Appendix A

Notice of Preparation

City of Gonzales

P.O. BOX 647
PHONE: (831) 675-5000

147 FOURTH ST.
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GONZALES, CALIFORNIA 93926
www.gonzalesca.gov

Maria Orozco
Mayor

Scott Funk
Mayor Pro Tem

Liz Silva
Councilmember

Lorraine Worthy
Councilmember

Paul Miller
Councilmember

René L. Mendez
City Manager

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

Project Title: Industrial Wastewater Treatment Plant

Project Location: The project is located in the City of Gonzales (City) in Monterey County. The proposed Industrial Wastewater Treatment Plant (IWTP) would be located directly adjacent to the existing City Wastewater Treatment Plant (WWTP) at the end of Short Road. The proposed wastewater collection line would primarily be within the roadway right-of-way from Puente Del Monte Avenue to Gonzales River Road and Short Road.

Lead Agency: City of Gonzales

Project Description: The City is proposing a significant upgrade to its wastewater treatment infrastructure and management with the planned construction of a new 2.0 million gallons per day (MGD) separate IWTP. The City's existing municipal WWTP has been challenged the past several years due to the nature of flows discharged to the WWTP by local industrial dischargers. The proposed IWTP would treat wastewater from the Gonzales Agricultural Business Industrial Park (GABIP) separately from the City's domestic wastewater system.

There are two components of the proposed project: the IWTP, and the proposed wastewater collection line. The proposed IWTP would be located north of the existing WWTP and would include a headworks with influent screening to remove trash and debris and an influent flow meter; an influent lift station to pump water to the equalization basin; a 2-stage flow equalization basin to buffer flow to the ponds system; a deep-operated aerated pond systems to introduce oxygen into wastewater; and effluent percolation beds to dispose of treated effluent. A solids management area would be set aside for accumulated biosolids, sludge, and debris from the influent screening. The IWTP is designed to be installed in a phased approach with Phase I having wastewater treatment capacity of 2.0 MGD. As the wastewater flows and number of industrial discharges increase, phase II of the IWTP will be constructed with a treatment capacity to 4.0 MGD.

The proposed wastewater collection line includes approximately 11,100 linear feet (LF) of new gravity sewer pipe located mainly on public street right-of-way. This collection line would convey flows starting near the intersection of Katherine Street and Puente Del Monte Avenue. The pipeline heads south on Puente Del Monte Avenue before turning west onto Gonzales River Road. The pipeline alignment continues on Gonzales River Road then continues west onto Short Road. The proposed collection line would convey flow on Short Road before finally terminating at the new IWTP site.

Public Review: The City is the lead agency under the California Environmental Quality Act for the project. Public agencies and members of the public are invited to comment on environmental topics to be addressed in the Environmental Impact Report (EIR). The comment period is from June 29, 2020 to July 28, 2020. An Initial Study (IS) has been prepared as the first step to evaluating impacts from the proposed project. The EIR will analyze those topics identified as potentially significant in the IS, including agricultural resources, air quality, biological resources, cultural resources, energy, geology and soils, greenhouse gas emissions, hazards/hazardous materials, land use, and tribal cultural resources. The NOP/IS can be reviewed on the City's website at https://gonzalesca.gov/services/community-development/community-development-documents. Written comments, including email, can be submitted to:

Patrick Dobbins, PE
Director of Public Works
City of Gonzales
147 Fourth Street
Gonzales, CA 93926
831-675-5000
pdobbins@ci.gonzales.ca.us

Comments must be submitted by 5:00 p.m. on July 28, 2020.

