24	338.96	3.00	2569.54	2333.17
1912.45					
81	46.99	341.02	3.00	2381.83	2206.57
1808.67					
81	46.99	341.02	3.00	2381.83	2206.57
1808.67					
82	47.74	343.05	3.00	2194.61	2080.28
1705.16					
82	47.74	343.05	3.00	2194.61	2080.28
1705.16					
83	48.49	344.93	2.63	2017.80	1961.02
1607.41					
83	48.49	344.93	2.63	2017.80	1961.02
1607.41					
84	48.49	345.92	0.37	1938.20	1907.33
1563.40					
84	48.49	345.92	0.37	1938.20	1907.33
1563.40					
85	49.23	347.03	3.00	1815.35	1824.47
1495.47					
85	49.23	347.03	3.00	1815.35	1824.47
1495.47					
86	49.98	348.97	3.00	1619.81	1692.58
1387.37					
86	49.98	348.97	3.00	1619.81	1692.58
1387.37					
87	50.73	350.89	3.00	1425.62	1561.59

1280.00					
87	50.73	350.89	3.00	1425.62	1561.59
1280.00					
88	51.48	352.77	3.00	1232.89	1431.60
1173.45					
88	51.48	352.77	3.00	1232.89	1431.60
1173.45					
89	52.22	354.62	3.00	1041.77	1302.68
1067.78					
89	52.22	354.62	3.00	1041.77	1302.68
1067.78					
90	52.97	356.44	3.00	852.38	1174.93
963.07					
90	52.97	356.44	3.00	852.38	1174.93
963.07					
91	53.72	358.24	3.00	664.86	1048.45
859.40					
91	53.72	358.24	3.00	664.86	1048.45
859.40					
92	54.47	359.99	3.00	479.37	923.34
756.84					
92	54.47	359.99	3.00	479.37	923.34
756.84					
93	55.21	361.72	3.00	296.05	799.69
655.49					
93	55.21	361.72	3.00	296.05	799.69
655.49					
94	55.96	362.64	0.22	192.67	729.96
598.33					
94	55.96	362.64	0.22	192.67	729.96
598.33					
95	55.96	363.48	2.78	104.74	670.65
549.72					
95	55.96	363.48	2.78	104.74	670.65
549.72					
96	56.71	365.08	3.00	320.38	216.10
177.13					
96	56.71	365.08	3.00	320.38	216.10
177.13					
97	57.46	366.71	3.00	142.31	95.99
78.68					
97	57.46	366.71	3.00	142.31	95.99
78.68					
98	58.20	367.77	0.94	27.15	18.31
15.01					
98	58.20	367.77	0.94	27.15	18.31
15.01					

Table 4 - Base Force Data on the 98 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.34	151.49	3.00	191.39	1929.09	1581.23
1	-5.34	151.49	3.00	191.39	1929.09	1581.23
2	-4.59	154.48	3.00	268.20	1980.90	1623.70
2	-4.59	154.48	3.00	268.20	1980.90	1623.70
3	-3.84	157.47	3.00	329.39	2022.17	1657.53
3	-3.84	157.47	3.00	329.39	2022.17	1657.53
4	-3.09	160.47	3.00	375.27	2053.12	1682.90
4	-3.09	160.47	3.00	375.27	2053.12	1682.90
5	-2.35	163.47	3.00	406.15	2073.95	1699.97
5	-2.35	163.47	3.00	406.15	2073.95	1699.97
6	-1.60	166.46	3.00	422.34	2084.87	1708.92
6	-1.60	166.46	3.00	422.34	2084.87	1708.92
7	-0.85	169.46	3.00	424.12	2086.07	1709.91
7	-0.85	169.46	3.00	424.12	2086.07	1709.91
8	-0.10	172.46	3.00	411.78	2077.75	1703.08
8	-0.10	172.46	3.00	411.78	2077.75	1703.08
9	0.64	175.46	3.00	385.60	2060.09	1688.61
9	0.64	175.46	3.00	385.60	2060.09	1688.61
10	1.39	178.46	3.00	345.86	2033.29	1666.64
10	1.39	178.46	3.00	345.86	2033.29	1666.64
11	2.14	181.46	3.00	292.84	1997.52	

1637.32
  11 2.14 181.46 3.00 292.84 1997.52
1637.32
  12 2.89 184.46 3.00 226.79 1952.97
1600.81
  12 2.89 184.46 3.00 226.79 1952.97
1600.81
  13 3.63 186.18 0.45 26.17 285.02
233.62
  13 3.63 186.18 0.45 26.17 285.02
233.62
  14 3.63 187.67 2.55 13653.21 10741.84
8804.85
  14 3.63 187.67 2.55 13653.21 10741.84
8804.85
  15 4.38 190.44 3.00 15787.09 12448.53
10203.78
  15 4.38 190.44 3.00 15787.09 12448.53
10203.78
  16 5.13 193.43 3.00 15519.55 12268.07
10055.87
  16 5.13 193.43 3.00 15519.55 12268.07
10055.87
  17 5.88 194.96 0.07 367.26 290.87
238.42
  17 5.88 194.96 0.07 367.26 290.87
238.42
  18 5.88 196.46 2.93 15145.63 11972.71
9813.77
  18 5.88 196.46 2.93 15145.63 11972.71
9813.77
  19 6.62 199.40 3.00 15788.17 12449.25
10204.38
  19 6.62 199.40 3.00 15788.17 12449.25
10204.38
  20 7.37 202.38 3.00 16045.78 12623.01
10346.80
  20 7.37 202.38 3.00 16045.78 12623.01
10346.80
  21 8.12 205.35 3.00 16285.78 12784.90
10479.50
  21 8.12 205.35 3.00 16285.78 12784.90
10479.50
  22 8.87 208.32 3.00 16508.40 12935.05
10602.58
  22 8.87 208.32 3.00 16508.40 12935.05
10602.58
  23 9.61 211.28 3.00 16713.85 13073.63
10716.17
  23 9.61 211.28 3.00 16713.85 13073.63

10716.17
  24   10.36   213.88   2.28   12802.58   10001.84
8198.29
  24   10.36   213.88   2.28   12802.58   10001.84
8198.29
  25   10.36   215.36   0.72   4095.78   3196.25
2619.90
  25   10.36   215.36   0.72   4095.78   3196.25
2619.90
  26   11.11   217.18   3.00   16973.31   13248.64
10859.62
  26   11.11   217.18   3.00   16973.31   13248.64
10859.62
  27   11.86   220.12   3.00   16994.31   13262.81
10871.23
  27   11.86   220.12   3.00   16994.31   13262.81
10871.23
  28   12.60   223.05   3.00   17001.08   13267.38
10874.98
  28   12.60   223.05   3.00   17001.08   13267.38
10874.98
  29   13.35   225.98   3.00   16993.84   13262.49
10870.97
  29   13.35   225.98   3.00   16993.84   13262.49
10870.97
  30   14.10   228.89   3.00   16972.77   13248.28
10859.32
  30   14.10   228.89   3.00   16972.77   13248.28
10859.32
  31   14.85   231.80   3.00   16938.07   13224.87
10840.14
  31   14.85   231.80   3.00   16938.07   13224.87
10840.14
  32   15.59   234.69   3.00   16889.96   13192.42
10813.54
  32   15.59   234.69   3.00   16889.96   13192.42
10813.54
  33   16.34   237.58   3.00   16828.62   13151.05
10779.62
  33   16.34   237.58   3.00   16828.62   13151.05
10779.62
  34   17.09   240.45   3.00   16754.26   13100.89
10738.51
  34   17.09   240.45   3.00   16754.26   13100.89
10738.51
  35   17.84   242.39   1.07   21836.67   15370.25
12598.66
  35   17.84   242.39   1.07   21836.67   15370.25
12598.66
  36   17.84   243.82   1.93   10759.07   8415.85

6898.29					
36	17.84	243.82	1.93	10759.07	8415.85
6898.29					
37	18.58	246.16	3.00	16708.35	13069.92
10713.13					
37	18.58	246.16	3.00	16708.35	13069.92
10713.13					
38	19.33	249.00	3.00	16717.19	13075.88
10718.01					
38	19.33	249.00	3.00	16717.19	13075.88
10718.01					
39	20.08	251.82	3.00	16711.66	13072.15
10714.96					
39	20.08	251.82	3.00	16711.66	13072.15
10714.96					
40	20.83	254.63	3.00	16691.96	13058.87
10704.07					
40	20.83	254.63	3.00	16691.96	13058.87
10704.07					
41	21.57	257.43	3.00	16658.31	13036.17
10685.46					
41	21.57	257.43	3.00	16658.31	13036.17
10685.46					
42	22.32	260.21	3.00	16610.89	13004.19
10659.25					
42	22.32	260.21	3.00	16610.89	13004.19
10659.25					
43	23.07	262.15	1.20	6591.64	5163.82
4232.67					
43	23.07	262.15	1.20	6591.64	5163.82
4232.67					
44	23.07	263.53	1.80	9957.55	7798.75
6392.47					
44	23.07	263.53	1.80	9957.55	7798.75
6392.47					
45	23.82	265.73	3.00	16471.25	12910.00
10582.04					
45	23.82	265.73	3.00	16471.25	12910.00
10582.04					
46	24.56	268.25	2.52	13766.27	10798.47
8851.27					
46	24.56	268.25	2.52	13766.27	10798.47
8851.27					
47	24.56	269.62	0.48	2968.11	1060.06
868.91					
47	24.56	269.62	0.48	2968.11	1060.06
868.91					
48	25.31	271.19	3.00	18554.31	6628.66
5433.37					
48	25.31	271.19	3.00	18554.31	6628.66

5433.37
  49   26.06   273.89   3.00   18492.35   6608.53
5416.86
  49   26.06   273.89   3.00   18492.35   6608.53
5416.86
  50   26.81   275.44   0.44   2730.63   976.18
800.15
  50   26.81   275.44   0.44   2730.63   976.18
800.15
  51   26.81   276.78   2.56   13652.71   10742.03
8805.00
  51   26.81   276.78   2.56   13652.71   10742.03
8805.00
  52   27.55   279.25   3.00   15887.93   12516.54
10259.53
  52   27.55   279.25   3.00   15887.93   12516.54
10259.53
  53   28.30   281.84   2.87   15030.84   11857.87
9719.64
  53   28.30   281.84   2.87   15030.84   11857.87
9719.64
  54   28.30   283.16   0.13   703.39   555.00
454.92
  54   28.30   283.16   0.13   703.39   555.00
454.92
  55   29.05   284.53   3.00   15515.17   12265.12
10053.44
  55   29.05   284.53   3.00   15515.17   12265.12
10053.44
  56   29.80   287.14   3.00   15240.98   12080.17
9901.85
  56   29.80   287.14   3.00   15240.98   12080.17
9901.85
  57   30.54   289.74   3.00   14957.51   11888.97
9745.12
  57   30.54   289.74   3.00   14957.51   11888.97
9745.12
  58   31.29   292.31   3.00   14664.98   11691.65
9583.39
  58   31.29   292.31   3.00   14664.98   11691.65
9583.39
  59   32.04   294.86   3.00   14363.62   11488.38
9416.78
  59   32.04   294.86   3.00   14363.62   11488.38
9416.78
  60   32.79   297.40   3.00   14053.67   11279.32
9245.41
  60   32.79   297.40   3.00   14053.67   11279.32
9245.41
  61   33.54   299.91   3.00   13735.36   11064.62

9069.42					
61	33.54	299.91	3.00	13735.36	11064.62
9069.42					
62	34.28	302.40	3.00	13408.93	10844.44
8888.94					
62	34.28	302.40	3.00	13408.93	10844.44
8888.94					
63	35.03	304.86	3.00	13074.62	10618.94
8704.11					
63	35.03	304.86	3.00	13074.62	10618.94
8704.11					
64	35.78	307.31	3.00	12732.68	10388.30
8515.06					
64	35.78	307.31	3.00	12732.68	10388.30
8515.06					
65	36.53	309.56	2.58	10665.54	8742.22
7165.81					
65	36.53	309.56	2.58	10665.54	8742.22
7165.81					
66	36.53	310.77	0.42	1718.58	1410.97
1156.54					
66	36.53	310.77	0.42	1718.58	1410.97
1156.54					
67	37.27	312.13	3.00	12074.68	9944.47
8151.27					
67	37.27	312.13	3.00	12074.68	9944.47
8151.27					
68	38.02	314.51	3.00	11784.51	9748.76
7990.84					
68	38.02	314.51	3.00	11784.51	9748.76
7990.84					
69	38.77	316.86	3.00	11485.85	9547.30
7825.71					
69	38.77	316.86	3.00	11485.85	9547.30
7825.71					
70	39.52	319.18	3.00	11178.95	9340.30
7656.04					
70	39.52	319.18	3.00	11178.95	9340.30
7656.04					
71	40.26	321.49	3.00	10864.09	9127.92
7481.96					
71	40.26	321.49	3.00	10864.09	9127.92
7481.96					
72	41.01	323.76	3.00	10541.54	8910.36
7303.63					
72	41.01	323.76	3.00	10541.54	8910.36
7303.63					
73	41.76	326.01	3.00	10211.59	8687.80
7121.20					
73	41.76	326.01	3.00	10211.59	8687.80

7121.20						
74	42.51	328.24	3.00	9874.51	8460.44	
6934.84						
74	42.51	328.24	3.00	9874.51	8460.44	
6934.84						
75	43.25	330.44	3.00	9530.60	8228.47	
6744.70						
75	43.25	330.44	3.00	9530.60	8228.47	
6744.70						
76	44.00	332.61	3.00	9180.16	7992.10	
6550.95						
76	44.00	332.61	3.00	9180.16	7992.10	
6550.95						
77	44.75	334.29	1.71	5055.10	4434.53	
3634.89						
77	44.75	334.29	1.71	5055.10	4434.53	
3634.89						
78	44.75	335.36	1.29	3749.36	3304.15	
2708.34						
78	44.75	335.36	1.29	3749.36	3304.15	
2708.34						
79	45.50	336.87	3.00	8272.80	7380.08	
6049.28						
79	45.50	336.87	3.00	8272.80	7380.08	
6049.28						
80	46.24	338.96	3.00	7708.61	6999.52	
5737.35						
80	46.24	338.96	3.00	7708.61	6999.52	
5737.35						
81	46.99	341.02	3.00	7145.50	6619.70	
5426.02						
81	46.99	341.02	3.00	7145.50	6619.70	
5426.02						
82	47.74	343.05	3.00	6583.82	6240.84	
5115.48						
82	47.74	343.05	3.00	6583.82	6240.84	
5115.48						
83	48.49	344.93	2.63	5299.54	5150.42	
4221.68						
83	48.49	344.93	2.63	5299.54	5150.42	
4221.68						
84	48.49	345.92	0.37	724.12	712.59	
584.09						
84	48.49	345.92	0.37	724.12	712.59	
584.09						
85	49.23	347.03	3.00	5446.04	5473.40	
4486.42						
85	49.23	347.03	3.00	5446.04	5473.40	
4486.42						
86	49.98	348.97	3.00	4859.44	5077.74	

4162.11					
86	49.98	348.97	3.00	4859.44	5077.74
4162.11					
87	50.73	350.89	3.00	4276.86	4684.78
3840.01					
87	50.73	350.89	3.00	4276.86	4684.78
3840.01					
88	51.48	352.77	3.00	3698.68	4294.79
3520.35					
88	51.48	352.77	3.00	3698.68	4294.79
3520.35					
89	52.22	354.62	3.00	3125.30	3908.04
3203.33					
89	52.22	354.62	3.00	3125.30	3908.04
3203.33					
90	52.97	356.44	3.00	2557.13	3524.80
2889.20					
90	52.97	356.44	3.00	2557.13	3524.80
2889.20					
91	53.72	358.24	3.00	1994.58	3145.36
2578.19					
91	53.72	358.24	3.00	1994.58	3145.36
2578.19					
92	54.47	359.99	3.00	1438.11	2770.02
2270.52					
92	54.47	359.99	3.00	1438.11	2770.02
2270.52					
93	55.21	361.72	3.00	888.15	2399.07
1966.46					
93	55.21	361.72	3.00	888.15	2399.07
1966.46					
94	55.96	362.64	0.22	41.95	158.92
130.26					
94	55.96	362.64	0.22	41.95	158.92
130.26					
95	55.96	363.48	2.78	291.42	1865.94
1529.47					
95	55.96	363.48	2.78	291.42	1865.94
1529.47					
96	56.71	365.08	3.00	961.13	648.29
531.39					
96	56.71	365.08	3.00	961.13	648.29
531.39					
97	57.46	366.71	3.00	426.94	287.97
236.05					
97	57.46	366.71	3.00	426.94	287.97
236.05					
98	58.20	367.77	0.94	25.50	17.20
14.10					
98	58.20	367.77	0.94	25.50	17.20

14.10

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 98 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
35	30679.2	17712.6	35425.3	30.00	0.000000E+00

SUM OF MOMENTS = 0.687089E+00 (ft/lbs);Imbalance (Fraction of Total Weight) = 0.6645447E-06

Sum of the Resisting Forces = 750949.96 (lbs)

Average Available Shear Strength = 2934.10(psf)

Sum of the Driving Forces = 615537.13 (lbs)

Average Mobilized Shear Stress = 2405.01(psf)

Total length of the failure surface = 255.94(ft)

Factor of Safety Balance Check: FS = 1.21999

CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.43457(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 1337.717(ft)

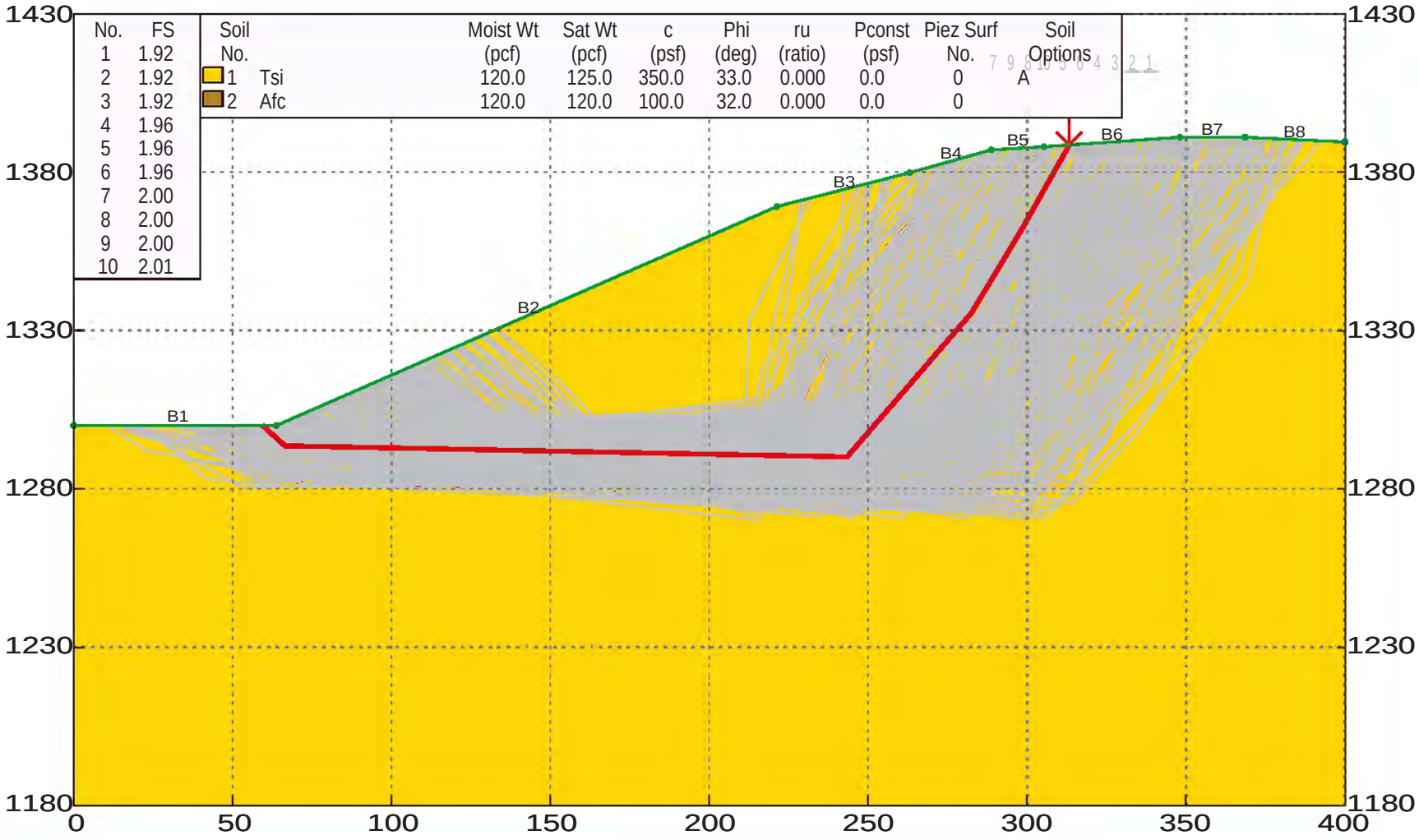
Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section C-C' - Block (Static)

LGC Geotechnical / BPP

\Section C - Static - Block (No Keyway).gsd



No.	FS
1	1.92
2	1.92
3	1.92
4	1.96
5	1.96
6	1.96
7	2.00
8	2.00
9	2.00
10	2.01

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	Tsi	120.0	125.0	350.0	33.0	0.000	0.0	0	A
2	Afc	120.0	120.0	100.0	32.0	0.000	0.0	0	

GEOSTASE FS = 1.92

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Static - Block (No Keyway).gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Static - Block (No Keyway).OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section C-C' - Block (Static)

BOUNDARY DATA

8 Surface Boundaries

8 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1300.000	63.800	1300.000	1
2	63.800	1300.000	221.300	1369.100	1
3	221.300	1369.100	263.000	1379.800	1
4	263.000	1379.800	288.700	1387.000	1
5	288.700	1387.000	305.300	1388.000	1
6	305.300	1388.000	348.000	1391.000	1
7	348.000	1391.000	368.600	1391.000	1
8	368.600	1391.000	400.000	1389.500	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Pressure Constant (psf)	Water Surface Option No.
1 Tsi	120.0	125.0	350.00	33.00	0.000	0.0	0 0
2 Afc	120.0	120.0	100.00	32.00	0.000	0.0	0 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	-5.0	350.00	33.00
2	0.0	100.00	18.00
3	90.0	350.00	33.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load Stress No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Deflection (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000

0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of
Non-Circular Zone Search = 30.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	50.00	1290.00	170.00	1290.00	20.00
2	210.00	1290.00	320.00	1290.00	40.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 41

Number of Trial Surfaces With Valid FS = 959

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted =   4.1 %

Statistical Data On All Valid FS Values:
   FS Max =   6.826   FS Min =   1.916   FS Ave =   3.308
   Standard Deviation =   0.760   Coefficient of Variation =   22.98 %

Critical Surface is Sequence Number   174 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

Factor Of Safety For The Critical or Specified Surface =   1.916

Table 1 - Geometry Data on the   57 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.37	1.99	61.62	1298.01	1300.00	-42.28	0.00	5.90
2	2.72	5.80	65.16	1294.79	1300.60	-42.28	23.69	3.67
3	4.99	8.78	69.01	1293.51	1302.29	-1.13	23.69	4.99
4	4.99	11.07	74.01	1293.41	1304.48	-1.13	23.69	4.99
5	4.99	13.36	79.00	1293.31	1306.67	-1.13	23.69	4.99
6	4.99	15.65	83.99	1293.21	1308.86	-1.13	23.69	4.99

7	4.99	17.93	88.98	1293.11	1311.05	-1.13	23.69
4.99							
8	4.99	20.22	93.98	1293.02	1313.24	-1.13	23.69
4.99							
9	4.99	22.51	98.97	1292.92	1315.43	-1.13	23.69
4.99							
10	4.99	24.80	103.96	1292.82	1317.62	-1.13	23.69
4.99							
11	4.99	27.09	108.96	1292.72	1319.81	-1.13	23.69
4.99							
12	4.99	29.38	113.95	1292.62	1322.00	-1.13	23.69
4.99							
13	4.99	31.67	118.94	1292.52	1324.19	-1.13	23.69
4.99							
14	4.99	33.96	123.94	1292.42	1326.38	-1.13	23.69
4.99							
15	4.99	36.25	128.93	1292.33	1328.57	-1.13	23.69
4.99							
16	4.99	38.54	133.92	1292.23	1330.76	-1.13	23.69
4.99							
17	4.99	40.83	138.92	1292.13	1332.96	-1.13	23.69
4.99							
18	4.99	43.12	143.91	1292.03	1335.15	-1.13	23.69
4.99							
19	4.99	45.41	148.90	1291.93	1337.34	-1.13	23.69
4.99							
20	4.99	47.69	153.89	1291.83	1339.53	-1.13	23.69
4.99							
21	4.99	49.98	158.89	1291.73	1341.72	-1.13	23.69
4.99							
22	4.99	52.27	163.88	1291.64	1343.91	-1.13	23.69
4.99							
23	4.99	54.56	168.87	1291.54	1346.10	-1.13	23.69
4.99							
24	4.99	56.85	173.87	1291.44	1348.29	-1.13	23.69
4.99							
25	4.99	59.14	178.86	1291.34	1350.48	-1.13	23.69
4.99							
26	4.99	61.43	183.85	1291.24	1352.67	-1.13	23.69
4.99							
27	4.99	63.72	188.85	1291.14	1354.86	-1.13	23.69
4.99							
28	4.99	66.01	193.84	1291.04	1357.05	-1.13	23.69
4.99							
29	4.99	68.30	198.83	1290.95	1359.24	-1.13	23.69
4.99							
30	4.99	70.59	203.82	1290.85	1361.43	-1.13	23.69
4.99							
31	4.99	72.88	208.82	1290.75	1363.62	-1.13	23.69
4.99							

32	4.99	75.16	213.81	1290.65	1365.81	-1.13	23.69
4.99							
33	4.99	77.45	218.80	1290.55	1368.00	-1.13	23.69
4.99							
34	3.40	79.07	223.00	1290.47	1369.54	-1.13	14.39
3.40							
35	4.66	80.18	227.03	1290.39	1370.57	-1.13	14.39
4.66							
36	4.66	81.47	231.69	1290.30	1371.77	-1.13	14.39
4.66							
37	4.66	82.76	236.35	1290.20	1372.96	-1.13	14.39
4.66							
38	4.66	84.05	241.02	1290.11	1374.16	-1.13	14.39
4.66							
39	4.90	82.48	245.80	1292.91	1375.39	49.21	14.39
7.50							
40	4.90	78.06	250.70	1298.58	1376.64	49.21	14.39
7.50							
41	4.90	73.64	255.60	1304.26	1377.90	49.21	14.39
7.50							
42	4.90	69.22	260.50	1309.94	1379.16	49.21	14.39
7.50							
43	0.05	66.98	262.97	1312.81	1379.79	49.32	14.39
0.08							
44	4.48	64.98	265.24	1315.44	1380.43	49.32	15.65
6.87							
45	4.47	61.03	269.71	1320.65	1381.68	49.32	15.65
6.87							
46	4.47	57.08	274.19	1325.86	1382.93	49.32	15.65
6.87							
47	4.48	53.12	278.66	1331.07	1384.19	49.32	15.65
6.87							
48	1.60	50.44	281.70	1334.60	1385.04	49.32	15.65
2.45							
49	3.10	47.58	284.05	1338.12	1385.70	59.07	15.65
6.03							
50	3.10	43.27	287.15	1343.29	1386.57	59.07	15.65
6.03							
51	4.61	37.41	291.00	1349.73	1387.14	59.07	3.45
8.97							
52	4.61	30.00	295.61	1357.42	1387.42	59.07	3.45
8.97							
53	3.69	23.12	299.76	1364.54	1387.67	60.60	3.45
7.52							
54	3.69	16.80	303.45	1371.09	1387.89	60.60	3.45
7.52							
55	3.67	10.50	307.14	1377.63	1388.13	60.60	4.02
7.48							
56	3.67	4.24	310.81	1384.14	1388.39	60.60	4.02
7.48							

57 0.63 0.56 312.96 1387.98 1388.54 61.42 4.02
1.32

Table 2 - Force Data On The 57 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1041.3	0.0	0.0	0.0	0.0	0.0
2	1891.3	0.0	0.0	0.0	0.0	0.0
3	5259.4	0.0	0.0	0.0	0.0	0.0
4	6631.0	0.0	0.0	0.0	0.0	0.0
5	8002.6	0.0	0.0	0.0	0.0	0.0
6	9374.2	0.0	0.0	0.0	0.0	0.0
7	10745.8	0.0	0.0	0.0	0.0	0.0
8	12117.4	0.0	0.0	0.0	0.0	0.0
9	13489.0	0.0	0.0	0.0	0.0	0.0
10	14860.6	0.0	0.0	0.0	0.0	0.0
11	16232.3	0.0	0.0	0.0	0.0	0.0
12	17603.9	0.0	0.0	0.0	0.0	0.0
13	18975.5	0.0	0.0	0.0	0.0	0.0
14	20347.1	0.0	0.0	0.0	0.0	0.0
15	21718.7	0.0	0.0	0.0	0.0	0.0
16	23090.3	0.0	0.0	0.0	0.0	0.0
17	24461.9	0.0	0.0	0.0	0.0	0.0
18	25833.5	0.0	0.0	0.0	0.0	0.0
19	27205.1	0.0	0.0	0.0	0.0	0.0
20	28576.7	0.0	0.0	0.0	0.0	0.0
21	29948.3	0.0	0.0	0.0	0.0	0.0
22	31319.9	0.0	0.0	0.0	0.0	0.0
23	32691.5	0.0	0.0	0.0	0.0	0.0
24	34063.2	0.0	0.0	0.0	0.0	0.0
25	35434.8	0.0	0.0	0.0	0.0	0.0
26	36806.4	0.0	0.0	0.0	0.0	0.0
27	38178.0	0.0	0.0	0.0	0.0	0.0
28	39549.6	0.0	0.0	0.0	0.0	0.0
29	40921.2	0.0	0.0	0.0	0.0	0.0
30	42292.8	0.0	0.0	0.0	0.0	0.0
31	43664.4	0.0	0.0	0.0	0.0	0.0
32	45036.0	0.0	0.0	0.0	0.0	0.0
33	46407.6	0.0	0.0	0.0	0.0	0.0
34	32259.9	0.0	0.0	0.0	0.0	0.0
35	44856.7	0.0	0.0	0.0	0.0	0.0
36	45577.4	0.0	0.0	0.0	0.0	0.0
37	46298.1	0.0	0.0	0.0	0.0	0.0
38	47018.8	0.0	0.0	0.0	0.0	0.0

39	48496.0	0.0	0.0	0.0	0.0	0.0
40	45896.6	0.0	0.0	0.0	0.0	0.0
41	43297.2	0.0	0.0	0.0	0.0	0.0
42	40697.8	0.0	0.0	0.0	0.0	0.0
43	428.7	0.0	0.0	0.0	0.0	0.0
44	34895.5	0.0	0.0	0.0	0.0	0.0
45	32772.4	0.0	0.0	0.0	0.0	0.0
46	30649.4	0.0	0.0	0.0	0.0	0.0
47	28526.4	0.0	0.0	0.0	0.0	0.0
48	9683.7	0.0	0.0	0.0	0.0	0.0
49	17699.5	0.0	0.0	0.0	0.0	0.0
50	16097.5	0.0	0.0	0.0	0.0	0.0
51	20690.3	0.0	0.0	0.0	0.0	0.0
52	16589.3	0.0	0.0	0.0	0.0	0.0
53	10243.0	0.0	0.0	0.0	0.0	0.0
54	7439.6	0.0	0.0	0.0	0.0	0.0
55	4627.3	0.0	0.0	0.0	0.0	0.0
56	1869.3	0.0	0.0	0.0	0.0	0.0
57	42.1	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1430423.91(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1430423.91(lbs)

TOTAL AREA OF SLIDING MASS = 11920.20(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 57 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	350.00	33.00	A
2	1	350.00	33.00	A
3	1	100.00	18.00	A
4	1	100.00	18.00	A
5	1	100.00	18.00	A
6	1	100.00	18.00	A
7	1	100.00	18.00	A
8	1	100.00	18.00	A
9	1	100.00	18.00	A
10	1	100.00	18.00	A
11	1	100.00	18.00	A
12	1	100.00	18.00	A
13	1	100.00	18.00	A
14	1	100.00	18.00	A
15	1	100.00	18.00	A
16	1	100.00	18.00	A
17	1	100.00	18.00	A
18	1	100.00	18.00	A
19	1	100.00	18.00	A

20	1	100.00	18.00	A
21	1	100.00	18.00	A
22	1	100.00	18.00	A
23	1	100.00	18.00	A
24	1	100.00	18.00	A
25	1	100.00	18.00	A
26	1	100.00	18.00	A
27	1	100.00	18.00	A
28	1	100.00	18.00	A
29	1	100.00	18.00	A
30	1	100.00	18.00	A
31	1	100.00	18.00	A
32	1	100.00	18.00	A
33	1	100.00	18.00	A
34	1	100.00	18.00	A
35	1	100.00	18.00	A
36	1	100.00	18.00	A
37	1	100.00	18.00	A
38	1	100.00	18.00	A
39	1	350.00	33.00	A
40	1	350.00	33.00	A
41	1	350.00	33.00	A
42	1	350.00	33.00	A
43	1	350.00	33.00	A
44	1	350.00	33.00	A
45	1	350.00	33.00	A
46	1	350.00	33.00	A
47	1	350.00	33.00	A
48	1	350.00	33.00	A
49	1	350.00	33.00	A
50	1	350.00	33.00	A
51	1	350.00	33.00	A
52	1	350.00	33.00	A
53	1	350.00	33.00	A
54	1	350.00	33.00	A
55	1	350.00	33.00	A
56	1	350.00	33.00	A
57	1	350.00	33.00	A

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 57 Slices

Slice	Alpha	X-Coord.	Base	Effective	Available

Slice No.	Base Angle (deg)	Slice Cntr (ft)	Base Leng. (ft)	Normal Stress (psf)	Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-42.28	61.62	5.90	626.71	756.99	397.92
1	-42.28	61.62	5.90	626.71	756.99	397.92
2	-42.28	65.16	3.67	1313.55	1203.03	632.38
2	-42.28	65.16	3.67	1313.55	1203.03	632.38
3	-1.13	69.01	4.99	1058.29	443.86	233.32
3	-1.13	69.01	4.99	1058.29	443.86	233.32
4	-1.13	74.01	4.99	1334.00	533.44	280.41
4	-1.13	74.01	4.99	1334.00	533.44	280.41
5	-1.13	79.00	4.99	1609.70	623.02	327.50
5	-1.13	79.00	4.99	1609.70	623.02	327.50
6	-1.13	83.99	4.99	1885.40	712.60	374.59
6	-1.13	83.99	4.99	1885.40	712.60	374.59
7	-1.13	88.98	4.99	2161.11	802.19	421.68
7	-1.13	88.98	4.99	2161.11	802.19	421.68
8	-1.13	93.98	4.99	2436.81	891.77	468.76
8	-1.13	93.98	4.99	2436.81	891.77	468.76
9	-1.13	98.97	4.99	2712.51	981.35	515.85
9	-1.13	98.97	4.99	2712.51	981.35	515.85
10	-1.13	103.96	4.99	2988.21	1070.93	562.94
10	-1.13	103.96	4.99	2988.21	1070.93	562.94
11	-1.13	108.96	4.99	3263.92	1160.51	610.03
11	-1.13	108.96	4.99	3263.92	1160.51	610.03

12	-1.13	113.95	4.99	3539.62	1250.09
657.12					
12	-1.13	113.95	4.99	3539.62	1250.09
657.12					
13	-1.13	118.94	4.99	3815.32	1339.67
704.21					
13	-1.13	118.94	4.99	3815.32	1339.67
704.21					
14	-1.13	123.94	4.99	4091.03	1429.26
751.30					
14	-1.13	123.94	4.99	4091.03	1429.26
751.30					
15	-1.13	128.93	4.99	4366.73	1518.84
798.39					
15	-1.13	128.93	4.99	4366.73	1518.84
798.39					
16	-1.13	133.92	4.99	4642.43	1608.42
845.48					
16	-1.13	133.92	4.99	4642.43	1608.42
845.48					
17	-1.13	138.92	4.99	4918.14	1698.00
892.57					
17	-1.13	138.92	4.99	4918.14	1698.00
892.57					
18	-1.13	143.91	4.99	5193.84	1787.58
939.66					
18	-1.13	143.91	4.99	5193.84	1787.58
939.66					
19	-1.13	148.90	4.99	5469.54	1877.16
986.75					
19	-1.13	148.90	4.99	5469.54	1877.16
986.75					
20	-1.13	153.89	4.99	5745.24	1966.74
1033.83					
20	-1.13	153.89	4.99	5745.24	1966.74
1033.83					
21	-1.13	158.89	4.99	6020.95	2056.32
1080.92					
21	-1.13	158.89	4.99	6020.95	2056.32
1080.92					
22	-1.13	163.88	4.99	6296.65	2145.91
1128.01					
22	-1.13	163.88	4.99	6296.65	2145.91
1128.01					
23	-1.13	168.87	4.99	6572.35	2235.49
1175.10					
23	-1.13	168.87	4.99	6572.35	2235.49
1175.10					
24	-1.13	173.87	4.99	6848.06	2325.07
1222.19					

24	-1.13	173.87	4.99	6848.06	2325.07
1222.19					
25	-1.13	178.86	4.99	7123.76	2414.65
1269.28					
25	-1.13	178.86	4.99	7123.76	2414.65
1269.28					
26	-1.13	183.85	4.99	7399.46	2504.23
1316.37					
26	-1.13	183.85	4.99	7399.46	2504.23
1316.37					
27	-1.13	188.85	4.99	7675.17	2593.81
1363.46					
27	-1.13	188.85	4.99	7675.17	2593.81
1363.46					
28	-1.13	193.84	4.99	7950.87	2683.39
1410.55					
28	-1.13	193.84	4.99	7950.87	2683.39
1410.55					
29	-1.13	198.83	4.99	8226.57	2772.97
1457.64					
29	-1.13	198.83	4.99	8226.57	2772.97
1457.64					
30	-1.13	203.82	4.99	8502.27	2862.56
1504.73					
30	-1.13	203.82	4.99	8502.27	2862.56
1504.73					
31	-1.13	208.82	4.99	8777.98	2952.14
1551.81					
31	-1.13	208.82	4.99	8777.98	2952.14
1551.81					
32	-1.13	213.81	4.99	9053.68	3041.72
1598.90					
32	-1.13	213.81	4.99	9053.68	3041.72
1598.90					
33	-1.13	218.80	4.99	9329.38	3131.30
1645.99					
33	-1.13	218.80	4.99	9329.38	3131.30
1645.99					
34	-1.13	223.00	3.40	9523.81	3194.47
1679.20					
34	-1.13	223.00	3.40	9523.81	3194.47
1679.20					
35	-1.13	227.03	4.66	9657.97	3238.07
1702.12					
35	-1.13	227.03	4.66	9657.97	3238.07
1702.12					
36	-1.13	231.69	4.66	9813.13	3288.48
1728.62					
36	-1.13	231.69	4.66	9813.13	3288.48
1728.62					

37	-1.13	236.35	4.66	9968.29	3338.89
1755.12					
37	-1.13	236.35	4.66	9968.29	3338.89
1755.12					
38	-1.13	241.02	4.66	10123.45	3389.31
1781.62					
38	-1.13	241.02	4.66	10123.45	3389.31
1781.62					
39	49.21	245.80	7.50	6786.57	4757.25
2500.69					
39	49.21	245.80	7.50	6786.57	4757.25
2500.69					
40	49.21	250.70	7.50	6414.19	4515.42
2373.57					
40	49.21	250.70	7.50	6414.19	4515.42
2373.57					
41	49.21	255.60	7.50	6041.81	4273.60
2246.45					
41	49.21	255.60	7.50	6041.81	4273.60
2246.45					
42	49.21	260.50	7.50	5669.44	4031.78
2119.34					
42	49.21	260.50	7.50	5669.44	4031.78
2119.34					
43	49.32	262.97	0.08	5473.92	3904.81
2052.59					
43	49.32	262.97	0.08	5473.92	3904.81
2052.59					
44	49.32	265.24	6.87	5305.59	3795.49
1995.13					
44	49.32	265.24	6.87	5305.59	3795.49
1995.13					
45	49.32	269.71	6.87	4973.00	3579.51
1881.60					
45	49.32	269.71	6.87	4973.00	3579.51
1881.60					
46	49.32	274.19	6.87	4640.41	3363.52
1768.06					
46	49.32	274.19	6.87	4640.41	3363.52
1768.06					
47	49.32	278.66	6.87	4307.82	3147.53
1654.53					
47	49.32	278.66	6.87	4307.82	3147.53
1654.53					
48	49.32	281.70	2.45	4082.07	3000.93
1577.46					
48	49.32	281.70	2.45	4082.07	3000.93
1577.46					
49	59.07	284.05	6.03	3337.89	2517.65
1323.42					

49	59.07	284.05	6.03	3337.89	2517.65	1323.42
50	59.07	287.15	6.03	3017.28	2309.44	1213.98
50	59.07	287.15	6.03	3017.28	2309.44	1213.98
51	59.07	291.00	8.97	2580.92	2026.07	1065.02
51	59.07	291.00	8.97	2580.92	2026.07	1065.02
52	59.07	295.61	8.97	2028.81	1667.53	876.55
52	59.07	295.61	8.97	2028.81	1667.53	876.55
53	60.60	299.76	7.52	1468.95	1303.95	685.43
53	60.60	299.76	7.52	1468.95	1303.95	685.43
54	60.60	303.45	7.52	1008.77	1005.11	528.34
54	60.60	303.45	7.52	1008.77	1005.11	528.34
55	60.60	307.14	7.48	551.14	707.92	372.12
55	60.60	307.14	7.48	551.14	707.92	372.12
56	60.60	310.81	7.48	96.05	412.38	216.77
56	60.60	310.81	7.48	96.05	412.38	216.77
57	61.42	312.96	1.32	39.91	25.92	13.63
57	61.42	312.96	1.32	39.91	25.92	13.63

Table 4 - Base Force Data on the 57 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-42.28	61.62	5.90	3700.69	4469.97	2349.68
1	-42.28	61.62	5.90	3700.69	4469.97	2349.68

2	-42.28	65.16	3.67	4821.87	4416.16
2321.39					
2	-42.28	65.16	3.67	4821.87	4416.16
2321.39					
3	-1.13	69.01	4.99	5285.12	2216.64
1165.20					
3	-1.13	69.01	4.99	5285.12	2216.64
1165.20					
4	-1.13	74.01	4.99	6661.98	2664.01
1400.36					
4	-1.13	74.01	4.99	6661.98	2664.01
1400.36					
5	-1.13	79.00	4.99	8038.85	3111.38
1635.52					
5	-1.13	79.00	4.99	8038.85	3111.38
1635.52					
6	-1.13	83.99	4.99	9415.71	3558.75
1870.68					
6	-1.13	83.99	4.99	9415.71	3558.75
1870.68					
7	-1.13	88.98	4.99	10792.57	4006.12
2105.85					
7	-1.13	88.98	4.99	10792.57	4006.12
2105.85					
8	-1.13	93.98	4.99	12169.43	4453.49
2341.01					
8	-1.13	93.98	4.99	12169.43	4453.49
2341.01					
9	-1.13	98.97	4.99	13546.29	4900.86
2576.17					
9	-1.13	98.97	4.99	13546.29	4900.86
2576.17					
10	-1.13	103.96	4.99	14923.15	5348.23
2811.34					
10	-1.13	103.96	4.99	14923.15	5348.23
2811.34					
11	-1.13	108.96	4.99	16300.01	5795.60
3046.50					
11	-1.13	108.96	4.99	16300.01	5795.60
3046.50					
12	-1.13	113.95	4.99	17676.87	6242.96
3281.66					
12	-1.13	113.95	4.99	17676.87	6242.96
3281.66					
13	-1.13	118.94	4.99	19053.74	6690.33
3516.83					
13	-1.13	118.94	4.99	19053.74	6690.33
3516.83					
14	-1.13	123.94	4.99	20430.60	7137.70
3751.99					