Gonzales will continue to be a safe, clean, family-friendly community, diverse in heritage, and committed to working collaboratively to preserve and retain its small-town charm

Initial Study
Industrial Wastewater Treatment Plant

Prepared for:

City of Gonzales
147 Fourth Street
Gonzales, CA 93926
Contact: Patrick Dobbins, PE

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024
Contact: Brian Grattidge

JUNE 2020

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FIGURES

TABLES

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
BMP	Best Management Practice
CAL FIRE	California Department of Forestry and Fire Protection
CBC	California Building Code
CEQA	California Environmental Quality Act
DOC	Department of Conservation
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
FEMA	Federal Emergency Management Agency
FMMP	Farmland Mapping and Monitoring Program
GABIP	Gonzales Agricultural Business Industrial Park
GHG	Greenhouse Gas
HCP	Habitat Conservation Plan
IS	Initial Study
IWTP	Industrial Wastewater Treatment Plant
MGD	Million Gallons per Day
NAHC	Native American Heritage Commission
NRHC	National Register of Historic Places
RWQCB	Regional Water Quality Control Board
SWPPP	Stormwater Pollution Prevention Program
VHFHSZ	Very High Fire Hazard Severity Zone
VMT	Vehicle Miles Traveled
WWTP	Wastewater Treatment Plant

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1 Introduction

1.1 Initial Study

This initial study has been prepared pursuant to the California Environmental Quality Act (CEQA). The City of Gonzales will prepare an Environmental Impact Report (EIR) to evaluate the environmental effects of the proposed Industrial Wastewater Treatment Plant Project (IWTP or "project"). This initial study will be used to determine the potentially significant environmental impacts to be analyzed in the EIR, pursuant to CEQA Guidelines Section 15063 (c)(3). The initial study, in addition to comments received in response to the Notice of Preparation of an EIR, per CEQA Guidelines Section 15082, will be used to determine the scope and contents of the EIR.

2 Project Description

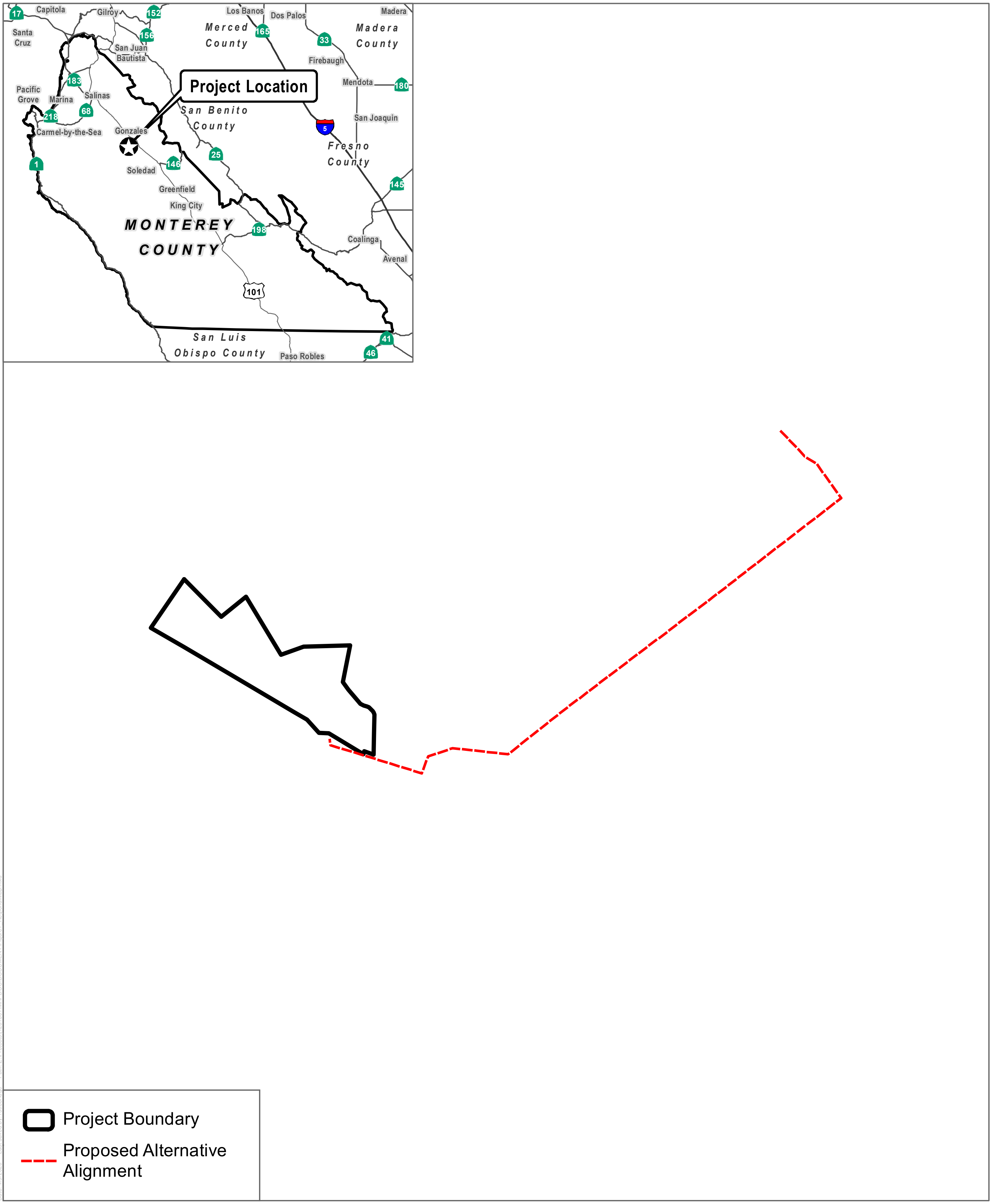
The City of Gonzales (City) is proposing an upgrade to its wastewater treatment infrastructure and management with the planned construction of a new 2.0 million gallon per day (MGD) separate Industrial Wastewater Treatment Plant (IWTP). The City's existing municipal Wastewater Treatment Plant (WWTP) has been challenged the past several years due to the nature of flows discharged to the WWTP by local industrial dischargers. The new plant would treat wastewater from the Gonzales Agricultural Business Industrial Park (GABIP) separately from the City's domestic wastewater system. By separating domestic and industrial waste flows, the City accommodates buildout of the GABIP and protects the existing domestic plant from constituents that impair the traditional biochemical treatment process. The separation of domestic and industrial waste flows requires a separate industrial waste collection system to convey industrial flows to the new treatment facility. This new facility will allow for the City to effectively expand wastewater treatment capacity and protect groundwater quality.

2.1 Project Location and Setting

The City is located in Monterey County, California, approximately 16 miles southeast of Salinas. The City has a current population of approximately 8,677 residents as of January 2019 (Department of Finance 2019), which is projected to increase to 24,000 by 2035 (City of Gonzales 2018). The City's wastewater, both domestic and industrial, is currently treated by the existing City-owned WWTP located at the end of Short Road, approximately 2 miles southwest of the intersection of South Alta Road and Gonzales River Road (see Figure 1, Regional Map).

The City is home to the GABIP, which is an approximately 75-acre area bounded by Alta Street to the east, Gonzales River Road to the south, and agricultural land to the north and west. The GABIP includes several large agricultural processing businesses. Additional acreage is planned to be added to the GABIP in the future to accommodate industrial business growth. A separate wastewater collection system was constructed for GABIP that ends near the intersection of Katherine Street and Puente Del Monte Avenue, but it is not in use. It is envisioned that all industrial wastewater flow will be diverted away from this sewer, and to a new IWTP dedicated gravity sewer, which will extend to the new IWTP (Wallace Group 2020).

The proposed IWTP would be located adjacent to the existing WWTP. The proposed wastewater collection line would primarily be within the roadway right-of-way from Puente Del Monte Avenue to Gonzales River Road and Short Road (see Figure 2, Project Location). The proposed IWTP would comprise of the entire Assessor's Parcel Numbers (APNs) 223061017000, -10200000, -1019000, -1014000, and partially of APNs -1023000 and 223011032000. The proposed IWTP site is approximately 78 acres. Parcels -1014000, -1023000, and 223011032000 are zoned and designated F/40 (Farmlands with minimum building site of 40 acres) in unincorporated Monterey County (Monterey County 2020). The existing WWTP is zoned Public Facilities (PF) and designated as Public/Quasi Public in the City's General Plan (City of Gonzales 2010a). The part of the proposed project site within the City boundary is designated as Pubic/Quasi Public but is not zoned (City of Gonzales 2010b).