14	-1.13	123.94	4.99	20430.60	7137.70	3751.99
15	-1.13	128.93	4.99	21807.46	7585.07	3987.15
15	-1.13	128.93	4.99	21807.46	7585.07	3987.15
16	-1.13	133.92	4.99	23184.32	8032.44	4222.32
16	-1.13	133.92	4.99	23184.32	8032.44	4222.32
17	-1.13	138.92	4.99	24561.18	8479.81	4457.48
17	-1.13	138.92	4.99	24561.18	8479.81	4457.48
18	-1.13	143.91	4.99	25938.04	8927.18	4692.64
18	-1.13	143.91	4.99	25938.04	8927.18	4692.64
19	-1.13	148.90	4.99	27314.90	9374.55	4927.81
19	-1.13	148.90	4.99	27314.90	9374.55	4927.81
20	-1.13	153.89	4.99	28691.76	9821.92	5162.97
20	-1.13	153.89	4.99	28691.76	9821.92	5162.97
21	-1.13	158.89	4.99	30068.63	10269.29	5398.13
21	-1.13	158.89	4.99	30068.63	10269.29	5398.13
22	-1.13	163.88	4.99	31445.49	10716.66	5633.30
22	-1.13	163.88	4.99	31445.49	10716.66	5633.30
23	-1.13	168.87	4.99	32822.35	11164.03	5868.46
23	-1.13	168.87	4.99	32822.35	11164.03	5868.46
24	-1.13	173.87	4.99	34199.21	11611.40	6103.62
24	-1.13	173.87	4.99	34199.21	11611.40	6103.62
25	-1.13	178.86	4.99	35576.07	12058.77	6338.79
25	-1.13	178.86	4.99	35576.07	12058.77	6338.79
26	-1.13	183.85	4.99	36952.93	12506.14	6573.95
26	-1.13	183.85	4.99	36952.93	12506.14	6573.95

27	-1.13	188.85	4.99	38329.79	12953.50
6809.11					
27	-1.13	188.85	4.99	38329.79	12953.50
6809.11					
28	-1.13	193.84	4.99	39706.65	13400.87
7044.28					
28	-1.13	193.84	4.99	39706.65	13400.87
7044.28					
29	-1.13	198.83	4.99	41083.52	13848.24
7279.44					
29	-1.13	198.83	4.99	41083.52	13848.24
7279.44					
30	-1.13	203.82	4.99	42460.38	14295.61
7514.60					
30	-1.13	203.82	4.99	42460.38	14295.61
7514.60					
31	-1.13	208.82	4.99	43837.24	14742.98
7749.77					
31	-1.13	208.82	4.99	43837.24	14742.98
7749.77					
32	-1.13	213.81	4.99	45214.10	15190.35
7984.93					
32	-1.13	213.81	4.99	45214.10	15190.35
7984.93					
33	-1.13	218.80	4.99	46590.96	15637.72
8220.09					
33	-1.13	218.80	4.99	46590.96	15637.72
8220.09					
34	-1.13	223.00	3.40	32387.28	10863.33
5710.40					
34	-1.13	223.00	3.40	32387.28	10863.33
5710.40					
35	-1.13	227.03	4.66	45033.71	15098.62
7936.71					
35	-1.13	227.03	4.66	45033.71	15098.62
7936.71					
36	-1.13	231.69	4.66	45757.19	15333.70
8060.28					
36	-1.13	231.69	4.66	45757.19	15333.70
8060.28					
37	-1.13	236.35	4.66	46480.67	15568.77
8183.85					
37	-1.13	236.35	4.66	46480.67	15568.77
8183.85					
38	-1.13	241.02	4.66	47204.15	15803.84
8307.42					
38	-1.13	241.02	4.66	47204.15	15803.84
8307.42					
39	49.21	245.80	7.50	50899.24	35679.35
18755.14					

39	49.21	245.80	7.50	50899.24	35679.35	18755.14
40	49.21	250.70	7.50	48106.42	33865.68	17801.77
40	49.21	250.70	7.50	48106.42	33865.68	17801.77
41	49.21	255.60	7.50	45313.61	32052.00	16848.39
41	49.21	255.60	7.50	45313.61	32052.00	16848.39
42	49.21	260.50	7.50	42520.79	30238.33	15895.02
42	49.21	260.50	7.50	42520.79	30238.33	15895.02
43	49.32	262.97	0.08	447.92	319.53	167.96
43	49.32	262.97	0.08	447.92	319.53	167.96
44	49.32	265.24	6.87	36427.48	26059.34	13698.30
44	49.32	265.24	6.87	36427.48	26059.34	13698.30
45	49.32	269.71	6.87	34143.97	24576.40	12918.78
45	49.32	269.71	6.87	34143.97	24576.40	12918.78
46	49.32	274.19	6.87	31860.45	23093.47	12139.27
46	49.32	274.19	6.87	31860.45	23093.47	12139.27
47	49.32	278.66	6.87	29576.93	21610.54	11359.75
47	49.32	278.66	6.87	29576.93	21610.54	11359.75
48	49.32	281.70	2.45	10020.31	7366.41	3872.21
48	49.32	281.70	2.45	10020.31	7366.41	3872.21
49	59.07	284.05	6.03	20134.80	15186.96	7983.15
49	59.07	284.05	6.03	20134.80	15186.96	7983.15
50	59.07	287.15	6.03	18200.79	13931.00	7322.94
50	59.07	287.15	6.03	18200.79	13931.00	7322.94
51	59.07	291.00	8.97	23145.15	18169.37	9550.87
51	59.07	291.00	8.97	23145.15	18169.37	9550.87

52	59.07	295.61	8.97	18193.98	14954.04
7860.71					
52	59.07	295.61	8.97	18193.98	14954.04
7860.71					
53	60.60	299.76	7.52	11046.01	9805.25
5154.21					
53	60.60	299.76	7.52	11046.01	9805.25
5154.21					
54	60.60	303.45	7.52	7585.66	7558.07
3972.96					
54	60.60	303.45	7.52	7585.66	7558.07
3972.96					
55	60.60	307.14	7.48	4122.72	5295.44
2783.59					
55	60.60	307.14	7.48	4122.72	5295.44
2783.59					
56	60.60	310.81	7.48	718.50	3084.71
1621.50					
56	60.60	310.81	7.48	718.50	3084.71
1621.50					
57	61.42	312.96	1.32	52.59	34.15
17.95					
57	61.42	312.96	1.32	52.59	34.15
17.95					

Sum of the Resisting Forces = 553835.09 (lbs)

Average Available Shear Strength = 1799.57(psf)

Sum of the Driving Forces = 312465.10 (lbs)

Average Mobilized Shear Stress = 1015.29(psf)

Total length of the failure surface = 307.76(ft)

Factor of Safety Balance Check: FS = 1.77247

Janbu's Correction Factor (fo) = 1.0808

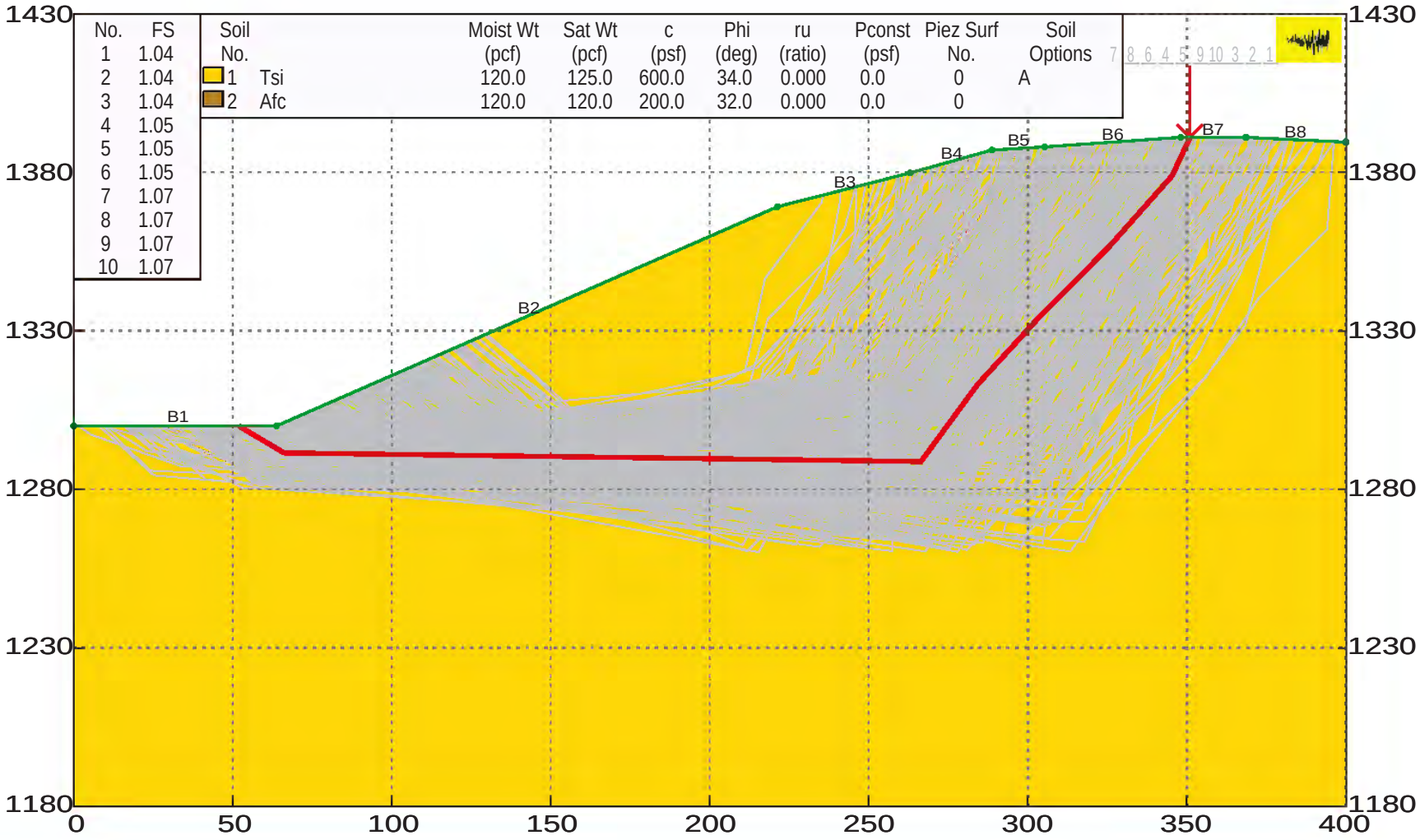
Janub's FS Corrected = 1.91564

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section C-C' - Block (Seismic (117A))

LGC Geotechnical / BPP

\Section C - Seismic (117A) - Block (No Keyway).gsd



GEOSTASE FS = 1.04

Simplified Janbu (Corrected) Method

kh = 0.26000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

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** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Seismic (117A) - Block (No Keyway).gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Seismic (117A) - Block (No Keyway).OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section C-C' - Block (Seismic (117A))

BOUNDARY DATA

8 Surface Boundaries

8 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1300.000	63.800	1300.000	1
2	63.800	1300.000	221.300	1369.100	1
3	221.300	1369.100	263.000	1379.800	1
4	263.000	1379.800	288.700	1387.000	1
5	288.700	1387.000	305.300	1388.000	1
6	305.300	1388.000	348.000	1391.000	1
7	348.000	1391.000	368.600	1391.000	1
8	368.600	1391.000	400.000	1389.500	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Pressure Constant (psf)	Water Surface Option No.
1 Tsi	120.0	125.0	600.00	34.00	0.000	0.0	0 0
2 Afc	120.0	120.0	200.00	32.00	0.000	0.0	0 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	-5.0	600.00	34.00
2	0.0	200.00	18.00
3	90.0	600.00	34.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000	0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of

Non-Circular Zone Search = 30.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	50.00	1290.00	170.00	1290.00	20.00
2	210.00	1290.00	320.00	1290.00	60.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 8

Number of Trial Surfaces With Valid FS = 992

Percentage of Trial Surfaces With Non-Converged and/or Non-Valid FS Solutions of the Total Attempted = 0.8 %

Statistical Data On All Valid FS Values:
FS Max = 3.488 FS Min = 1.041 FS Ave = 1.845
Standard Deviation = 0.440 Coefficient of Variation = 23.86 %

Critical Surface is Sequence Number 78 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

Factor Of Safety For The Critical or Specified Surface = 1.041

Table 1 - Geometry Data on the 63 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	5.94	1.78	54.89	1298.22	1300.00	-30.95	0.00	

6.92
2 5.94 5.34 60.83 1294.66 1300.00 -30.95 0.00
6.92
3 2.28 8.30 64.94 1292.20 1300.50 -30.95 23.69
2.65
4 5.01 10.62 68.58 1291.48 1302.10 -0.79 23.69
5.01
5 5.01 12.88 73.59 1291.41 1304.29 -0.79 23.69
5.01
6 5.01 15.15 78.59 1291.34 1306.49 -0.79 23.69
5.01
7 5.01 17.42 83.60 1291.27 1308.69 -0.79 23.69
5.01
8 5.01 19.68 88.61 1291.20 1310.88 -0.79 23.69
5.01
9 5.01 21.95 93.62 1291.13 1313.08 -0.79 23.69
5.01
10 5.01 24.21 98.62 1291.07 1315.28 -0.79 23.69
5.01
11 5.01 26.48 103.63 1291.00 1317.47 -0.79 23.69
5.01
12 5.01 28.74 108.64 1290.93 1319.67 -0.79 23.69
5.01
13 5.01 31.01 113.65 1290.86 1321.87 -0.79 23.69
5.01
14 5.01 33.27 118.65 1290.79 1324.07 -0.79 23.69
5.01
15 5.01 35.54 123.66 1290.72 1326.26 -0.79 23.69
5.01
16 5.01 37.80 128.67 1290.65 1328.46 -0.79 23.69
5.01
17 5.01 40.07 133.67 1290.59 1330.66 -0.79 23.69
5.01
18 5.01 42.34 138.68 1290.52 1332.85 -0.79 23.69
5.01
19 5.01 44.60 143.69 1290.45 1335.05 -0.79 23.69
5.01
20 5.01 46.87 148.70 1290.38 1337.25 -0.79 23.69
5.01
21 5.01 49.13 153.70 1290.31 1339.44 -0.79 23.69
5.01
22 5.01 51.40 158.71 1290.24 1341.64 -0.79 23.69
5.01
23 5.01 53.66 163.72 1290.17 1343.84 -0.79 23.69
5.01
24 5.01 55.93 168.72 1290.10 1346.03 -0.79 23.69
5.01
25 5.01 58.19 173.73 1290.04 1348.23 -0.79 23.69
5.01
26 5.01 60.46 178.74 1289.97 1350.43 -0.79 23.69

5.01							
27	5.01	62.73	183.75	1289.90	1352.62	-0.79	23.69
5.01							
28	5.01	64.99	188.75	1289.83	1354.82	-0.79	23.69
5.01							
29	5.01	67.26	193.76	1289.76	1357.02	-0.79	23.69
5.01							
30	5.01	69.52	198.77	1289.69	1359.21	-0.79	23.69
5.01							
31	5.01	71.79	203.77	1289.62	1361.41	-0.79	23.69
5.01							
32	5.01	74.05	208.78	1289.56	1363.61	-0.79	23.69
5.01							
33	5.01	76.32	213.79	1289.49	1365.80	-0.79	23.69
5.01							
34	5.01	78.58	218.80	1289.42	1368.00	-0.79	23.69
5.01							
35	3.40	80.18	223.00	1289.36	1369.54	-0.79	14.39
3.40							
36	4.79	81.28	227.09	1289.30	1370.59	-0.79	14.39
4.79							
37	4.79	82.58	231.88	1289.24	1371.82	-0.79	14.39
4.79							
38	4.79	83.87	236.67	1289.17	1373.04	-0.79	14.39
4.79							
39	4.79	85.16	241.46	1289.11	1374.27	-0.79	14.39
4.79							
40	4.79	86.46	246.24	1289.04	1375.50	-0.79	14.39
4.79							
41	4.79	87.75	251.03	1288.98	1376.73	-0.79	14.39
4.79							
42	4.79	89.05	255.82	1288.91	1377.96	-0.79	14.39
4.79							
43	4.79	90.34	260.61	1288.84	1379.19	-0.79	14.39
4.79							
44	3.36	91.48	264.68	1288.79	1380.27	-0.79	15.65
3.36							
45	4.85	89.35	268.79	1292.07	1381.42	53.78	15.65
8.20							
46	4.85	84.09	273.63	1298.69	1382.78	53.78	15.65
8.20							
47	4.85	78.83	278.48	1305.31	1384.14	53.78	15.65
8.20							
48	3.19	74.47	282.49	1310.79	1385.26	53.78	15.65
5.40							
49	4.61	70.86	286.39	1315.50	1386.35	47.63	15.65
6.84							
50	5.20	66.28	291.30	1320.88	1387.16	47.63	3.45
7.72							
51	5.20	60.89	296.50	1326.58	1387.47	47.63	3.45

7.72							
52	5.20	55.50	301.70	1332.28	1387.78	47.63	3.45
7.72							
53	1.00	52.33	304.80	1335.64	1387.97	45.14	3.45
1.41							
54	5.04	49.51	307.82	1338.67	1388.18	45.14	4.02
7.15							
55	5.04	44.80	312.86	1343.74	1388.53	45.14	4.02
7.15							
56	5.04	40.08	317.90	1348.80	1388.89	45.14	4.02
7.15							
57	5.04	35.37	322.94	1353.87	1389.24	45.14	4.02
7.15							
58	4.97	30.38	327.95	1359.21	1389.59	48.54	4.02
7.50							
59	4.97	25.11	332.91	1364.83	1389.94	48.54	4.02
7.50							
60	4.97	19.84	337.88	1370.45	1390.29	48.54	4.02
7.50							
61	4.97	14.56	342.84	1376.07	1390.64	48.54	4.02
7.50							
62	2.67	9.15	346.66	1381.76	1390.91	65.05	4.02
6.34							
63	2.96	3.19	349.48	1387.81	1391.00	65.05	0.00
7.03							

Table 2 - Force Data On The 63 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1268.9	0.0	0.0	329.9	0.0	0.0
2	3806.7	0.0	0.0	989.7	0.0	0.0
3	2268.7	0.0	0.0	589.9	0.0	0.0
4	6380.7	0.0	0.0	1659.0	0.0	0.0
5	7741.9	0.0	0.0	2012.9	0.0	0.0
6	9103.1	0.0	0.0	2366.8	0.0	0.0
7	10464.4	0.0	0.0	2720.7	0.0	0.0
8	11825.6	0.0	0.0	3074.7	0.0	0.0
9	13186.9	0.0	0.0	3428.6	0.0	0.0
10	14548.1	0.0	0.0	3782.5	0.0	0.0
11	15909.4	0.0	0.0	4136.4	0.0	0.0
12	17270.6	0.0	0.0	4490.4	0.0	0.0
13	18631.9	0.0	0.0	4844.3	0.0	0.0
14	19993.1	0.0	0.0	5198.2	0.0	0.0
15	21354.3	0.0	0.0	5552.1	0.0	0.0

16	22715.6	0.0	0.0	5906.1	0.0	0.0
17	24076.8	0.0	0.0	6260.0	0.0	0.0
18	25438.1	0.0	0.0	6613.9	0.0	0.0
19	26799.3	0.0	0.0	6967.8	0.0	0.0
20	28160.6	0.0	0.0	7321.7	0.0	0.0
21	29521.8	0.0	0.0	7675.7	0.0	0.0
22	30883.1	0.0	0.0	8029.6	0.0	0.0
23	32244.3	0.0	0.0	8383.5	0.0	0.0
24	33605.6	0.0	0.0	8737.4	0.0	0.0
25	34966.8	0.0	0.0	9091.4	0.0	0.0
26	36328.0	0.0	0.0	9445.3	0.0	0.0
27	37689.3	0.0	0.0	9799.2	0.0	0.0
28	39050.5	0.0	0.0	10153.1	0.0	0.0
29	40411.8	0.0	0.0	10507.1	0.0	0.0
30	41773.0	0.0	0.0	10861.0	0.0	0.0
31	43134.3	0.0	0.0	11214.9	0.0	0.0
32	44495.5	0.0	0.0	11568.8	0.0	0.0
33	45856.8	0.0	0.0	11922.8	0.0	0.0
34	47218.0	0.0	0.0	12276.7	0.0	0.0
35	32711.7	0.0	0.0	8505.0	0.0	0.0
36	46696.7	0.0	0.0	12141.1	0.0	0.0
37	47440.1	0.0	0.0	12334.4	0.0	0.0
38	48183.6	0.0	0.0	12527.7	0.0	0.0
39	48927.0	0.0	0.0	12721.0	0.0	0.0
40	49670.5	0.0	0.0	12914.3	0.0	0.0
41	50414.0	0.0	0.0	13107.6	0.0	0.0
42	51157.4	0.0	0.0	13300.9	0.0	0.0
43	51900.9	0.0	0.0	13494.2	0.0	0.0
44	36917.6	0.0	0.0	9598.6	0.0	0.0
45	51953.5	0.0	0.0	13507.9	0.0	0.0
46	48895.2	0.0	0.0	12712.7	0.0	0.0
47	45836.8	0.0	0.0	11917.6	0.0	0.0
48	28484.1	0.0	0.0	7405.9	0.0	0.0
49	39218.2	0.0	0.0	10196.7	0.0	0.0
50	41368.0	0.0	0.0	10755.7	0.0	0.0
51	38004.2	0.0	0.0	9881.1	0.0	0.0
52	34640.3	0.0	0.0	9006.5	0.0	0.0
53	6255.6	0.0	0.0	1626.5	0.0	0.0
54	29947.7	0.0	0.0	7786.4	0.0	0.0
55	27097.2	0.0	0.0	7045.3	0.0	0.0
56	24246.8	0.0	0.0	6304.2	0.0	0.0
57	21396.4	0.0	0.0	5563.1	0.0	0.0
58	18102.7	0.0	0.0	4706.7	0.0	0.0
59	14961.3	0.0	0.0	3889.9	0.0	0.0
60	11820.0	0.0	0.0	3073.2	0.0	0.0
61	8678.6	0.0	0.0	2256.4	0.0	0.0
62	2935.1	0.0	0.0	763.1	0.0	0.0
63	1133.5	0.0	0.0	294.7	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1797118.02(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1797118.02(lbs)

TOTAL AREA OF SLIDING MASS = 14975.98(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 63 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	600.00	34.00	A
2	1	600.00	34.00	A
3	1	600.00	34.00	A
4	1	200.00	18.00	A
5	1	200.00	18.00	A
6	1	200.00	18.00	A
7	1	200.00	18.00	A
8	1	200.00	18.00	A
9	1	200.00	18.00	A
10	1	200.00	18.00	A
11	1	200.00	18.00	A
12	1	200.00	18.00	A
13	1	200.00	18.00	A
14	1	200.00	18.00	A
15	1	200.00	18.00	A
16	1	200.00	18.00	A
17	1	200.00	18.00	A
18	1	200.00	18.00	A
19	1	200.00	18.00	A
20	1	200.00	18.00	A
21	1	200.00	18.00	A
22	1	200.00	18.00	A
23	1	200.00	18.00	A
24	1	200.00	18.00	A
25	1	200.00	18.00	A
26	1	200.00	18.00	A
27	1	200.00	18.00	A
28	1	200.00	18.00	A
29	1	200.00	18.00	A
30	1	200.00	18.00	A
31	1	200.00	18.00	A
32	1	200.00	18.00	A
33	1	200.00	18.00	A
34	1	200.00	18.00	A
35	1	200.00	18.00	A
36	1	200.00	18.00	A
37	1	200.00	18.00	A
38	1	200.00	18.00	A
39	1	200.00	18.00	A
40	1	200.00	18.00	A

41	1	200.00	18.00	A
42	1	200.00	18.00	A
43	1	200.00	18.00	A
44	1	200.00	18.00	A
45	1	600.00	34.00	A
46	1	600.00	34.00	A
47	1	600.00	34.00	A
48	1	600.00	34.00	A
49	1	600.00	34.00	A
50	1	600.00	34.00	A
51	1	600.00	34.00	A
52	1	600.00	34.00	A
53	1	600.00	34.00	A
54	1	600.00	34.00	A
55	1	600.00	34.00	A
56	1	600.00	34.00	A
57	1	600.00	34.00	A
58	1	600.00	34.00	A
59	1	600.00	34.00	A
60	1	600.00	34.00	A
61	1	600.00	34.00	A
62	1	600.00	34.00	A
63	1	600.00	34.00	A

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 63 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-30.95	54.89	6.92	1007.39	1279.49	1224.39
1	-30.95	54.89	6.92	1007.39	1279.49	1224.39
2	-30.95	60.83	6.92	1742.18	1775.11	1698.68
2	-30.95	60.83	6.92	1742.18	1775.11	1698.68
3	-30.95	64.94	2.65	2353.47	2187.44	

2093.24					
3	-30.95	64.94	2.65	2353.47	2187.44
2093.24					
4	-0.79	68.58	5.01	1283.05	616.89
590.32					
4	-0.79	68.58	5.01	1283.05	616.89
590.32					
5	-0.79	73.59	5.01	1556.16	705.63
675.24					
5	-0.79	73.59	5.01	1556.16	705.63
675.24					
6	-0.79	78.59	5.01	1829.28	794.37
760.16					
6	-0.79	78.59	5.01	1829.28	794.37
760.16					
7	-0.79	83.60	5.01	2102.39	883.11
845.08					
7	-0.79	83.60	5.01	2102.39	883.11
845.08					
8	-0.79	88.61	5.01	2375.51	971.85
930.00					
8	-0.79	88.61	5.01	2375.51	971.85
930.00					
9	-0.79	93.62	5.01	2648.63	1060.59
1014.92					
9	-0.79	93.62	5.01	2648.63	1060.59
1014.92					
10	-0.79	98.62	5.01	2921.74	1149.33
1099.84					
10	-0.79	98.62	5.01	2921.74	1149.33
1099.84					
11	-0.79	103.63	5.01	3194.86	1238.07
1184.76					
11	-0.79	103.63	5.01	3194.86	1238.07
1184.76					
12	-0.79	108.64	5.01	3467.98	1326.81
1269.68					
12	-0.79	108.64	5.01	3467.98	1326.81
1269.68					
13	-0.79	113.65	5.01	3741.09	1415.55
1354.60					
13	-0.79	113.65	5.01	3741.09	1415.55
1354.60					
14	-0.79	118.65	5.01	4014.21	1504.30
1439.52					
14	-0.79	118.65	5.01	4014.21	1504.30
1439.52					
15	-0.79	123.66	5.01	4287.32	1593.04
1524.44					
15	-0.79	123.66	5.01	4287.32	1593.04

1524.44					
16	-0.79	128.67	5.01	4560.44	1681.78
1609.36					
16	-0.79	128.67	5.01	4560.44	1681.78
1609.36					
17	-0.79	133.67	5.01	4833.56	1770.52
1694.28					
17	-0.79	133.67	5.01	4833.56	1770.52
1694.28					
18	-0.79	138.68	5.01	5106.67	1859.26
1779.20					
18	-0.79	138.68	5.01	5106.67	1859.26
1779.20					
19	-0.79	143.69	5.01	5379.79	1948.00
1864.12					
19	-0.79	143.69	5.01	5379.79	1948.00
1864.12					
20	-0.79	148.70	5.01	5652.90	2036.74
1949.04					
20	-0.79	148.70	5.01	5652.90	2036.74
1949.04					
21	-0.79	153.70	5.01	5926.02	2125.48
2033.96					
21	-0.79	153.70	5.01	5926.02	2125.48
2033.96					
22	-0.79	158.71	5.01	6199.14	2214.22
2118.88					
22	-0.79	158.71	5.01	6199.14	2214.22
2118.88					
23	-0.79	163.72	5.01	6472.25	2302.96
2203.79					
23	-0.79	163.72	5.01	6472.25	2302.96
2203.79					
24	-0.79	168.72	5.01	6745.37	2391.70
2288.71					
24	-0.79	168.72	5.01	6745.37	2391.70
2288.71					
25	-0.79	173.73	5.01	7018.48	2480.44
2373.63					
25	-0.79	173.73	5.01	7018.48	2480.44
2373.63					
26	-0.79	178.74	5.01	7291.60	2569.18
2458.55					
26	-0.79	178.74	5.01	7291.60	2569.18
2458.55					
27	-0.79	183.75	5.01	7564.72	2657.93
2543.47					
27	-0.79	183.75	5.01	7564.72	2657.93
2543.47					
28	-0.79	188.75	5.01	7837.83	2746.67

2628.39					
28	-0.79	188.75	5.01	7837.83	2746.67
2628.39					
29	-0.79	193.76	5.01	8110.95	2835.41
2713.31					
29	-0.79	193.76	5.01	8110.95	2835.41
2713.31					
30	-0.79	198.77	5.01	8384.07	2924.15
2798.23					
30	-0.79	198.77	5.01	8384.07	2924.15
2798.23					
31	-0.79	203.77	5.01	8657.18	3012.89
2883.15					
31	-0.79	203.77	5.01	8657.18	3012.89
2883.15					
32	-0.79	208.78	5.01	8930.30	3101.63
2968.07					
32	-0.79	208.78	5.01	8930.30	3101.63
2968.07					
33	-0.79	213.79	5.01	9203.41	3190.37
3052.99					
33	-0.79	213.79	5.01	9203.41	3190.37
3052.99					
34	-0.79	218.80	5.01	9476.53	3279.11
3137.91					
34	-0.79	218.80	5.01	9476.53	3279.11
3137.91					
35	-0.79	223.00	3.40	9668.49	3341.48
3197.59					
35	-0.79	223.00	3.40	9668.49	3341.48
3197.59					
36	-0.79	227.09	4.79	9801.89	3384.83
3239.07					
36	-0.79	227.09	4.79	9801.89	3384.83
3239.07					
37	-0.79	231.88	4.79	9957.90	3435.52
3287.58					
37	-0.79	231.88	4.79	9957.90	3435.52
3287.58					
38	-0.79	236.67	4.79	10113.91	3486.21
3336.09					
38	-0.79	236.67	4.79	10113.91	3486.21
3336.09					
39	-0.79	241.46	4.79	10269.92	3536.90
3384.60					
39	-0.79	241.46	4.79	10269.92	3536.90
3384.60					
40	-0.79	246.24	4.79	10425.93	3587.59
3433.11					
40	-0.79	246.24	4.79	10425.93	3587.59

3433.11					
41	-0.79	251.03	4.79	10581.94	3638.28
3481.61					
41	-0.79	251.03	4.79	10581.94	3638.28
3481.61					
42	-0.79	255.82	4.79	10737.96	3688.97
3530.12					
42	-0.79	255.82	4.79	10737.96	3688.97
3530.12					
43	-0.79	260.61	4.79	10893.97	3739.66
3578.63					
43	-0.79	260.61	4.79	10893.97	3739.66
3578.63					
44	-0.79	264.68	3.36	11031.54	3784.37
3621.41					
44	-0.79	264.68	3.36	11031.54	3784.37
3621.41					
45	53.78	268.79	8.20	5056.22	4010.46
3837.77					
45	53.78	268.79	8.20	5056.22	4010.46
3837.77					
46	53.78	273.63	8.20	4733.03	3792.47
3629.16					
46	53.78	273.63	8.20	4733.03	3792.47
3629.16					
47	53.78	278.48	8.20	4409.83	3574.47
3420.55					
47	53.78	278.48	8.20	4409.83	3574.47
3420.55					
48	53.78	282.49	5.40	4141.94	3393.77
3247.63					
48	53.78	282.49	5.40	4141.94	3393.77
3247.63					
49	47.63	286.39	6.84	4431.73	3589.24
3434.68					
49	47.63	286.39	6.84	4431.73	3589.24
3434.68					
50	47.63	291.30	7.72	4120.54	3379.34
3233.82					
50	47.63	291.30	7.72	4120.54	3379.34
3233.82					
51	47.63	296.50	7.72	3754.13	3132.19
2997.32					
51	47.63	296.50	7.72	3754.13	3132.19
2997.32					
52	47.63	301.70	7.72	3387.72	2885.05
2760.81					
52	47.63	301.70	7.72	3387.72	2885.05
2760.81					
53	45.14	304.80	1.41	3324.73	2842.56

2720.15					
53	45.14	304.80	1.41	3324.73	2842.56
2720.15					
54	45.14	307.82	7.15	3125.35	2708.07
2591.46					
54	45.14	307.82	7.15	3125.35	2708.07
2591.46					
55	45.14	312.86	7.15	2792.98	2483.89
2376.93					
55	45.14	312.86	7.15	2792.98	2483.89
2376.93					
56	45.14	317.90	7.15	2460.60	2259.70
2162.39					
56	45.14	317.90	7.15	2460.60	2259.70
2162.39					
57	45.14	322.94	7.15	2128.23	2035.51
1947.86					
57	45.14	322.94	7.15	2128.23	2035.51
1947.86					
58	48.54	327.95	7.50	1644.32	1709.11
1635.51					
58	48.54	327.95	7.50	1644.32	1709.11
1635.51					
59	48.54	332.91	7.50	1290.86	1470.70
1407.37					
59	48.54	332.91	7.50	1290.86	1470.70
1407.37					
60	48.54	337.88	7.50	937.41	1232.29
1179.23					
60	48.54	337.88	7.50	937.41	1232.29
1179.23					
61	48.54	342.84	7.50	583.95	993.88
951.08					
61	48.54	342.84	7.50	583.95	993.88
951.08					
62	65.05	346.66	6.34	439.29	296.30
283.54					
62	65.05	346.66	6.34	439.29	296.30
283.54					
63	65.05	349.48	7.03	152.95	103.17
98.72					
63	65.05	349.48	7.03	152.95	103.17
98.72					

Table 4 - Base Force Data on the 63 Slices

Slice	Alpha	X-Coord.	Base	Effective	Available
Mobilized					

No.	(deg)	Slice Cntr (ft)	Leng. (ft)	Normal Force (lbs)	Shear Force (lbs)	Shear Force * (lbs)
1	-30.95	54.89	6.92	6975.65	8859.84	8478.32
1	-30.95	54.89	6.92	6975.65	8859.84	8478.32
2	-30.95	60.83	6.92	12063.73	12291.79	11762.50
2	-30.95	60.83	6.92	12063.73	12291.79	11762.50
3	-30.95	64.94	2.65	6247.59	5806.82	5556.78
3	-30.95	64.94	2.65	6247.59	5806.82	5556.78
4	-0.79	68.58	5.01	6425.08	3089.17	2956.15
4	-0.79	68.58	5.01	6425.08	3089.17	2956.15
5	-0.79	73.59	5.01	7792.76	3533.56	3381.40
5	-0.79	73.59	5.01	7792.76	3533.56	3381.40
6	-0.79	78.59	5.01	9160.43	3977.94	3806.65
6	-0.79	78.59	5.01	9160.43	3977.94	3806.65
7	-0.79	83.60	5.01	10528.11	4422.33	4231.90
7	-0.79	83.60	5.01	10528.11	4422.33	4231.90
8	-0.79	88.61	5.01	11895.79	4866.71	4657.15
8	-0.79	88.61	5.01	11895.79	4866.71	4657.15
9	-0.79	93.62	5.01	13263.46	5311.10	5082.40
9	-0.79	93.62	5.01	13263.46	5311.10	5082.40
10	-0.79	98.62	5.01	14631.14	5755.48	5507.65
10	-0.79	98.62	5.01	14631.14	5755.48	5507.65
11	-0.79	103.63	5.01	15998.82	6199.87	5932.89
11	-0.79	103.63	5.01	15998.82	6199.87	5932.89
12	-0.79	108.64	5.01	17366.49	6644.25	

6358.14
  12   -0.79   108.64   5.01   17366.49   6644.25
6358.14
  13   -0.79   113.65   5.01   18734.17   7088.64
6783.39
  13   -0.79   113.65   5.01   18734.17   7088.64
6783.39
  14   -0.79   118.65   5.01   20101.85   7533.02
7208.64
  14   -0.79   118.65   5.01   20101.85   7533.02
7208.64
  15   -0.79   123.66   5.01   21469.52   7977.41
7633.89
  15   -0.79   123.66   5.01   21469.52   7977.41
7633.89
  16   -0.79   128.67   5.01   22837.20   8421.79
8059.14
  16   -0.79   128.67   5.01   22837.20   8421.79
8059.14
  17   -0.79   133.67   5.01   24204.88   8866.18
8484.39
  17   -0.79   133.67   5.01   24204.88   8866.18
8484.39
  18   -0.79   138.68   5.01   25572.55   9310.56
8909.64
  18   -0.79   138.68   5.01   25572.55   9310.56
8909.64
  19   -0.79   143.69   5.01   26940.23   9754.95
9334.89
  19   -0.79   143.69   5.01   26940.23   9754.95
9334.89
  20   -0.79   148.70   5.01   28307.91   10199.33
9760.14
  20   -0.79   148.70   5.01   28307.91   10199.33
9760.14
  21   -0.79   153.70   5.01   29675.58   10643.72
10185.39
  21   -0.79   153.70   5.01   29675.58   10643.72
10185.39
  22   -0.79   158.71   5.01   31043.26   11088.10
10610.64
  22   -0.79   158.71   5.01   31043.26   11088.10
10610.64
  23   -0.79   163.72   5.01   32410.94   11532.49
11035.89
  23   -0.79   163.72   5.01   32410.94   11532.49
11035.89
  24   -0.79   168.72   5.01   33778.62   11976.87
11461.14
  24   -0.79   168.72   5.01   33778.62   11976.87

11461.14					
25	-0.79	173.73	5.01	35146.29	12421.26
11886.39					
25	-0.79	173.73	5.01	35146.29	12421.26
11886.39					
26	-0.79	178.74	5.01	36513.97	12865.64
12311.64					
26	-0.79	178.74	5.01	36513.97	12865.64
12311.64					
27	-0.79	183.75	5.01	37881.65	13310.03
12736.89					
27	-0.79	183.75	5.01	37881.65	13310.03
12736.89					
28	-0.79	188.75	5.01	39249.32	13754.41
13162.14					
28	-0.79	188.75	5.01	39249.32	13754.41
13162.14					
29	-0.79	193.76	5.01	40617.00	14198.80
13587.39					
29	-0.79	193.76	5.01	40617.00	14198.80
13587.39					
30	-0.79	198.77	5.01	41984.68	14643.18
14012.64					
30	-0.79	198.77	5.01	41984.68	14643.18
14012.64					
31	-0.79	203.77	5.01	43352.35	15087.57
14437.89					
31	-0.79	203.77	5.01	43352.35	15087.57
14437.89					
32	-0.79	208.78	5.01	44720.03	15531.95
14863.13					
32	-0.79	208.78	5.01	44720.03	15531.95
14863.13					
33	-0.79	213.79	5.01	46087.71	15976.34
15288.38					
33	-0.79	213.79	5.01	46087.71	15976.34
15288.38					
34	-0.79	218.80	5.01	47455.38	16420.72
15713.63					
34	-0.79	218.80	5.01	47455.38	16420.72
15713.63					
35	-0.79	223.00	3.40	32875.94	11362.10
10872.84					
35	-0.79	223.00	3.40	32875.94	11362.10
10872.84					
36	-0.79	227.09	4.79	46930.96	16206.38
15508.52					
36	-0.79	227.09	4.79	46930.96	16206.38
15508.52					
37	-0.79	231.88	4.79	47677.93	16449.09

15740.78					
37	-0.79	231.88	4.79	47677.93	16449.09
15740.78					
38	-0.79	236.67	4.79	48424.90	16691.79
15973.03					
38	-0.79	236.67	4.79	48424.90	16691.79
15973.03					
39	-0.79	241.46	4.79	49171.88	16934.50
16205.29					
39	-0.79	241.46	4.79	49171.88	16934.50
16205.29					
40	-0.79	246.24	4.79	49918.85	17177.21
16437.54					
40	-0.79	246.24	4.79	49918.85	17177.21
16437.54					
41	-0.79	251.03	4.79	50665.82	17419.91
16669.80					
41	-0.79	251.03	4.79	50665.82	17419.91
16669.80					
42	-0.79	255.82	4.79	51412.80	17662.62
16902.05					
42	-0.79	255.82	4.79	51412.80	17662.62
16902.05					
43	-0.79	260.61	4.79	52159.77	17905.33
17134.31					
43	-0.79	260.61	4.79	52159.77	17905.33
17134.31					
44	-0.79	264.68	3.36	37101.63	12727.70
12179.63					
44	-0.79	264.68	3.36	37101.63	12727.70
12179.63					
45	53.78	268.79	8.20	41469.30	32892.38
31476.01					
45	53.78	268.79	8.20	41469.30	32892.38
31476.01					
46	53.78	273.63	8.20	38818.58	31104.44
29765.06					
46	53.78	273.63	8.20	38818.58	31104.44
29765.06					
47	53.78	278.48	8.20	36167.85	29316.51
28054.12					
47	53.78	278.48	8.20	36167.85	29316.51
28054.12					
48	53.78	282.49	5.40	22346.09	18309.68
17521.25					
48	53.78	282.49	5.40	22346.09	18309.68
17521.25					
49	47.63	286.39	6.84	30333.68	24567.12
23509.24					
49	47.63	286.39	6.84	30333.68	24567.12

23509.24					
50	47.63	291.30	7.72	31804.17	26083.25
24960.09					
50	47.63	291.30	7.72	31804.17	26083.25
24960.09					
51	47.63	296.50	7.72	28976.05	24175.66
23134.64					
51	47.63	296.50	7.72	28976.05	24175.66
23134.64					
52	47.63	301.70	7.72	26147.93	22268.07
21309.19					
52	47.63	301.70	7.72	26147.93	22268.07
21309.19					
53	45.14	304.80	1.41	4695.33	4014.39
3841.53					
53	45.14	304.80	1.41	4695.33	4014.39
3841.53					
54	45.14	307.82	7.15	22336.68	19354.44
18521.02					
54	45.14	307.82	7.15	22336.68	19354.44
18521.02					
55	45.14	312.86	7.15	19961.22	17752.18
16987.76					
55	45.14	312.86	7.15	19961.22	17752.18
16987.76					
56	45.14	317.90	7.15	17585.77	16149.91
15454.49					
56	45.14	317.90	7.15	17585.77	16149.91
15454.49					
57	45.14	322.94	7.15	15210.31	14547.65
13921.22					
57	45.14	322.94	7.15	15210.31	14547.65
13921.22					
58	48.54	327.95	7.50	12332.40	12818.31
12266.34					
58	48.54	327.95	7.50	12332.40	12818.31
12266.34					
59	48.54	332.91	7.50	9681.48	11030.24
10555.27					
59	48.54	332.91	7.50	9681.48	11030.24
10555.27					
60	48.54	337.88	7.50	7030.57	9242.18
8844.20					
60	48.54	337.88	7.50	7030.57	9242.18
8844.20					
61	48.54	342.84	7.50	4379.65	7454.11
7133.13					
61	48.54	342.84	7.50	4379.65	7454.11
7133.13					
62	65.05	346.66	6.34	2783.34	1877.39

```
1796.54
  62      65.05     346.66       6.34         2783.34         1877.39
1796.54
  63      65.05     349.48       7.03         1074.85          725.00
693.78
  63      65.05     349.48       7.03         1074.85          725.00
693.78

     Sum of the Resisting Forces =  695993.80 (lbs)

     Average Available Shear Strength =   1987.58(psf)

     Sum of the Driving Forces =   720131.34 (lbs)

     Average Mobilized Shear Stress =    2056.51(psf)

     Total length of the failure surface =     350.17(ft)


     Factor of Safety Balance Check: FS =  0.96648

     Janbu's Correction Factor (fo) =  1.0771

     Janub's FS Corrected =  1.04101

               *** SEISMIC SLOPE DISPLACEMENT DATA ***
          (Note: kv is set = zero for displacement calculations)
          Seismic Yield Coefficient (ky) =  0.28050(g)
          Calculated Newmark Seismic Displacement =    0.000(ft)


          Average Elevation of Point of Application of kh on Sliding Mass =
1305.439(ft)

          Non-Symmetrical Sliding Resistance Has Been Specified
          for Downhill Sliding.

                        **** END OF GEOSTASE OUTPUT ****
```

Appendix E
Infiltration Testing Results

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/27/2023
Boring Number: I-2

Test hole dimensions (if circular)	
Boring Depth (feet)*:	3
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	7:25	7:54	29.0	0.17	0.19	0.02	No
2	7:54	8:19	25.0	0.19	0.19	0.00	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	8:19	8:49	30.0	0.19	0.20	0.01	0.01
2	8:49	9:19	30.0	0.20	0.21	0.01	0.01
3	9:19	9:49	30.0	0.21	0.21	0.00	0.00
4	9:49	10:19	30.0	0.21	0.22	0.01	0.01
5	10:19	10:49	30.0	0.22	0.23	0.01	0.01
6	10:49	11:19	30.0	0.23	0.23	0.00	0.00
7	11:19	11:49	30.0	0.23	0.24	0.01	0.01
8	11:49	12:19	30.0	0.24	0.24	0.00	0.00
9	12:19	12:49	30.0	0.24	0.25	0.01	0.01
10	12:49	13:19	30.0	0.25	0.26	0.01	0.01
11	13:19	13:49	30.0	0.26	0.26	0.00	0.00
12	13:49	14:19	30.0	0.26	0.27	0.01	0.01
						Tested Infiltration Rate (No Factor of Safety)	**0.01**
						MinimumFactor of Safety	**See Report**
						Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/27/2023
Boring Number: I-3

Test hole dimensions (if circular)	
Boring Depth (feet)*:	10
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	7:44	8:09	25.0	6.27	6.31	0.04	No
2	8:09	8:34	25.0	6.31	6.34	0.03	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	8:34	9:04	30.0	6.06	6.06	0.00	0.00
2	9:04	9:34	30.0	6.06	6.07	0.01	0.01
3	9:34	10:04	30.0	6.07	6.09	0.02	0.02
4	10:04	10:36	32.0	6.09	6.11	0.02	0.02
5	10:36	11:06	30.0	6.11	6.14	0.03	0.03
6	11:06	11:38	32.0	6.14	6.16	0.02	0.02
7	11:38	12:09	31.0	6.16	6.19	0.03	0.03
8	12:09	12:39	30.0	6.19	6.21	0.02	0.02
9	12:39	13:09	30.0	6.21	6.24	0.03	0.03
10	13:10	13:40	30.0	6.04	6.06	0.02	0.02
11	13:40	14:13	33.0	6.06	6.08	0.02	0.02
12	14:13	14:43	30.0	6.08	6.10	0.02	0.02

Tested Infiltration Rate (No Factor of Safety)	**0.02**
MinimumFactor of Safety	**See Report**
Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/27/2023
Boring Number: I-4

Test hole dimensions (if circular)	
Boring Depth (feet)*:	3
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	7:38	8:03	25.0	0.26	0.45	0.19	No
2	8:05	8:30	25.0	0.27	0.38	0.11	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	8:30	9:00	30.0	0.27	0.36	0.09	0.13
2	9:01	9:31	30.0	0.26	0.33	0.07	0.10
3	9:32	10:02	30.0	0.27	0.31	0.04	0.06
4	10:03	10:33	30.0	0.25	0.3	0.05	0.07
5	10:34	11:04	30.0	0.25	0.29	0.04	0.06
6	11:05	11:35	30.0	0.24	0.28	0.04	0.06
7	11:36	12:06	30.0	0.24	0.27	0.03	0.04
8	12:07	12:37	30.0	0.24	0.28	0.04	0.06
9	12:37	13:07	30.0	0.23	0.27	0.04	0.05
10	13:08	13:38	30.0	0.23	0.26	0.03	0.04
11	13:39	14:10	31.0	0.21	0.26	0.05	0.07
12	14:11	14:41	30.0	0.21	0.26	0.05	0.07
						Tested Infiltration Rate (No Factor of Safety)	**0.07**
						MinimumFactor of Safety	**See Report**
						Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/28/2023
Boring Number: I-5

Test hole dimensions (if circular)	
Boring Depth (feet)*:	12
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	6:56	7:22	26.0	4.88	4.89	0.01	No
2	7:22	7:47	25.0	4.89	4.89	0.00	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	7:47	8:17	30.0	4.89	4.91	0.02	0.01
2	8:17	8:47	30.0	4.91	4.92	0.01	0.01
3	8:47	9:17	30.0	4.92	4.94	0.02	0.01
4	9:17	9:47	30.0	4.94	4.96	0.02	0.01
5	9:47	10:17	30.0	4.96	4.97	0.01	0.01
6	10:17	10:47	30.0	4.97	4.99	0.02	0.01
7	10:47	11:17	30.0	4.99	5.00	0.01	0.01
8	11:17	11:47	30.0	5.00	5.01	0.01	0.01
9	11:47	12:18	31.0	5.01	5.03	0.02	0.01
10	12:18	12:48	30.0	5.03	5.05	0.02	0.01
11	12:48	13:18	30.0	5.05	5.07	0.02	0.01
12	13:19	13:49	30.0	5.07	5.08	0.01	0.01
						Tested Infiltration Rate (No Factor of Safety)	**0.01**
						MinimumFactor of Safety	**See Report**
						Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/28/2023
Boring Number: I-6

Test hole dimensions (if circular)	
Boring Depth (feet)*:	3
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	6:59	7:24	25.0	0.31	0.46	0.15	No
2	7:24	7:49	25.0	0.46	0.54	0.08	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	7:50	8:20	30.0	0.42	0.50	0.08	0.12
2	8:21	8:51	30.0	0.34	0.44	0.10	0.14
3	8:51	9:21	30.0	0.44	0.53	0.09	0.13
4	9:22	9:52	30.0	0.29	0.44	0.15	0.21
5	9:53	10:23	30.0	0.21	0.43	0.22	0.31
6	10:24	10:54	30.0	0.27	0.43	0.16	0.23
7	10:55	11:25	30.0	0.31	0.43	0.12	0.17
8	11:26	11:56	30.0	0.20	0.41	0.21	0.29
9	11:58	12:28	30.0	0.20	0.43	0.23	0.32
10	12:30	13:00	30.0	0.25	0.42	0.17	0.24
11	13:00	13:30	30.0	0.42	0.50	0.08	0.12
12	13:31	14:01	30.0	0.33	0.43	0.10	0.14

Tested Infiltration Rate (No Factor of Safety)	**0.14**
MinimumFactor of Safety	**See Report**
Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

Appendix F
General Earthwork and Grading Specifications for Rough Grading

General Earthwork and Grading Specifications for Rough Grading

1.0 General

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ a qualified Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to confirm that the attained level of compaction is being accomplished as specified. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the project plans and specifications. The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of “equipment” of work and the estimated quantities of daily earthwork

contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the
Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate personnel will be available for observation and testing. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified. It is the contractor's sole responsibility to provide proper fill compaction.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed. The contractor is responsible for all hazardous waste relating to his work. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Client should acquire the services of a qualified environmental assessor.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be over-excavated as specified in the following section. Scarification shall continue until soils are broken down and free of oversize material and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Over-excavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of the geotechnical consultant. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than
5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 The Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

7.2 All bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over

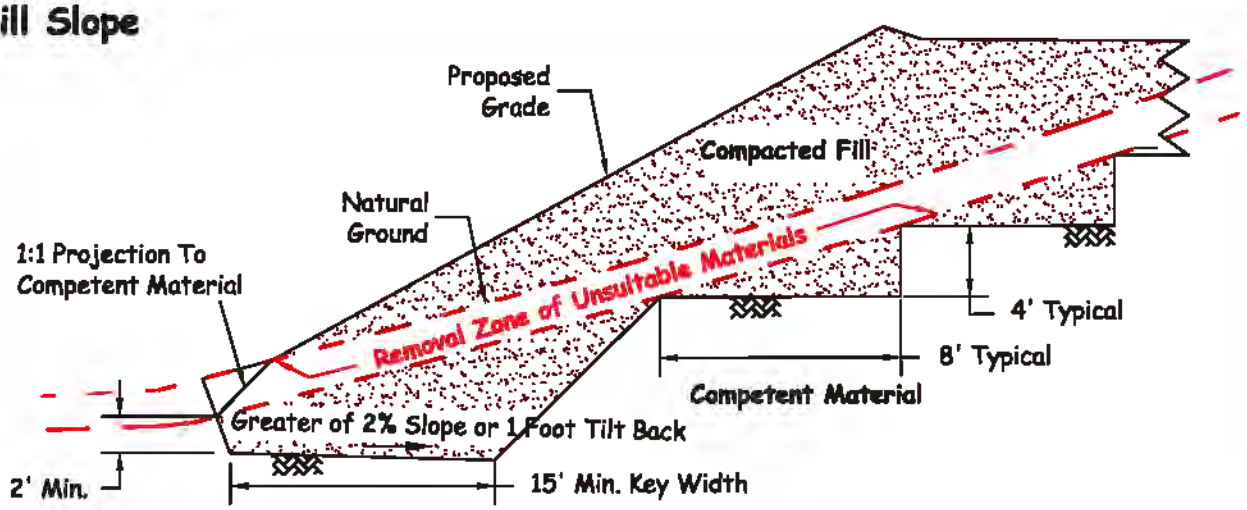
the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

7.3 The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

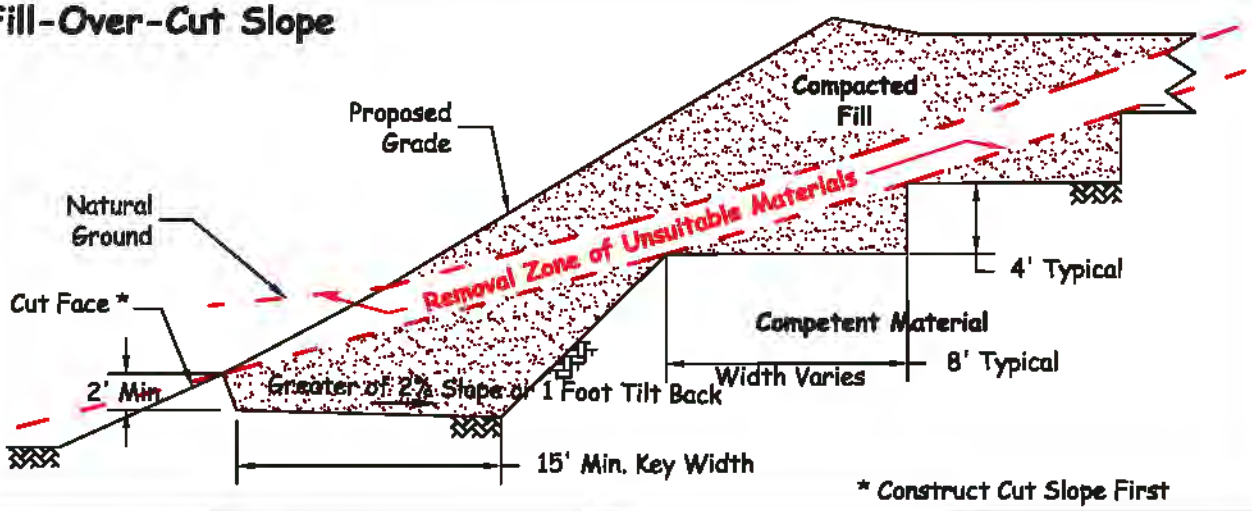
7.4 The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.5 Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

Fill Slope

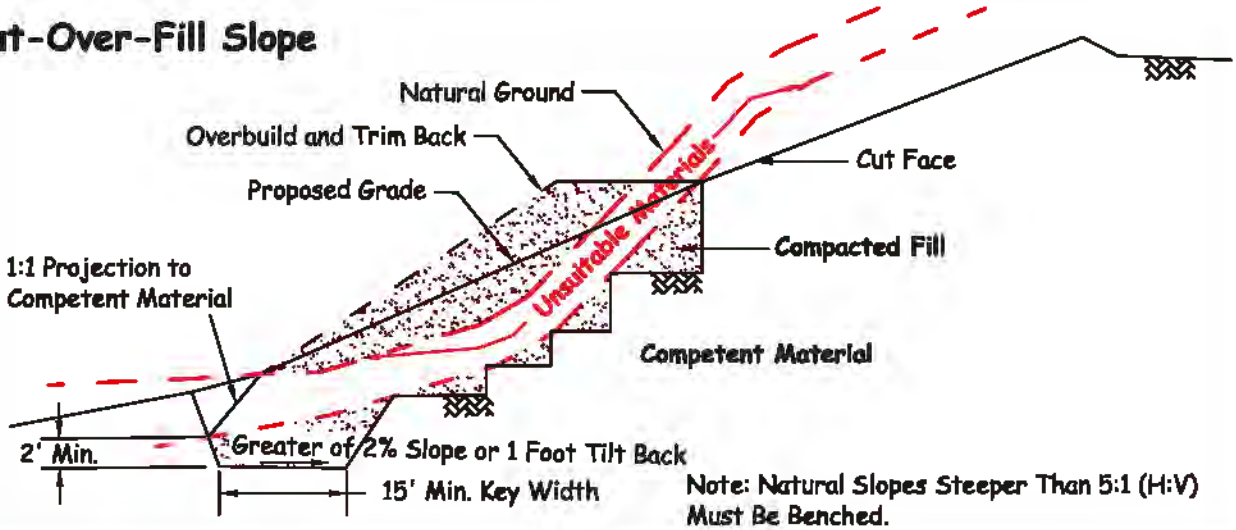


Fill-Over-Cut Slope



* Construct Cut Slope First

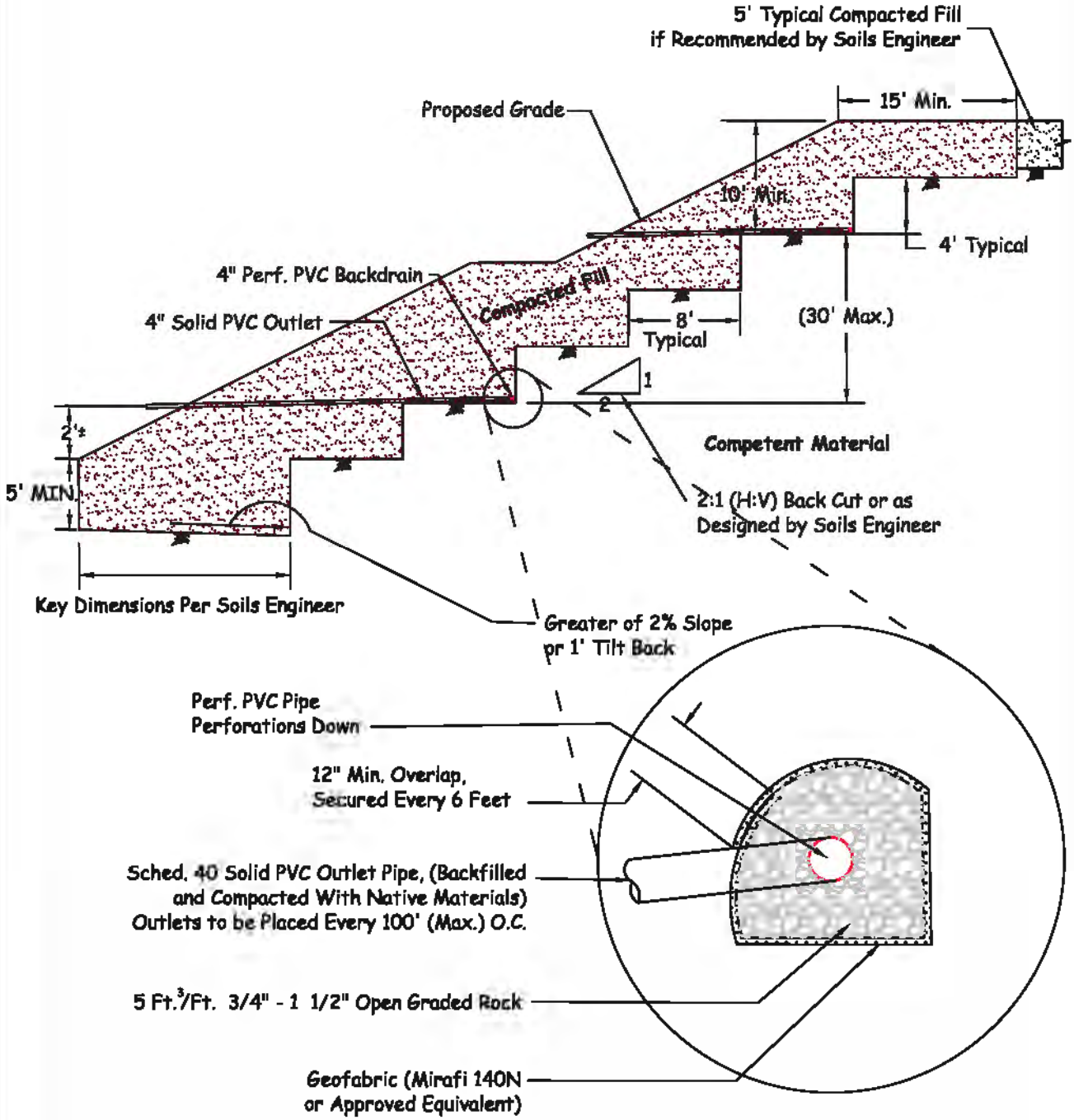
Cut-Over-Fill Slope



Note: Natural Slopes Steeper Than 5:1 (H:V) Must Be Benched.

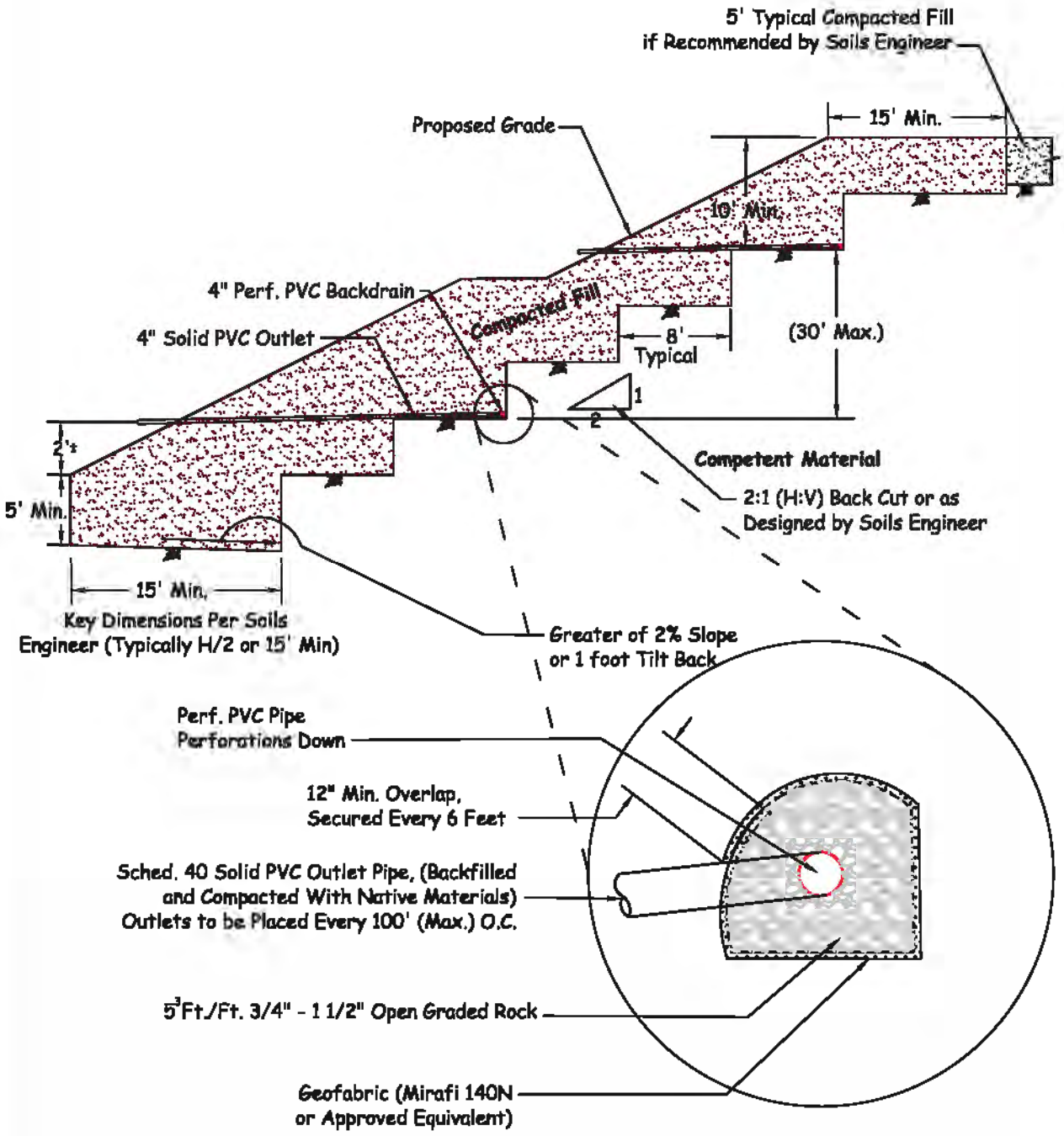
LGC Geotechnical, Inc.

KEYING AND BENCHING



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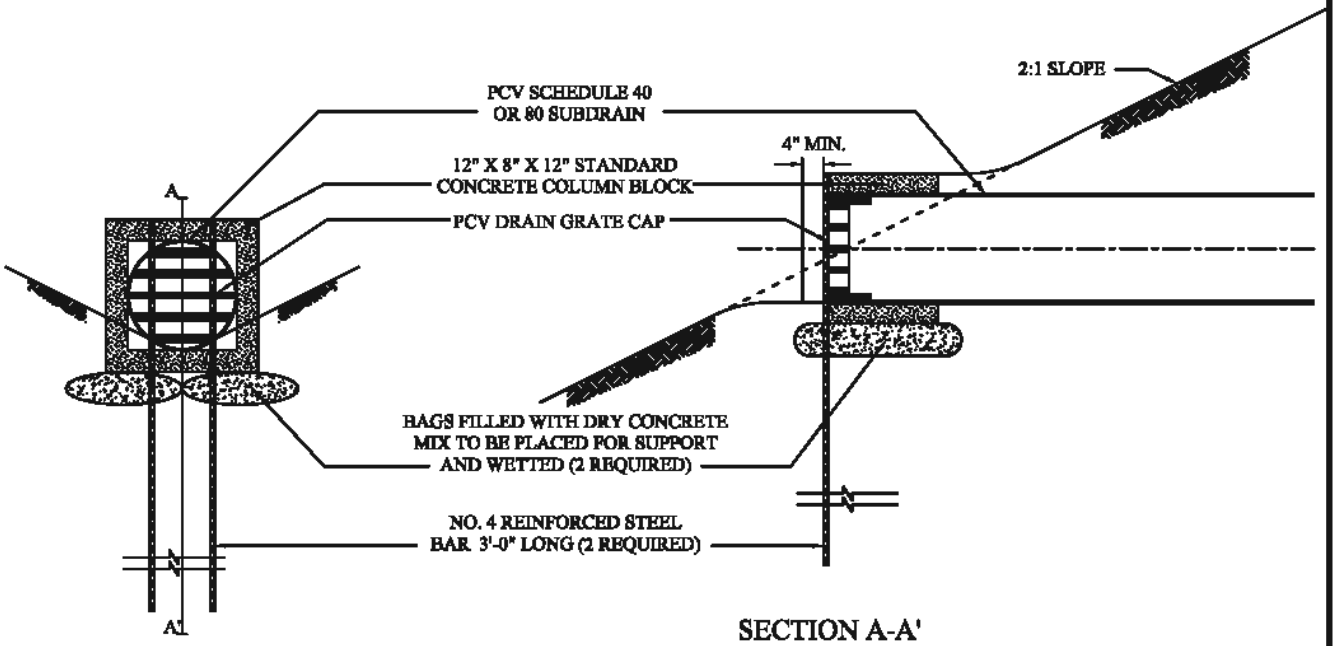
TYPICAL BUTTRESS DETAIL



LGC Geotechnical, Inc.

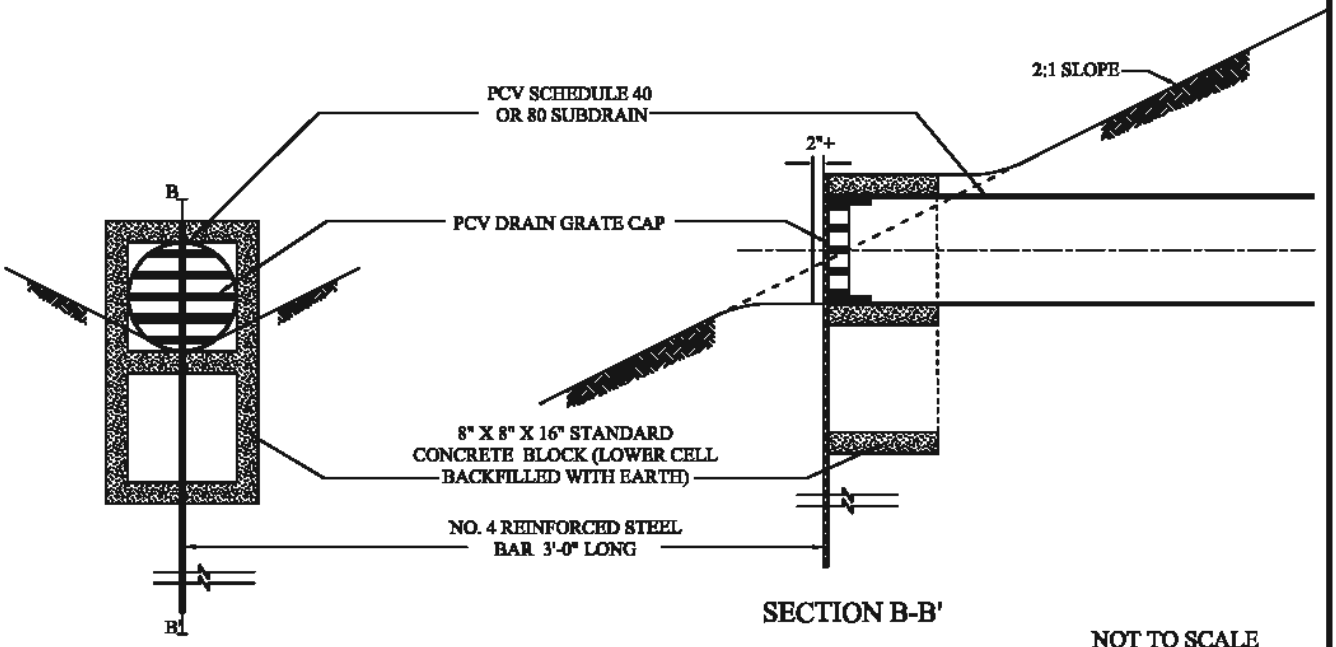
TYPICAL STABILIZATION FILL DETAIL

SUBDRAIN OUTLET MARKER -6" & 8" PIPE



SECTION A-A'

SUBDRAIN OUTLET MARKER -4" PIPE



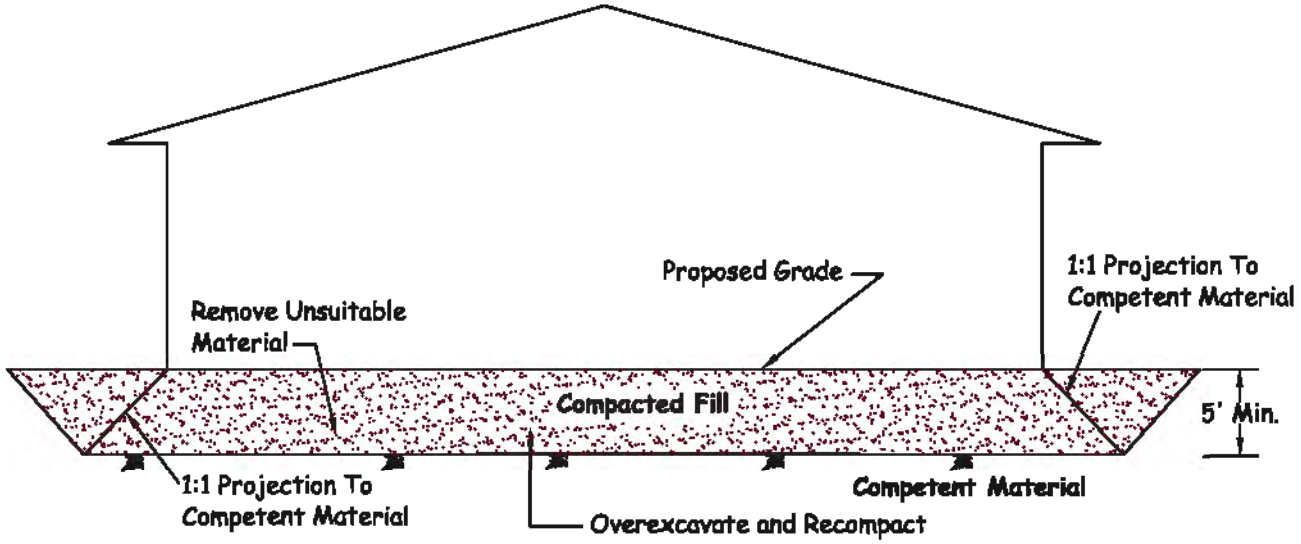
SECTION B-B'

NOT TO SCALE

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SUBDRAIN OUTLET MARKER DETAIL

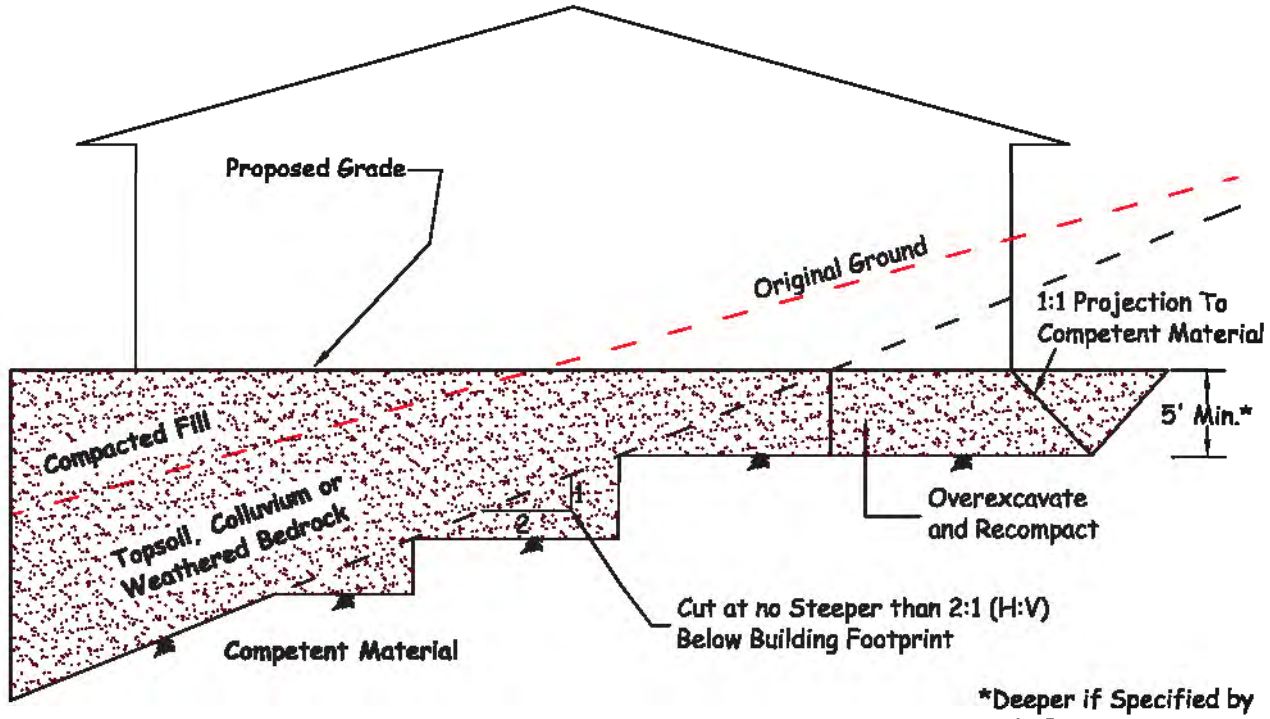
Cut Lot
(Exposing Unsuitable Soils at Design Grade)



Note 1: Removal Bottom Should be Graded With Minimum 2% Fall Towards Street or Other Suitable Area (as Determined by Soils Engineer) to Avaid Ponding Below Building

Note 2: Where Design Cut Lots are Excavated Entirely Into Competent Material, Overexcavation May Still be Required for Hard-Rock Conditions or for Materials With Variable Expansion Characteristics.

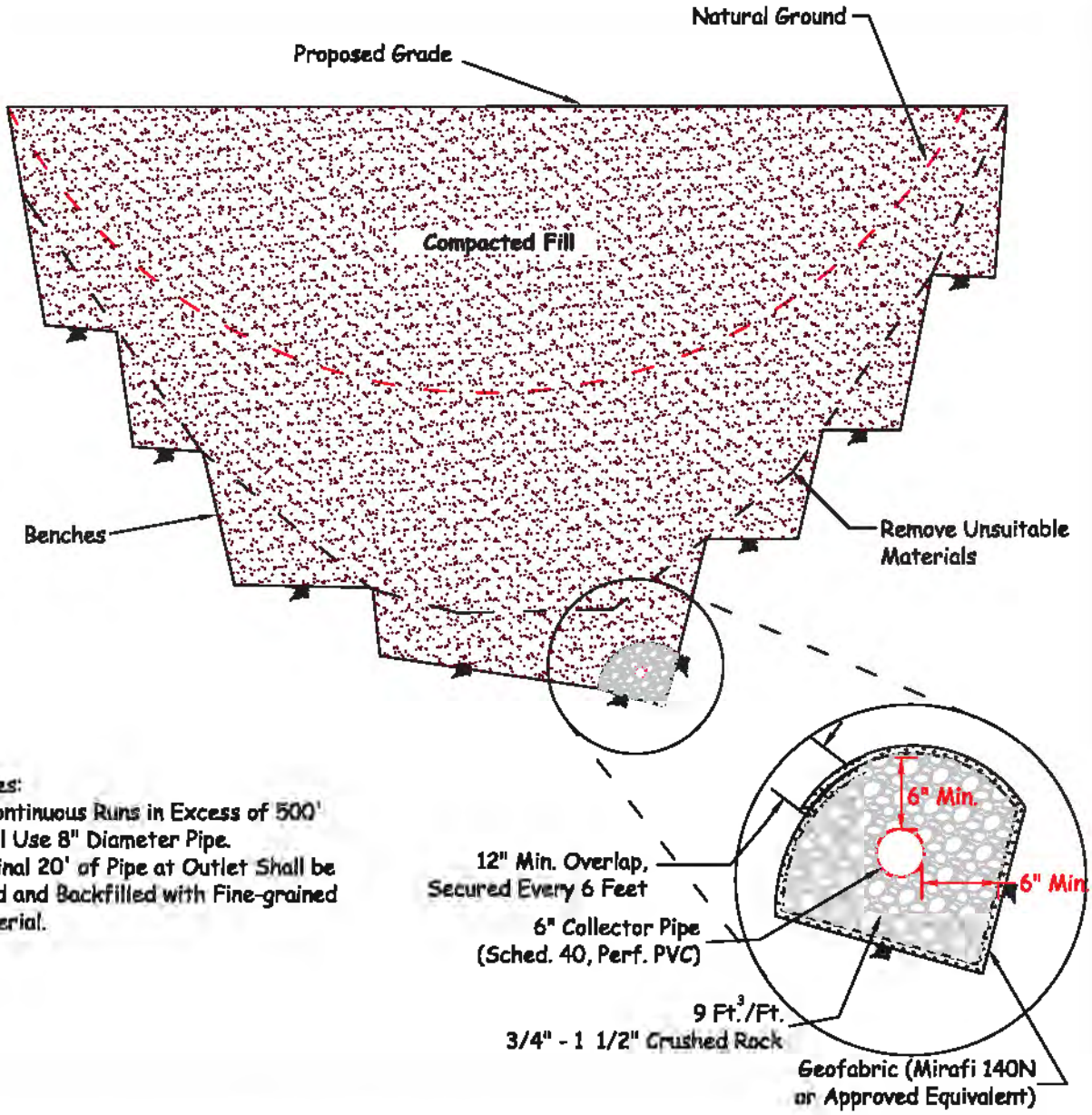
Cut/Fill Transition Lot



*Deeper if Specified by Soils Engineer

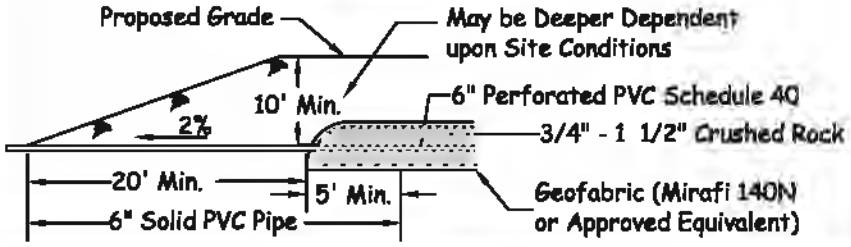
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CUT AND TRANSITION LOT OVEREXCAVATION DETAIL



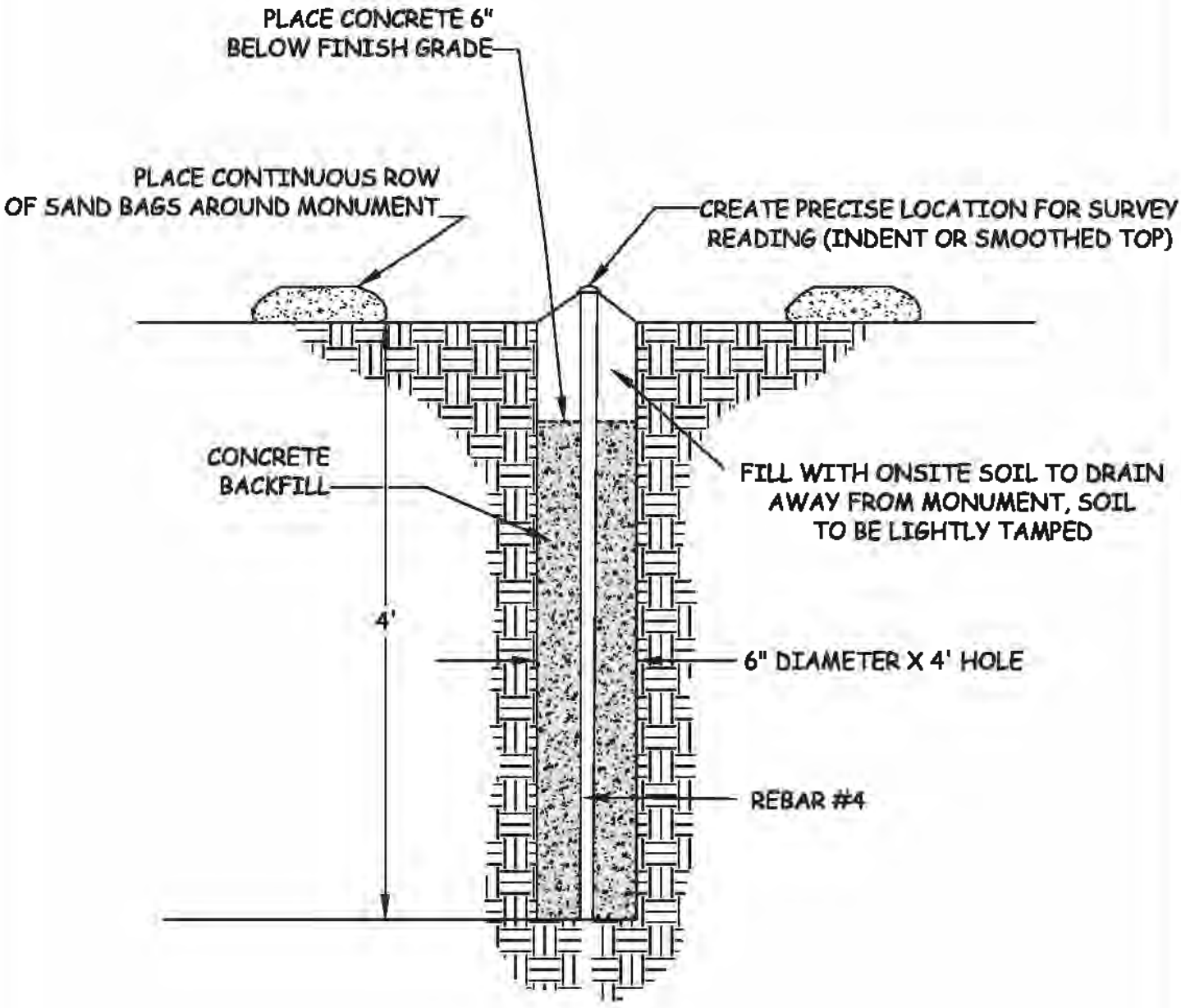
Notes:
1) Continuous Runs in Excess of 500' Shall Use 8" Diameter Pipe.
2) Final 20' of Pipe at Outlet Shall be Solid and Backfilled with Fine-grained Material.

Proposed Outlet Detail



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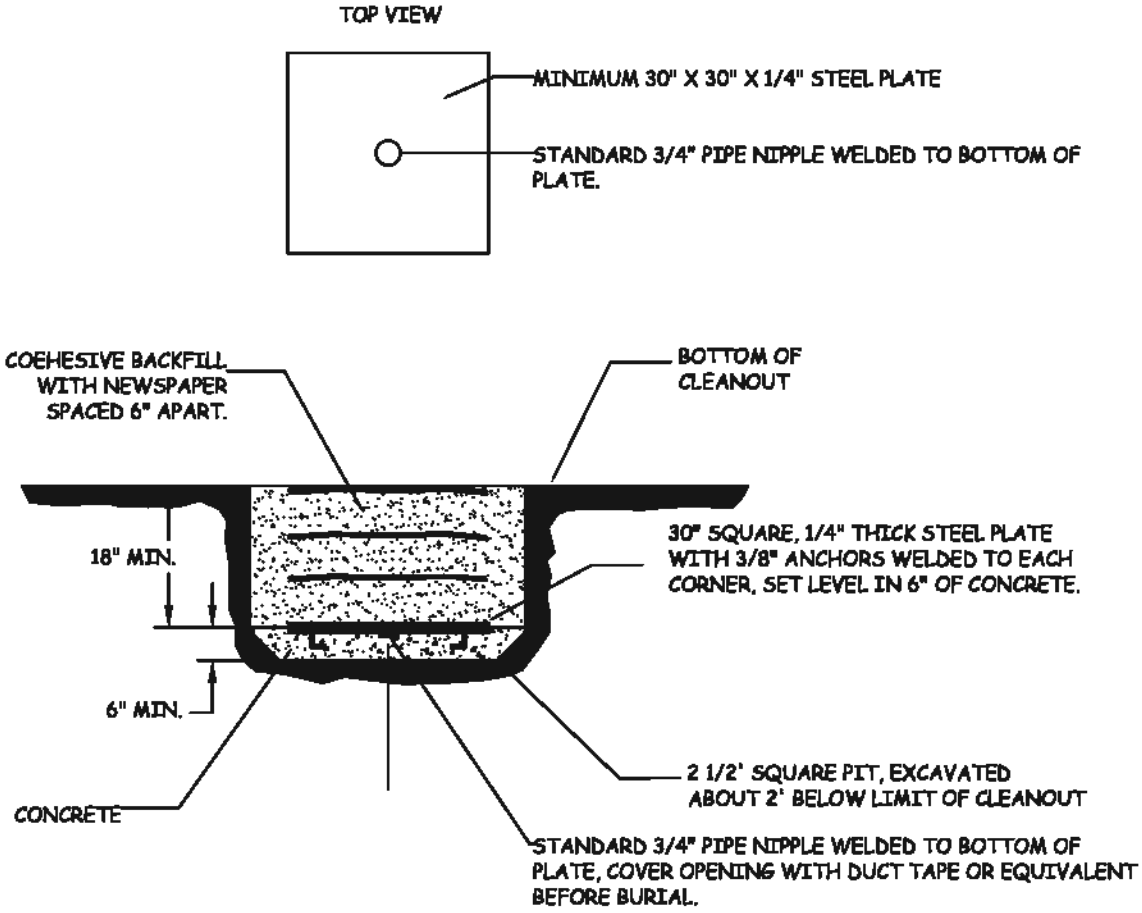
CANYON SUBDRAINS



NO CONSTRUCTION EQUIPMENT WITHIN 25 FEET OF ANY INSTALLED SETTLEMENT MONUMENTS

LGC Geotechnical, Inc.