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SOURCE: USGS 7.5-Minute Series Gonzales and Palo Escrito Creek Quadrangles

0 1,000 2,000 Feet

FIGURE 1

Regional Map

City of Gonzales Separate Industrial Water Recycling Facility - Technical Memo

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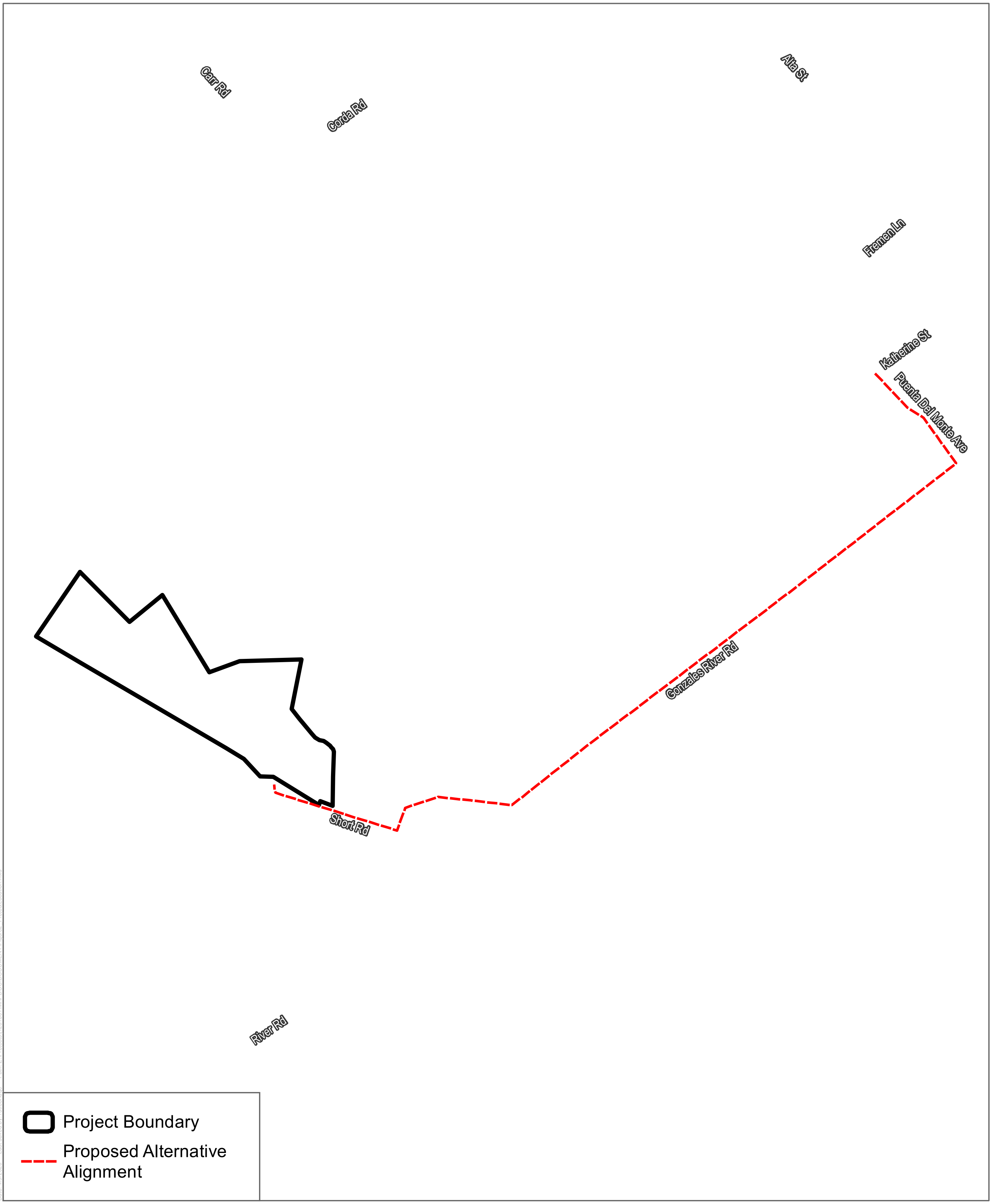