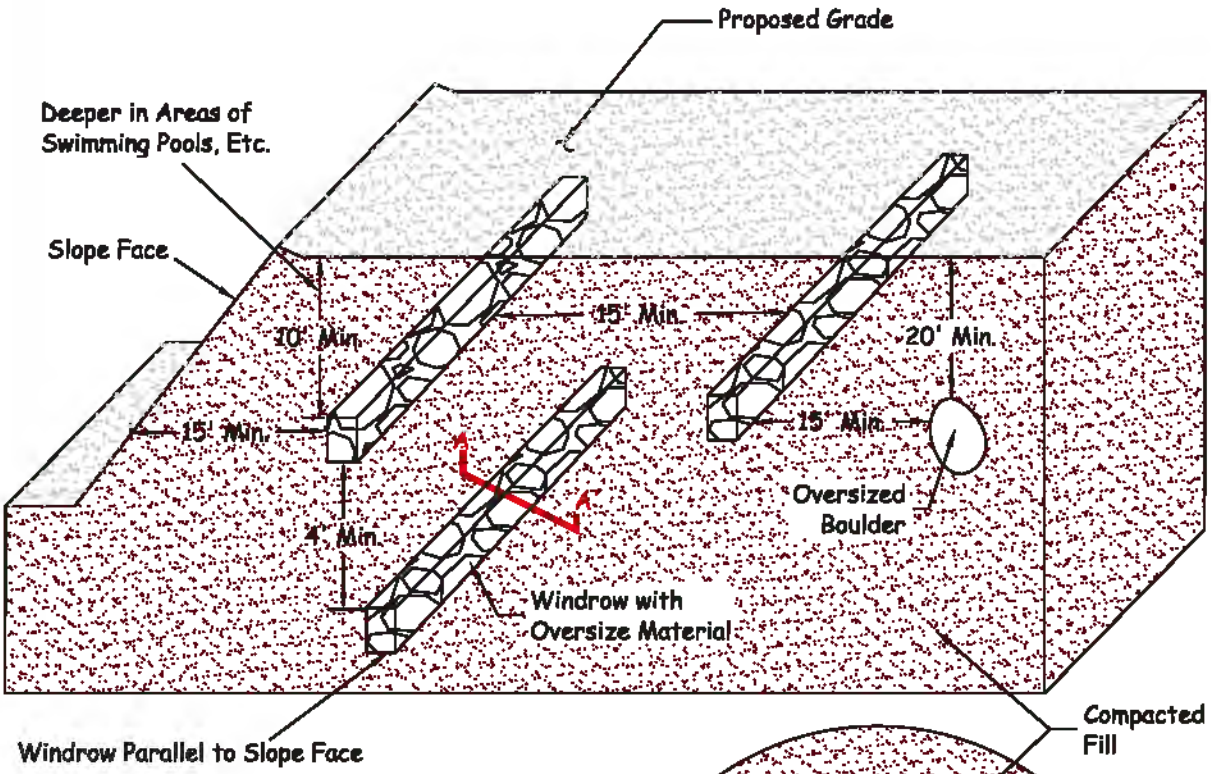
TYPICAL SURFACE SETTLEMENT MONUMENT

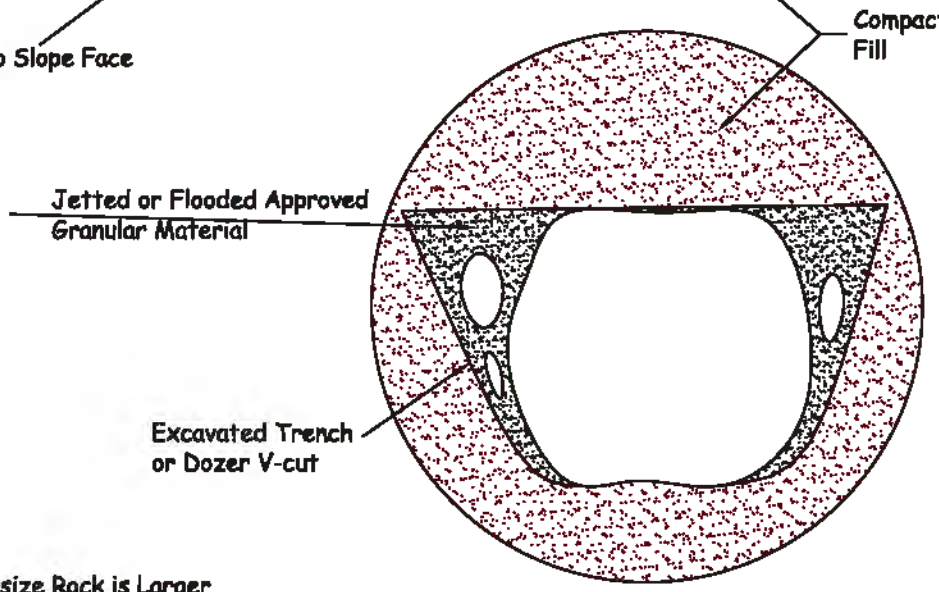


1. SURVEY FOR HORIZONTAL AND VERTICAL LOCATION TO NEAREST .01 INCH PRIOR TO BACKFILL USING KNOW LOCATIONS THAT WILL REMAIN INTACT DURING THE DURATION OF THE MONITORING PROGRAM. KNOW POINTS EXPLICITELY NOT ALLOWED ARE THOSE LOCATED ON FILL OR THAT WILL BE DESTROYED DURING GRADING.
2. IN THE EVENT OF DAMAGE TO SETTLEMENT PLATE DURING GRADING, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE GEOTECHNICAL ENGINEER AND SHALL BE RESPONSIBLE FOR RESTORING THE SETTLEMENT PLATES TO WORKING ORDER.
3. DRILL TO RECOVER AND ATTACH RISER PIPE.

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TYPICAL SETTLEMENT PLATE AND RISER



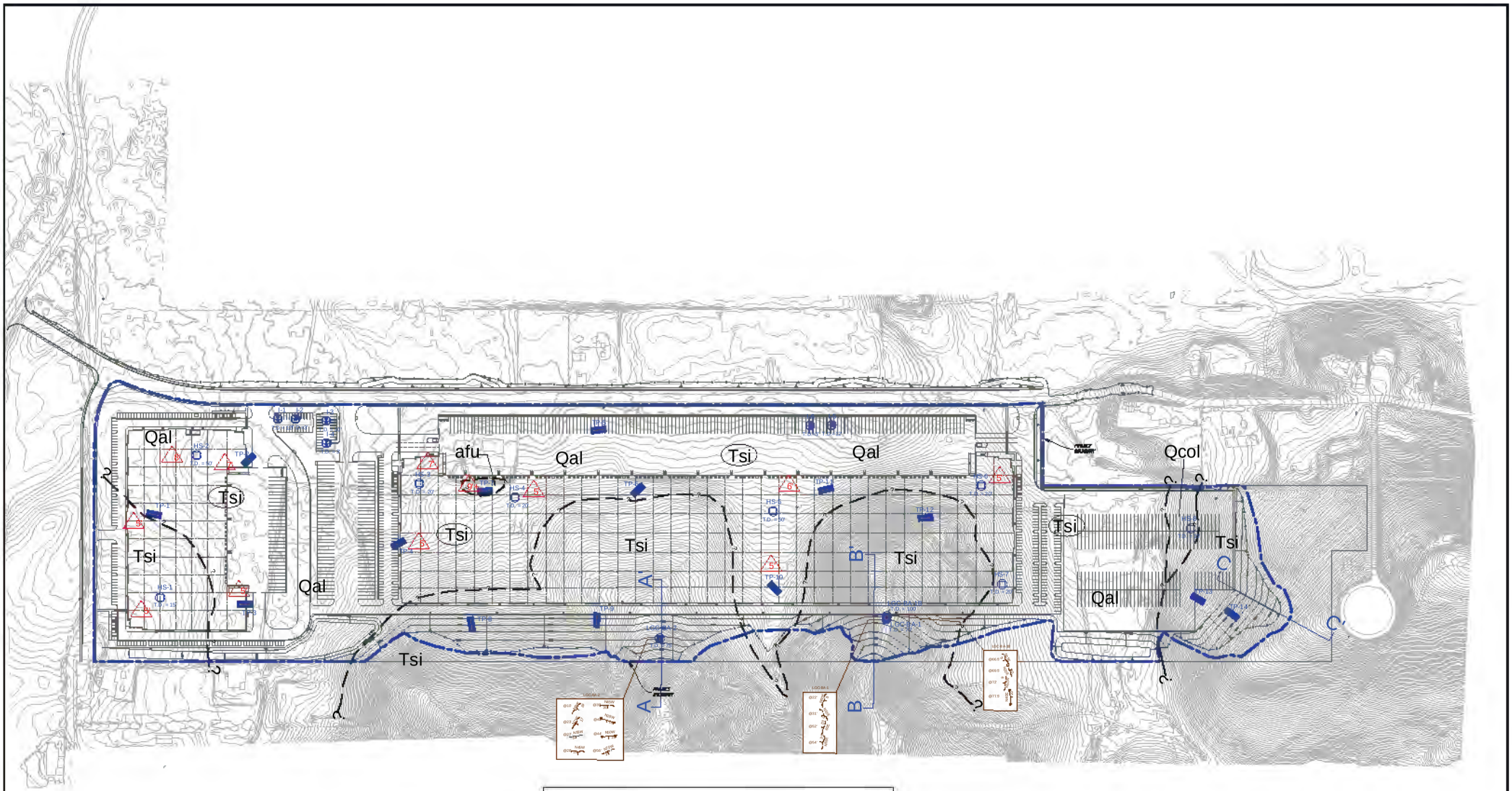


Note: Oversize Rock is Larger than 8" in Maximum Dimension.

Section A-A'

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OVERSIZE ROCK DISPOSAL DETAIL

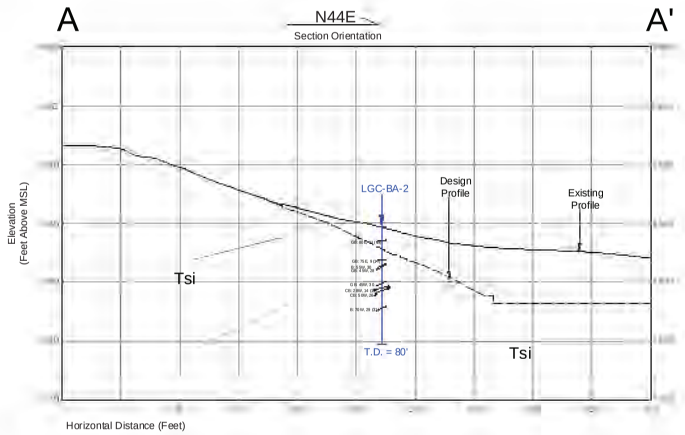


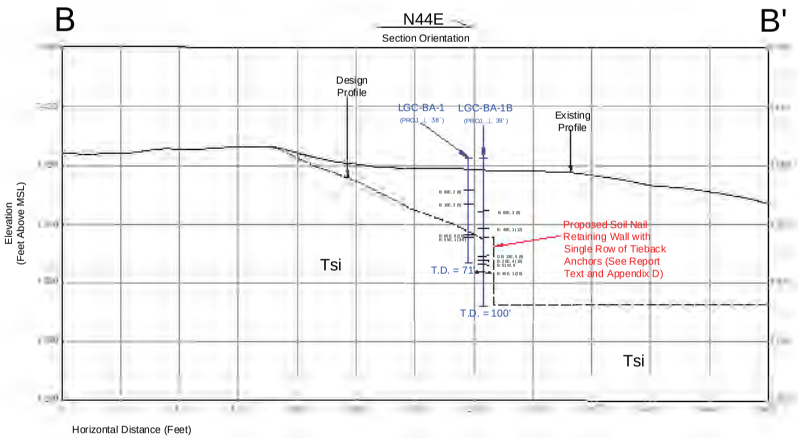
LGC Geotechnical, Inc.
131 Calle Iglesia, Ste. 200
San Clemente, CA 92672
TEL (949) 369-6141 FAX (949) 369-6142

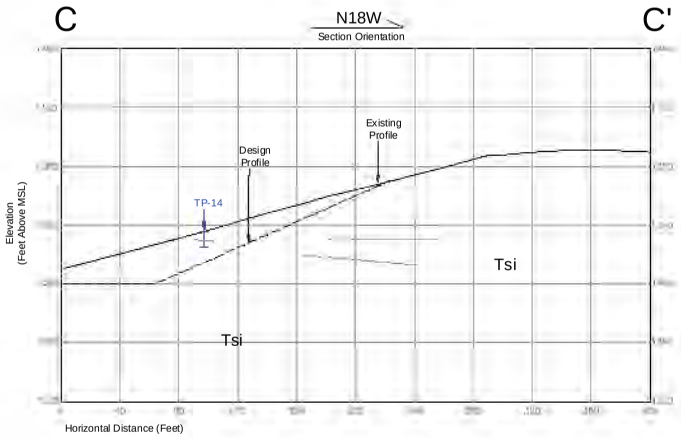
Preliminary Geotechnical Map

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	2310-01
ENG. / GEOL.	RLD / BPC
SCALE	1" = 80'
DATE	January 2024

SHEET 1 of 2







SCALE: 1"=40'
40' 0 40' 80'

LGC Geotechnical, Inc.
131 Calle Iglesia, Ste. 200
San Clemente, CA 92672
TEL (949) 369-6141 FAX (949) 369-6142

Geotechnical Cross-Sections
A-A', B-B', and C-C'

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	23160-01
ENG. / GEOL.	RLD / BPG
SCALE	1" = 40'
DATE	January 2024

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Western Riverside Area, California



January 29, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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GaC—Garretson very fine sandy loam, 2 to 8 percent slopes.....15
RaD3—Ramona sandy loam, 8 to 15 percent slopes, severely eroded.....16
RuF—Rough broken land.....18
Wg—Willows silty clay, saline-alkali.....18
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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:6,910 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 16, Aug 30, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AaD	Altamont clay, 5 to 15 percent slopes	2.1	3.6%
AbF	Altamont cobbly clay, 8 to 35 percent slopes	27.9	47.5%
GaC	Garretson very fine sandy loam, 2 to 8 percent slopes	1.0	1.6%
RaD3	Ramona sandy loam, 8 to 15 percent slopes, severely eroded	2.3	3.9%
RuF	Rough broken land	3.1	5.2%
Wg	Willows silty clay, saline-alkali	22.5	38.2%
Totals for Area of Interest		**58.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Western Riverside Area, California

AaD—Altamont clay, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: hcqg
Elevation: 200 to 3,250 feet
Mean annual precipitation: 9 to 25 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 200 to 310 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Altamont and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Altamont

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 18 inches: clay
H2 - 18 to 23 inches: silty clay
H3 - 23 to 27 inches: bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R019XD001CA - CLAYEY
Hydric soil rating: No

Minor Components

Gaviota
Percent of map unit: 5 percent
Hydric soil rating: No

Soper
Percent of map unit: 5 percent
Hydric soil rating: No

Vallecitos
Percent of map unit: 2 percent
Hydric soil rating: No

Altamont
Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 1 percent
Hydric soil rating: No

AbF—Altamont cobbly clay, 8 to 35 percent slopes

Map Unit Setting
National map unit symbol: hcqk
Elevation: 200 to 3,000 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 250 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition
Altamont and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Altamont

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile
H1 - 0 to 18 inches: cobbly clay
H2 - 18 to 23 inches: silty clay
H3 - 23 to 27 inches: bedrock

Properties and qualities

Slope: 8 to 35 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R019XD001CA - CLAYEY
Hydric soil rating: No

Minor Components

Soper

Percent of map unit: 5 percent

Gaviota

Percent of map unit: 5 percent

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 2 percent
Hydric soil rating: No

GaC—Garretson very fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hcv2
Elevation: 430 to 1,740 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Garretson and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Garretson

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metasedimentary rock

Typical profile

H1 - 0 to 10 inches: very fine sandy loam
H2 - 10 to 60 inches: loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Arbuckle

Percent of map unit: 5 percent
Hydric soil rating: No

Cortina

Percent of map unit: 5 percent
Hydric soil rating: No

Perkins

Percent of map unit: 5 percent
Hydric soil rating: No

RaD3—Ramona sandy loam, 8 to 15 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: hcyb
Elevation: 250 to 3,500 feet

Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Ramona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramona

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 8 inches: sandy loam
H2 - 8 to 17 inches: fine sandy loam
H3 - 17 to 68 inches: sandy clay loam
H4 - 68 to 74 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Greenfield

Percent of map unit: 5 percent
Hydric soil rating: No

Hanford

Percent of map unit: 5 percent
Hydric soil rating: No

Tujunga

Percent of map unit: 5 percent
Hydric soil rating: No

RuF—Rough broken land

Map Unit Composition

Rough broken land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rough Broken Land

Setting

Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum derived from mixed sources

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 0 to 3 inches to paralithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Wg—Willows silty clay, saline-alkali

Map Unit Setting

National map unit symbol: hd08
Elevation: 0 to 1,700 feet
Mean annual precipitation: 19 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 210 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Willows and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Willows

Setting

Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Alluvium derived from mixed sources

Typical profile

H1 - 0 to 10 inches: silty clay
H2 - 10 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: R019XD068CA - SILTY BASIN
Hydric soil rating: No

Minor Components

Domino

Percent of map unit: 5 percent
Hydric soil rating: No

Chino

Percent of map unit: 5 percent
Hydric soil rating: No

Madera

Percent of map unit: 5 percent
Hydric soil rating: No

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Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Technical Infeasibility Criteria

Technical infeasibility for on-site infiltration may result from conditions including the following:

1. The corrected in-situ infiltration rate is less than 0.3 inches per hour, as determined by infiltration test, and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of retention-based stormwater quality control measures;
2. Locations where the seasonal high groundwater level is within 10 feet of the surface, as determined by soils investigations;
3. Locations within 100 feet of a groundwater well used for drinking water;
4. Brownfield development sites where infiltration poses a risk of pollutant mobilization;
5. Other locations where pollutant mobilization is a documented concern (e.g., at or near properties that are contaminated or store hazardous substances underground);
6. Locations with potential geotechnical hazards;
7. Smart growth and infill or redevelopment locations where the density and/or nature of the project would create significant difficulty for compliance with the onsite retention requirement;
8. Locations where infiltration may adversely impact biological resources; or
9. Locations where infiltration may cause health and safety concerns.

It may be technically infeasible for stormwater runoff harvest and use for the following situations:

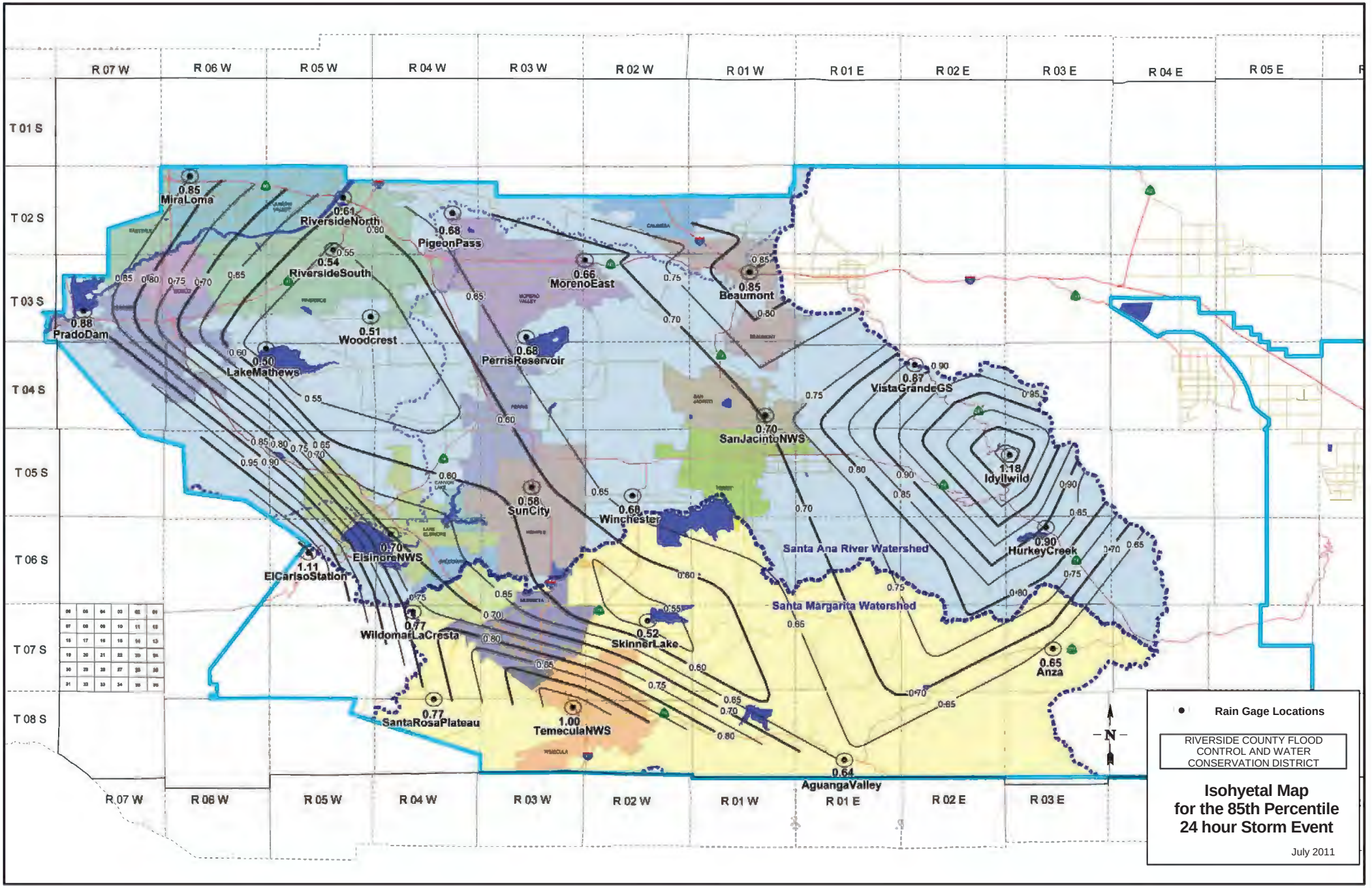
1. Projects that would not provide sufficient irrigation or (where permitted) domestic grey water demand for use of stored stormwater runoff due to limited landscaping or extensive use of low water use plant palettes in landscaped areas;
2. Projects that are required to use recycled water for landscape irrigation;
3. Projects in which the harvest and use of stormwater runoff would conflict with local, state, or federal ordinances or building codes;
4. Locations where storage facilities may cause potential geotechnical hazards as outlined in the geotechnical report; or
5. Locations where storage facilities may cause health and safety concerns.

It may be technically infeasible for Bioretention (with underdrains) for the following situations:

1. Projects that have less than 0.3 in/hr infiltration rate and do not have sufficient land area to construct an above ground system;
2. Projects that have no potential connection to existing or proposed storm drain systems.

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation


R 07 W
R 06 W
R 05 W
R 04 W
R 03 W
R 02 W
R 01 W
R 01 E
R 02 E
R 03 E
R 04 E
R 05 E
T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S
0.85 MiraLoma
0.61 RiversideNorth
0.68 PigeonPass
0.54 RiversideSouth
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.68 PerrisReservoir
0.50 LakeMathews
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.60 Winchester
0.70 ElsinoreNWS
1.11 ElCariso Station
0.90 HurkeyCreek
Santa Ana River Watershed
Santa Margarita Watershed
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley
N
Rain Gage Locations
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
Isohyetal Map for the 85th Percentile 24 hour Storm Event
July 2011

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall ***only*** *be used in conjunction with BMP designs from the* ***LID BMP Design Handbook*** *)*

Company Name KWC Engineers — Date 8/1/2023

Designed by Andrew Burror — Case No

Company Project Number/Name 19.1994 Baker Industrial

BMP Identification

BMP NAME / ID DMA A

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E — D_{85}= 0.70 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Roofs	*207768*	*Roofs*	*1*	*0.89*	*185329.1*			
Concrete	*186269*	*Concrete or Asphalt*	*1*	*0.89*	*166151.9*			
Landscape	*58531*	*Ornamental Landscaping*	*0.1*	*0.11*	*6465.2*			
	452568	***Total***			**357946.2**	**0.70**	**20880.2**	**20,881**

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: KWC Engineers — Date: 8/1/2023

Designed by: Andrew Burror — Case No:

Company Project Number/Name: 19.1994 Baker Industrial

BMP Identification

BMP NAME / ID: DMA B

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.70 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Roofs	*356102*	*Roofs*	*1*	*0.89*	*317643*			
Concrete	*324568*	*Concrete or Asphalt*	*1*	*0.89*	*289514.7*			
Landscape	*124738*	*Ornamental Landscaping*	*0.1*	*0.11*	*13778.3*			
	805408	*Total*			*620936*	*0.70*	*36221.3*	*36,222*

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name KWC Engineers   Date 8/1/2023
Designed by Andrew Burror   Case No
Company Project Number/Name 19.1994 Baker Industrial

BMP Identification

BMP NAME / ID DMA C

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth,
from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.70 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Roofs	*421203*	*Roofs*	*1*	*0.89*	*375713.1*			
Concrete	*465993*	*Concrete or Asphalt*	*1*	*0.89*	*415665.8*			
Landscape	*107278*	*Ornamental Landscaping*	*0.1*	*0.11*	*11849.7*			
	994474	***Total***			**803228.6**	**0.70**	***46855***	***55,041***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: KWC Engineers — Date: 11/3/2023

Designed by: Peter Said — Case No:

Company Project Number/Name: 19.1994 Baker Industrial

BMP Identification

BMP NAME / ID: DMA D

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
Concrete	*173576*	*Concrete or Asphalt*	*1*	*0.89*	*154829.8*			
Landscape	*86064*	*Ornamental Landscaping*	*0.1*	*0.11046*	*9506.5*			
	259640		*Total*		*164336.3*	*0.20*	*0.8*	*1.1*

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name KWC Engineers | Date 12/10/2024

Designed by Peter Said | Case No

Company Project Number/Name 19.1994 Baker Industrial

BMP Identification

BMP NAME / ID DMA E

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

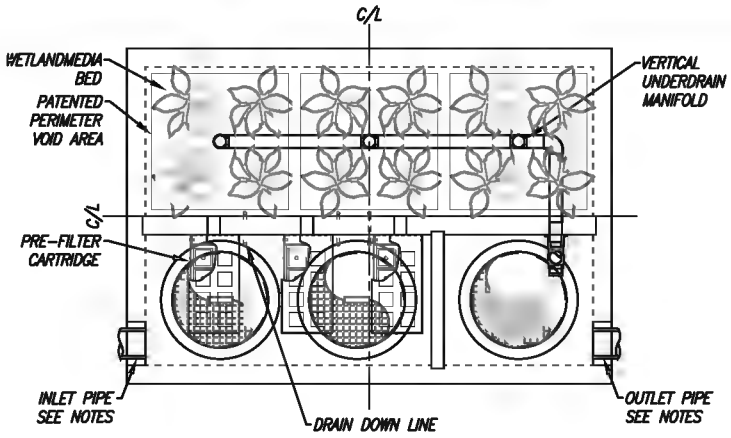
Insert additional rows if needed to accommodate all DMAs draining to the BMP

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imprivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*Concrete*	*55815*	*Concrete or Asphalt*	*1*	*0.89*	*49787*			
	Landscape	*28861*	*Ornamental Landscaping*	*0.1*	*0.11046*	*3187.9*			
		84676	***Total***			**52974.9**	**0.20**	***0.2***	***0.2***

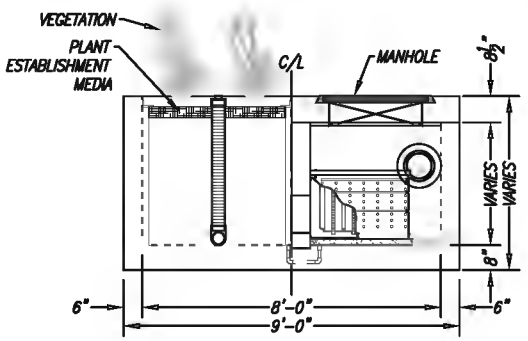
Notes:

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
FLOW BASED (CFS)			
0.346			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



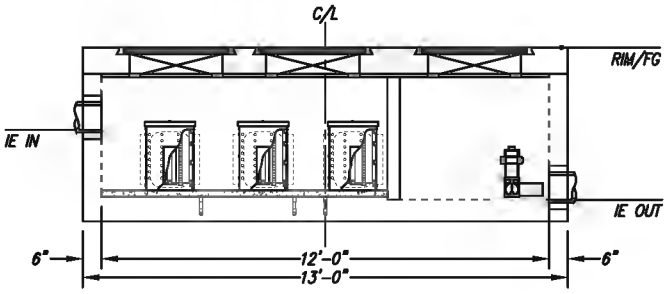
LEFT END VIEW

INSTALLATION NOTES

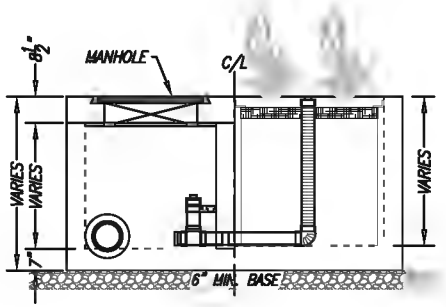
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS' SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
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GENERAL NOTES

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ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.346
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

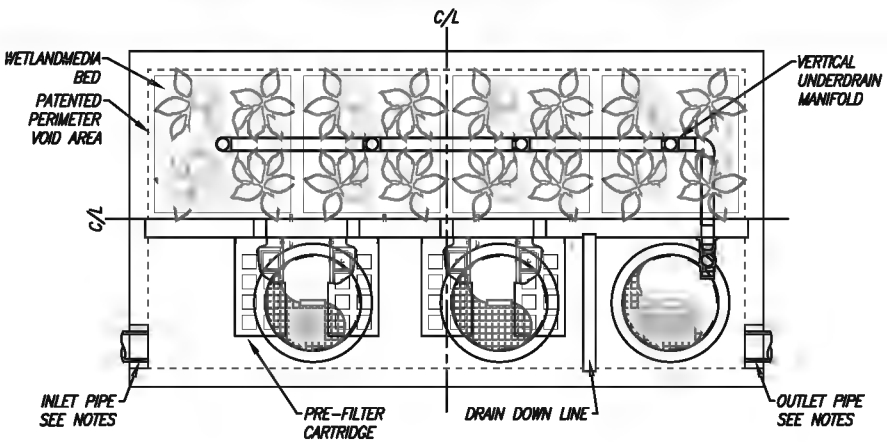
MODULAR WETLANDS
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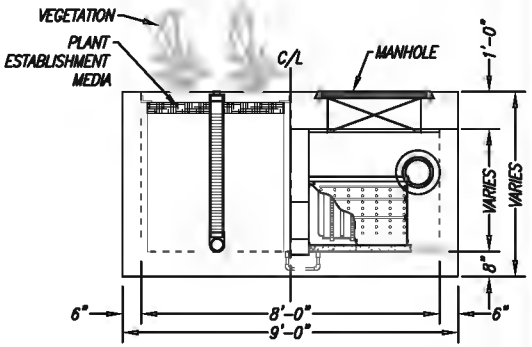
MWS-L-8-12-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)			
20151			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



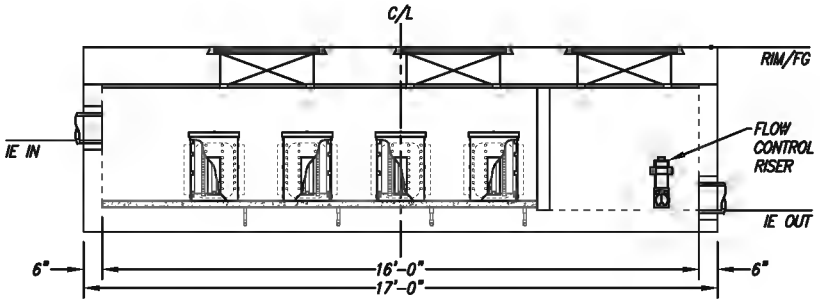
LEFT END VIEW

INSTALLATION NOTES

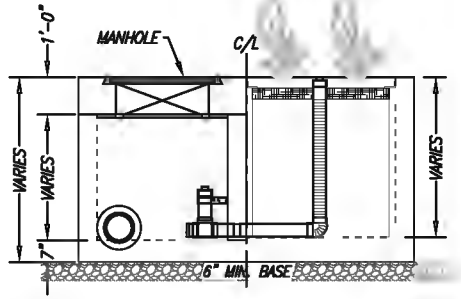
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ELEVATION VIEW



RIGHT END VIEW

REQUIRED TREATMENT VOLUME (CF)	20151
DRAINDOWN DURATION (HOURS)	48
AVERAGE DISCHARGE RATE PER MWS UNIT(GPM)	26.17
OPERATING HEAD (FT)	3.4
WETLANDMEDIA INFILTRATION RATE (IN/HR) OR	26
WETLANDMEDIA LOADING RATE (GPM/SF)	0.26

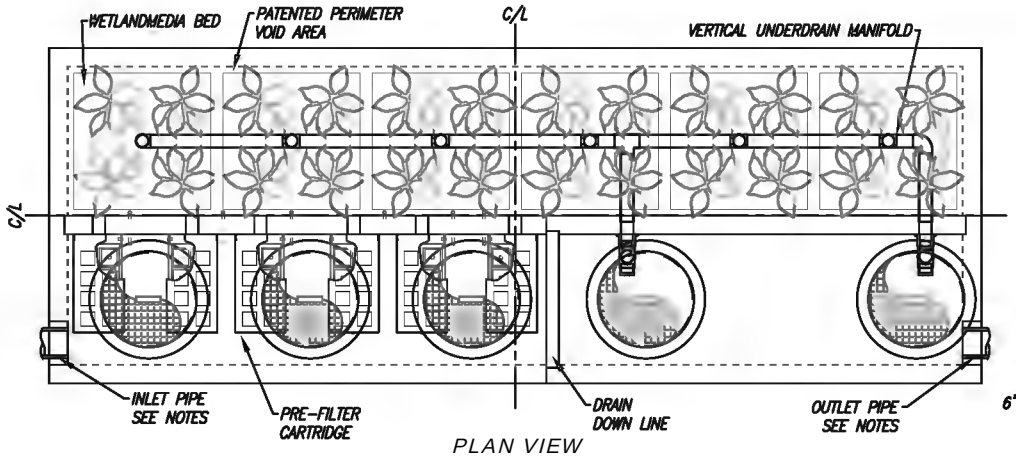
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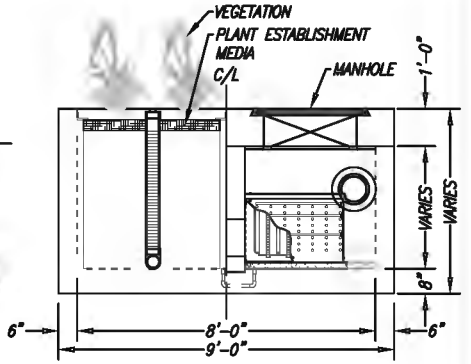
MWS-L-8-16-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)			
30227			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



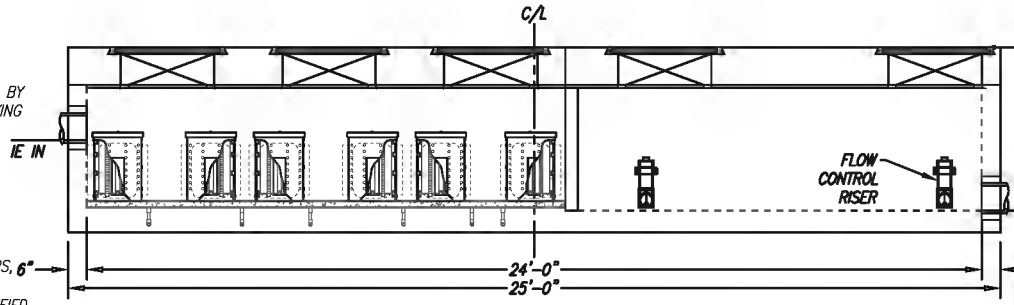
LEFT END VIEW

INSTALLATION NOTES

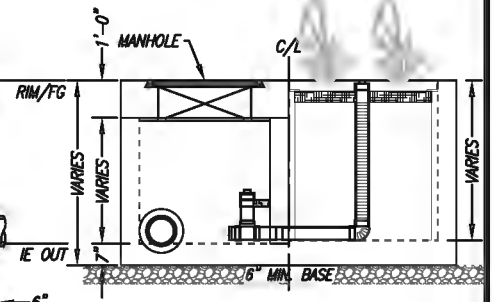
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ELEVATION VIEW



RIGHT END VIEW

REQUIRED TREATMENT VOLUME (CF)	30227
DRAINDOWN DURATION (HOURS)	48
AVERAGE DISCHARGE RATE PER MWS UNIT(GPM)	26.17
OPERATING HEAD (FT)	3.4
WETLANDMEDIA INFILTRATION RATE (IN/HR) OR	26
WETLANDMEDIA LOADING RATE (GPM/SF)	0.26

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MWS-L-8-24-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

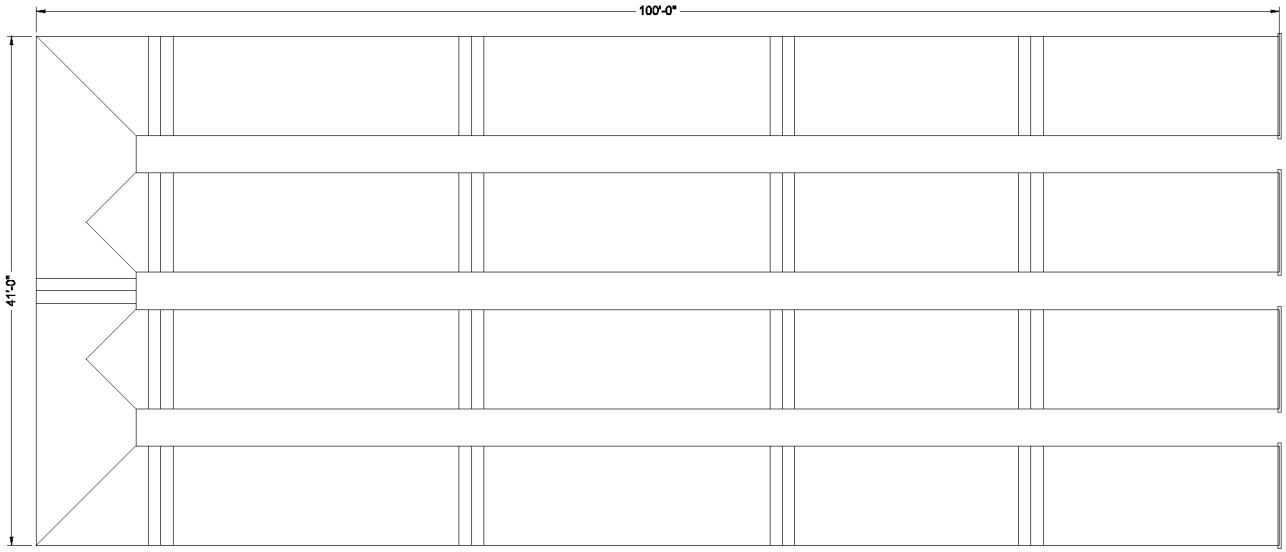
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 409 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 20,406 CF
- PIPE STORAGE VOLUME = 20,559 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 20,559 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
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ASSEMBLY
SCALE: 1" = 10'

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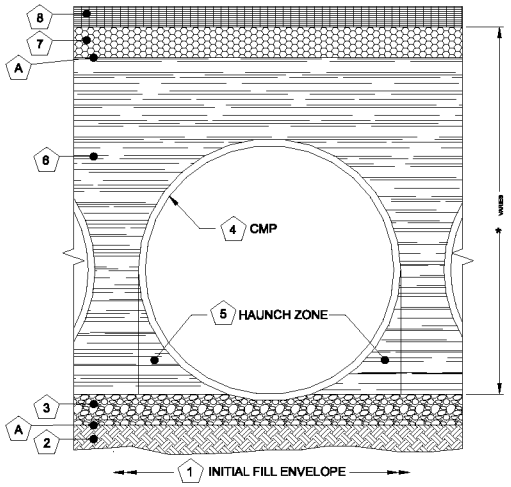
DATE	REVISION DESCRIPTION	BY

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800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO40769 778664 - Baker Industrial
DMA A
Lake Elsinore, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
27913	40769	11/8/2023
DESIGNED:		DRAWN:
DYO		DYO
CHECKED:		APPROVED:
DYO		DYO
SHEET NO.:		
1		



DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE				
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding Info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

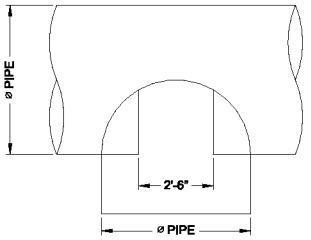
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

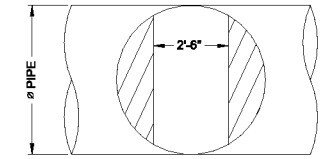
BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



PLAN

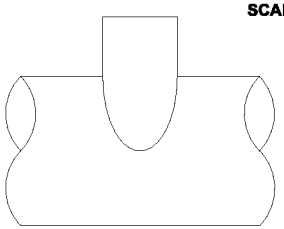


FRONT

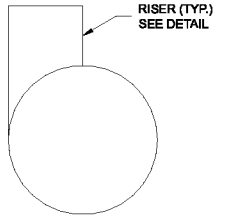
TYPICAL MANWAY DETAIL

SCALE: N.T.S.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



ELEVATION

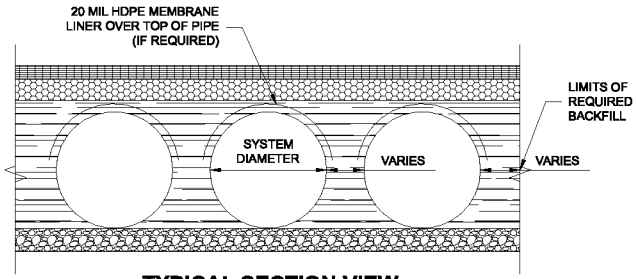


END

TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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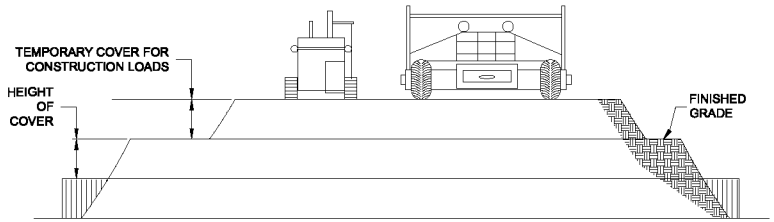
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO40769 778664 - Baker Industrial
DMA A
Lake Elsinore, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
27913	40769	11/9/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
128-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

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PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

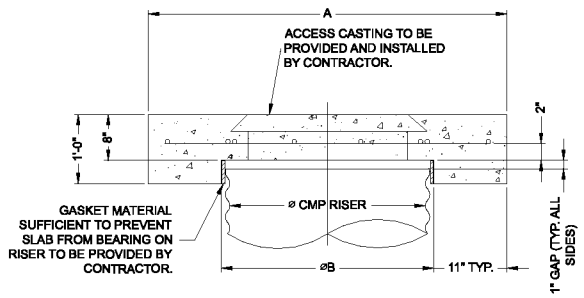
APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-796 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

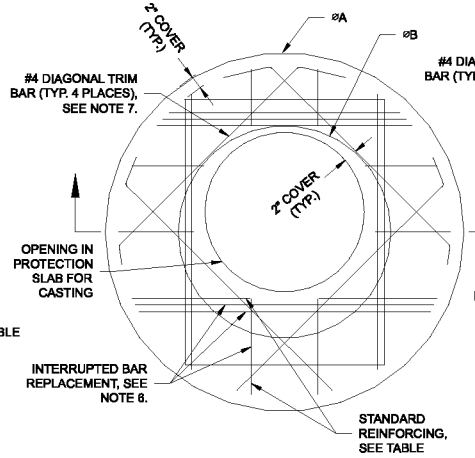
IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.