SOURCE: Esri Clarity Basemap 2019

[redacted]

FIGURE 2

Project Location

City of Gonzales Separate Industrial Water Recycling Facility - Technical Memo

2.2 Background

The City owns and operates an existing municipal WWTP, currently permitted at 1.3 MGD capacity (maximum month flow), with approximately half of the entire plant flow from industrial sources (Wallace Group 2020). The City provides wastewater collection and treatment for residents and businesses within the City, and expects an increase in wastewater flows in the upcoming years due to new development. Therefore, the City is motivated to expand wastewater treatment capacity for its customers as quickly and efficiently as possible. The City has prepared multiple studies of the existing facilities and alternatives for upgrade and expansion in recent years in order to evaluate the collection system, plant capacity, and condition; investigate treatment and expansion alternatives; and estimate capital costs. A Long-Term Wastewater Management Plan (LTWMP) was prepared to aggregate relevant information contained in the City's past studies. The LTWMP recommended a number of alternatives for the City to expand treatment capacity to 3.0 MGD, one of which was to construct a separate industrial treatment facility with separate collection system for agricultural industrial wastewater treatment, under a separate, non-municipal waste discharge permit. Ultimately, the City decided to move forward with the preliminary design of a separate industrial WWTP at a location adjacent to the north side of the existing WWTP.

2.3 Project Characteristics

There are two components of the proposed project: the IWTP, and the proposed wastewater collection line.

The proposed IWTP would be located north of the existing WWTP and would include a headworks with influent screening to remove trash and debris and an influent flow meter; an influent lift station to pump water to the equalization basin; a 2-stage flow equalization basin to buffer flow to the ponds system; a deep-operated aerated pond systems to introduce oxygen into wastewater; and effluent percolation beds to dispose of treated effluent. a solids management area would be set aside for accumulated biosolids, sludge, and debris from the influent screening.

The IWTP is designed to be installed in a phased approach with Phase I having wastewater treatment capacity of 2.0 MGD. As the wastewater flows and number of industrial discharges in the GABIP increase, phase II of the IWRF will be constructed with a treatment capacity to 4.0 MGD. Table 2.3-1 below provides a summary of the design flows for the IWTP.

Table 2.3-1. Proposed IWTP Design Wastewater Flow

Parameter	Existing Industrial Flow	Design Criteria (Phase I)	Design Criteria (Phase II)
ADMMF, MGD	0.6	2.0	4.0
PHF, MGD	NA	5.0	10.0

Source: Wallace Group 2020
Notes:
ADMMF= Average day, maximum month flow
PHF= Peak hourly flow
MGD= million gallons per day

As part of the proposed IWTP, design criteria is established for the treatment facilities to define biological treatment capacity. Table 2.3-2 provides a summary of proposed design wastewater influent waste strength.

Table 2.3-2. Proposed IWTP Design Wastewater Strength

Parameter	Design Criteria (Phase I)	Design Criteria (Phase II)
Influent BOD5, mg/L (lb/day)	600 (6,255)[a]	600 (12,510)[a]
Influent TSS, mg/L (lb/day)	600 (6,255)[a]	600 (12,510)[a]
Influent Total Nitrogen (mg/L)	40	40
Influent TDS (mg/L)	1,000	1,000

Source: Wallace Group 2020
Notes:
[a] Based on ADMMF design flow
MGD= million gallons per day
BOD5=biochemical oxygen demand
TSS=total suspended solids
TDS=total dissolved solids

The City would use General Waste Discharge Order No. R3-2004-0066 (Fruit & Vegetable Order) as a means of regulating this new facility. The Fruit & Veg Order includes a number of provisions related to wastewater, including Provision C.8, which states that in land-applied applications, the treated fruit and vegetable wastewater effluent shall not have an organic loading rate that exceeds 100 pounds of BOD5 per acre per day (30-day average).

Table 2.3-3 below summarizes the anticipated effluent quality parameters for the proposed IWTP, consistent with the regional Basin Plan.

Table 2.3-3. Probable Waste Discharge Requirements for IWTP

Parameter[1]	Effluent Limitation[2]
BOD5 (mg/L; lbs/acre/day)	45[3] , 100[4]
TSS (mg/L; lb/acre/day)	45[3] , 100[4]
Boron	0.5
Chlorides	250
TDS	1,500
pH (pH Units)	6.5 – 8.3[4]
Sodium	250
Nitrate as N	10
Sulfate	600
Other Constituents	Primary and Secondary Drinking Water Standards[5]

Source: Wallace Group 2020
Notes:
[1] All units expressed in mg/L unless otherwise indicated.
[2] Basin Plan water quality objective for groundwater, unless otherwise indicated.
[3] Secondary treatment standards for facilities such as pond systems, that are "equivalent to secondary treatment standards", EPA NPDES Permit Writers' Manual, USEPA, September 2010. If other than a pond system is proposed, BOD and TSS limitations may be more stringent than listed.
[4] Fruit & Vegetable Order No. R3-2004-0066. Note, for BOD5, current limitations are expressed in pounds per acre per day.
[5] Effluent discharged from new IWRF should meet all other federal and state drinking water standards.

The proposed wastewater collection line includes approximately 11,100 linear feet (LF) of new gravity sewer pipe located mainly on public street right-of-way. This collection line would convey flows starting near the intersection of Katherine Street and Puente Del Monte Avenue. The pipeline heads south on Puente Del Monte Avenue before turning west onto Gonzales River Road. The pipeline alignment continues on Gonzales River Road then continues west onto Short Road. The proposed collection line would convey flow on Short Road before finally terminating at the new IWTP site.

Circulation and Parking

The proposed IWTP site is accessible via Short Road from Gonzales River Road. This is the same path used to access the existing WWTP. Limited employee and visitor parking would be constructed on the project site.

Located largely within County of Monterey and City of Gonzales right-of-way, the proposed IWTP wastewater collection line is accessible for operations and maintenance procedures, with manholes installed at- or near-grade.

Project Construction and Schedule

Construction of the IWTP is scheduled to begin in 2021, and is expected to take 8-12 months.

Construction of the proposed wastewater collection line would be achieved by open cut construction methods. Open cut construction would involve installation of the sewer pipe in a trench. The trench is expected to be up to 3-feet wide and depth will vary based on the required hydraulics, but may range from 6 – 10 feet deep. The requirement for trenchless construction techniques is not anticipated because there are no significant crossings identified along the proposed wastewater collection line, such as waterways, environmentally-sensitive areas or busy intersections. Much of the construction will take place within the public right-of-way. Construction of the wastewater collection line is scheduled to begin in 2020, and is expected to take 3-6 months.

Potential Permits and Approvals Required

The IWTP will require the approval of waste discharge requirements (WDRs) by the Central Coast Regional Water Quality Control Board. The City's WWTP is permitted under Regional Board Order Number R3-2006-0005, dated March 7, 2006.

The design and construction of the proposed wastewater collection line will require an encroachment permit from the County of Monterey for construction within County road rights of way.

A Stormwater Pollution Prevention Plan (SWPPP) is required for General Construction by the California State Water Resources Control Board (SWRCB) if the proposed project's total area of disturbance is greater than 1 acre.

An air permit will likely be required for the plant standby generator and treatment plant.

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3 Summary of Findings

3.1 Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project.

- ☐ Aesthetics
- ☒ Biological Resources
- ☒ Geology and Soils
- ☒ Hydrology and Water Quality
- ☐ Noise
- ☐ Recreation
- ☐ Utilities and Service Systems
- ☒ Agriculture and Forestry Resources
- ☒ Cultural Resources
- ☒ Greenhouse Gas Emissions
- ☒ Land Use and Planning
- ☐ Population and Housing
- ☐ Transportation
- ☐ Wildfire
- ☒ Air Quality
- ☒ Energy
- ☒ Hazards and Hazardous Materials
- ☐ Mineral Resources
- ☐ Public Services
- ☒ Tribal Cultural Resources
- ☒ Mandatory Findings of Significance