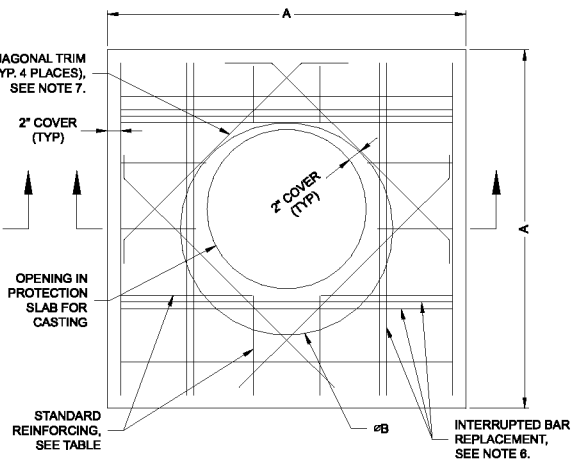
SECTION VIEW

REINFORCING TABLE				
ø CMP RISER	A	ø B	REINFORCING	**BEARING PRESSURE (PSF)
24"	ø 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	ø 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	ø 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	ø 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
46"	ø 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO40769 778664 - Baker Industrial
DMA A
Lake Elsinore, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
27913	40769	11/9/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

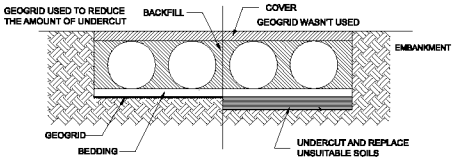
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

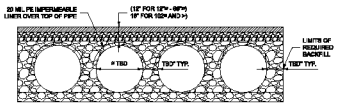


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

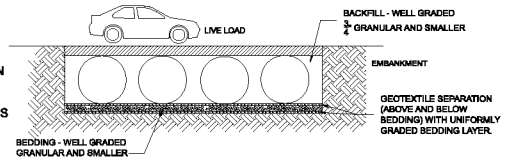
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

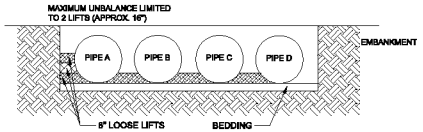
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



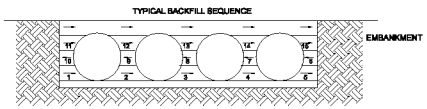
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

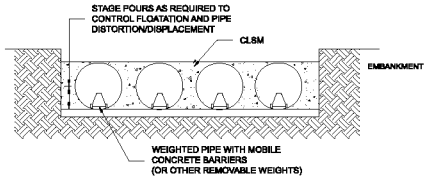


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

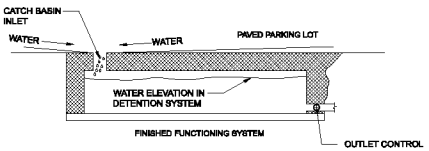


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO40769 778664 - Baker Industrial
DMA A
Lake Elsinore, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
27913	40769	11/9/2023
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

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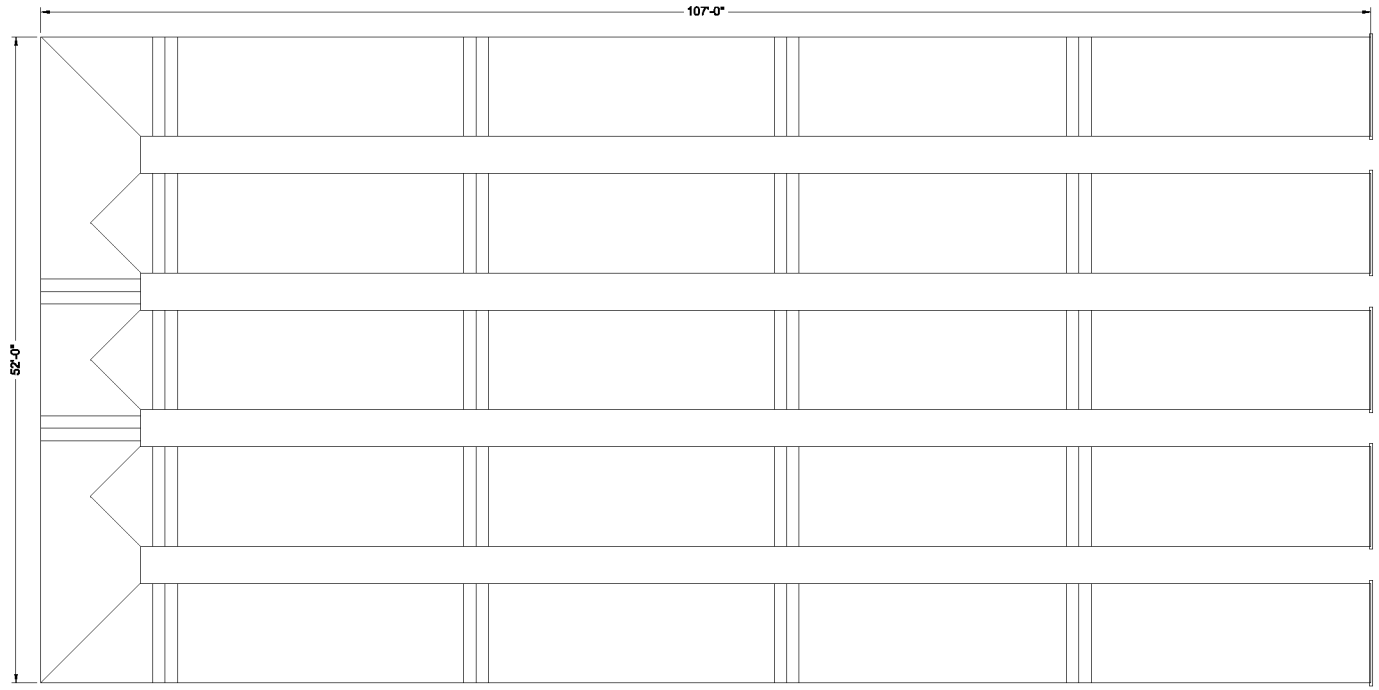
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 547 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 27,395 CF
- PIPE STORAGE VOLUME = 27,495 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 27,495 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 10'

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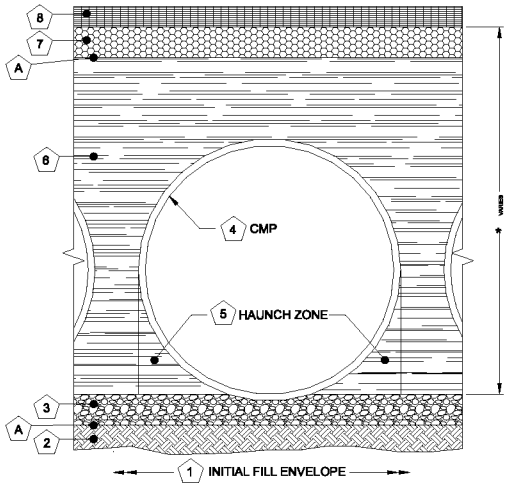
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO40770 778664 - Baker Industrial
DMA B
Lake Elsinore, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
27913	40770	11/8/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE				
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding Info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

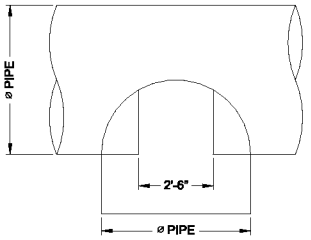
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

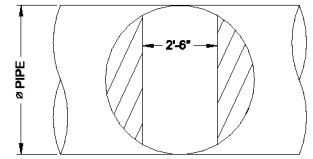
BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



PLAN

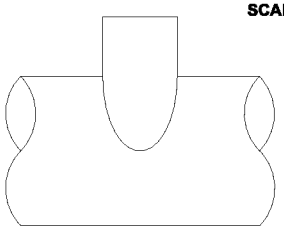


FRONT

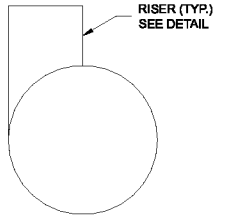
TYPICAL MANWAY DETAIL

SCALE: N.T.S.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



ELEVATION

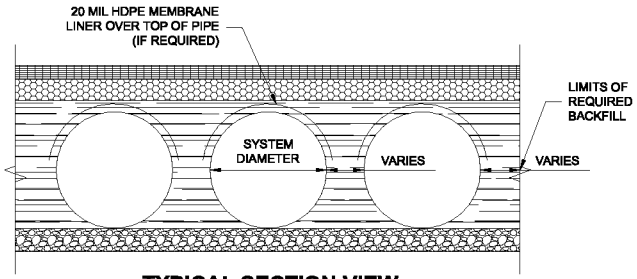


END

TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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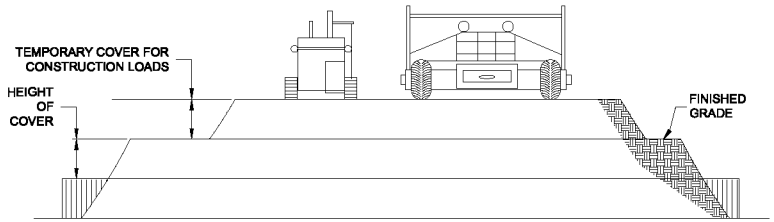
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO40770 778664 - Baker Industrial
DMA B
Lake Elsinore, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
27913	40770	11/9/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
128-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

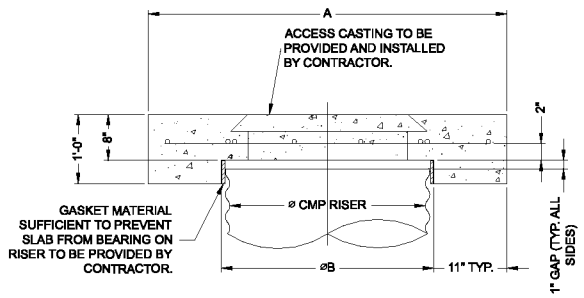
APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-796 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

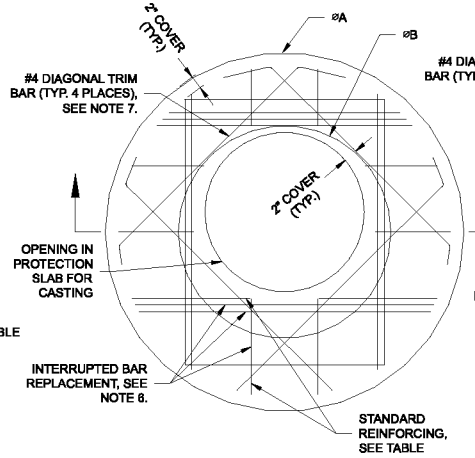
IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.



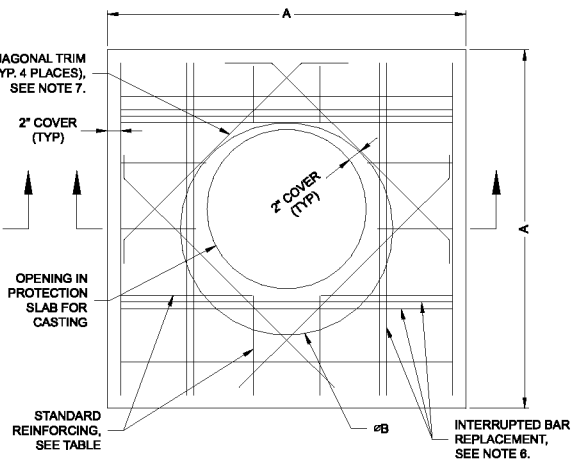
SECTION VIEW

REINFORCING TABLE				
ø CMP RISER	A	ø B	REINFORCING	**BEARING PRESSURE (PSF)
24"	ø 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	ø 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	ø 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	ø 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
46"	ø 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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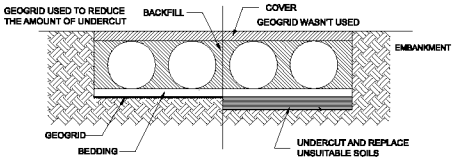
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

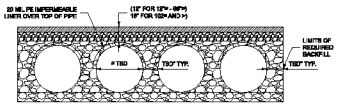


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

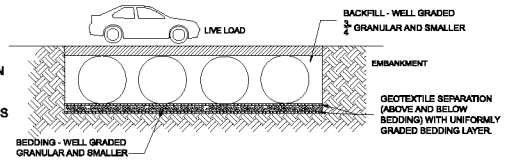
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

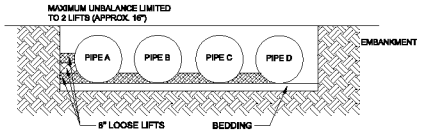
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



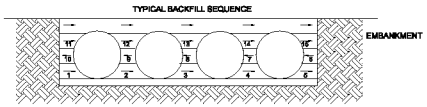
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

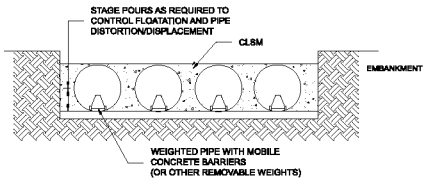


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

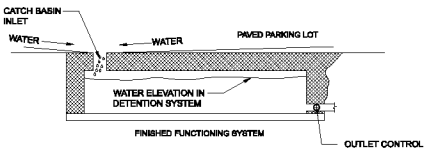


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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DETENTION SYSTEM

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SHEET NO.: 1		

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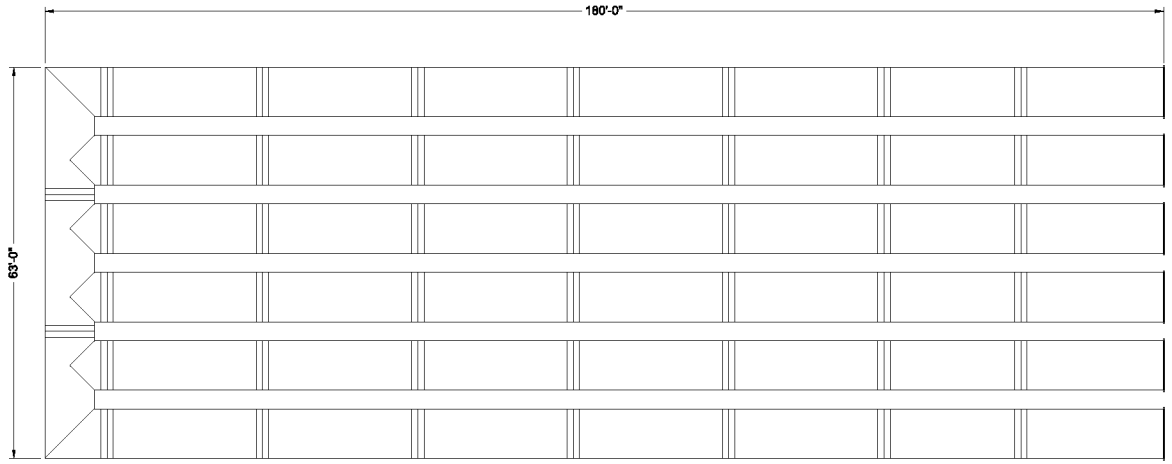
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 1,095 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 54,649 CF
- PIPE STORAGE VOLUME = 55,041 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 55,041 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 20'

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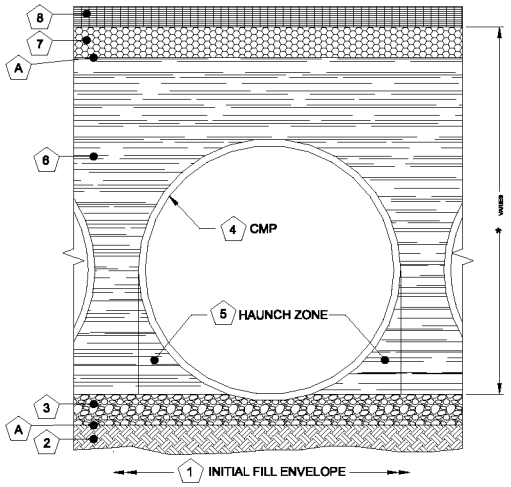
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO40772 778664 - Baker Industrial
DMA C
Lake Elsinore, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
27913	40772	11/9/2023
DESIGNED:		DRAWN:
DYO		DYO
CHECKED:		APPROVED:
DYO		DYO
SHEET NO.:		
1		



	DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE			
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding Info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

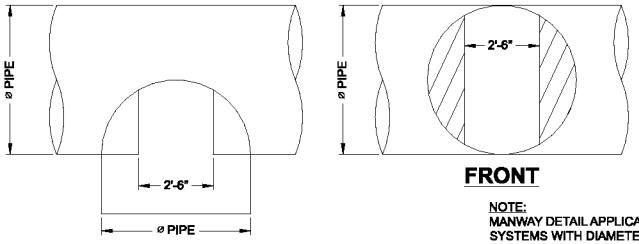
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

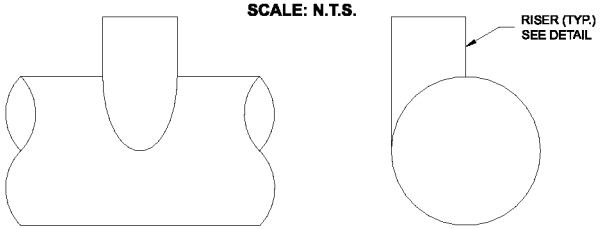
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



TYPICAL MANWAY DETAIL

SCALE: N.T.S.

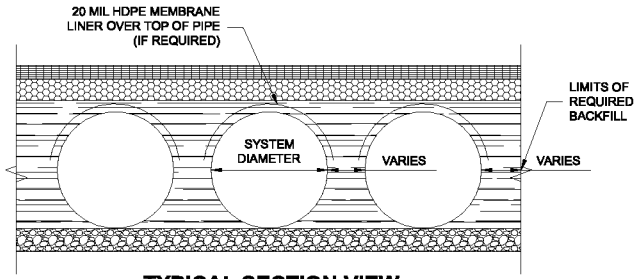
NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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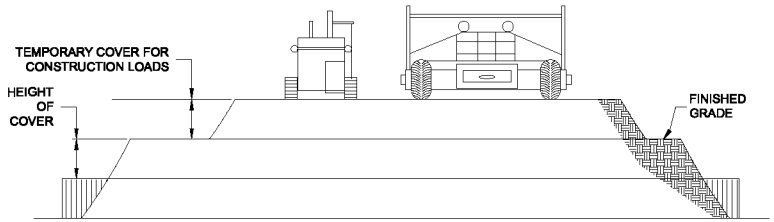
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CONTECH CMP DETENTION SYSTEMS
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DYO40772 778664 - Baker Industrial
DMA C
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DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
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SHEET NO.: 1		

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CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
128-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

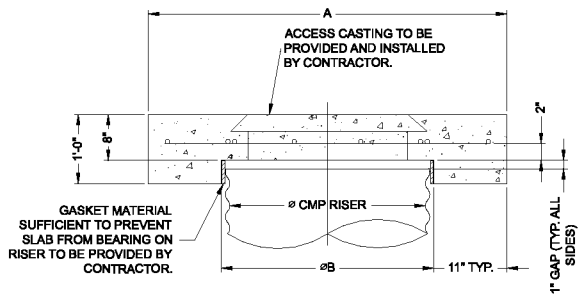
APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-796 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

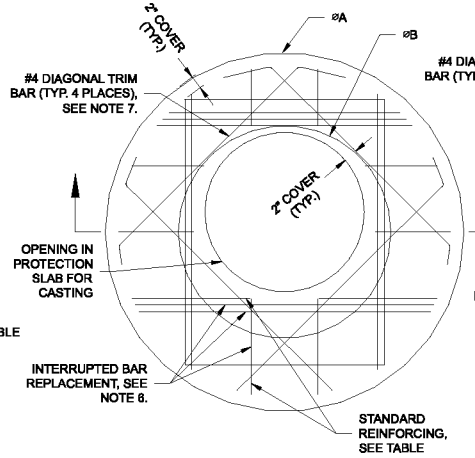
IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.



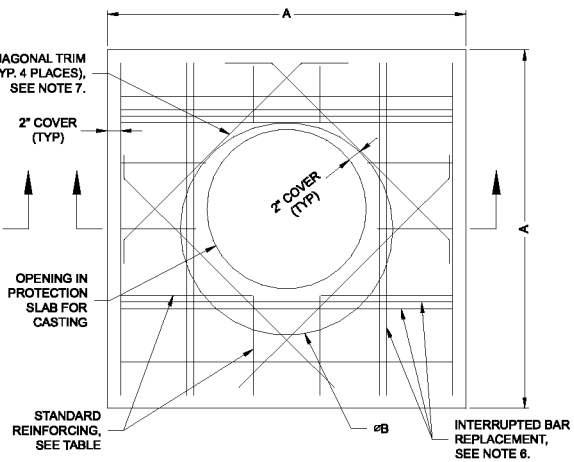
SECTION VIEW

REINFORCING TABLE				
ø CMP RISER	A	ø B	REINFORCING	**BEARING PRESSURE (PSF)
24"	ø 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	ø 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	ø 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	ø 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
46"	ø 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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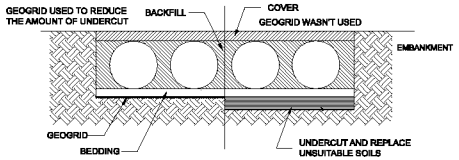
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

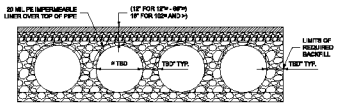


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

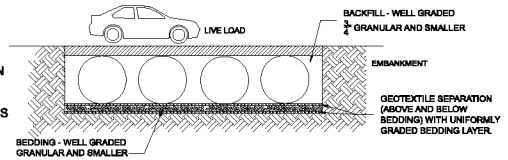
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

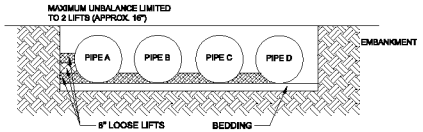
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



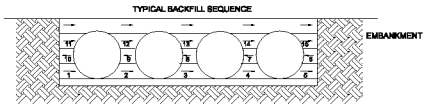
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

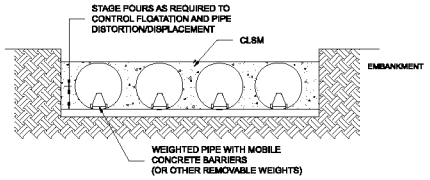


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

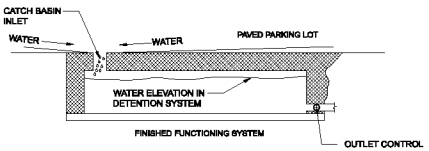


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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DATE	REVISION DESCRIPTION	BY

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO40772 778664 - Baker Industrial
DMA C
Lake Elsinore, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
27913	40772	11/9/2023
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

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Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	**... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE**		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
❑ **A.** On-site storm drain inlets	❑ Locations of inlets.	❑ Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	❑ Maintain and periodically repaint or replace inlet markings. ❑ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ❑ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ❑ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
❑ **B.** Interior floor drains and elevator shaft sump pumps		❑ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	❑ Inspect and maintain drains to prevent blockages and overflow.
❑ **C.** Interior parking garages		❑ State that parking garage floor drains will be plumbed to the sanitary sewer.	❑ Inspect and maintain drains to prevent blockages and overflow.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **D1.** Need for future indoor & structural pest control		❑ Note building design features that discourage entry of pests.	❑ Provide Integrated Pest Management information to owners, lessees, and operators.
❑ **D2.** Landscape/ Outdoor Pesticide Use	❑ Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ❑ Show self-retaining landscape areas, if any. ❑ Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)	State that final landscape plans will accomplish all of the following. ❑ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ❑ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ❑ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ❑ Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	❑ Maintain landscaping using minimum or no pesticides. ❑ See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater/Error! Hyperlink reference not valid. ❑ Provide IPM information to new owners, lessees and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **E.** Pools, spas, ponds, decorative fountains, and other water features.	❑ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)	If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	❑ See applicable operational BMPs in "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
❑ **F.** Food service	❑ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ❑ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	❑ Describe the location and features of the designated cleaning area. ❑ Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	❑ See the brochure, "The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ Provide this brochure to new site owners, lessees, and operators.
❑ **G.** Refuse areas	❑ Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. ❑ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area. ❑ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	❑ State how site refuse will be handled and provide supporting detail to what is shown on plans. ❑ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	❑ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

STORMWATER POLLUT ANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **H.** Industrial processes.	❑ Show process area.	❑ If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	❑ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

STORMWATER POLLUT ANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release (CalARP) ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank www.cchealth.org/groups/hazmat/	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
❑ **J.** Vehicle and Equipment Cleaning	❑ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	❑ If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑ Car dealerships and similar may rinse cars with water only.

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❑ **K.** Vehicle/Equipment Repair and Maintenance	❑ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. ❑ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ❑ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	❑ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ❑ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ❑ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the Stormwater Control Plan, note that all of the following restrictions apply to use the site: ❑ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ❑ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ❑ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment. Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

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1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **L.** Fuel Dispensing Areas	❑ Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable. ❑ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.		❑ The property owner shall dry sweep the fueling area routinely. ❑ See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

[6] The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

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❑ **M.** Loading Docks	❑ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer. ❑ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ❑ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		❑ Move loaded and unloaded items indoors as soon as possible. ❑ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

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❑ **N.** Fire Sprinkler Test Water		❑ Provide a means to drain fire sprinkler test water to the sanitary sewer.	❑ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
O. Miscellaneous Drain or Wash Water or Other Sources ❑ Boiler drain lines ❑ Condensate drain lines ❑ Rooftop equipment ❑ Drainage sumps ❑ Roofing, gutters, and trim. ❑ Other sources		❑ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ❑ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ❑ Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ❑ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. ❑ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. Include controls for other sources as specified by local reviewer.	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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❑ **P.** Plazas, sidewalks, and parking lots.			❑ Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

BAKER INDUSTRIAL
WQMP MAINTENANCE AGREEMENT
EXHIBIT

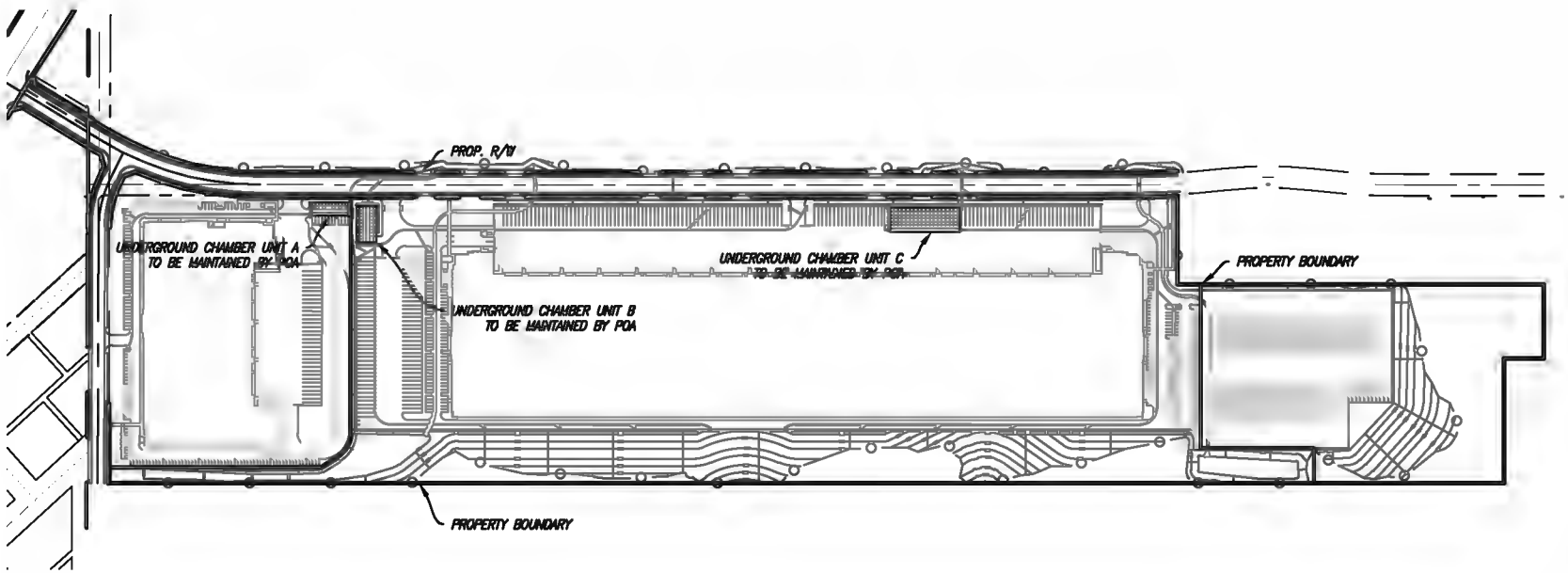


EXHIBIT
BAKER INDUSTRIAL
WQMP TREATMENT BMP LOCATION MAP

PREPARED BY:

KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1500 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

SHEET
1 OF 1

List of Onsite Activity Restrictions

1. Prohibit discharges of fertilizer, pesticides, or animal wastes to streets or storm drains.

2. Prohibit blowing or sweeping of debris (leaf litter, grass clippings, litter, etc.) into streets or storm drains.

3. Prohibit connections of pool/spa drains to streets or storm drains.

4. Requirement to keep dumpster lids closed at all times.

5. Requirement to keep trash receptacles covered or sheltered by a roof overhang or canopy.

6. Prohibit discharges of paint or masonry wastes to streets or storm drains.

7. Prohibit the washing kitchen wastes or kitchen equipment (restaurant, fast food, grocery store deli, bakery, etc.) to stormwater drainage features.

8. Prohibit vehicle washing, maintenance, or repair on the premises or restrict those activities to designated areas.

(LIST OF BMP MAINTENANCE ITEMS)
(To Be Completed by the Project Engineer)

BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
StormFilter Pretreatment Unit	Property Owner	Maintenance should be done during dry weather conditions A person can open the manhole on the StormFilter and inspect the vault to determine the need for maintenance. If needed remove sediment and replace cartridge.	Before storm season, (July), or after rain event.
MWS Unit	Property Owner	Maintenance should be done during dry weather conditions when no flow is entering the system. A person can open the manhole on the StormFilter and inspect the vault to determine the need for maintenance. If needed remove sediment and replace cartridge.	Before storm season, (July), or after rain event.
CMP Underground Infiltration System	Property Owner	Maintenance should be done during dry weather conditions when no flow is entering the system. A person can open the manhole on the StormFilter and inspect the vault to determine the need for maintenance. If needed remove sediment and replace cartridge.	Before storm season, (July), or after rain event.
N1 - Education	Property Owner	The Owner shall utilize the Stormwater and Water Quality BMP educational materials contained in this report for training programs.	Before storm season (July)
N2 – Activity Restriction	Property Owner	Owner shall prescribe activity restrictions to protect surface water quality.	Upon occupancy and annually thereafter (July)
N3 – Landscape Management	Property Owner	Maintain landscape weekly or as needed to comply with local City Ordinances	Weekly
N4 – BMP Maintenance	Property Owner	Inspect site and review records to make sure non-structural and structural BMPs are properly maintained as schedule. Provide records to City if requested	Monthly, after rain event
N7 – Spill Contingency	Property Owner	Owner shall prepare occupancy specific plan regarding the storage of cleanup materials, notification of responsible agencies, disposal of cleanup materials, documentation etc.	Monthly
N10 – Uniform Fire Code Implementation	Property Owner	Owner shall comply with Article 80 of the Uniform Fire Code	Monthly
N11 - Litter/Debris Control Program	Property Owner	Owner shall contract with landscaping maintenance firm to regularly empty trash receptacles, collect litter, and report tenant disposal violations. Owner shall be responsible for trash and litter control in the common areas of the facilities.	Weekly
N12 - Employee Training	Property Owner	Owner shall prepare or include a provision for an education program/manual for employees regarding the storage of hazardous materials and	Upon initial employment

		implementation of spill contingency plans.	
N14 - Catch Basin Inspection Program	Property Owner	Owner shall inspect, clean, and maintain drainage facilities prior to start of the rainy season.	Before rainy season (July), after rain event
N15 - Vacuum Sweep Private Streets and Parking Lots	Property Owner	Dictated by waste accumulation, or as needed to comply with local ordinances.	Before rainy season (July) to limit pollution during storm event
N17 - Comply with all other applicable NPDES permits	Property Owner	Permittees shall comply with all other NPDES permits to include BMPs that are required as part of a SWPPP.	Monthly
FloGard Catch Basin Filter Inserts	Property Owner	The owner shall perform visual inspections of the Catch Basin and Filter Inserts to remove miscellaneous landscape, Debris, and Trash from inside the baskets. Filter medium shall be replaced once per year per manufacturer's recommendation or more frequently if warranted.	Before storm season (July), after rain event

BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
S1 - Provide Storm Drain System Stenciling and Signage	Property Owner	Owner to maintain legibility of stencil and signs.	Should be inspected annually before rainy season (July) and be repainted/replaced as necessary.
S3 - Trash Enclosures to Reduce Pollutant	Property Owner	Property owner to maintain trash enclosure to prevent run-on and exposure to direct precipitation.	Trash Enclosures shall be inspected and cleaned weekly. Dumpster pick up shall be scheduled weekly at minimum
S4 – Use Efficient Irrigation Systems and Landscape Design	Property Owner	Property owner shall maintain and audit irrigation system and landscaping in accordance with CASQA BMP Handbook SD-12.	Weekly
S6 – Slope and Channel Protection	Property Owner	Property owner shall maintain/protect slopes and channels in accordance with CASQA BMP Handbook SD-10.	Before storm season (July), after rain event
S14 - Wash Water Control for Food Preparation Areas	Property Owner	Property owner shall provide signage where applicable stating the prohibition of discharging wash water to storm drain system.	Should be inspected annually before rainy season (July) and be repainted/replaced as necessary.

Weekly WQMP Inspection Record

Performed by: _____ Date: _____

BMP	Activity	Yes	No
Trash & Debris	Are Common Areas clean of trash & debris?		
	Are the trash receptacles clean of trash and debris?		
	Does the perimeter of the site been clear of trash & debris?		
Drainage Facilities	Are there any signs of illegal discharges or dumping down any drainage facilities?		

Quarterly WQMP Inspection Record

Performed by: _____ Date: _____

BMP	Activity	Yes	No
MS4 Signage	Does the Catch Basin label need replacing?		
Drainage Facilities	Does the Catch Basin need cleaning of debris?		
	Do any drainage facilities need repair?		
Trash & Debris	Do any trash receptacles need repair?		
	Have the trash bins been picked up on a regular basis?		
	Does the trash enclosure need cleaning?		

RECORD OF BMP IMPLEMENTATION, MAINTENANCE, AND INSPECTION

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

10 Ways to Save Water Outdoors



bewaterwise.com

TIP #1 The average homeowner uses twice the amount of water needed to keep plants healthy. Use the watering calculator and index at **bewaterwise.com** to know exactly how much water your plants need.

TIP #2 Check your sprinkler system for leaks, overspray and broken sprinkler heads. Update with drip or other more water-efficient sprinklers where appropriate.

TIP #3 This fall, plant a portion of your garden with beautiful native and California Friendly plants. Browse the plant database at **bewaterwise.com** to find just the right look for your outdoor spaces.

TIP #4 Reduce the amount of water-thirsty grass. Keep only what you need and replace the rest with less-thirsty plants or permeable paving.

TIP #5 For the grass you keep, set your lawnmower blade higher.

TIP #6 Adjust your sprinkler timer downward in September. Plants need less water when days are shorter.

TIP #7 Use a broom instead of the hose for cleaning sidewalks and patios.

TIP #8 Mulch! A layer of bark, gravel, compost, sawdust or low-growing groundcover evens out soil temperature and allows better water retention.

TIP #9 Check the list of invasive plants that hurt our environment at **caleppc.org** and remove any from your garden.

TIP #10 Share these tips with your gardener, neighbors and friends. Water conservation should be a part of every Southern Californian's lifestyle, but that doesn't mean we can't have lush and beautiful outdoor spaces.

bewaterwise.com

Stormwater and the Construction Industry

Protect Natural Features



Bad

Good

- Minimize clearing.
- Minimize the amount of exposed soil.
- Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity.
- Protect streams, stream buffers, wild woodlands, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas.

Construction Phasing



- Sequence construction activities so that the soil is not exposed for long periods of time.
- Schedule or limit grading to small areas.
- Install key sediment control practices before site grading begins.
- Schedule site stabilization activities, such as landscaping, to be completed immediately after the land has been graded to its final contour.

Vegetative Buffers



Bad

Good

- Protect and install vegetative buffers along waterbodies to slow and filter stormwater runoff.
- Maintain buffers by mowing or replanting periodically to ensure their effectiveness.

Silt Fencing



Bad

Good

- Inspect and maintain silt fences after each rainstorm.
- Make sure the bottom of the silt fence is buried in the ground.
- Securely attach the material to the stakes.
- Don't place silt fences in the middle of a waterway or use them as a check dam.
- Make sure stormwater is not flowing around the silt fence.

Maintain your BMPs!

IN RIVERSIDE COUNTY ....Call 1-800-506-2555

TO REPORT ILLEGAL STORMDRAIN DISPOSAL

E-mail: Flood.fcnpdes@co.riverside.ca.us

Visit our website: www.floodcontrol.co.riverside.ca.us

Brought to you by the Storm Water/Clean Water Pollution Protection Program.....

REMEMBER, ONLY RAIN IN THE STORMDRAIN!

Site Stabilization



Bad

Good

- Vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed.

Construction Entrances



Bad

Good

- Remove mud and dirt from the tires of construction vehicles before they enter a paved roadway.
- Properly size entrance BMPs for all anticipated vehicles.
- Make sure that the construction entrance does not become buried in soil.

Slopes



Bad

Good

- Rough grade or terrace slopes.
- Break up long slopes with sediment barriers, or under drain, or divert stormwater away from slopes.

Dirt Stockpiles



Bad

Good

- Cover or seed all dirt stockpiles.

Storm Drain Inlet Protection



Bad

Good

- Use rock or other appropriate material to cover the storm drain inlet to filter out trash and debris.
- Make sure the rock size is appropriate (usually 1 to 2 inches in diameter).
- If you use inlet filters, maintain them regularly.

www.epa.gov/npdes/menuofbmps

Stormwater and the Construction Industry

Planning and Implementing Erosion and Sediment Control Practices

The construction industry is a critical participant in the nation's efforts to protect streams, rivers, lakes, wetlands, and oceans. Through the use of best management practices (BMPs), construction site operators are the key defense against erosion and sedimentation.

As stormwater flows over a construction site, it picks up pollutants like sediment, debris, and chemicals. High volumes of stormwater can also cause stream bank erosion, and destroy downstream aquatic habitat. Preventing soil erosion and sedimentation is an important responsibility at all construction sites.

In addition to the environmental impact, uncontrolled erosion can have a significant financial impact on a construction project. It costs money and time to repair gullies, replace vegetation, clean sediment-clogged storm drains, replace poorly installed BMPs, and mitigate damage to other people's property or to natural resources.

Best Management Practice (BMP)
A BMP is a method used to prevent or control stormwater runoff and the discharge of pollutants, including sediment, into local waterbodies. Silt fences, inlet protection, and site-stabilization techniques are typical BMPs on a construction site.

Operator
An operator is someone who has control over and the ability to modify construction plans and specifications (e.g. owner, general contractor)

or

Someone who has control over the day-to-day operations at a site (e.g., owner, general contractor) that are necessary to ensure compliance with the permit requirements. It is the responsibility of a construction site owner or operator to contain stormwater runoff and prevent erosion during **all** stages of a project.

There may be more than one person at a site who meets these definitions and must apply for permit coverage. (States may have different definitions of the term "operator.")

So what's being done about polluted runoff?

The Clean Water Act includes the National Pollutant Discharge Elimination System (NPDES) permitting program. As of January 2003, 44 states and territories are authorized to issue NPDES stormwater permits. If your state isn't authorized to operate the NPDES stormwater permit program, EPA issues the permits. Permits vary from state to state, so contact your state or EPA for specific information. Your permitting authority has specific information on your state's NPDES stormwater permit program. In general, construction permits require construction operators to do all of the following:

- Develop and implement a stormwater pollution prevention plan
- Submit a permit application or notice of intent (NOI)
- Comply with the permit, including maintaining BMPs and inspecting the site

Under the NPDES program, construction activities that disturb 1 or more acres are required to obtain stormwater permit coverage. States have different names for the plans that construction operators must develop, such as

- Stormwater pollution prevention plan
- Erosion and sediment control plan
- Erosion control and stormwater management plan
- Stormwater management plan
- Water pollution control plan
- Pollution prevention plan

This document uses the term "*Plan*."

I think I need a permit... Where do I start?

All land-disturbing activities, including clearing, grading, and excavation, that disturb **1 or more acres** are required to be covered under a state or EPA-issued NPDES construction stormwater permit **prior to land disturbance**. Permit requirements vary by state. Begin by researching the specific requirements in your state. You might already be subject to local erosion and sediment control requirements, but that doesn't release you from the requirements of the NPDES program at the state or EPA level. Although you must comply with both sets of requirements, in most cases they have been designed to be complementary. Contact your permitting authority to find out exactly what you need to do. A good place to start your search is the Construction Industry Compliance Assistance web site at http://www.envcap.org/cica.

The NPDES permit requirements include small construction activities that are part of a larger common plan of development or sale, such as a single lot within a larger subdivision. For developments with multiple operators, all operators must have permit coverage for their individual parts of the larger development, no matter how large or small each operation happens to be. When there are multiple operators at one site, they're encouraged to develop and share one comprehensive Plan and obtain permit coverage as co-permitees.

The **owner or operator** of the construction site is responsible for complying with the requirements of the permit. Responsibilities include developing a Plan, obtaining permit coverage, implementing BMPs, and stabilizing the site at the end of the construction activity.

Construction sites that discharge unpermitted stormwater are in violation of the Clean Water Act and may be subject to fines of up to $27,500 a day per violation.

Determine your eligibility

All construction activity that disturbs 1 or more acres of land, as well as activity that disturbs less than 1 acre but is part of a larger common plan of development, must obtain permit coverage.

Read and understand your stormwater permit requirements

Get a copy of the permit for construction activities and a permit application (or notice of intent form) from your state or EPA permitting authority.

Develop a Plan

Most states do not require you to submit your Plan. However, you do need to keep the Plan on site. If that's impractical, you may post a notice that tells where the Plan is kept so it can be accessed by the permitting authority and other interested parties.

You'll need to post a copy of your completed application on site. Put it in a place where the public can see it so they'll know your site is covered by an NPDES permit!

Apply for permit coverage

Once you understand your permit requirements and have developed a Plan, you can submit a stormwater permit application (or notice of intent) to your permitting authority. This must be done before beginning any land disturbance on the site. Some states require a few days of lead time, so check with your permitting authority. Once you've submitted the application, you must satisfy the conditions of the permit.

Implement the Plan

Be prepared to implement the BMPs in your Plan before construction begins. Ensure that BMPs are properly maintained, and upgrade and repair them as necessary.

Developing and Implementing a Plan

You must have a Plan that includes erosion and sediment control and pollution prevention BMPs. These Plans require

- Advance planning and training to ensure proper implementation of the BMPs
- Erosion and sediment control BMPs in place until the area is permanently stabilized
- Pollution prevention BMPs to keep the construction site "clean"
- Regular inspection of the construction site to ensure proper installation and maintenance of BMPs

Fortunately, the practices and measures that must be included in your Plan are already part of the standard operating procedures at many construction sites.

Six steps are associated with developing and implementing a stormwater Plan. There's a wealth of information available on developing pollution prevention plans. Please contact your permitting authority for help in finding additional guidance materials, or visit www.epa.gov/npdes/stormwater. A sample construction plan is available at www.epa.gov/npdes/pubs/sample_swppp.pdf.

1. Site Evaluation and Design Development

- **Collect site information**
- **Develop site plan design**
- **Prepare pollution prevention site map**

The first step in preparing a Plan is to define the characteristics of the site and the type of construction that will occur. This involves collecting site information, identifying natural features that should be protected, developing a site plan design, describing the nature of the construction activity, and preparing a pollution prevention site map.

2. Assessment

- **Measure the site area**
- **Determine the drainage areas**
- **Calculate the runoff coefficient**

The next step is assessing the impact the project will have on stormwater runoff. Determine the drainage areas and estimate the runoff amounts and velocities. For more information on calculating the runoff coefficient, go to www.epa.gov/npdes/pubs/chap02_conguide.pdf, page 11.

3. Control Selection and Plan Design

- **Review and incorporate state or local requirements**
- **Select erosion and sediment controls**
- **Select other controls**
- **Select stormwater management controls**
- **Indicate the location of controls on the site map**
- **Prepare an inspection and maintenance plan**
- **Coordinate controls with construction activity**
- **Prepare sequence of major activities**

In the third step you'll actually document your procedures to prevent and control polluted stormwater runoff. You must delineate areas that will not be disturbed, including critical natural areas like streamside areas, floodplains, and trees. You must also identify the measures (or BMPs) you'll use to protect these areas.