3.2 Determination

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

for Patrick Dobbins 6/25/20

Signature Date

Evaluation of Environmental Impacts

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an Environmental Impact Report (EIR) is required.
4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).
5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
    a. Earlier Analysis Used. Identify and state where they are available for review.
    b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
    c. Mitigation Measures. For effects that are "Less Than Significant With Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
9. The explanation of each issue should identify:
    a. The significance criteria or threshold, if any, used to evaluate each question; and
    b. The mitigation measure identified, if any, to reduce the impact to less than significance

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4 Initial Study Checklist

1. **Project title:**

   Industrial Wastewater Treatment Plant Project

2. **Lead agency name and address:**

   City of Gonzales
   147 Fourth St
   Gonzales, CA 93926

3. **Contact person and phone number:**

   Patrick M. Dobbins, PE
   Public Works Director/City Engineer
   City of Gonzales
   831-675-5000

4. **Project location:**

   The proposed IWTP would be located directly adjacent to the existing WWTP located at the end of Short Road. The proposed wastewater collection line would primarily be within the roadway right-of-way from Puente Del Monte Avenue to Gonzales River Road and Short Road (see Figure 2, Project Location). The proposed IWTP would comprise of the entire Assessor's Parcel Numbers (APNs) 223061017000, -10200000, -1019000, -1014000, and partially of APNs -1023000 and 223011032000.

5. **Project sponsor's name and address:**

   City of Gonzales
   147 Fourth St
   Gonzales, CA 93926

6. **General plan designation:**

   City property: Public/Quasi Public

   Unincorporated Monterey County property: F/40 (Farmlands with minimum building site of 40 acres)

7. **Zoning:**

   The part of the proposed project site within the City boundary is not zoned (City of Gonzales 2010b).

   Unincorporated Monterey County portion: F/40.

8. **Description of project. (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary):**

See Section 2, Project Description.

9. **Surrounding land uses and setting (Briefly describe the project's surroundings):**

The proposed project is surrounded by agricultural land to the north, east, and west, and the existing WWTP and Salinas River to the south.

10. **Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement):**

The IWTP will require the approval of waste discharge requirements (WDRs) by the Central Coast Regional Water Quality Control Board. The City's WWTP is permitted under Regional Board Order Number R3-2006-0005, dated March 7, 2006.

The construction of the proposed wastewater collection line will require an encroachment permit from the County of Monterey.

A Stormwater Pollution Prevention Plan (SWPPP) is required for General Construction by the California State Water Resources Control Board (SWRCB) if the proposed project's total area of disturbance is greater than 1 acre.

11. **Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?**

The City has notified California Native American tribes pursuant to section 21080.3.1. Notified tribes will have 30 days to request consultation with the City regarding the proposed project.

4.1 Aesthetics

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
I.	**AESTHETICS –** Except as provided in Public Resources Code Section 21099, would the project:				
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b)	Substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c)	In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

a) Would the project have a substantial adverse effect on a scenic vista?

The existing visual character of the City is influenced primarily by agricultural lands that slope gently eastward toward the foothills of the Gabilan Mountains. Agricultural fields and low-density residential uses are the primary visual features. No major landscape features are visible except for long-distance views of the Gabilan Mountains to the east and the Sierra de Salinas to the west of town. The City's General Plan considers the view of citrus and avocado orchards, grazing land, and vineyards from Gonzales River Road to be a scenic vista (City of Gonzales 2018b).

The proposed project would construct a new IWTP and underground wastewater collection line. The proposed project would be adjacent to the existing WWTP and would not cause a substantial change in the views of the area. The project would not block any views of the surround Mountains or the view of agricultural lands from Gonzales River Road. While the new wastewater collections line would involve construction, the resulting visual impacts would be temporary in nature and above-ground conditions would be restored to existing conditions. The project would comply with the applicable standards of the General Plan and Gonzales City Code related to aesthetics. Therefore, impacts would be **less than significant.**

b) ***Would the project substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?***

The project is not visible from an officially designated State Scenic Highway (Caltrans 2017). There would be no impact.

c) ***In non-urbanized areas, would the project substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?***