Phasing your project to minimize the amount of exposed soil at any given time is a highly effective way to prevent erosion. Erosion control measures designed to prevent soil from being mobilized include diversions to route stormwater away from exposed soils and stabilization with vegetation, mulch, and geotextiles. Sedimentation control measures designed to remove sediment from stormwater or prevent it from leaving the site include silt fences, sediment traps, and diversions.

You'll need to select erosion and sediment controls—including stabilization measures for protecting disturbed areas and structural controls for diverting runoff and removing sediment—that are appropriate for your particular site. The appropriateness of the control measures will depend on several factors, but will be influenced most directly by the site characteristics. Some stabilization measures you might consider are temporary seeding, permanent seeding, and mulching. Structural control measures include earth dikes, silt fences, and sediment traps. No single BMP will meet all of the erosion and sedimentation control needs of a construction site. A combination of BMPs is necessary. For more information on the types of BMPs appropriate for your construction site, see the BMP fact sheet series available at www.epa.gov/npdes/menuofbmps.

Soil erosion control tips...

- Design the site to infiltrate stormwater into the ground and to keep it out of storm drains. Eliminate or minimize the use of stormwater collection and conveyance systems while maximizing the use of stormwater infiltration and bioretention techniques.
- Minimize the amount of exposed soil on site.
  - To the extent possible, plan the project in stages to minimize the amount of area that is bare and subject to erosion. The less soil exposed, the easier and cheaper it will be to control erosion.
  - Vegetate disturbed areas with permanent or temporary seeding immediately upon reaching final grade.
  - Vegetate or cover stockpiles that will not be used immediately.
- Reduce the velocity of stormwater both onto and away from the project area.
  - Interceptors, diversions, vegetated buffers, and check dams are a few of the BMPs that can be used to slow down stormwater as it travels across and away from the project site.
  - Diversion measures can also be used to direct flow away from exposed areas toward stable portions of the site.
  - Silt fences and other types of perimeter filters should never be used to reduce the velocity of runoff.
- Protect defined channels immediately with measures adequate to handle the storm flows expected.
  - Sod, geotextile, natural fiber, riprap, or other stabilization measures should be used to allow the channels to carry water without causing erosion. Use softer measures like geotextile or vegetation where possible to prevent downstream impacts.
- Keep sediment on site.
  - Place aggregate or stone at construction site vehicle exits to accommodate at least two tire revolutions of large construction vehicles. Much of the dirt on the tires will fall off before the vehicle gets to the street.
  - Regular street sweeping at the construction entrance will prevent dirt from entering storm drains. Do not hose paved areas.
  - Sediment traps and basins are temporary structures and should be used in conjunction with other measures to reduce the amount of erosion.
- Maintaining all BMPs is critical to ensure their effectiveness during the life of the project.
  - Regularly remove collected sediment from silt fences, berms, traps, and other BMPs.
  - Ensure that geotextiles and mulch remain in place until vegetation is well established.
  - Maintain fences that protect sensitive areas, silt fences, diversion structures, and other BMPs.

Other BMPs and Activities to Control Polluted Runoff

You'll need to select other controls to address potential pollutant sources on your site. Construction materials, debris, trash, fuel, paint, and stockpiles become pollution sources when it rains. Basic pollution prevention practices can significantly reduce the amount of pollution leaving construction sites. The following are some simple practices that should be included in the Plan and implemented on site:

- Keep potential sources of pollution out of the rain as practicable (e.g., inside a building, covered with plastic or tarps, or sealed tightly in a leak-proof container).
- Clearly identify a protected, lined area for concrete truck washouts. This area should be located away from streams, storm drain inlets, or ditches and should be cleaned out periodically.
- Park, refuel, and maintain vehicles and equipment in one area of the site to minimize the area exposed to possible spills and fuel storage. This area should be well away from streams, storm drain inlets, or ditches. Keep spill kits close by and clean up any spills or leaks immediately, including spills on pavement or earthen surfaces.
- Practice good housekeeping. Keep the construction site free of litter, construction debris, and leaking containers. Keep all waste in one area to minimize cleaning.
- Never hose down paved surfaces to clean dust, debris, or trash. This water could wash directly into storm drains or streams. Sweep up materials and dispose of them in the trash. Never bury trash or debris!
- Dispose of hazardous materials properly.

4. Certification and Notification

- **Certify the Plan**
- **Submit permit application or notice of intent**

Once the Plan has been developed, an authorized representative must sign it. Now is the time to submit the permit application or notice of intent. Your permit might require that the Plan be kept on site, so be sure to keep it available for the staff implementing the Plan.

Erosion and sedimentation control practices are only as good as their installation and maintenance.

5. Implementing and Maintaining a Plan

- **Implement controls**
- **Inspect and maintain controls**
- **Update/change the Plan**
- **Report releases of hazardous materials**

A Plan describes the practices and activities you'll use to prevent stormwater contamination and meet the NPDES permit requirements. Make sure that the Plan is implemented and that the Plan is updated as necessary to reflect changes on the site.

Erosion and sedimentation control practices are only as good as their installation and maintenance. Train the contractors that will install the BMPs and inspect immediately to ensure that the BMPs have been installed correctly.

Regularly inspect the BMPs (especially before and after rain events) and perform any necessary repairs or maintenance immediately. Many BMPs are designed to handle a limited amount of sediment. If not maintained, they'll become ineffective and a source of sediment pollution.

It's also important to keep records of BMP installation, implementation, and maintenance. Keep track of major grading activities that occur on the site, when construction activities cease (temporarily or permanently), and when a site is temporarily or permanently stabilized.

If construction plans change at any time, or if more appropriate BMPs are chosen for the site, update the Plan accordingly.

6. Completing the Project: Final Stabilization and Termination of the Permit

- **Final stabilization**
- **Notice of Termination**
- **Record retention**

Many states and EPA require a Notice of Termination (NOT) or other notification signifying that the construction activity is completed. An NOT is required when

- Final stabilization has been achieved on all portions of the site for which the permittee is responsible.
- Another operator has assumed control over all areas of the site that have not been finally stabilized. That operator would need to submit a new permit application to the permitting authority.
- For residential construction only, temporary stabilization of a lot has been completed prior to transference of ownership to the homeowner, with the homeowner being made aware of the need to perform final stabilization.

Permittees must keep a copy of their permit application and their Plan for at least 3 years following final stabilization. This period may be longer depending on state and local requirements.

Preconstruction Checklist

- A site description, including
  - Nature of the activity
  - Intended sequence of major construction activities
  - Total area of the site
  - Existing soil type and rainfall runoff data
  - A site map with:
    - Drainage patterns
    - Approximate slopes after major grading
    - Area of soil disturbance
    - Outline of areas which will not be disturbed
    - Location of major structural and nonstructural soil erosion controls
    - Areas where stabilization practices are expected to occur
    - Surface waters
    - Stormwater discharge locations
  - Name of the receiving water(s)
- A description of controls:
  - Erosion and sediment controls, including
    - Stabilization practices for all areas disturbed by construction
    - Structural practices for all drainage/discharge locations
  - Stormwater management controls, including
    - Measures used to control pollutants occurring in stormwater discharges after construction activities are complete
    - Velocity dissipation devices to provide nonerosive flow conditions from the discharge point along the length of any outfall channel
  - Other controls, including
    - Waste disposal practices that prevent discharge of solid materials
    - Measures to minimize offset tracking of sediments by construction vehicles
    - Measures to ensure compliance with state or local waste disposal, sanitary sewer, or septic system regulations
  - Description of the timing during the construction when measures will be implemented
- State or local requirements incorporated into the Plan
- Inspection and maintenance procedures for control measures identified in the Plan
- Contractor certification and Plan certification

Implementation Checklist

- Maintain records of construction activities, including
  - Dates when major grading activities occur
  - Dates when construction activities temporarily cease on the site or a portion of the site
  - Dates when construction activities permanently cease on the site or a portion of the site
  - Dates when stabilization measures are completed on the site
- Prepare inspection reports summarizing
  - Name of person conducting BMP inspections
  - Qualifications of person conducting BMP inspections
  - BMPs/areas inspected
  - Observed conditions
  - Necessary changes to the Plan
- Report releases of reportable quantities of oil or hazardous materials
  - Notify the National Response Center at 800-424-8802 immediately
  - Report releases to your permitting authority immediately, or as specified in your permit. You must also provide a written report within 14 days.
  - Modify the Plan to include
    - The date of release
    - Circumstances leading to the release
    - Steps taken to prevent reoccurrence of the release
- Modify Plan as necessary
  - Incorporate requests of the permitting authority to bring the Plan into compliance
  - Address changes in design, construction operation, or maintenance that affect the potential for discharge of pollutants

An ounce of prevention is worth a pound of cure! It's far more efficient and cost-effective to prevent pollution than it is to try to correct problems later. Installing and maintaining simple BMPs and pollution prevention techniques on site can greatly reduce the potential for stormwater pollution and can also save you money!

Visit www.epa.gov/npdes/stormwater for more information.

EPA 833-B-03-001
April 2003

StormWater CleanWater PROTECTION PROGRAM

After the Storm

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

EPA 833-B-03-002

January 2003

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A Citizen's Guide to Understanding Stormwater

Stormwater Pollution Solutions



Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential



Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Auto care



Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Lawn care



Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Septic systems



Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Pet waste



Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.



Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.



Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

Commercial



Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Construction



Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.

Agriculture



Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.



- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

Automotive Facilities



Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

Forestry



Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.



Landscaping and garden maintenance activities can be major contributors to water pollution. Soils, yard wastes, over-watering and garden chemicals become part of the urban runoff mix that winds its way through streets, gutters and storm drains before entering lakes, rivers, streams, etc. Urban runoff pollution contaminates water and harms aquatic life!

In Riverside County, report illegal discharges into the storm drain, call
1-800-506-2555
"Only Rain Down the Storm Drain"

Important Links:

Riverside County Household Hazardous Waste Collection Information
1-800-304-2226 or www.rivcowm.org

Riverside County Backyard Composting Program
1-800-366-SAVE

Integrated Pest Management (IPM) Solutions
www.ipm.ucdavis.edu

California Master Gardener Programs
www.mastergardeners.org
www.camastergardeners.ucdavis.edu

California Native Plant Society
www.cnps.org

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

...Only Rain Down ...the Storm Drain

What you should know for... Landscape and Gardening

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators



Tips for Landscape & Gardening

This brochure will help you to get the most of your lawn and gardening efforts and keep our waterways clean. Clean waterways provide recreation, establish thriving fish habitats, secure safe sanctuaries for wildlife, and add beauty to our communities. NEVER allow gardening products or waste water to enter the street, gutter or storm drain.

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.



- Plant native vegetation to reduce the amount of water, fertilizers and pesticides applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.



- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains or sewers. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control rhe pest you are targeting.
- Try natural long-term common sense solutions first. Integrated Pest Management (IPM) can provide landscaping guidance and solutions, such as:
  - **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
  - **Biological Controls** - Use predatory insects to control harmful pests.
  - **Chemical Controls** - Check out www.ipm.ucdavis.edu before using chemicals. Remember, all chemicals should be used cautiously and in moderation.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

www.bewaterwise.com Great water conservation tips and drought tolerant garden designs.

www.ourwaterourworld.com Learn how to safely manage home and garden pests.

Additional information can also be found on the back of this brochure.

Helpful telephone numbers and links:

Riverside County Stormwater Protection Partners

Flood Control District	(951) 955-1200
County of Riverside	(951) 955-1000
City of Banning	(951) 922-3105
City of Beaumont	(951) 769-8520
City of Calimesa	(909) 795-9801
City of Canyon Lake	(951) 244-2955
Cathedral City	(760) 770-0327
City of Coachella	(760) 398-4978
City of Corona	(951) 736-2447
City of Desert Hot Springs	(760) 329-6411
City of Eastvale	(951) 361-0900
City of Hemet	(951) 765-2300
City of Indian Wells	(760) 346-2489
City of Indio	(760) 391-4000
City of Lake Elsinore	(951) 674-3124
City of La Quinta	(760) 777-7000
City of Menifee	(951) 672-6777
City of Moreno Valley	(951) 413-3000
City of Murrieta	(951) 304-2489
City of Norco	(951) 270-5607
City of Palm Desert	(760) 346-0611
City of Palm Springs	(760) 323-8299
City of Perris	(951) 943-6100
City of Rancho Mirage	(760) 324-4511
City of Riverside	(951) 361-0900
City of San Jacinto	(951) 654-7337
City of Temecula	(951) 694-6444
City of Wildomar	(951) 677-7751

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers



Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

Do you know where street flows actually go?

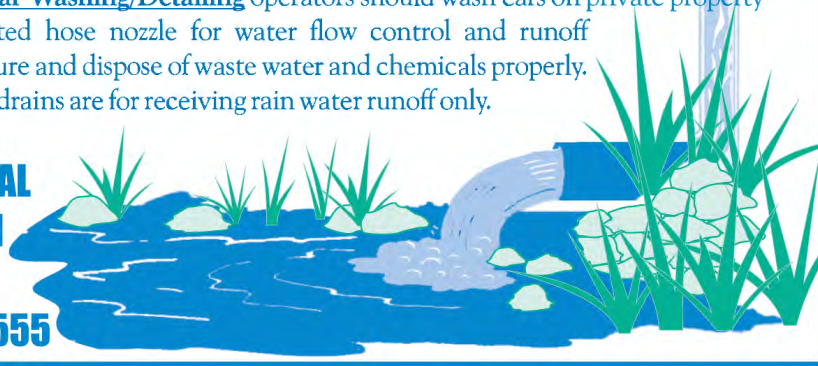
Storm drains are NOT connected to sanitary sewer systems and treatment plants!



The primary purpose of storm drains is to carry *rain* water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555



Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. ***Each of us*** can do our part to keep stormwater clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing of wash water into the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.



Report illegal storm drain disposal
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them with being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.



When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlets by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.

Saltwater Pools

- Salt water pools, although different from regular pools, are in fact, sanitized using chlorine. A salt-chlorine generator separates the chlorine and sodium molecules in salt and reintroduces them into the pool water. The same harmful effects of chlorine still apply.
- A salt water pool is still maintained with chemicals such as Muriatic acid, soda ash and sodium carbonate to help keep a proper pH, total Alkalinity, Calcium Hardness and Stabilizer levels.



- It may be illegal to discharge salt water to land. The salt may kill plants and the build-up of salt in soil puts animals, plants, and groundwater at risk. Consult your city representatives to determine local requirements regarding salt water drainage.

NEVER put unused chemicals into the trash, onto the ground or down a storm drain.

IMPORTANT: The discharge of pollutants into the street, gutter, storm drain system or waterways - without a permit or waiver - is strictly prohibited by local ordinances, state and federal law. Violations may result in monetary fines and enforcement actions.

Helpful telephone numbers and links

Riverside County Water Agencies:

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
City of Corona	(951) 736-2263
City of Hemet	(951) 765-3710
City of Norco	(951) 270 5607
City of Riverside Public Works	(951) 351-6140
City of San Jacinto	(951) 654-4041
Coachella Valley Water District	(760) 398-2651
Desert Water Agency (Palm Springs)	(760) 323-4971
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley Municipal Water District	(951) 674 3146
Elsinore Water District	(951) 674-2168
Farm Mutual Water Company	(951) 244-4198
Idyllwild Water District	(951) 659-2143
Indio Water Authority	(760) 391-4129
Jurupa Community Services District	(951) 685-7434
Lee Lake Water	(951) 658-3241
Mission Springs Water	(760) 329-6448
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
Riverside Co. Service Area #51	(760) 227-3203
Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

CALL 1-800-506-2555 to:

- Report clogged storm drains or illegal storm drain disposal from residential, industrial, construction and commercial sites into public streets, storm drains and/or water bodies.
- Find out about our various storm drain pollution prevention materials.
- Locate the dates and times of Household Hazardous Waste (HHW) Collection Events.
- Request adult, neighborhood, or classroom presentations.
- Locate other County environmental services.
- Receive grasscycling information and composting workshop information.

Or visit our
Riverside County Flood Control and Water Conservation District
website at: www.rcflood.org

Other links to additional storm drain pollution information:

- County of Riverside Environmental Health: www.rivcoeh.org
- State Water Resources Control Board: www.waterboards.ca.gov
- California Stormwater Quality Association: www.casqa.org
- United States Environmental Protection Agency (EPA): www.epa.gov/compliance/assistance (compliance assistance information)

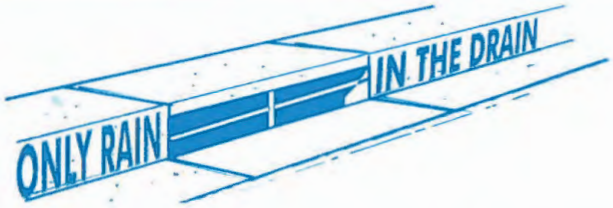
Riverside County's, "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

Guidelines for Maintaining your...



Swimming Pool, Jacuzzi and Garden Fountain

Where does the water go?



Pool, Jacuzzi and Fountain wastewater and rain water runoff (also called stormwater) that reach streets can enter the storm drain and be conveyed directly into local streams, rivers and lakes.



A storm drain's purpose is to prevent flooding by carrying rain water away from developed areas. Storm drains are not connected to sanitary sewers systems and treatment plants!

Wastewater, from residential swimming pools, Jacuzzis, fishponds and fountains, often contains chemicals used for sanitizing or cleansing purposes. Toxic chemicals (such as chlorine or copper-based algaecides) may pollute the environment when discharged into a storm drain system.

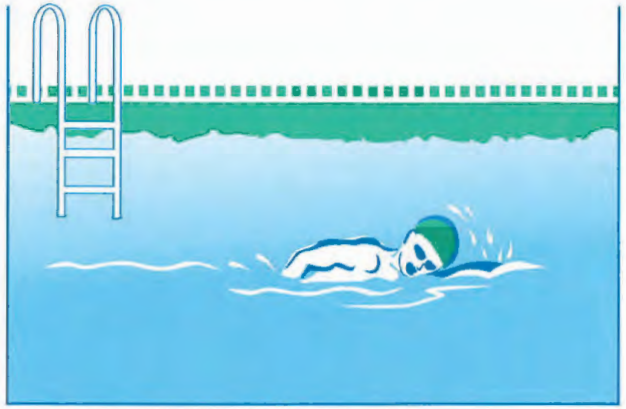
The Cities and County of Riverside have adopted ordinances that prohibit the discharge of wastewater to the street and storm drain system.



Discharge Regulations

Regulatory requirements for discharging wastewater from your pool may differ from city to city. Chlorinated water should not be discharged into the street, storm drain or surface waters. Check with your water agency to see if disposal to the sanitary sewer line is allowed for pool discharges (see reverse for Riverside County sewer agencies).

If allowed, a hose can be run from the pool Jacuzzi, or fountain to the private sewer cleanout, washing machine drain or a sink or bathtub.



If you cannot discharge to the sewer, you may drain your fountain, pool, or jacuzzi to your landscaping by following these guidelines:

First, reduce or eliminate solids (e.g. debris, leaves or dirt) in the pool water and allow the chemicals in the pool water to dissipate before draining the pool (this could take up to 7 days, verify using a home pool test kit).

Second, slowly drain to a landscaped area away from buildings or structures. Control the flow to prevent soil erosion; it may take more than one day to empty. Do not allow sediment to enter the street, gutter or storm drain.

Maintenance & Chemicals

Cleaning Filters



Filter rinse water and backwash must be discharged to the sanitary sewer, on-site septic tank and drain field system (if properly designed and adequately sized), or a seepage pit. Alternatively, rinse water or backwash may be diverted to landscaped or dirt areas. Filter media and other non-hazardous solids should be picked up and disposed of in the trash.

Algaecides

Avoid using copper-based algaecides unless absolutely necessary. Control algae with chlorine, organic polymers or other alternatives to copper-based pool chemicals. Copper is a heavy metal that can be toxic to aquatic life when you drain your pool.

Chemical Storage and Handling

- Use only the amount indicated on product labels
- Store chlorine and other chemicals in a covered area to prevent runoff. Keep out of reach of children and pets.
- Chlorine kits, available at retail swimming pool equipment and supply stores, should be used to monitor the chlorine and pH levels before draining your pool.
- Chlorine and other pool chemicals should never be allowed to flow into the gutter or storm drain system.

Take unwanted chemicals to a Household Hazardous Waste (HHW) Collection Event. There's no cost for taking HHW items to collection events – it's FREE! Call **1-800-506-2555** for a schedule of HHW events in your community.



Fiscal Impact Analysis
&
Economic Benefit Analysis

Baker & Pierce Street Development

Lake Elsinore, CA

October 1, 2024

Prepared By:

DPFG

DEVELOPMENT PLANNING & FINANCING GROUP

Glossary of Defined Terms and Acronyms

Budget	*City of Lake Elsinore Annual Operating Budget for Fiscal Year 2024-25*.
City	*City of Lake Elsinore*.
Developer	*Riverside Legacy*.
DPFG	*Development Planning & Financing Group*.
FIA	*Fiscal Impact Analysis*.
EBA	*Economic Benefit Analysis*.
General Fund	*City of Lake Elsinore General Fund*.
Project	*Baker and Pierce Street Development*.
State	*State of California*.
TRA	*Tax Rate Area*.
Vehicle License Fee	*In 2004, the California Legislature approved a property tax swap of Vehicle License Fees (VLF) as part of a state/local budget agreement. As a result of the swap, more than 90% of the City's Motor License Vehicle Fund was swapped for property taxes*.

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1. Introduction

Baker and Pierce Street Development (the "Project") is located southwest of the intersection of Baker Street and Pierce Street in the City of Lake Elsinore ("City"). Regional access to the Project site is provided by Interstate 15 (I-15) located 0.40 miles east of the site. Local access to the site is provided from Baker Street and Pierce Street. The Project site encompasses 10 parcels totaling approximately 65.81 acres. The site is currently vacant and undeveloped with naturally occurring vegetation. The Project will consist of constructing two new warehouse buildings and related onsite improvements. The project will also include ROW improvements along Baker Street and Pierce Street.

The Project will consist of two new warehouse buildings totaling 1,000,451 SF. Building 1 will be 212,028 SF, inclusive of 10,000 SF of office. Building 2 will be 788,423 SF inclusive of 20,000 SF of office as follows:

LAND USE ASSUMPTIONS

Land Use	Project SF
High Cube Warehouse (Bldg. 1)	202,028
High Cube Warehouse (Bldg. 2)	768,423
High Cube Warehouse – Office (Bldg. 1)	10,000
High Cube Warehouse – Office (Bldg. 2)	20,000
Total Non-Residential SF	**1,000,451**

2. Purpose of Fiscal Impact Analysis

This Fiscal Impact Analysis ("FIA") has been prepared to determine the estimated fiscal impacts of the Project to the City's General Fund. The purpose of the FIA is to show that the Project is economically feasible and would generate an annual surplus to the City's General Fund. The Project will generate revenue for the General Fund primarily through increased Property Taxes, and Sales Tax, while increasing the need for City services such as police, fire, and public works. The reader should be aware that the FIA contains estimates or projections of the Project's future revenue and cost impacts on the City, and actual fiscal results may vary from estimates because events and circumstances may occur in a manner that is different than projected in the FIA. The primary purpose of this FIA is to estimate the Project's net fiscal impact on the City's General Fund at build-out.

3. Purpose of Economic Benefit Analysis

The Economic Benefit Analysis ("EBA") has been prepared to estimate the number of annual jobs created and annual labor income generated (i) during the construction of the Project ("Construction Period Impacts"), and (ii) on an on-going basis after the construction is complete ("Ongoing Annual Impacts') using IMPLAN. IMPLAN is the most widely employed and accepted regional economic analysis software for predicting economic impacts. The IMPLAN model is used to predict the economic consequences of a development project within a local economy and measures the direct, indirect, and induced effects in terms of employment, and earnings within the local region.

3. FIA and EBA Executive Summary

The result of the FIA at build-out for the Project is summarized as follows:

General Fund	At Build-out
Case Study Method	
Sales Tax	$ 10,744
Measure Z	9,723
Property Tax	243,411
Property Tax In-Lieu of VLF	163,627
Property Transfer Tax	5,816
Fire Service Tax Credit	-
Total Case Study Method Revenue	**$ 433,321**
Marginal Increase Method	
Franchise Tax	7,582
Other Tax	46
Transient Occupancy Tax	-
Licenses, Permits and Fees	9,939
Intergovernmental	1,359
Fine & Forfeitures	2,673
Investment Earnings	-
Reimbursement/Other	-
Special Assessment	-
Total Marginal Increase Method Revenue	$ 21,599
Total Recurring Revenue	**$ 454,920**
Recurring Expenditure	
General Government	$ 5,340
Administrative Services	3,230
Public Safety	55,663
Community Development	8,116
Economic Development	1,450
Public Services	18,845
Community Services	7,481
Non-Departmental	-
Total Recurring Expenditure	**$ 100,063**
Net General Fund Fiscal Surplus	**$ 354,857**
City CFD 2015-2 Surplus (Deficit)	-
Total General Fund Fiscal Surplus	**$ 354,857**

The results of the EBA during the construction period and on an on-going basis are summarized below.

Job and Labor Income	Construction Period	Ongoing Annual
Total Annual Jobs	1,404	748
Total Annual Labor Income	$85.9 Million	$43.03 Million

In addition to the General Fund Fiscal Surplus, the Project will generate an estimated **748 annual jobs** an estimated **$43.04 million** in labor income. The Project is estimated to be pay an estimated **$2,974,043** in one-time fees to City of Lake Elsinore and $5,206,867 in one-time fees to various other agencies.

4. FIA Limiting Conditions

The FIA is subject to the following limiting conditions:

- The FIA contains an analysis of recurring revenues and costs to the City from the development of the Project. The FIA is based on estimates, assumptions and other information developed from DPFG's research, and information from DPFG's proprietary database which were collected through fiscal impact analyses previously prepared by DPFG and others.

- The sources of information and basis of the estimates are stated herein. While we believe the sources of information are dependable, DPFG does not express an opinion or any other form of assurance on the accuracy of such information.

- The analysis of recurring revenues and cost impacts to the City contained in the FIA is not considered to be a "financial forecast" or a "financial projection" as technically defined by the American Institute of Certified Public Accountants. The word "projection" used within this report relates to broad expectations of future events or market conditions.

- Since the analyses contained herein are based on estimates and assumptions which are inherently subject to uncertainty and variation depending on evolving events, DPFG cannot represent those results will be achieved. Some assumptions inevitably will not materialize, and unanticipated events and circumstances may occur; therefore, the actual results achieved may vary from the projections.

5. EBA Limiting Conditions

Our analysis uses conservative metrics drawn from Los Angeles County market conditions and our industry knowledge and experience. It should be noted, however, that market conditions may change between now and when the Project is anticipated to open. Accordingly, as the information, estimates, and assumptions used in the analysis are inherently subject to uncertainty and variation depending on evolving events (e.g., market conditions, government regulations, etc.), the estimates presented herein are subject to change.

6. Fiscal Impact Analysis

The FIA was prepared to estimate the allocable revenue and cost impacts to the City's General Fund related to the Project's development. The FIA uses a combination of (i) Case Study Method and (ii) Average Costing Method to estimate Project's impacts.

Case Study Method: When projecting fiscal impacts using a case study method, the FIA determines the impacts of the Project's population on the City. Case studies rely on communication with public officials, review of the City Annual Budget to assess plans to expand or maintain local services, and then determine categories of either excess or deficient service capacity.

Average Costing Method: When projecting fiscal impacts using an average costing method, the FIA determines per capita/employee impacts by applying the appropriate per capita, per employee and per capita and employee factors ("Factors") to the Project land use assumptions. The Factors were calculated using the City of Lake Elsinore Annual Operating Budget for Fiscal Year 2024-25 ("Budget"). Factors are projected in 2024 dollars.

7. FIA Recurring Revenues

7.1 Case Study Method

The annual General Fund revenues calculated using the Case Study Method as referenced in section 5 of this report are as follows:

7.1.1 Sales and Use Tax

Under the California Sales and Use Tax Law, the sale of tangible personal property is subject to sales or use tax unless exempt or otherwise excluded. When the sales tax applies, the use tax does not apply, and the opposite is also true. The sales tax is imposed on all retailers for the privilege of selling tangible personal property in the State and is measured by the retailer's gross receipts. The Project will generate off-site sales tax and use tax as follows:

The Project is estimated to generate 452 on-site full-time equivalent employees. It is assumed that the employees will spend $4,300 weekly and 50% of the total taxable sales is captured within the City. The City will receive 1.00% in Sales Tax Revenue, and 10.50% of the 1.00% in Use Tax Revenue. With these assumptions, the Project will generate an estimated **$10,744** in off-site retail sales tax and use tax.

6.1.2 Measure Z Sales Tax

Measure Z is a locally controlled one cent, or one percent, transaction and use tax to generate unrestricted general fund dollars to address city service, public safety, and local recovery needs. Measure Z was approved by the residents of the City on November 3rd, 2020, and officially went into effect on April 1, 2021. The Project generates an estimated **$9,723** in Measure Z sales tax at build-out.

6.1.3 Property Tax

In addition to other ad valorem charges imposed by various local agencies, landowners in the State of California ("State") are required to pay annual property taxes of 1% on the assessed value of their property pursuant to Proposition 13. Each county in California is divided into tax rate areas ("TRA"). After the basic 1% property tax is collected by the County, the tax is allocated to various local agencies based on each agency's share of the

basic tax within the property's applicable TRA. The following table summarizes the impact of the Project to the General Fund:

Total Assessed Value	$	211,508,808
Basic Tax		1.00%
Basic Tax Paid	$	2,115,088
City Share of 1%		11.508%
Total Annual Property Taxes	**$**	**243,411**

6.1.4 Property Tax in-Lieu of VLF

In May 2004, Governor Schwarzenegger a swap of city and county VLF revenue for additional property tax share as part of a budget agreement between the State and local governments. The swap was included in the 2004 budget package. Under this legislation, property tax in-lieu of VLF is allocated to Cities and Counties pursuant to a complex formula involving each agency relative share of assessed value. The property tax in-lieu of VLF revenue that will be generated by the Project can be estimated by determining the (i) percentage growth in the total assessed value of the City attributable to the Project and multiplying by (ii) the property tax in-lieu of VLF revenue of $7.5 million expected to be received per the City. Based on these calculations, the Project is anticipated to generate **$163,627** annually in property tax in-lieu of VLF revenue.

6.1.5 Property Transfer Tax

The County may levy a transfer tax at the rate of $0.55 for each $500 of assessed value. A City within the County that levies this tax can levy a transfer tax at a rate of $0.55 per $1,000. If both the County and City levy the transfer tax, a credit shall be allowed against the amount imposed by the County in the amount of tax that is imposed by the City per California Revenue Taxation Code 11911. It is assumed that the ownership of the Project will change every 20 years. Based on these assumptions, the Project is estimated to generate **$5,816** in Property Transfer Tax.

The total recurring annual General Fund revenue calculated using the case study method is estimated to be **$433,321** at build out.

7.2 Average Costing Method

The general Fund revenue that are calculated using the Average Costing Method as referenced in section 5 of this report are as follows:

Recurring Revenue	Marginal Increase	Measure	At Build-Out
Franchise Tax	100%	PER	$ 7,582
Other Tax	100%	PER	46
Transient Occupancy Tax	0%	PER	-
Licenses, Permits and Fees	Varies	PER	9,939
Intergovernmental	100%	PER	1,359
Fines and Forfeitures	100%	PER	2,673

Investment Earnings	0%	PER	-
Reimbursement/Others	0%	PER	-
Special Assessments	0%	PER	-
Total Average Costing Method Revenue			**$ 21,599**

"PER" = Per Equivalent Residents

The total recurring annual General Fund revenue generated by the case study method as well as the multiplier method for the Project is estimated to be **$454,920** at build-out.

8. FIA Recurring Expenditure

The general Fund expenditure for all general fund categories is calculated using the multiplier method using various marginal increase rate and applying the appropriate per capita, per employee and per capita and employee factors ("Factors") to the Residential Project and Non-Residential Project land use assumptions as follows:

Recurring Expenditure	Marginal Increase	Measure	At Build-Out
General Government	50.00%	PER	$ 5,340
Administrative Services	50.00%	PER	3,230
Public Safety	100.00%	PER	55,663
Community Development	50.00%	PER	8,116
Economic Development	50.00%	PER	1,450
Public Services	50.00%	PER	18,845
Community Services	50.00%	PER	7,418
Non-Departmental	0.00%	PER	-
Total Recurring Expenditure			**$ 100,063**

"PER" = Per Equivalent Residents

The total recurring annual General Fund expenditure calculated using the multiplier method for the Project is estimated to be **$100,063** at build-out**.**

9. Fire Service Tax Credit

The City contracts with the County of Riverside for a full range of fire protection, fire prevention, rescue, fire marshal and medical emergency services. The County receives approximately 4.73% share of the basic 1% property tax to fund the fire protection services. Hence, the City receives credit for structural fire fund taxes received by the County to offset its annual fire protection contract. The City receives an estimated **$100,052** in Fire Services Tax Credit as a result of the Project.

The total Fire services contract with the County for fiscal year 2024-25 is estimated to be $13,031,350. Using a Per Capita and 50% Employee Multiplier and a marginal increase of 100%, the total annual Fire services cost for the Project is anticipated to be **$34,261** at buildout. Since the Fire Tax Credit generated by the Project is higher than the anticipated fire services cost, no additional fire services cost is assumed for the Project.

10. Services CFD Summary

New developments within the City are required to annex into the City of Lake Elsinore CFD 2015-2 ("Maintenance CFD") for maintenance of right-of-way items along Baker Street and Pierce Street. The cost associated with the maintenance of the ROW items will be paid by the special tax levied for Maintenance CFD without any burden to the City. The total Maintenance CFD revenue generated by the Project are calculated as follows:

Maintenance CFD Revenue	**Project Total**
Total Estimated Revenue	$ 61,914
Total Estimated Expenditure	61,914
Net Maintenance CFD Surplus (Deficit)	**$ -**

11. One-time Fee Summary

In addition to the annual recurring revenue, the Project will generate one-time fees in the amount estimated as follows. For more details refer to Exhibit A, Table 11.

Fee Category	**Total Fees**
City of Lake Elsinore	
Development Impact Fees	$ 1,941,483
Building Permit Fees	1,032,560
Total City of Lake Elsinore Fees	**$ 2,974,043**
Other Agencies	
Elsinore Valley Municipal Water District Fees	1,607,061
County of Riverside Fees	2,759,426
Lake Elsinore Unified School District Fees	840,379
Total Other Agencies Fees	**$ 5,206,867**

**The one-time fee calculation is preliminary and subject to change. The calculation does not include additional mitigation measures that may be imposed on the project (public improvements, fair-share contribution, Development Agreement fee etc.) as part of the Conditions of Approval or Development Agreement for the Project.*

12. Economic Benefit Analysis

A key concept to understand about the IMPLAN economic impact analysis is that one form of economic activity always stimulates other economic activities. The total economic impact of a specific project or event on a study area is the sum of the direct, indirect, and induced impacts. The direct economic activity stemming from the Project stimulates subsequent indirect and induced impacts to the local economy.

The three components of economic impact are further described below:

Direct Impact: Represents the initial change in the economy attributable to the development of the Project which occurs directly on the Project site.

Indirect Impact: Represents the impact on local industries based on inter-industry purchases as the economy responds to new demand of the directly affected industries. This impact represents the additional rounds of economic activity that occur consequently

from the direct impacts, specifically through the production of goods and services required to support businesses directly impacted. For example, as it relates to jobs, if a direct impact of a Project is the creation of on-site jobs because of operations within the specialty studios, then an indirect impact would be the creation of jobs for independent artists, writers, and performers.

Induced Impact: Represents the impact to the local economy based on the increased household spending due to additional labor income generated, specifically through the purchase of goods and/or services required to meet consumer demand generated by the Project's employees.

The specific economic impacts evaluated in this analysis are employment and labor income.

Employment: Represents the number of jobs produced in the economy.

Labor Income: Represents the total value of all forms of employment income paid throughout the local economy.

These economic impacts are driven by economic activity generated directly at the Project site as well as the related flow of economic activity in the specified region. In this case, the defined geographic region is the County of Los Angeles and the economic activities generating impacts are the construction of the Project, the annual ongoing activities of the new businesses located in the Project, and new local spending by the Project's employee. Accordingly, this analysis evaluates the direct, indirect, and induced effects of the Project at two separate times: (i) a one-time evaluation of direct, indirect, and induced effects during the construction of the Project ("**Construction Period Impacts**") and (ii) the ongoing annual direct, indirect, and induced effects at buildout ("**Ongoing Annual Impacts**").

Construction Period Impacts:

The "Construction Period" commences upon initial site development and ends upon completion of construction. Per the Developer, the Construction Period is expected to be approximately four (3) years. Direct inputs were comprised of construction cost summarized as follows:

Direct Construction Cost:	
High Cube Warehouse (Bldg. 1)	$ 44,101,824
High Cube Warehouse (Bldg. 2)	163,991,984
Off-site Improvements	3,415,000
Total Direct Construction Cost	**$ 211,508,808**

Construction of the Project will contribute to the creation of new direct, indirect, and induced jobs in the City and County-wide. Direct jobs created during the Construction Period consist of the employees constructing the Project, whereas the indirect and induced jobs created during this phase relate to (i) the other industries that need to produce additional goods and services to meet the demand from contractors/businesses directly involved in the construction of the Project and (ii) discretionary spending of the construction employees. The Project is anticipated to create 337 annual jobs during the Construction Period.

Labor income during the construction period includes employment compensation and benefits paid to workers. The direct effect on labor income during the Construction Period is comprised of labor income paid to construction employees on site. The indirect effect on labor income includes the income of those employees of businesses providing goods and services to the contractors/businesses working directly on the site. The induced effect on labor income is comprised of the income of employees working at businesses that experience growth from the discretionary spending of the direct and indirect employees. Overall, the Project is estimated to generate an average of **$85,093,000** annually in labor income over the Construction Period.

Ongoing Annual Impacts:

Ongoing annual direct effects represent the anticipated economic effects of the Project once the site is stabilized. Ongoing annual direct effects on employment relate to the employees working at the Project, whereas the indirect and induced jobs created during this phase relate to the other industries that produce goods and services that support the new businesses of the Project and local spending by the new employees of the Project. The project is anticipated to create approximately 452 full-time equivalent employees. Full-time equivalent employees for the Project were based on occupancy and the square feet per employee estimates according to the anticipated tenant type. Because IMPLAN's definition of employment includes "all jobs" (i.e., full-time, part-time, and seasonal), IMPLAN industry sector conversion factor of 0.9379 for light Industrial use and 0.9245 for general office use in the County of Riverside This resulted in approximately 483 total direct employees (i.e., total "headcount" jobs). Based on this direct employee number, the Project is anticipated to create **748** annual jobs (direct, indirect, and induced).

The direct effect on labor income during the Permanent Ongoing Period includes the labor income paid to on-site employees of the Project. The indirect and induced effects on labor income consist of the income of those employees associated with businesses that service the Project, as well as the income of the new employees generated by the increased demand for goods and services from the Project. Overall, the Project is estimated to generate **$43,042,000** annually in labor income.

13. Conclusion

The FIA analyzes the impacts of the Project to the City's general fund revenue and expenditure. Based on the analysis of revenues and expenditure detailed above, the Project will generate a surplus of **$354,857** at build-out.

The Project is also anticipated to annex into City Maintenance CFD, and the revenue generated by the CFD will offset the cost of various items maintained by the City. Furthermore, the Project will pay an estimated **$2,974,043** in one-time fees to the City.

The EBA estimates that the Project will create **1,404 temporary jobs** and generate **$85.09 million** in labor income annually during the construction period. Furthermore, the Project creates **748 permanent jobs** and generate **$43.04 million** in labor income on an ongoing basis.

14. Fiscal Impact Analysis and Economic Benefit Analysis– Exhibits

The Fiscal Impact Analysis and Economic Benefit Analysis is organized as follows:

Exhibit	Table	Description
A	1	Fiscal Impact Analysis Summary
A	2	Post ERAF Share of the Basic Tax Calculation
A	3	Land Use Assumptions
A	4	Property Tax Calculation
A	5	Property Transfer Tax Calculation
A	6	Property Tax In-Lieu of VLF Calculation
A	7	Sales Tax Calculation
A	8A	General Fund Revenue Summary
A	8B	General Fund Expenditure Summary
A	9	Fire Service Tax Credit Calculation
A	10	Maintenance CFD Summary
A	11	Fee Payment Summary
B	1	Land Use Assumptions
B	2	Economic Benefit Analysis Summary
B	3	Construction Period Impacts
B	4	Ongoing Annual Impacts
B	5	Top Ten Industries Affected

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 1 - Fiscal Impact Analysis Summary
October 01, 2024

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	Table Ref.		Annual at Buildout	% of Total
Recurring Revenues:				
Case Study Method				
Sales Tax	7	$	10,744	2.4%
Measure Z	7		9,723	2.1%
Property Tax	4		243,411	53.5%
Property Tax In-Lieu of VLF	6		163,627	36.0%
Property Transfer Tax	5		5,816	1.3%
Fire Service Tax Credit	9		-	0.0%
Total Case Study Method Revenue		**$**	**433,321**	**95.3%**
Average Costing Method				
Franchise Tax	8A		7,582	1.7%
Other Tax	8A		46	0.0%
Transient Occupancy Tax	8A		-	0.0%
Licenses, Permits and Fees	8A		9,939	2.2%
Intergovernmental	8A		1,359	0.3%
Fine & Forfeitures	8A		2,673	0.6%
Investment Earnings	8A		-	0.0%
Reimbursements/Other	8A		-	0.0%
Special Assessments	8A		-	0.0%
Total Average Costing Method Revenue		**$**	**21,599**	**4.7%**
Total Recurring Revenue		**$**	**454,920**	**100.0%**
Recurring Expenditures:				
General Government	8B	$	5,340	5.3%
Administrative Services	8B		3,230	3.2%
Public Safety	8B		55,663	55.6%
Community Development	8B		8,116	8.1%
Economic Development	8B		1,450	1.4%
Public Services	8B		18,845	18.8%
Community Services	8B		7,418	7.4%
Non-Departmental	8B		-	0.0%
Total Recurring Expenditures		**$**	**100,063**	**100.0%**
Net General Fund Fiscal Surplus (Deficit)		**$**	**354,857**	
City Maintenance CFD (CFD 2015-2)				
Estimated Revenue	10	$	61,914	
Estimated Expenditure	10		61,914	
Net CFD 2015-2 Surplus (Deficit)		$	-	
Total General Fund Fiscal Surplus (Deficit)		**$**	**354,857**	
One-time Fees Paid:				
City of Lake Elsinore (DIF and Permit Fees)	11	$	2,974,043	
Other Agencies	11		5,206,867	
Total One-time Fees Paid:		**$**	**8,180,910**	

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 2 - Post ERAF Share of the Basic Tax Calculation
October 01, 2024

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Agency	TRA 5-018
General Fund	11.339682570%
County Free Library	1.157176560%
County Structure Fire Protection	**4.730380380%**
City of Lake Elsinore	**11.508324850%**
Lake Elsinore Unified	26.644194000%
Mt. San Jacinto Junior College	3.195462000%
Elsinore Area Elementary School Fund	5.840098000%
Riverside County Office of Education	3.298590000%
Riverside County Regional Park and Open Space	0.279900400%
Flood Control Admin	0.189294380%
Flood Control Zone 3	2.704254280%
Elsinore Valley Cemetery	0.807760300%
Elsinore Valley Municipal Water	8.137168960%
Western Municipal Water	1.094622030%
Educational Revenue Augmentation Fund	19.073091290%
Total	**100.000000000%**

Footnotes:

Source: Riverside County Auditor-Controller's Office.

In addition to other ad valorem charges imposed by various local agencies, land owners in California are required to pay annual property taxes of 1% on the assessed value of their property pursuant to Proposition 13.

Each County in California is divided into tax rate areas ("TRA"). After the basic 1% property tax is collected by the county, the tax is allocated to various local agencies based on each agency's share of the basic tax within the property's applicable TRA. This exhibit shows the share of the basic tax applicable to the Project's TRA.

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 3 - Land Use Assumptions
October 01, 2024

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I. Assessed Value	# SF (a)	AV/SF (a)	Total Assessed Valuation
High Cube Warehouse (Bldg. 1)	202,028	$ 208	42,021,824
High Cube Warehouse (Bldg. 2)	768,423	208	159,831,984
High Cube Warehouse - Office (Bldg. 1)	10,000	208	2,080,000
High Cube Warehouse - Office (Bldg. 2)	20,000	208	4,160,000
Off-site Improvements			3,415,000
Total Assessed Value			**$ 211,508,808**

II. Employee Summary	# SF (a)	SF/Employee (b)	Total Employees
High Cube Warehouse (Bldg. 1)	202,028	2,469	82
High Cube Warehouse (Bldg. 2)	768,423	2,469	311
High Cube Warehouse - Office (Bldg. 1)	10,000	507	20
High Cube Warehouse - Office (Bldg. 2)	20,000	507	39
Total Estimated Employees	**1,000,451**		**452**

III. Equivalent Resident Summary

		Citywide (c)	Project
Total Residents	[1]	71,452	-
Total Employees	[2]	29,100	452
Equivalent Residents	[2]x50%=[3]	14,550	226
Total Equivalent Resident	**[1]+[3]=[4]**	**86,002**	**226**

Footnotes:

(a) Per Riverside Leagcy as of 9/18/2024.

(b) Per 2018 Commercial Building Energy Consumption Survey, Table B2 published by U.S. Energy Information Administration.

(c) City Population per the California Department of Finance, E-5 City/County Population and Housing Estimates as of 1/1/2024 for City of Lake Elsinore. City Employment per State of California, Employment Development Department Monthly Labor Force Data for Cities and Census Designated Places as of August 2024.

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 4 - Property Tax Calculation
October 01, 2024

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Property Tax		**Table Ref.**		
Assessed Value				
Non-Residential Assessed Value		3		211,508,808
Total Assessed Value	**[1]**		**$**	**211,508,808**
Basic Rate				1.00%
Basic Tax Paid	[2]=[1]*1%		$	2,115,088
City General Fund Share of Basic Tax (a)	[3]	2		11.508325%
Total Annual Property Taxes to City	**[4]=[2]x[3]**		**$**	**243,411**

Footnotes:

(a) See Table 2 - Post ERAF share of 1%.

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 5 - Property Transfer Tax Calculation
October 01, 2024

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Total Assessed Value per Table 3	$	211,508,808
Turnover Rate (a)		5.00%
Annual Taxable Assessed Value	$	10,575,440
Property Transfer Tax Rate (b)		0.110000%
Total Annual Property Transfer Taxes	$	11,633
City's Share		50%
Total Annual Property Transfer Taxes to City	**$**	**5,816**

Footnotes:

(a) It is assumed that the residential property is being sold every 20 years.

(b) The County may levy a transfer tax at the rate of $0.55 for each $500 of assessed value. A City within the County that levies this tax can levy a transfer tax at a rate of $0.55 per $1,000. If both the County and City levy the transfer tax, a credit shall be allowed against the amount imposed by the County in the amount of tax that is imposed by the City per California Revenue and Taxation Code 11911.

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 6 - Property Tax In-Lieu of VLF Calculation
December 06, 2023

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Property Tax In-Lieu of VLF

Nominal Dollars:			
City Assessed Valuation (a)	[1]	$	9,171,057,242
Property Tax In-Lieu of VLF (b)	[2]		7,516,713
VLF Increase per $1,000 increase in AV	[3]=[2]/[1]*1000	$	0.8196
Total Assessed Value (c)	[4]	$	211,508,808
Less: Existing Assessed Value (d)	[5]		11,869,644
Net (New) Assessed Value	[6]=[4]-[5]	$	199,639,164
Project Assessed Valuation / 1,000	[7]=[6]/1000	$	199,639.16
VLF Increase per $1,000 increase in AV	[3]		0.8196
LA County Vehicle License Fee	=[3]*[7]	**$**	**163,627**

Footnotes:

(a) Per Riverside County Auditor Controller Office for FY 2024-25.
(b) Per Estimated VLF Adjsutment amount posted by Riverside County Auditor Controller Office for FY 2024-25.
(c) See Table 3 - Land Use Assumptions.
(d) Current assessed value based on the FY 2024-25 tax bills.

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 7 - Sales Tax Calculation
October 01, 2024

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Off-Site Sales and Use Tax Revenue	**Table Ref.**			
I. Employee Spending				
New Employees	3			452
Annual Spending per employee (a)			$	4,300
Annual Taxable Sales				1,944,571
Employee Spending Captured in City at 50% of taxable Sales			$	972,286
Sales Tax @1% of taxable sales		1.00%		9,723
Use Tax @10.50% of sales tax		10.50%		1,021
Total Off-Site Sales Tax Revenue			**$**	**10,744**
Measure Z Sales Tax @1.00% of taxable sales (b)		**1.00%**	**$**	**9,723**

Footnotes:

(a) Per recent market study prepared for a comparable Project within the County and independent market research conducted by DPFG.

(c) In November 2020, City of Lake Elsinore voters approved Measure Z: a locally controlled one cent, or one percent, transactions and use tax to generate unrestricted general fund dollares to address City service, public safety, and local recovery needs. Measure Z became effective April 1, 2021 and raises the City's sales tax by additional 1%.

(d) Per recent market study prepared for a comparable Project within the County and independent market research conducted by DPFG.

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 8A - General Fund Revenue Summary
October 01, 2024

DRAFT

Recurring Items: Revenues	FY 2024-25 Budget Page Ref.	[1] Proposed Annual Budget FY 2024-25 (a)	[2] Marginal Increase (b)	[3]=[1]*[2] Net General Fund	Measure (c)	[4] City Equivalent Units (c)	[3]/[4]=[5] Factor	[6] Project Equivalent Units	[5]X[6] Amount
General Funds									
Taxes									
Sales Tax	57	$ 17,087,000	----------	See Table 7	----------				$ 10,744
Measure Z (d)	57	-	----------	See Table 7	----------				9,723
Property Tax	57	4,097,607	----------	See Table 4	----------				243,411
Property Tax In-Lieu of VLF	57	7,516,713	----------	See Table 6	----------				163,627
Franchise Tax	57	2,883,910	100.00%	2,883,910	PER	86,002	33.53	226	7,582
Property Transfer Tax	57	378,640	----------	See Table 5	----------				5,816
Other Tax	57	17,510	100.00%	17,510	PER	86,002	0.20	226	46
Transient Occupancy Tax	57	621,960	0.00%	-	PER	86,002	-	226	-
Fire Service Tax Credit	57	5,382,550	----------	See Table 9	----------				-
Licenses, Permits and Fees									
Building Permit Fee	57	1,462,920	0.00%	-	PER	86,002	-	226	-
Other Licenses & Permits									
Business License	57	463,500	100.00%	463,500	PER	86,002	5.39	226	1,219
Special Event Fees	57	51,810	50.00%	25,905	PER	86,002	0.30	226	68
Encroachment Permit	57	212,180	0.00%	-	PER	86,002	-	226	-
D.A. Prop 64	57	1,133,000	0.00%	-	PER	86,002	-	226	-
Other	57	41,200	50.00%	20,600	PER	86,002	0.24	226	54
Fees									
City Clerk	57	13,850	50.00%	6,925	PER	86,002	0.08	226	18
Community Developme	57	2,556,610	50.00%	1,278,305	PER	86,002	14.86	226	3,361
Engineering	57	2,271,630	50.00%	1,135,815	PER	86,002	13.21	226	2,986
Community Services	57	266,360	50.00%	133,180	PER	86,002	1.55	226	350
Administration	57	509,280	50.00%	254,640	PER	86,002	2.96	226	669
Facility Rentals - Other	57	780,190	50.00%	390,095	PER	86,002	4.54	226	1,026
Fire Prevention	57	142,400	50.00%	71,200	PER	86,002	0.83	226	187
Intergovernmental									
Vehicle License Fees	57	97,590	100.00%	97,590	PER	86,002	1.13	226	257
State Mandate Costs	57	419,210	100.00%	419,210	PER	86,002	4.87	226	1,102
Fine & Forfeitures	57	1,016,670	100.00%	1,016,670	PER	86,002	11.82	226	2,673
Investment Earnings	57	423,330	0.00%	-	PER	86,002	-	226	-
Reimbursements/Other									
Public Safety	57	532,570	0.00%	-	PER	86,002	-	226	-
Street Program	58	1,000,000	0.00%	-	PER	86,002	-	226	-
Other	58	12,598,200	0.00%	-	PER	86,002	-	226	-
Special Assessments	58	7,194,960	0.00%	-	PER	86,002	-	226	-
TOTAL REVENUES		**$ 71,173,350**							**$ 454,920**

Footnotes:

(a) Per City of Lake Elsinore Annual Operating Budget for Fiscal Year 2024-25.

(b) The marginal increase represents the impact to the City's expenditure due to the nature of the expenditure relative to the Project.

(c) Based on (1) 71,452, City of Lake Elsinore residents, California Department of Finance, January 1, 2024, (2) 29,100, total City of Lake Elsinore employees and (3) City employment reduced by 50% to account for the estimated less frequent use of City public services by employees than residents. "PER" = Per Equivalent Resident.

(d) Measure Z is locally controlled one cent or 1% sales and use tax to generate unrestricted general fund dollars to address city services, public safety and local recovery needs.

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 8B - General Fund Expenditure Summary
October 01, 2024

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Recurring Items: Expenditure	FY 2024-25 Budget Page Ref.	[1] Proposed Annual Budget FY 2024-25 (a)	[2] Marginal Increase (b)	[3]=[1]*[2] Net General Fund	Measure (c)	[4] City Equivalent Units (c)	[3]/[4]=[5] Factor	[6] Project Equivalent Units	[5]X[6] Amount
General Government									
City Council	61	$ 354,770	50.00%	$ 177,385	PER	86,002	2.06	226	$ 466
Community Support	61	604,260	50.00%	302,130	PER	86,002	3.51	226	794
City Clerk	61	1,095,020	50.00%	547,510	PER	86,002	6.37	226	1,439
City Attorney	61	675,190	50.00%	337,595	PER	86,002	3.93	226	888
City Manager	61	1,333,230	50.00%	666,615	PER	86,002	7.75	226	1,753
Total General Government		$ 4,062,470							$ 5,340
Administrative Services									
Finance	61	$ 1,666,310	50.00%	$ 833,155	PER	86,002	9.69	226	$ 2,190
Human Resources	61	790,530	50.00%	395,265	PER	86,002	4.60	226	1,039
Total Administrative Services		$ 2,456,840							$ 3,230
Public Safety									
Police Services	61	$ 19,531,030	100.00%	$ 19,531,030	PER	86,002	227.10	226	$ 51,350
Fire Services	61	12,136,450	----------	See Table 9	----------				-
Fire Prevention	61	894,900	----------	See Table 9	----------				-
Animal Services	61	1,209,040	100.00%	1,209,040	PER	86,002	14.06	226	3,179
Emergency Services	61	431,460	100.00%	431,460	PER	86,002	5.02	226	1,134
Total Public Safety		$ 34,202,880							$ 55,663
Community Development									
Planning & Zoning	61	$ 2,242,660	50.00%	$ 1,121,330	PER	86,002	13.04	226	$ 2,948
Building & Safety	61	1,729,510	50.00%	864,755	PER	86,002	10.06	226	2,274
Code Enforcement	61	2,201,690	50.00%	1,100,845	PER	86,002	12.80	226	2,894
Total Community Development		$ 6,173,860							$ 8,116
Economic Development									
Economic Development	61	$ 1,103,010	50.00%	$ 551,505	PER	86,002	6.41	226	$ 1,450
Total Economic Development		$ 1,103,010							$ 1,450
Public Services									
Engineering	61	$ 4,133,950	50.00%	$ 2,066,975	PER	86,002	24.03	226	$ 5,434
Public Works - Administrati	61	4,808,110	50.00%	2,404,055	PER	86,002	27.95	226	6,321
Park Maintenance	61	4,031,600	50.00%	2,015,800	PER	86,002	23.44	226	5,300
Lake Maintenance	61	1,362,060	50.00%	681,030	PER	86,002	7.92	226	1,791
Total Public Services		$ 14,335,720							$ 18,845
Community Services									
Recreation	61	$ 2,297,450	50.00%	$ 1,148,725	PER	86,002	13.36	226	$ 3,020
Community Center	61	1,395,710	50.00%	697,855	PER	86,002	8.11	226	1,835
Senior Center	61	910,810	50.00%	455,405	PER	86,002	5.30	226	1,197
Neighborhood Center	61	1,039,070	50.00%	519,535	PER	86,002	6.04	226	1,366
Total Community Services		$ 5,643,040							$ 7,418
Non-Departmental									
Non-Departmental	61	$ 3,195,530	0.00%	$ -	PER	86,002	-	226	$ -
Total Non-Departmental		$ 3,195,530							$ -
TOTAL EXPENDITURE		**$ 71,173,350**							**$ 100,063**

Footnotes:

(a) Per City of Lake Elsinore Annual Operating Budget for Fiscal Year 2024-25.

(b) The marginal increase represents the impact to the City's expenditure due to the nature of the expenditure relative to the Project.

(c) Based on (1) 71,452, City of Lake Elsinore residents, California Department of Finance, January 1, 2024, (2) 29,100, total City of Lake Elsinore employees and (3) City employment reduced by 50% to account for the estimated less frequent use of City public services by employees than residents.
"PER" = Per Equivalent Resident.

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 9 - Fire Service Tax Credit Calculation
October 01, 2024

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County Structure Fire Protection				
Total Assessed Value			$	211,508,808
Basic Tax				1.00%
Total Ad Valorem Tax		[1]	$	2,115,088
County Share of the Basic Tax for Structure Fire Protection	(a)	[2]		4.73%
Total Fire Service Tax Credit		**[3]=[1]x[2]**	**$**	**100,052**
City of Lake Elsinore Fire Services Cost				
Fire Services	(b)		$	12,136,450
Fire Prevention	(b)			894,900
Total Fire Services Cost		[4]	$	13,031,350
Marginal Increase	(c)			100%
Net Fire Services Cost			$	13,031,350
Total Equivalent Residents	(d)	[5]		86,002
Factor		[6]=[4]/[5]	$	151.52
Proposed Project Equivalent Residents		[7]		226
Total Fire Services Cost for the Proposed Project		**[8]=[7]*[6]**	**$**	**34,261**
Net Fire Services and Fire Prevention Cost	**(e)**		**$**	**-**

Footnotes:

(a) The City contracts with the County of Riverside for a full range of fire protection, fire prevention, rescue, fire marshal and medical emergency services. The County receives approximately 4.73% share of the basic 1% property tax to fund the fire protection services. Hence, the City receives credit for structural fire fund taxes received by the County to offset its annual fire protection contract.

(b) Per City of Lake Elsinore Annual Operating Budget for Fiscal Year 2024-25, Page 61.

(c) The marginal increase represents the impact to the City's expenditure due to the nature of the expenditure relative to the

(d) Based on (1) 71,452, City of Lake Elsinore residents, California Department of Finance, January 1, 2024, (2) 29,100, total City of Lake Elsinore employees and (3) City employment reduced by 50% to account for the estimated less frequent use of City public services by employees than residents.

(e) The fire services tax credit generated by the project exceeds the fire services cost to serve the Proposed Project. Hence, it is assumed that the Proposed Project will not incur additional fire services cost.

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 10 - Maintenance CFD Summary
October 01, 2024

City of Lake Elsinore CFD 2015-2 ("Maintenance CFD")

Revenue:			
Total Project Acreage	(a)		65.81
Estimated Special Tax per Acre	(b)	$	941
Total Maintenance CFD Revenue		**$**	**61,914**
Expenditure			
ROW Items along Baker Street and Pierce Street	(b)	$	61,914
Total Services CFD Estimated Cost		**$**	**61,914**
Total Maintenance CFD Fiscal Surplus (Deficit)		**$**	**-**

Footnotes:

(a) See Table 3 - Land use Assumptions.

(c) Reflects the revenue generated by the City of Lake Elsinore CFD 2015-2 once the project is annexed into the CFD. Please note that the special tax amount is preliminary and subject to change. The special tax is based on the cost estimate for maintenance of ROW landscaping, street sweeping, street trees, side walk, pavement management and parks. The quantity for these items are preliminary estimates. A detailed Maintenacne Exhibit need to be prepared by the developer and approved by the City to accuratley estimate the cost for CFD 2015-2.

Exhibit A
Riverside Legacy
Baker and Pierce Street Development
City of Lake Elsinore
Table 11 - Fee Payment Summary
October 01, 2024

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Development Impact Fees (City of Lake Elsinore)		Fee	Per	Building 1 Units	Building 1 Total Fee	Building 2 Units	Building 2 Total Fee	Project Total
Traffic Impact Fee	[1]	$ 0.81	SF	212,028	$ 171,743	788,423	$ 638,623	$ 810,365
City Hall & Public Works	[1]	36	1,000 SF	212	7,633	788	28,383	36,016
Fire Facility	[1]	159	1,000 SF	212	33,712	788	125,359	159,072
Park Capital Improvement Fund	[1]	0.10	SF	212,028	21,203	788,423	78,842	100,045
Storm Drain Capital Improvement Fund	[1]	12,703	Acre	13.95	177,172	51.86	658,812	835,984
Sub-Total:					**$ 411,463**		**$ 1,530,020**	**$ 1,941,483**
City of Lake Elsinore - Building Permit Fees								
Base Permit Fee (Average)	[7]	FORMULA			$ 107,206		$ 397,339	$ 504,545
Plan Check Fee (Average)	[7]	FORMULA			80,404		298,004	378,408
Plan Review Fee	[7]	FORMULA			16,081		59,601	75,682
Electrical Permit (Estimate)	[7]	ESTIMATE			2,000		2,000	4,000
Mechanical Permit (Estimate)	[7]	ESTIMATE			2,000		2,000	4,000
Plumbing Permit (Estimate)	[7]	ESTIMATE			2,000		2,000	4,000
Green Building Fee	[7]	0.00004	of Valuation		899		3,342	4,241
Seismic Fee	[7]	0.00028	of Valuation		6,291		23,394	29,685
Photovoltaic Fees (Estimate)	[7]	ESTIMATE			5,000		5,000	10,000
Fire Plan Check Fee	[7]	ESTIMATE			3,000		3,000	6,000
Fire Sprinkler Plan Review and Inspection	[7]	ESTIMATE			3,000		3,000	6,000
Fire Alarm Plan Review and Inspection	[7]	ESTIMATE			3,000		3,000	6,000
Sub-Total:					**$ 230,881**		**$ 801,679**	**$ 1,032,560**
Total Fees Paid to City of Lake Elsinore								**$ 2,974,043**
Elsinore Valley Municipal Water District								
Domestic Water Connection Fee (2" Meter)	[2]	$ 87,401	Meter	1	$ 87,401	2	$ 174,802	$ 262,203
Irrigation Water Connection Fee (1.5" Meter)	[2]	54,662	Meter	1	54,662	2	109,324	163,986
Sewer Connection Fee	[2]	1,180	1,000 SF	212	250,265	788	930,607	1,180,872
Sub-Total:					**$ 392,328**		**$ 1,214,733**	**$ 1,607,061**
County of Riverside								
TUMF	[3]	$ 2.33	SF	204,330	$ 476,089	411,832	$ 959,569	$ 1,435,658
MSHCP	[4]	19,615	Acre	13.95	273,576	51.86	1,017,287	1,290,863
Stephen's Kangaroo Rat Fee	[5]	500	Acre	13.95	6,974	51.86	25,931	32,905
Sub-Total:					**$ 756,638**		**$ 2,002,788**	**$ 2,759,426**
Lake Elsinore Unified School District								
School Developer Fee	[6]	0.84	SF	212,028	$ 178,104	788,423	$ 662,275	$ 840,379
Sub-Total:					**$ 178,104**		**$ 662,275**	**$ 840,379**
Total Fees Paid to Other Agencies								**$ 5,206,867**

Footnotes:

*The analysis above does not include additional mitigation measures that may be imposed on the project (public improvements, etc.) as part of the Conditions of Approval ("COA") or the Development Agreement ("DA").

[1] Represents the applicable development impact fees per the City of Lake Elsinore ("City") Fee Schedule, effective 1/1/2022.

[2] Reflects the applicable Water and Sewer Connection fees per the Elsinore Valley Municipal Water District ("EVMWD") Fee Schedule effective 7/1/2024.

[3] Reflects the applicable TUMF as of 1/1/2025.

[4] Reflects the applicable MSHCP as of 7/1/2024.

[5] Reflects the KRAT fees for the project.

[6] The State Allocation Board approved the maximum level I School Fee of $0.84 per square foot on 1/24/2024. It is anticipated that Lake Elsinore Unified School District ("LEUSD") will prepare a Fee Justification Study to increase the Level I School Fees to the maximum allowed rate.

[7] Building permit fee estimates per City's building permit fee schedule, County Fire Fee Schedule, and sample permits.

Exhibit B
Riverside Legacy
Baker and Pierce Street Development
Table 1 - Land Use Assumptions
October 01, 2024

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I. Assessed Value	SF (a)	Assessed Value per SF (a)	Total Assessed Value
High Cube Warehouse (Bldg. 1)	202,028	$ 208	$ 42,014,012
High Cube Warehouse (Bldg. 2)	768,423	208	159,802,271
High Cube Warehouse - Office (Bldg. 1)	10,000	208	2,079,613
High Cube Warehouse - Office (Bldg. 2)	20,000	208	4,159,227
Off-site Improvements			3,415,000
Total Non-Residential Assessed Value			**$ 211,470,123**

II. Project Population	Total SF	SF per Employee (b)	Total FTE Employees	IMPLAN Employee Conversion rate (c)	Total Full-time, Part-time and seasonal Employees
High Cube Warehouse (Bldg. 1)	202,028	2,469	82	0.9379	87
High Cube Warehouse (Bldg. 2)	768,423	2,469	311	0.9379	332
High Cube Warehouse - Office (Bldg. 1)	10,000	507	20	0.9245	21
High Cube Warehouse - Office (Bldg. 2)	20,000	507	39	0.9245	43
Total Non- Residential Employees			**452**		**483**

Footnotes:

(a) Per Riverside Legacy as of as of 9/18/2024.

(b) Per 2018 Commercial Building Energy Consumption Survey, Table B2 published by U.S. Energy Information Administration.

(c) IMPLAN conversion rates are used to convert the FTE number to full-time, part-time and seasonal number (Total Employment). The Total Employment is calculated by dividing the FTE number by the IMPLAN conversion rate.

Exhibit B
Riverside Legacy
Baker and Pierce Street Development
Table 2 - Economic Benefit Analysis Summary
October 01, 2024

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Average Annual Construction Period Impacts
18 Months Construction Period

Jobs	Labor Income
Direct Effect **999**	Direct Effect **$63.74 Million**
Indirect Effect **156**	Indirect Effect **$9.41 Million**
Induced Effect **249**	Induced Effect **$11.94 Million**
Total Average Annual Number of Jobs **1,404**	Total Average Annual Labor Income **$85.09 Million**

Permanent Ongoing Annual Impacts

Jobs	Labor Income
Direct Effect **483**	Direct Effect **$29.91 Million**
Indirect Effect **144**	Indirect Effect **$7.33 Million**
Induced Effect **121**	Induced Effect **$5.8 Million**
Total Average Annual Number of Jobs **748**	Total Average Annual Labor Income **$43.04 Million**

Cumulative
Construction Period Impacts

18 Months Cumulative Labor Income
$127.64 Million

Exhibit B
Riverside Legacy
Baker and Pierce Street Development
Table 2 - Construction Period Impacts
October 1, 2024

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Average Annual Jobs Created During Construction Period (a)

Employment Impact	Jobs	Description
Direct Effect	**999**	Represents direct onsite construction-related jobs.
Indirect Effect	**156**	Represents jobs created as a result of new business to business spending in the local economy.
Induced Effect	**249**	Represents jobs created as a result of spending by new direct and indirect employees in the local economy.
Total	**1,404**	

Average Annual Labor Income Generated During Construction Period (a)

Labor Income Impact	Labor Income	Description
Direct Effect	**$63.74 Million**	Represents direct onsite construction labor income.
Indirect Effect	**$9.41 Million**	Represents labor income generated as a result of new business to business spending in the local economy.
Induced Effect	**$11.94 Million**	Represents labor income generated as a result of spending by new direct and indirect employees in the local economy.
Total	**$85.09 Million**	

Footnotes:
(a) Calculated using IMPLAN, a nationally recognized economic modeling system. Riverside County is the study area. Jobs are reported as all jobs (full-time, part-time, and seasonal).

Exhibit B
Riverside Legacy
Baker and Pierce Street Development
Table 3 - Ongoing Annual Impacts
October 1, 2024

DRAFT

Total Ongoing Annual Number of Jobs Created (a)

Employment Impact	Total Jobs	Description
Direct Effect (b)	**483**	Represents direct onsite jobs created by the operations of the new facilities.
Indirect Effect	**144**	Represents jobs created as a result of new business to business spending in the local economy.
Induced Effect	**121**	Represents jobs created as a result of spending by new direct and indirect employees in the local economy.
Total	**748**	

Total Ongoing Annual Labor Income Generated (a)

Labor Income Impact	Total Labor Income	Description
Direct Effect	**$29.91 Million**	Represents labor income generated by the operations of the new facilities
Indirect Effect	**$7.33 Million**	Represents labor income generated from new business to business spending in the local economy.
Induced Effect	**$5.8 Million**	Represents labor income generated by spending of new direct and indirect employees in the local economy.
Total	**$43.04 Million**	

Footnotes:
(a) Calculated using IMPLAN, a nationally recognized economic modeling system. Riverside County is the study area. Jobs are reported as all jobs (full-time, part-time, and seasonal).
(b) 452 full-time equivalent direct jobs were converted to 483 full-time, part-time and seasonal jobs using IMPLAN industry sector conversion factors.

Exhibit B
Riverside Legacy
Baker and Pierce Street Development
Table 4 - Top 10 Industries Affected
October 1, 2024

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Total Ongoing Annual Top 10 Industries Affected (a) (b)

Rank	Industry	Jobs
1	Warehousing and Storage	459
2	Office Administrative Services	67
3	Other Real Estate	33
4	Employment Services	19
5	Limited-Service Restaurants	9
6	Couriers and Messengers	9
7	Full-Service Restaurants	8
8	Individual and Family Services	6
9	All Other Food and Drinking Places	5
10	Services to Buildings	5

Footnotes:

(a) Calculated using IMPLAN, a nationally recognized economic modeling system. Riverside County is the study area. Jobs are reported as all jobs (full-time, part-time, and seasonal).

(b) Jobs by Top Ten industries affected by the new commercial activity and local spending as a result of the new Project.

APPENDIX B

EVMWD PLANNED DEVELOPMENTS

Planned Developments Since 2024 WSMP

Ref No.	Project Name	Project Type	Project Status	Acre	Water Demand (AFY)
500	Mixed Use Commercial Center	Mixed Use	PLAN	7.5	14.3
501	SFR APN 375321022,375321023, 375321024	Medium High Density Residential	PLAN	0.3	0.8
506	74 Commerce Park	Mixed Use	PLAN	29.4	56.1
508	Vine St Development	Medium Density Residential	PLAN	8.8	21.7
511	JJS Holdings Cannabis Facility	Commercial	PLAN	0.8	2.2
512	Glen Ivy Senior Living	Medium High Density Residential	PLAN	10.1	27.1
513	Tract 38378	Medium High Density Residential	PLAN	17.4	46.8
514	SFR APN 365-240-003	Low Density Residential	PLAN	2.1	2.9
518	Paragon Framing Facility Wildomar	Commercial	PLAN	6.4	16.6
519	APN #374-201-001 Reflections 36 Unit CMU	Mixed Use	PLAN	1.3	2.4
520	The Cottages at Wildomar	High Density Residential	PC	8.9	26.0
521	Largo Concrete Wildomar Plant	Industrial	PC	8.4	6.6
522	SFR APN 378-244-008	Medium Density Residential	PLAN	0.2	0.4
525	Glen Eden Community Water & Sewer	Medium Density Residential	PLAN	42.7	105.2
526	Hampton Inn & Suites	Commercial	PLAN	2.8	7.2
529	SFD - Skyline Dr	Low Medium Density Residential	PLAN	0.4	0.9
530	Beyond Foods	Commercial	PC	4.2	10.9
531	LE City Hall Onsite	Public Institutional	PC	0.6	0.8
532	Coyote Cove	Medium Density Residential	PLAN	14.9	36.8
535	Glen Ivy Village Hotel & Resort	Commercial	PLAN	10.0	25.7
539	Dream Center - Congregate Living	Public Institutional	PLAN	0.8	1.2
540	Minthorn Industrial	Industrial	PLAN	3.4	2.7
541	Elsinore Market	Commercial	PLAN	0.5	1.2
542	Pasadena Industrial Building	Industrial	PLAN	0.6	0.5
544	13205 Temescal Canyon	Medium Density Residential	PLAN	5.5	13.5
545	SFR APN 375-022-006	Medium High Density Residential	PLAN	0.1	0.2
550	Church & Mortuary (Muslim Mortuary Cemetery)	Public Institutional	PLAN	46.3	67.4
553	Collier Commercial Building	Commercial	PLAN	0.7	1.7
554	SFR APN#345-220-009	Low Density Residential	PLAN	2.1	2.9

555	4-Plex	Mixed Use	PLAN	0.2	0.4
557	Ringside Bar & Grill APN 379-191-029	Commercial	PLAN	0.3	0.9
558	SFR APN 375-343-021	Medium Density Residential	PLAN	0.2	0.4
559	O'Reilly Auto Parts Wildomar	Commercial	PLAN	2.4	6.2
560	SFR APN 379-214-015	Medium High Density Residential	PLAN	0.1	0.3
562	Fourplex Multi-Family Dwelling	Medium High Density Residential	PC	0.3	0.8
563	18181 Collier Ave - Daves Auto Recking	Commercial	PLAN	2.8	7.1
564	Riverside Drive Apartments APN# 379-315-033	High Density Residential	PLAN	5.0	14.5
566	SFR APN 373-231-007	Medium High Density Residential	PLAN	0.1	0.3
568	SFR 2 Lots - APN 367-050-050	Low Density Residential	PLAN	1.7	2.3
569	Drive Thru Restaurant APN 370-050-034	Commercial	PLAN	0.6	1.6
571	Lake Elsinore Medical Campus - College for Nurses	Public Institutional	PLAN	0.2	0.2
572	SFR APN# 381-248-033	Medium High Density Residential	PLAN	0.1	0.2
573	Starbucks - 18295 Collier Ave	Commercial	PLAN	1.0	2.5
574	Alberhill Ranch Commercial - (APN 389-200-031)	Commercial	PLAN	1.4	3.6
576	Blackwell Blvd Residential Project	Medium Density Residential	PC	0.5	1.2
579	SFR With ADU APN# 374-081-013	Medium Density Residential	PLAN	0.2	0.5
582	Bundy Canyon Plaza Phase 1	Commercial	COMP	3.0	7.6
583	Nursery APN 349-040-019	Commercial	PLAN	5.7	14.6
584	Contractor Yard APN 347-100-001	Commercial	PLAN	13.8	35.5
585	Lakefront Plaza Commercial Center	Commercial	PLAN	2.0	5.2
586	West Nichols Logistics Center	Industrial	PLAN	80.6	63.2
587	Commercial Building APN 347-090-005	Commercial	PLAN	2.8	7.2
588	150 SFR Specific Plan PM 17508	Low Density Residential	PLAN	110.9	149.1
589	Church - Bundy Canyon APN 367-270-021	Public Institutional	PLAN	3.3	4.8
590	Ellis St Duplex APN 377-244-004	Medium High Density Residential	PLAN	0.2	0.4
591	Audrey Townhomes APN 379-150-051	Medium High Density Residential	PLAN	1.0	2.8
592	JC Industries Cabinet Shop	Commercial	PLAN	0.6	1.6
596	SFR W/ADU APN 374-093-015	Medium Density Residential	PC	0.2	0.5
597	SFR APN 362-250-029	Very Low Density Residential	COMP	2.6	2.0
598	SFR APN 375-124-004, -005, -006	Medium Density Residential	PLAN	0.2	0.5
599	SFR APN 375-041-055	Medium High Density Residential	PLAN	0.1	0.3
600	SFR APN 381-281-021	Medium High Density Residential	PLAN	0.1	0.4

603	Cedar Investment Grp, (APN 373-082-022, 023-026)	Mixed Use	PLAN	0.5	1.0
604	Mixed Use - (APN 380-230-007)	Mixed Use	PLAN	11.8	22.5
605	Sycamore Academy Expansion APN 380-170-021	Public Institutional	PLAN	4.0	5.9
607	Skydive Elsinore	Commercial	COMP	134.0	345.2
609	Commercial Retail (APN 366-290-007, 008)	Commercial	PLAN	6.2	16.1
612	75-Unit Affordable Apartments	High Density Residential	PLAN	3.5	10.3
613	Mobile Home - APN 349-300-033	Medium Density Residential	PLAN	2.0	4.9
615	SFR - APN 361-021-022	Very Low Density Residential	PLAN	2.3	1.8
617	Supply Nursery	Commercial	PLAN	3.4	8.8
618	8-Unit Condos	High Density Residential	PLAN	0.5	1.4
619	TR 31779 - Andaya Homes	Low Density Residential	PLAN	2.0	2.7
620	Elsinore Heights	Industrial	PLAN	58.4	45.8
621	Commercial Retail - (380-120-012, 013)	Commercial	PLAN	4.7	12.0
623	Multi-Family Residential APN 374-060-004	Medium Density Residential	PLAN	0.4	1.0
624	Lakeshore Dutch Bros	Commercial	PLAN	1.3	3.3
625	Single Family Residence	Medium Density Residential	PLAN	0.2	0.4
626	Westley Road Development	Medium Density Residential	PLAN	83.3	205.3
627	Senior Apts - [23-113]	High Density Residential	PLAN	3.5	10.1
628	SFR - (Brian Rasmussen)	Low Medium Density Residential	PLAN	0.3	0.8
629	SFR (James Clark)	Medium High Density Residential	PLAN	0.1	0.3
630	Canyon Hills SF2 zoning to MF2 Zoning	Medium High Density Residential	PLAN	145.5	391.1
631	MultiFamily Residential	Medium Density Residential	PLAN	0.4	1.0
633	Rezzo Coffee and Strawberry Stand	Commercial	PLAN	0.4	1.0
634	SFR (Guillermo Gonzalez)	Medium High Density Residential	PLAN	0.1	0.2
635	SFR (Juan Hernandez)	Low Density Residential	PLAN	2.1	2.9
636	Ellis Apartment Complex	Medium High Density Residential	PLAN	0.6	1.6
637	SFR 32545 Machado St	Low Density Residential	PLAN	0.4	0.6
638	Horizon Manufactured Homes	Medium Density Residential	PLAN	0.5	1.2
640	16912 Ulmer St	High Density Residential	PLAN	0.1	0.2
641	SFR-Ryan Ave	Low Density Residential	PC	0.5	0.7
643	SFR - 24853 Fir Street	Low Medium Density Residential	PLAN	0.2	0.5
645	MFD 811 W Graham Ave Lakeview Plaza	High Density Residential	PLAN	0.3	1.0
646	Palomar at Wesley Tract Offsite Sewer Analysis	Medium Density Residential	PC	16.1	39.7

649	Elsinore Valley Cemetery Admin Building	Public Institutional	PLAN	1.3	1.8
650	SFR-Barber St	Medium High Density Residential	PLAN	0.1	0.3
651	SFR-Lash Ave	Medium High Density Residential	PLAN	0.1	0.3
652	Holladay Lake Elsinore Extended Stay Hotel (Echo Suites Hotel)	Commercial	PLAN	3.0	7.6
654	SFR-Head Circle	Low Density Residential	PLAN	0.4	0.5
655	SFR Kansas Street	Medium High Density Residential	PLAN	0.1	0.3
658	SFR-Strickland Ave	Medium Density Residential	PLAN	0.3	0.7
659	Bundy Canyon Plaza Phase 2	Commercial	INSP	2.9	7.4
664	Lakeland Village Community Child Care Center (DD)	Public Institutional	PLAN	9.2	13.5
667	SFR- Reid Street	Medium High Density Residential	PLAN	0.1	0.3
678	The Pottery	High Density Residential	PLAN	0.8	2.2
681	SFR-Gunnerson Manufactured Home	Low Medium Density Residential	PLAN	0.3	0.7
683	SFR- 22155 Village Way	Low Medium Density Residential	PLAN	0.3	0.6
685	SFR- Nebraska Street	Medium High Density Residential	PLAN	0.1	0.3
686	SFR Herbert St-Muniz Residence (DD)	Low Medium Density Residential	PLAN	0.2	0.5
687	SFR -17 Morton Ave (DD)	Medium High Density Residential	PLAN	0.1	0.3
688	SFR-Hove	Medium Density Residential	PLAN	13.1	32.3
689	SFR- Arredondo	Medium Density Residential	PLAN	5.1	12.5
691	MFD - Bundy Canyon Road	Medium High Density Residential	PLAN	44.9	120.8
693	SFR - 16297 Gunnerson St	Medium High Density Residential	PLAN	0.1	0.3
694	Commercial - 28067 Highway 74	Commercial	PLAN	2.3	6.0
698	Sumner Single Family Residence	Medium Density Residential	PLAN	0.2	0.5
700	MFD - 34861 Orange ST	Medium Density Residential	PLAN	5.0	12.3
701	SFD - 603 W Sumner Ave	Medium High Density Residential	PLAN	0.2	0.5
710	MFD - Rose Ave	Medium High Density Residential	PLAN	0.7	1.8
712	SFD Palm Ave	Medium High Density Residential	PLAN	0.1	0.2
713	SFR Riverside	High Density Residential	PLAN	0.1	0.2
715	Gas Station and Convenience Store (Corydon Gateway Commercial)))	Commercial	PLAN	1.1	2.8
716	132 E Sumner Ave Lake Elsinore, CA 92530	High Density Residential	PLAN	0.2	0.6
717	2024-00640-DD	Medium Density Residential	PLAN	9.3	23.0
718	Hildebrand Residence	Medium Density Residential	PLAN	3.3	8.1
719	Mission Tr Massage Parlor	Commercial	PLAN	1.8	4.7
720	SFD Robert St (Perris)	Medium Density Residential	PLAN	2.4	5.8

722	TRACT Development - Wildomar Johnson Property	Medium High Density Residential	PLAN	19.3	51.9
724	SFD Park Way	Medium High Density Residential	PLAN	0.1	0.4
725	22610 Canyon Lake Drive North	Medium Density Residential	INSP	0.2	0.4
727	SFD Vacation Dr	Medium Density Residential	PLAN	0.2	0.4
728	SFD 21488 Grand Ave	Medium Density Residential	PLAN	0.2	0.4
729	SFD Illinois St	Medium High Density Residential	PLAN	0.1	0.2
730	Lakeland Terrace Tract Development	Low Medium Density Residential	PLAN	69.3	155.2
732	SFD - Wheeler St	Medium High Density Residential	PLAN	0.1	0.3
733	MFD - Main St	High Density Residential	PLAN	0.2	0.6
736	SFR - Grand Ave	Medium Density Residential	PLAN	2.3	5.8
737	MFD - Grand Ave	Medium Density Residential	PLAN	9.7	23.9

APPENDIX C

EVMWD GSAS' AUTHORIZATIONS

RESOLUTION NO. 17-01-01

A RESOLUTION OF THE ELSINORE VALLEY MUNICIPAL WATER DISTRICT ELECTING TO BE THE GROUNDWATER SUSTAINABILITY AGENCY (GSA) FOR THE ELSINORE VALLEY SUBBASIN

WHEREAS, the Elsinore Valley Municipal Water District relies on groundwater in the Elsinore Groundwater Basin (Elsinore Basin) for a significant portion of its water supply; and

WHEREAS, Elsinore Valley Municipal Water District adopted a Groundwater Management Plan in 2005 for areas within the Elsinore Basin; and

WHEREAS, recognizing the importance of groundwater to communities like those served by the Elsinore Valley Municipal Water District, the California Legislature enacted the Sustainable Groundwater Management Act of 2014 (California Water Code § 10720 et seq.) ("SGMA"), which provides local agencies with important new groundwater management tools to achieve sustainable groundwater use; and

WHEREAS, the legislative intent of SGMA is to, among other goals, provide for sustainable management of groundwater basins and sub-basins defined by the California Department of Water Resources (DWR) to enhance local management of groundwater, to establish minimum standards for sustainable groundwater management, and to provide specified local agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater; and

WHEREAS, Water Code § 10723(a) authorizes a local agency with water supply or water management responsibilities overlying a groundwater basin to elect to become a Groundwater Sustainability Agency (GSA) under SGMA: and

WHEREAS, SGMA specifies the authorities and responsibilities assigned to GSA's; and

WHEREAS, pursuant to SGMA, groundwater management of high and medium priority basins as designated by DWR is now required; and

WHEREAS, DWR has designated the Elsinore Basin as a high priority basin, requiring that it be managed pursuant to SGMA; and

WHEREAS, as required by SGMA, DWR adopted emergency regulations (Code of California Regulations, Title 23, Chapter 1.5, Subchapter 1. Groundwater Basin Boundaries, §§ 340 — 346.60) ("Regulations")) describing the process by which local agencies may request changes to groundwater basin boundaries identified in DWR Bulletin 118 to better align with scientific or jurisdictional boundaries; and

WHEREAS, Elsinore Valley Municipal Water District, the City of Corona ("Corona") and Temescal Valley Water District ("TVWD") jointly requested the Elsinore Basin be split into two distinct groundwater areas and that the outer edges of the Elsinore Basin boundaries, as described in Bulletin 118, be changed to more closely align with the physical limits of the basin's alluvial sediments; and

WHEREAS, on October 11, 2016, the California Water Commission approved the subject request and established two subbasins within the Elsinore Basin; the southerly Elsinore Valley Subbasin (Bulletin 118 Basin No. #8-004.01) and the northerly Bedford-Coldwater Subbasin (#8-004.02); and

WHEREAS, the current service areas of Corona, TVWD, or any other retail water agency do not cover any portion of the Elsinore Valley Subbasin; and

WHEREAS, the entire Elsinore Valley Subbasin lies within Elsinore Valley Municipal Water District's service area including its Sphere of Influence, as approved by the Riverside County Local Agency Formation Commission (LAFCO); and

WHEREAS, Elsinore Valley Municipal Water District is willing to continue to manage groundwater in compliance with SGMA within the Elsinore Valley Subbasin; and

WHEREAS, Elsinore Valley Municipal Water District intends to work cooperatively with Corona and TWVD for the joint sustainable management of the Bedford-Coldwater Subbasin in compliance with SGMA; and

WHEREAS, California Water Code § 10723.8 requires that a local agency electing to serve as a GSA notify DWR within 30 days of the local agency's election to become a GSA authorized to undertake sustainable groundwater management within a basin; and

WHEREAS, California Water Code § 10723.8 mandates that 90 days following the posting by DWR of the focal agency's notice of election to become a GSA that entity shall be presumed to be the exclusive GSA for the area within the basin the agency is managing as described in the notice, provided that no other GSA formation notice covering the same area has been submitted to DWR; and

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE ELSINORE VALLEY MUNICIPAL WATER DISTRICT, AS FOLLOWS:

Section 1. Elsinore Valley Municipal Water District hereby elects to be the exclusive GSA for the Elsinore Valley Subbasin (Bulletin 118 Basin No. #8-004.01).

Section 2. Elsinore Valley Municipal Water District staff is directed to submit to DWR, within thirty (30) days of the approval of this Resolution, the notice and supporting documentation required by Water Code § 10723.8 and any other documentation required by SGMA to support Elsinore Valley Municipal Water District's formation of a GSA over the Elsinore Valley Subbasin.

Section 3. The General Manager, or his designee, is authorized to prepare or modify such documents as are necessary to meet DWR requirements for posting of Elsinore Valley Municipal Water District's notice of intent to be the Elsinore Valley Subbasin GSA, pursuant to SGMA.

Section 4. The approval of this Resolution and the actions described herein are categorically exempt from the requirements of the California Environmental Quality Act (CEQA) since: (1) they constitute a reorganization of local governmental agencies which does not change the geographical area in which previously existing powers are exercised (State CEQA Guidelines, § 15320); (2) the Resolution results in the formation of an agency only and not the approval of any project or proposal containing enough "meaningful information for environmental assessment" (State CEQA Guidelines 15004); and (3) it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment. (State CEQA Guidelines 15061(b)(3).) Staff is directed to file and post within five (5) business days the attached Notice of Exemption with the Clerk of the Board of Supervisors of Riverside County.

Section 5. This declaration shall take effect from and after its adoption.

APPROVED, ADOPTED AND SIGNED this 12th day of January, 2017.

Harvey Ryan, President of the
Board of Directors of
Elsinore Valley Municipal Water District

ATTEST:

Terese Quintanar, Secretary of the
Board of Directors of
Elsinore Valley Municipal Water District

STATE OF CALIFORNIA)
) ss:
COUNTY OF RIVERSIDE)

I, Terese Quintanar, Secretary of the Board of Directors of the Elsinore Valley Municipal Water District, do hereby certify that the foregoing Resolution No. 17-01-01, was duly adopted by said Board at its Regular Meeting held on January 9, 2017, and that it was so adopted by the following roll call vote:

AYES:	Cambero, Horton, Morris, Williams, Ryan
NOES:	None
ABSENT:	None
ABSTAIN:	None

Terese Quintanar, Secretary of the
Board of Directors of the
Elsinore Valley Municipal Water District

JOINT POWERS AGREEMENT

by and among

THE CITY OF CORONA,
a California general law city,

ELSINORE VALLEY MUNICIPAL
WATER DISTRICT,
a municipal water district

and

TEMESCAL VALLEY WATER DISTRICT,
a California water district

for the formation of a joint powers authority and management of

THE BEDFORD-COLDWATER SUB-BASIN
OF THE ELSINORE BASIN

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JOINT POWERS AGREEMENT BY AND AMONG THE CITY OF CORONA, ELSINORE VALLEY MUNICIPAL WATER DISTRICT, AND TEMESCAL VALLEY WATER DISTRICT FOR THE FORMATION OF A JOINT POWERS AUTHORITY AND MANAGEMENT OF THE BEDFORD-COLDWATER SUB-BASIN OF THE ELSINORE BASIN

THIS JOINT POWERS AGREEMENT ("Agreement") is entered into as of March 29, 2017, by and between the CITY OF CORONA ("Corona"), a California General Law City organized and existing under the laws of the State of California, ELSINORE VALLEY MUNICIPAL WATER DISTRICT ("EVMWD"), a Municipal Water District organized under Water Code §§ 71000 et seq., and the TEMESCAL VALLEY WATER DISTRICT ("TVWD"), a California Water District organized under California Water Code §§ 34000 et seq., hereinafter collectively referred to as "Members", with reference to the following:

A. WHEREAS, in September 2014, the Governor signed three bills (SB 1168, SB 1319, and AB 1739) into law creating the Sustainable Groundwater Management Act of 2014 ("SGMA"); and

B. WHEREAS, SGMA generally requires the formation of one or more Groundwater Sustainability Agencies ("GSA" or "GSAs") responsible for implementing sustainable groundwater management and preventing "undesirable results" in groundwater basins and sub-basins designated as a medium or high priority basin by the California Department of Water Resources ("DWR") in its Bulletin 118 inventory of California groundwater basins; and

C. WHEREAS, DWR has designated the Bedford-Coldwater Sub-Basin (the "Sub-Basin"), as a medium priority groundwater basin under Bulletin 118; and

D. WHEREAS, each of the Members overlies a portion of the Sub-Basin and exercises water management, water supply or land use authority within a portion of the Sub-Basin; and

E. WHEREAS, the Members are local agencies that can exercise powers related to groundwater management within their jurisdictional boundaries and qualify individually to serve as a GSA within portions of the Sub-Basin per Water Code Section 10723; and

F. WHEREAS, under SGMA, a combination of local agencies may elect to form a joint powers authority ("JPA") to serve as the GSA for all or portions of the Sub-Basin through a joint powers agreement; and

G. WHEREAS, the Members intend by this Agreement to create a JPA to implement SGMA in the entire Sub-Basin, and are authorized to enter into this Agreement pursuant to the Joint Exercise of Powers Act, Government Code §§ 6500 et seq., for the purpose of acting as a separate public agency that can carry out all obligations, and exercise all powers, of a GSA in all areas of the Sub-Basin; and

H. WHEREAS, under SGMA, a GSA, including a JPA composed of one or more SGMA-eligible local agencies, must file a notice of intent with DWR by June 30, 2017 indicating the GSA's intent to undertake sustainable groundwater management within all or portions of a groundwater basin; and

I. WHEREAS, the governing boards of each of the three Members have formally agreed to: (1) enter into this Agreement; (2) form a JPA that can jointly exercise the powers common to the Members and fulfill all legal obligations imposed by SGMA; and (3) authorize the JPA to promptly file all necessary documentation with DWR so as to permit the JPA to become the exclusive GSA for the entire Sub-Basin; and

J. WHEREAS, the Members further intend by this Agreement to provide for the management and funding commitments reasonably anticipated to be necessary for the above purposes and for the purpose of ensuring that the Sub-Basin is sustainably managed in accordance with the timelines established by SGMA; and

K. WHEREAS, the Members understand that Corona has entered into a Water Enterprise Management Agreement and a Wastewater Enterprise Management Agreement, both dated as of February 6, 2002, with the Corona Utility Authority ("CUA") for the maintenance, management and operation of those utility systems (collectively "the CUA Management Agreements"). To the extent that this Agreement is deemed to be a "material contract" under either of the CUA Management Agreements, Corona enters into this Agreement on behalf of the CUA and subject to the terms of the applicable CUA Management Agreements.

ACCORDINGLY, IT IS AGREED BY ALL MEMBERS:

1. RECITALS: The foregoing recitals are incorporated as terms of this Agreement.

2. DEFINITIONS: Unless otherwise required by the context, the following terms shall have the following meanings:

a. "Administering Member" shall mean the Member designated by the Authority Board to provide administration, operation and staffing of the Authority so as to ensure the Authority complies with this Agreement and all legal requirements. The Board is not required to designate an Administering Member, and a Member so designated is not required to accept the designation.

b. "Administrator" shall mean the individual selected to act as the chief executive of the Authority, and the person responsible for its day to day operations. The Administrator may, but it is not required to be, an employee of one of the Members.

c. "Authority" and "JPA" as used herein shall, unless otherwise noted, mean the "Bedford-Coldwater Groundwater Sustainability Authority," the separate public agency created by this Agreement and Government Code Sections 6507 and 6508, and the entity charged by this Agreement with becoming the exclusive GSA for the Sub-Basin.

d. "Board" or "Board of Directors," shall, unless otherwise indicated, mean the Board of Directors of the Authority.

e. "DWR" shall mean the California Department of Water Resources.

f. "Effective Date" shall mean the date on which all Members have signed this Agreement.

g. "Fiscal Year" shall run from July 1 through June 30.

h. "Groundwater Sustainability Agency" or "GSA" shall mean a groundwater sustainability agency as defined in SGMA, Water Code § 10721.

i. "Groundwater Sustainability Plan," "Plan," or "GSP" shall have the same meaning as provided in SGMA, Water Code § 10721.

j. "Member" shall mean any of the individual signatories to this Agreement, and "Members" shall collectively mean two or more of the signatories to this Agreement.

k. "SGMA" shall mean the Sustainable Groundwater Management Act of 2014, as amended, and any regulations of DWR or the State Water Resources Control Board that implement SGMA.

l. "Special Projects" shall mean projects that are consistent with, and within the scope of activities, authorized by this Agreement, but which are undertaken by fewer than all the Members in the name of the Authority in accordance with the procedures outlined in Sections 10 and 14.

m. "Sub-Basin" shall mean the Bedford-Coldwater Sub-Basin of the Elsinore Groundwater Basin, Sub-Basin No. 8-004.2, as identified in the most recent modifications of Bulletin 118 by DWR.

n. "SWRCB" shall mean the California State Water Resources Control Board.

3. CERTIFICATION: Each Member, as a signatory to this Agreement, certifies and declares that it is a public agency, as defined by Government Code § 6500, that is authorized to enter into a joint powers agreement to contract with each other for the joint exercise of any common power under Article 1, Chapter 5, Division 7, Title 1 of the Government Code or any power otherwise granted to one or more of the Members by SGMA.

4. CREATION OF SEPARATE AGENCY: There is hereby created, per Government Code §§ 6507 and 6508, an agency separate from the parties to the Agreement, and which is responsible for the administration of this Agreement, to be known as the "**BEDFORD-COLDWATER GROUNDWATER SUSTAINABILITY AUTHORITY**." Within thirty (30) days of the Effective Date of this Agreement, the Members, and/or the Authority shall: (a) cause a notice of this Agreement to be prepared and filed with the office of the California Secretary of State as required by Government Code § 6503.5; (b) file a copy of this Agreement with the State Controller per Government Code § 6503.6; and (c) file a copy of this Agreement with the Local Agency Formation Commission ("LAFCO") for Riverside County per Government Code § 6503.6.

5. PURPOSES AND MEMBER RESPONSIBILITIES: The Authority is formed with the purpose and intent of jointly creating a separate legal entity to fulfill the role and legal obligations of a GSA required by SGMA, to include complying with SGMA and ensuring sustainable groundwater management throughout the Sub-Basin, so that the Members may collaboratively and cost effectively develop, adopt, and implement a GSP for the Sub-Basin in

accordance with pertinent regulatory timelines. The geographic boundaries of the GSA that will be formed by the Authority, which will encompass the entire Sub-Basin, are as depicted in the map attached hereto as Exhibit "A," which is incorporated herein by reference. The Authority may also represent the Members, as appropriate, in discussions and transactions with other local agencies, to include (but not limited to) the development of inter-basin coordination agreements with other GSAs in Riverside County, and agreements with other local agencies or groundwater sustainability agencies as may be required to ensure compliance with SGMA for the Sub-Basin.

6. POWERS: The Members intend that the Authority provide for the joint exercise of powers common to the Members as such powers relate to the management of the Sub-Basin, and for the exercise of such additional powers as are conferred by law in order to meet the requirements of SGMA. The Members are each SGMA-eligible local agencies empowered by the laws of the State of California to exercise the powers specified in this Agreement, and such other powers as are granted to GSAs by SGMA. These common powers shall be exercised for the benefit of any one or more of the Members or otherwise in the manner set forth in this Agreement. Subject to the limitations set forth in this Agreement, the Authority shall have the powers to perform all acts necessary to accomplish its purposes as stated in this Agreement, as authorized by law, including but not limited to the following:

a. To make and/or assume contracts and to employ agents, employees, consultants and such other persons or firms as the Board may deem necessary, to the full extent of the Authority's power, including, but not limited to, engineering, hydrogeological, and other consultants, and with attorneys and accountants and financial advisors, for the purpose of providing any service required by the Authority to accomplish its purposes, or to otherwise take such actions as are necessary to ensure the Sub-Basin is managed in accordance with the requirements of SGMA;

b. To conduct all necessary research and investigations, and to compile appropriate reports and collect data from all available sources to assist in preparation and implementation of a GSP, and to support the development of such other agreements as may be necessary to ensure the Sub-Basin can be sustainably managed;

c. To cooperate, act in conjunction with, and contract with the United States, the State of California, or any agency thereof, the County of Riverside, or such other entities or persons as the Board may deem necessary to ensure that the Authority fulfills its obligations under SGMA;

d. To apply for, accept and receive licenses, permits, water rights, approvals, agreements, grants, loans, gifts, contributions, donations or other aid from any agency of the United States, the State of California or other public or private person or entity necessary for fulfilling the purposes of SGMA in the Sub-Basin;

e. To acquire by grant, purchase, lease, gift, devise, contract, construction, eminent domain or otherwise, and hold, use, enjoy, sell, let, and dispose of, real and personal property of every kind, including lands, water rights, structures, buildings, rights-of-way, easements, and privileges, and construct, maintain, alter, and operate any and all works or

improvements, within or outside the agency, necessary or proper to carry out any of the purposes of the Authority as specified in this Agreement and/or the requirements of SGMA;

f. To enforce the requirements of SGMA within the Sub-Basin to the extent authorized by law including, but not limited to, the imposition and collection of civil penalties as authorized by SGMA;

g. To sue and be sued in its own name;

h. To provide for the prosecution of, defense of, or other participation in actions or proceedings at law or in public meetings in which the Members, pursuant to this Agreement or otherwise pertaining to management of the Sub-Basin, may have an interest, and to employ counsel or other expert assistance for that purpose;

i. To adopt an initial operating budget and initial Member contributions within ninety (90) days of the execution of this Agreement, and an annual budget and Member contributions, by March 31 of each subsequent Fiscal Year;

j. To incur debts, liabilities or obligations, subject to the limitations provided in this Agreement;

k. To impose fees authorized by SGMA (Water Code §§ 10730-10731), without any limitation on a Member's separate ability to impose fees within its jurisdiction, to fund the cost of furthering the purposes of this Agreement, complying with SGMA, and sustainably managing groundwater within the Sub-Basin;

l. To adopt rules, regulations, policies and procedures for governing the operation of the GSA and adoption and implementation of the GSP consistent with the powers and purposes of the Authority and as authorized by SGMA;

m. To investigate legislation and proposed legislation affecting SGMA and the Sub-Basin and make appearances regarding such matters;

n. Subject to the limitations imposed by this Agreement, to take such actions as are deemed necessary by the Board to achieve the purposes stated above and to provide for the sustainable management of the Sub-Basin; and

o. To adopt and revise bylaws, rules, ordinances, and resolutions in a manner authorized by law and not inconsistent with the terms of this Agreement.

Any power necessary or incidental to the foregoing powers shall be exercised by the Authority in the manner provided for under the legal authority applicable to the City of Corona except as otherwise provided by law or in this Agreement.

7. OBLIGATIONS OR LIABILITIES OF AUTHORITY: No debt, liability or obligation of the Authority shall constitute a debt, liability or obligation of any of the Members, except as otherwise provided in this Agreement or unless otherwise required by law.

8. DESIGNATION OF ADMINISTERING MEMBER/ADMINISTRATOR: The powers of the Authority provided in this Agreement shall be exercised in the manner provided by this Agreement. The Board may designate an Administering Member and/or an Administrator to provide all or a portion of the administrative (or other) services required by this Agreement, SGMA, or other legal authority. However, whether or not the Board decides to designate an Administering Member, each Member shall nevertheless be responsible, when requested by the Board, for designating staff from their agency to coordinate with the Board and other Members, and for otherwise ensuring the Authority has sufficient staffing and administrative support to comply with this Agreement and other legal obligations.

9. ORGANIZATION:

a. Additional Members: The Board may allow additional members to join the Authority. Additional Members must be local agencies capable of being designated as a GSA under SGMA. The Board may set whatever conditions it deems necessary as a precondition to addition of the new Member, to include requiring the additional Members to reimburse the other Members for a proportionate share of the costs already incurred by the existing Members.

b. Bylaws: The Board shall adopt bylaws governing the management of the Authority within 180 days of the Effective Date. The bylaws shall require the Board to develop a conflict of interest code for the Authority compliant with California law, and to otherwise ensure that the Board operates in a manner that is fully compliant with the Brown Act, the Joint Exercise of Powers Act, Government Code §§ 6500 et seq., SGMA, and all other applicable legal requirements.

c. Committees: The Board may create committees as authorized by law.

d. Governing Board: The Authority shall be governed by a Board of Directors which shall be composed of one (1) elected representative of each Member, appointed by each Member. The governing body of each Member shall determine in its sole discretion the person it will appoint to the Authority Board of Directors. The Board of Directors shall receive no compensation from the JPA for serving on the Board of the JPA.

e. Meetings: Regular meetings of the Board may be held quarterly, or as the Board determines necessary, on such dates and times and at such locations as the Board shall fix by resolution. Special meetings of the Board shall be called in accordance with Government Code § 54956. All meetings of the Board shall comply with the provisions of the Ralph M. Brown Act (Government Code §§ 54950 et seq.).

f. Officers: The officers of the Authority shall be a Chairperson, and Vice-Chairperson, and such other officers as the Board shall designate. The election of officers will take place at the first meeting of the JPA Board, and subsequently in the first Board meeting of each new Fiscal Year unless the time of election is otherwise designated in the Authority bylaws. The officers or persons who have charge of, handle or have access to any property of the Authority shall be designated in the bylaws, and such officers and persons shall comply with all applicable requirements of Government Code § 6505.1.

g. Quorum: Two-thirds (2/3) of the Board of Directors shall constitute a quorum in order to conduct business.

h. Rules: The Board may adopt such other rules, policies, and regulations as it deems proper consistent with all applicable laws, this Agreement, and the Authority's bylaws.

i. Term: The Authority Board Members shall serve without terms and at the pleasure of the legislative body which appointed them.

j. Treasurer: The Treasurer of the Board shall be formally designated by a resolution adopted by the Board of Directors stating the effective date of the appointment and the term of the appointment.

k. Voting: Each Director shall have one vote. A simple majority of the quorum shall be required for the adoption of a motion, resolution, contract authorization or other action of the Board, except that:

(1) A majority vote of less than a quorum may vote to adjourn;

(2) Any of the following actions shall require a unanimous vote of the entire Board:

(a) Adoption, modification or alteration of the GSP, or of the GSA boundaries;

(b) Adoption of assessments, charges or fees;

(c) Adoption or modification of ramp-downs or curtailments;

(d) Initiation/settlement of enforcement actions;

(e) Adoption of an initial budget;

(f) Adoption or modification of the annual budget, as further described in Section 14, below;

(g) Initiation/termination or settlement of any litigation or threatened litigation that involves the Authority;

(h) Admission of additional Members to the Authority;

(i) Appointment, employment, or dismissal of the Authority's Administrator and/or Legal Counsel;

(j) Designating an Administrator or Administering Member;

(k) Setting the amounts of any contributions or fees to be made or paid to the Authority by any Member, including extraordinary costs as defined in Section 15;

(l) Acquisition by grant, purchase, lease, gift, devise, contract, construction, or otherwise, and hold, use, enjoy, sell, let, and dispose of, real and personal property of every kind, including lands, water rights, structures, buildings, rights-of-way, easements, and privileges, and construct, maintain, alter, and operate any and all works or improvements, within or outside the agency, necessary or proper to carry out any of the purposes of the Authority;

(m) Replacement of the annual special audit required by Government Code § 6505(f) with an audit covering a two year period;

(n) Amendments or modifications of this Agreement;

(o) Adoption or modification of bylaws or other binding rules governing the operations of the JPA Board;

(p) Adoption of ordinances;

(q) Issuance of bonds or other indebtedness;

(r) Allocating funding received from grants, loans, or from other alternative sources, in a manner that does not result in equal sharing of alternative funding among the Members;

(s) To apply for, accept and receive licenses, permits, water rights, approvals, agreements, grants, loans, gifts, contributions, donations or other aid from any agency of the United States, the State of California or other public or private person or entity necessary for fulfilling the purposes of SGMA in the Sub-Basin.

10. SPECIAL PROJECTS AND PROJECT COMMITTEES:

a. With the prior approval of the entire Board, Members may undertake Special Projects in the name of the Authority, utilizing the legal powers granted to the Authority under SGMA, the Joint Exercise of Powers Act, or other applicable legal authorities. All Members shall be given the opportunity to participate in Special Projects, but shall not be required to participate.

b. A Member considering a new project, other than a groundwater extraction project, where the project is reasonably likely to affect groundwater management in the Sub-Basin shall consult with the other Members before individually undertaking the project to determine whether that individual project might otherwise be better accomplished as an Authority Special Project.

c. Members electing to participate in a Special Project shall enter into a Special Project Agreement in accordance with Section 14.a(4) of this Agreement. Such Special Project Agreement shall provide that: (a) no Special Project undertaken pursuant to such agreement shall conflict with the terms of this Agreement or the GSP; (b) the Members to the Special Project Agreement shall indemnify, defend and hold harmless the Authority, and Members

of the Authority who are not participating in the Special Project, against any costs liabilities, or expenses of any kind arising as a result of the Special Project; (c) all benefits and liabilities attributable to a Special Project shall solely be the benefits and liabilities of the Members that have entered into the Special Project Agreement, and non-participating Members shall have no rights, and incur no obligations or liabilities, in the Special Project.

11. FISCAL AGENT, DEPOSITORY AND ACCOUNTING: The "Treasurer" appointed by the Board is designated as the fiscal agent and depository for the Authority per Government Code §§ 6505.5 and 6505.6. The Treasurer of the Authority shall be the treasurer of one of the Authority's Members, or a certified public accountant designated by the Board, or an officer or employee designated per Government Code § 6505.6. The Treasurer shall be the depositary and have custody of all money of the Authority, from whatever source, subject to the applicable provisions of any indenture or resolution providing for a trustee or other fiscal agent. All funds of the Authority shall be held in the operating fund established by Section 14, or such other separate accounts as may be necessary, in the name of the Authority and not commingled with the funds of any Member or any other person or entity. Full books and accounts shall be maintained for the Authority in accordance with generally accepted accounting principles applicable to governmental entities per Government Code §§ 6505 et seq., and any other applicable laws of the State of California.

12. ACCOUNTABILITY, REPORTS AND AUDITS: There shall be strict accountability of all funds, and an auditor designated by the Board shall report any and all receipts and disbursements to the Board with such frequency as shall reasonably be required by the Board. The Authority will utilize the services of an outside independent certified public accountant to make an annual audit of the accounts and records of the Authority as required by Government Code § 6505, unless the Members, elect to conduct the audit for a two (2) year period. In each case, the minimum requirements of the audit shall be those prescribed by the State Controller for special districts pursuant to Government Code § 26909, and shall conform to generally accepted accounting principles. The outside independent certified public accountant selected by the Authority as auditor shall be formally designated by a resolution adopted by the Board of Directors stating the effective date of the appointment and the term of the appointment.

13. OPERATING BUDGET AND EXPENDITURES: The Board shall adopt a budget as specified in the bylaws and as set forth in Section 14, below. Unless otherwise required by this Agreement or applicable law, the Authority's Treasurer shall draw checks or warrants or make payments as specified in the bylaws of the Authority. The Authority may, consistent with the bylaws, invest any money in the treasury that is not needed for its immediate necessities.

14. CONTRIBUTIONS/BUDGETS: Unless otherwise provided in this Agreement, the Members shall equally share in the costs of the JPA. The Authority shall establish an operating fund. The fund shall be used to pay all administrative, operating and other expenses incurred by the Authority, and shall be funded by equal Member's contributions for payment of costs of the Authority. The Board may direct that any surplus funds be returned to the Members, per Government Code § 6512, in proportion to the contributions made by each Member.

a. Authority Budgets: Authority budgets shall be established as follows:

(1) General Operating Budget. No more than ninety (90) days following the first meeting of the Board, and annually thereafter in the month of March or other mutually agreed upon timeframe, a general operation budget (the "Operating Budget") shall be adopted by the Board. The Operating Budget shall be prepared in sufficient detail to constitute an operating outline for the purpose of establishing rates and/or contributions to be billed to and paid by the Members. The operating rates and/or contributions to be billed to and paid by each Member shall be based upon an equal contribution by each Member. The Operating Budget shall outline anticipated revenues and planned expenditures to be made during the ensuing Budget year by functional category such as operations and maintenance, administration, projects, programs, planning, study and any applicable contributions to operate related reserves. For the purpose of the Operating Budget, operating shall mean any financial activity related to exchange transactions, as defined by applicable generally accepted accounting principles ("GAAP") associated with the principal activity of the JPA. The Operating Budget shall be adopted by unanimous approval of the Board. The rates and contributions approved by the Board shall be paid by the Members pursuant to Section 14.c below.

(2) Non-Operating Budget. No more than ninety (90) days following the first meeting of the Board, and annually thereafter in the month of March or other mutually agreed upon timeframe, a non-operating budget (the "Non-Operating Budget") shall be adopted by the Board. The Non-Operating Budget shall be prepared in sufficient detail to constitute a non-operating outline for the purpose of establishing rates and/or contributions to be billed to and paid by the Members. These rates and/or contributions shall be based upon equal contributions by each Member. At a minimum, the Non-Operating Budget shall outline anticipated revenues and planned expenditures for non-operating financial activities for the ensuing Fiscal Year, inclusive of any amount necessary for servicing debt. For the purpose of the budget, Non-Operating shall mean any financial activity related to non-exchange transactions, as defined by applicable GAAP. Examples of non-exchange transactions include investment income, contributed capital from Members for capital debt service, interest expense, and return of capital to Members. The Non-Operating Budget shall be adopted by unanimous approval of the Board. The rates and contributions approved by the Board shall be paid by the Members pursuant to Section 14.c below.

(3) Capital Project Budget. No more than ninety (90) days following the first meeting of the Board, and annually thereafter in the month of March, or other mutually agreed upon timeframe, a capital project budget (the "Capital Project Budget") shall, if applicable, be adopted by the Board. The Capital Project Budget, if applicable, shall be prepared in sufficient detail to constitute a capital project outline to assess contributions to be paid by the Members and expenditures to be paid by the Members during the ensuing year for capital projects needed for major repair, replacement, expansion and efficiency of any capital improvements constructed or installed by or on behalf of the Authority. These contributions shall be based upon equal contribution by each Member, subject to unequal contribution amounts for Special Projects, as addressed in Sections 10 and 14.a.(4). The Capital Project Budget shall be adopted by unanimous approval of the Board. The contributions approved by the Board shall be paid by the Members pursuant to Section 14.c below.

(4) Special Project Budgets. In addition to the Operating Budgets, the Non-Operating Budgets, and the Capital Project Budget, the Board may budget at any time for the study, implementation or construction of any Special Project, program or study proposed to be undertaken by the Authority for matters not deemed to be of general benefit to all Members. A Special Project budget and written Special Project Agreement of the Members who consented to participation in the Special Project shall be established for each Special Project, which budget and agreement shall determine the respective obligations, functions, and rights of the Members involved and of the Authority. The directors of the Board representing the Members who will be involved in financing and implementing the Special Project shall be and constitute a "Special Project Committee," for purposes of administration and implementation of the Special Project. No Special Project shall be acquired or constructed by the Board without the consent of each of the governing boards of the participating Members. Ratification of the Special Project budget by each of the participating Members shall constitute consent for the acquisition and construction of the Special Project. Notwithstanding the foregoing, no debt shall be incurred by the Authority for a Special Project without the unanimous consent of the Board. Any rates and contributions approved by the Special Project Committee and approved by the participating Members shall be paid by the participating Members pursuant to Section 14.c below.

Where the Board has approved one or more Special Projects, annually thereafter in the month of March (or other mutually agreed upon timeframe), a Special Project budget shall be developed by each Special Project Committee if required by the applicable Special Project Agreement, Each Special Project budget shall include, without limitation, the following:

(i) Administrative expenses;

(ii) Studies and planning costs;

(iii) Engineering and construction costs;

(iv) The allocation of costs, including debt service costs, if any, among participating Members;

(v) Annual maintenance and operating expenses for the project; and

(vi) A formula for allocating annual maintenance and operating expenses, if any.

All actions by a Special Project Committee shall be deemed actions of the Authority and shall be taken in the name of the Authority, provided, only the participating Members shall have rights and obligations in the Special Project as herein provided.

b. Failure to Obtain Budget Approvals. In the event a budget acceptable to the Board is not approved prior to the start of a Fiscal Year the Authority shall continue to operate at the level of expenditure as authorized below:

(1) General Operating Budget. The Operating Budget shall be at the expenditure level authorized by the last approved Operating Budget increased by the Consumer Price Index ("CPI") with a minimum increase of no less than two percent (2%). The CPI shall mean the change in CPI for Urban Wage Earners and Clerical Workers for the Los Angeles County, Orange County, and Riverside County areas for the all items category for the 12-month period ending the February prior to the beginning of the Fiscal Year budgeted as determined by the U.S. Department of Labor, Bureau of Labor Statistics, or other mutually agreeable source if such a CPI is no longer available. This factor will be applied to the Operating Budget until such time as a new Operating Budget is approved by the Authority. Any shortfall in revenues will be made up from available reserves dedicated by the Board for such a purpose, and if insufficient to cover the shortfall, any available reserve funds not designated by the Board for other purposes or otherwise legally restricted for other purposes by external parties. Reserves shall mean any available cash or investments.

(2) Non-Operating Budget. The Non-Operating Budget shall automatically be established at the required level necessary to meet annual debt service requirements including any revenue coverage covenants. Each Member shall contribute to the Authority such amounts which will yield during each Fiscal Year net revenues payable to the Authority sufficient for the Authority to satisfy all covenants in any indentures, loan agreements or other documents entered into by the Authority and to enter into such other agreements as are necessary for the Authority to secure financing to pay the acquisition price for any facilities authorized by the Authority.

(3) Capital Project Budget. The Capital Project Budget shall automatically be established at the required level necessary to implement capital projects previously approved by the Authority.

c. Payments of Amounts Due. The payments owed for contributions from each Member to the Authority shall be due, payable, and delivered by the Members to the Authority within forty-five (45) days after receipt of a billing therefor from the Authority. To the extent permitted by state law, unpaid and past due contributions shall bear interest at ten percent (10%) per annum, calculated daily, from the date due to the date payment is received by the Authority.

15. ASSESSMENTS FOR EXTRAORDINARY COSTS: In the event the Authority should experience an unanticipated need to pay for extraordinary costs (e.g., those costs that are unanticipated and not otherwise funded through the budget), including, but not limited to the costs of litigation or indemnification as provided in this Agreement, and to the extent that such costs cannot otherwise be reasonably funded through use of reserves on hand or through the other revenue sources authorized by this Agreement, the Board may allocate the additional costs to the Members, whether such extraordinary costs are actually incurred or estimated to be necessary. Unless otherwise specifically allocated to one or more Members by the unanimous vote of the Board, all allocations of extraordinary costs shall be shared equally by each Member. The Members agree that they will then contribute their proportionate share of the extraordinary costs within a reasonable period of time as determined by the Board, or as otherwise specified in the Bylaws.

16. STAFFING: The Board shall provide for staffing of the Authority in accordance with procedures established in the bylaws. Such staffing shall ensure the Authority is able to accomplish all requirements imposed by SGMA, this Agreement, and/or any other requirements imposed by law. Legal counsel shall be appointed by the Board and shall serve at the pleasure of the Board. Legal counsel may be an attorney that also performs work for one of the Members, provided appropriate waivers suitable to the Board, and counsel for all of the Members, are first obtained.

17. DISPUTE RESOLUTION: The Members desire to informally resolve all disputes related to this Agreement and/or SGMA, whenever possible, at the lowest possible level, and triggering of the dispute resolution procedures described herein shall only occur where the Members and/or the Board have reached impasse and are unable to resolve matters without invoking formal dispute resolution procedures. Should informal resolution of any dispute prove unsuccessful, the Parties agree to neutral facilitation/mediation of the dispute as a next step prior to filing a lawsuit or otherwise seeking judicial intervention. The appointed facilitator/mediator, who need not be a licensed attorney, shall be a person who is not a current or former employee or agent of any Member, and someone who has knowledge of the rules governing public agencies, and who has experience with the management of groundwater resources in Southern California. The facilitator shall be compensated by the Authority.

The facilitator shall be a third party neutral assigned by the Center for Collaborative Policy ("CCP") of Sacramento State University, or such other neutral as is unanimously decided upon by the Members involved in the dispute. In the event that the Members involved in the dispute are unable to agree upon the facilitator or mediator, then each Member involved in the dispute shall provide the name of one recommended facilitator or mediator to the Authority's legal counsel. The facilitator/mediator shall then be selected by the Authority's legal counsel, based upon whichever recommended facilitator/mediator is the most qualified facilitator/mediator for the type of dispute involved. The selected facilitator/mediator shall diligently seek to achieve a consensus based solution to the dispute. Upon the request of one of the Members involved in the dispute, the facilitator shall render a recommended resolution of the dispute after five facilitated negotiation sessions between the Members involved in the dispute where an acceptable resolution has not yet been reached. The facilitator/mediator's recommended resolution shall not be admissible in any judicial proceedings. Where facilitation/mediation as described herein is unable to successfully resolve the dispute, then a Member involved in the dispute, upon providing 60 days-notice to the other Members and the Authority, may initiate judicial proceedings in the Superior Court for Riverside County.

This Section shall not bar a Member or Member(s) from initiating legal action in another appropriate forum with jurisdiction over the matter as necessary to comply with an applicable statute of limitation, provided such legal action, where authorized, is stayed pending completion of the dispute resolution process described herein. Members involved in a dispute governed by this Section are encouraged to enter a tolling agreement, if legally authorized, in order to allow sufficient time for completion of the process required by this Section.

18. WITHDRAWAL:

a. Notice to Members: Any Member may withdraw from the Authority by delivery of written notice to withdraw to each of the Members at least two years prior to the date of withdrawal ("Withdrawal Notice Period"), unless the Members unanimously agree to allow the withdrawing Member to withdraw sooner than two years, in which case the date of withdrawal shall be the date unanimously agreed upon by the Board. The withdrawing Member shall continue to be a full Member during the pendency of the Withdrawal Notice Period and shall retain all rights and obligations during such period unless otherwise agreed to by unanimous vote of the Board.

b. Effect of Withdrawal: Should a Member choose to withdraw from the Authority in accordance with the terms of this Agreement, that Member retains any legal right it has under SGMA to serve as the GSA for the groundwater basin underlying its jurisdictional boundaries, provided such withdrawal will not cause the Authority (or its remaining Members) to default on financial obligations or to otherwise fail to comply with the legal obligations imposed by SGMA. The Authority and the non-withdrawing Members shall retain whatever legal rights they have under SGMA, and the withdrawal of the Member shall have no effect on the continuance of this Agreement among the remaining Members. The withdrawing Member shall not take any action after withdrawal that would be reasonably anticipated to frustrate the ability of the Authority to comply with SGMA. After providing written notice of withdrawal, the withdrawing Member shall act at all times in good faith in the best interests of the Authority until such time as the withdrawal process is complete.

c. Continuing Fiscal Obligations: Any Member that withdraws as provided herein shall remain proportionately liable during the Withdrawal Notice Period for its proportionate share of the budget. If the Members elect to incur extraordinary costs in accordance with Section 15, the withdrawing Member shall be proportionately liable during the Withdrawal Notice Period for the obligations or debts approved and incurred by the Authority for those extraordinary costs, unless the Members agree otherwise. Any Member that withdraws shall remain proportionately liable for any unfunded capital expenditures or debt service obligations incurred or approved by the Board prior to the date of written notice of withdrawal of such Member until such time as the obligation is fully satisfied.

d. Continuing Claims Obligations: Members will remain obligated to contribute their proportionate share (based upon the membership roll as of the date of the claim), including without limitation legal defense costs, for any occurrences incurred during the Member's membership, but not presented as a claim against the Authority until after the Member's withdrawal.

e. Divisions of Property Assets: The real and/or personal property assets contributed by the withdrawing Member or the value of the real and/or personal property assets at the date of withdrawal will be returned to the withdrawing Member to the extent such assets are not required for the Authority to meet its continuing obligations as a GSA under SGMA. If such real and/or personal property assets are needed to meet the continuing obligations of the Authority to comply with SGMA, then the remaining Members of the Authority and the withdrawing Member shall negotiate a purchase or lease of such assets for a price not to exceed the fair market value of those assets.

19. TERM AND TERMINATION: This Agreement shall become effective, and the Authority shall come into existence, on the Effective Date. The Agreement, and the Authority, shall thereafter continue in full force and effect until the governing bodies of the Members unanimously elect to terminate the Agreement. Upon unanimous election to terminate this Agreement, the Board shall continue to act as a board to wind up and settle the affairs of the Authority. The Board shall adequately provide for the known debts, liabilities and obligations of the Authority, and shall then distribute the assets of the Authority among the Members, as follows:

a. The assets contributed by each Member, or the value thereof as of the date of termination, shall be distributed to that Member.

b. The remaining assets shall then be distributed to each Member in equal proportions.

The distribution of assets shall be made in-kind to the extent possible by returning to each Member those assets contributed by such parties to the Authority; however, no party shall be required to accept transfer of an asset in kind.

Notwithstanding any other provision by the Board for payment of all known debts, liabilities and obligations of the Authority, each Member shall remain liable for any and all such debts, liabilities, and obligations in equal proportions, or in the proportion specified by unanimous action of the Board if alternative proportions are so specified for particular actions or activities that give rise to such debts, liabilities, and obligations.

Termination of this Agreement shall not occur, and the Members shall continue to fund the operations of the Authority as a GSA for the Sub-Basin, until the Authority determines by a unanimous vote of the Board that: (a) a GSA is no longer required for the Sub-Basin; or (b) one or more of the individual Members will undertake the legal obligations of a GSA previously performed by the Authority, and such termination of the Authority will not result in the Sub-Basin being placed in a probationary status by the SWRCB.

20. INDEMNIFICATION/CONTRIBUTION: Members, directors, officers, agents and employees of the Authority shall use ordinary care and reasonable diligence in the exercise of their powers, and in the performance of their duties pursuant to this Agreement. The Authority shall hold harmless, defend and indemnify the Members, the Authority Board, and the Members' directors, agents, officers and employees from and against any liability, claims, actions, costs, damages or losses of any kind, including death or injury to any person and/or damage to property (including property owned by any Member), arising out of the activities or omissions of the Authority, or its agents, officers and employees related to this Agreement or SGMA ("Claims").

a. To the extent authorized by California law, no Member shall be liable for the actions or omissions of any other Member or the Authority related to this Agreement.

b. The indemnification obligations described herein shall continue beyond the term of this Agreement as to any acts or omissions occurring during this Agreement or any extension of this Agreement.

c. To the extent that the Authority is unable or unwilling (because of comparative fault of Member(s), or other good faith legal basis) to hold harmless, defend and/or indemnify any Member to this Agreement as provided in this Section, such Member shall be entitled to contribution from the other Members in equal proportion to the extent one Member pays more than its equal share of such obligation. Provided, however, that where one or more Members is determined by a court (or in a settlement approved by a court) to be responsible for a greater proportion for the Claims, each Member will only be responsible for contribution to the other Member (or Members) up to the extent of the contributing Member's proportional responsibility.

21. INSURANCE: The Authority shall obtain insurance for the Board members and general liability insurance containing liability in such amounts as the Board shall determine will be necessary to adequately insure against the risks of liability (including compliance with the indemnification provisions in Section 20 above) that may be incurred by the Authority. The Members, their officers, directors and employees, shall be named as additional insureds.

22. CLAIMS: All claims against the Authority, including, but not limited to, claims by public officers and employees for fees, salaries, wages, mileage, or any other expenses, shall be filed within the time and in the manner specified in Chapter 2 (commencing with Section 910) of Part 3, Division 3.6 of Title I of the Government Code, which describes the appropriate content of a claim.

23. ENTIRE AGREEMENT REPRESENTED: This Agreement represents the entire agreement among the parties as to its subject matter and no prior oral or written understanding shall be of any force or effect. No part of this Agreement may be modified without the written consent of all of the parties.

24. HEADINGS: Section headings are provided for organizational purposes only and do not in any manner affect the scope, meaning or intent of the provisions under the headings.

25. NOTICES: Except as may be otherwise required by law, any notice to be given shall be written and shall be either personally delivered sent by facsimile transmission, emailed or sent by first class mail, postage prepaid and addressed as follows:

MEMBERS:

City of Corona
Attn: General Manager,
Department of Water and Power
Address: 755 Public Safety Way
Corona, CA 92880

Elsinore Valley Municipal Water District
Attn: General Manager
Address: 31315 Chaney Street
Lake Elsinore, CA 92530

Temescal Valley Water District
Attn: General Manager
Address: 22646 Temescal Canyon Rd
Corona, CA 92883

Notice delivered personally is deemed to be received upon delivery. Notice sent by first class mail shall be deemed received on the fourth day after the date of mailing. Any party may change the above address by giving written notice pursuant to this Section.

26. CONSTRUCTION: This Agreement reflects the contributions of all parties and accordingly the provisions of Civil Code § 1654 shall not apply to address and interpret any uncertainty.

27. NO THIRD PARTY BENEFICIARIES INTENDED: Unless specifically set forth, the parties to this Agreement do not intend to provide any other party with any benefit or enforceable legal or equitable right or remedy.

28. WAIVERS: The failure of any party to insist on strict compliance with any provision of this Agreement shall not be considered a waiver of any right to do so, whether for that breach or any subsequent breach.

29. CONFLICT WITH LAWS OR REGULATIONS/SEVERABILITY: This Agreement is subject to all applicable laws and regulations. If any provision of this Agreement is found by any court or other legal authority, or is agreed by the parties, to be in conflict with any code or regulation governing its subject, the conflicting provision shall be considered null and void. If the effect of nullifying any conflicting provision is such that a material benefit of the Agreement to any party is lost, the Agreement may be terminated at the option of the affected party. In all other cases the remainder of the Agreement shall continue in full force and effect.

30. FURTHER ASSURANCES AND OBLIGATION OF GOOD FAITH DEALING: Each party agrees to execute any additional documents and to perform any further acts which may be reasonably required to affect the purposes of this Agreement. Moreover,

consent or approval, where reasonably requested in furtherance of the purposes of this Agreement or compliance with SGMA, shall not be unreasonably withheld by a Member.

31. COUNTERPARTS: This Agreement may be signed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

32. AMENDMENT: This document may only be amended with a vote by all of its Members.

33. CUA ASSIGNMENT: To the extent that this Agreement is deemed to be a "material contract" under either of the CUA Management Agreements, the Members have no right to terminate this Agreement, either or without cause, based upon the existence or non-existence of either or both of the CUA Management Agreements. Therefore, if an applicable CUA Management Agreement expires or terminates for any reason, the Members shall remain fully obligated to perform under this Agreement contracting directly with the CUA or another third party contracted by the CUA for the maintenance, management and operation of the applicable utility systems.

CITY OF CORONA SIGNATURE PAGE
FOR
JOINT POWERS AGREEMENT BY AND AMONG THE CITY OF CORONA, ELSINORE VALLEY MUNICIPAL WATER DISTRICT AND TEMESCAL VALLEY WATER DISTRICT FOR THE FORMATION OF A JOINT POWERS AUTHORITY AND MANAGEMENT OF THE BEDFORD-COLDWATER SUB-BASIN OF THE ELSINORE BASIN

EACH OF THE UNDERSIGNED, having read and considered the above provisions, indicate their agreement by their authorized signatures.

CITY OF CORONA,
a California General Law City organized and existing under the laws of the State of California

By: _____
Dick Haley
Mayor

Attest:

_____
Lisa Mobley
City Clerk

Approved as to Form:

_____
Dean Derleth
City Attorney

Consent:

_____
Darrell Talbert
Executive Director
Corona Utility Authority

ELSINORE VALLEY MUNICIPAL WATER DISTRICT SIGNATURE PAGE FOR JOINT POWERS AGREEMENT BY AND AMONG THE CITY OF CORONA, ELSINORE VALLEY MUNICIPAL WATER DISTRICT AND TEMESCAL VALLEY WATER DISTRICT FOR THE FORMATION OF A JOINT POWERS AUTHORITY AND MANAGEMENT OF THE BEDFORD-COLDWATER SUB-BASIN OF THE ELSINORE BASIN

EACH OF THE UNDERSIGNED, having read and considered the above provisions, indicate their agreement by their authorized signatures.

ELSINORE VALLEY MUNICIPAL WATER DISTRICT, a Municipal Water District organized under Water Code §§ 71000

By:_____
Harvey R. Ryan
President, Board of Directors

ATTEST

Terese Quintanar
Secretary to the Board

APPROVED AS TO FORM

John E. Brown
General Counsel

TEMESCAL VALLEY WATER DISTRICT SIGNATURE PAGE
FOR
JOINT POWERS AGREEMENT BY AND AMONG THE CITY OF CORONA, ELSINORE VALLEY MUNICIPAL WATER DISTRICT AND TEMESCAL VALLEY WATER DISTRICT FOR THE FORMATION OF A JOINT POWERS AUTHORITY AND MANAGEMENT OF THE BEDFORD-COLDWATER SUB-BASIN OF THE ELSINORE BASIN

EACH OF THE UNDERSIGNED, having read and considered the above provisions, indicate their agreement by their authorized signatures.

TEMESCAL VALLEY WATER DISTRICT,
a California Water District organized under
California Water Code §§ 34000 et seq.

By: _____
C.W. Colladay
President, Board of Directors

Attest:

_____
Paul Rodriguez
Board Secretary

Approved as to Form:

_____
Dave Saunders
General Counsel