The City's General Plan EIR determined that adoption of the General Plan, which includes expansion of wastewater facilities, would result in the conversion of the rural/open space landscape to a built landscape associated with urban uses. The General Plan recommends preservation of views and the maintenance of distinct edges to the city. Views to surrounding hills and farms contribute to perceptions of the city as a small town and provide easy orientation for residents. The proposed project would not substantially impact the visual character of the area. Although the project site is currently agricultural land, the new IWTP would be adjacent to the existing WWTP and would be similar in visual character. The IWTP would not be located in an area frequently seen by the public, as Short Road serves primarily as an entrance to the existing WWTP. There are also no sensitive receptors nearby. Overall, the project would not substantially degrade visual character or quality of public views and impacts would be **less than significant.**

d) ***Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?***

The project would include additional on-site safety and security lighting. All lighting would be hooded or screened to direct light downward, preventing unintentional light and glare impacts to nearby viewpoints. There are also no sensitive receptors nearby. Impacts would be **less than significant.**

4.2 Agriculture and Forestry Resources

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
II. **AGRICULTURE AND FORESTRY RESOURCES** – In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☒	☐	☐	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☒	☐	☐	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☒	☐	☐	☐

a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

The Farmland Mapping and Monitoring Program (FMMP), administered by the California Department of Conservation (CDC), produces maps and statistical data for use in analyzing impacts on California's agricultural resources (CDC 2008). FMMP rates and classifies agricultural land according to soil quality, irrigation status, and other criteria. Prime Farmland is a classification for farmland with the best combination of physical and chemical features able to sustain long-term agricultural production. These lands have the soil quality, growing season, and moisture supply needed to produce sustained high yields.

The IWTP site contains approximately 70 acres of Prime Farmland (FMMP 2012). The proposed project would have a **potentially significant** impact related to farmland conversion that will be further examined in the EIR.

b) ***Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?***

The project site includes land under a Williamson Act contract. The California Land Conservation Act of 1965 (commonly referred to as the Williamson Act) which allows local governments to enter into contracts with private landowners for the purpose of preventing conversion of agricultural land to non-agricultural uses (CDC 2013). The project site is not yet zoned by the City. The existing WWTP is zoned Public Facilities. A portion of the project site is zoned Farmland (40-acre minimum) by Monterey County. Conflicts with Williamson Act contracted land would be **potentially significant** and would be further addressed in the EIR.

c) ***Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?***

California Public Resources Code Section 12220(g) defines “forest land” for the purposes of CEQA as land that can support 10% native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.

California Government Code Section 51104(g) defines “Timber,” “Timberland,” and “Timberland Production Zone” for the purposes of CEQA as either trees of any species maintained for eventual harvest for forest production purposes (“Timber”); privately owned land, or land acquired for State forest purposes, used for growing and harvesting timber (“Timberland”); or “Timberland Production Zone” which means an area zoned and used for growing and harvesting timber.

The proposed project site does not include any forest land or timberland. There would be **no impact.**

d) ***Would the project result in the loss of forest land or conversion of forest land to non-forest use?***

As stated previously, the project site does not include any forest land. There would be **no impact.**

e) ***Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?***

The project would involve the conversion of farmland to a non-agricultural use by building the proposed IWTP. This would be a **potentially significant** impact and will be addressed in the EIR.

4.3 Air Quality

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
III. AIR QUALITY – Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☒	☐	☐	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☒	☐	☐	☐

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

The project is located within the North Central Coast Air Basin, within the jurisdictional boundary of the Monterey Bay Air Resources District (MBARD). Short-term construction emissions, as well as operational emissions from IWTP pumps and other system components would potentially contribute to changes in air quality that would conflict with or obstruct implementation of any applicable air quality plans. Thus, this impact would be **potentially significant** and would be further analyzed in the EIR.

b) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

The air quality analysis in the EIR will discuss the proposed project's consistency with plans and strategies to meet ambient air quality standards for ozone and particulate matter, both of which are nonattainment pollutants in the North Central Coast Air Basin. The project would potentially result in a cumulatively considerable net increase of ozone or particulate matter and thus impacts would be **potentially significant** and analyzed in the EIR.

c) Would the project expose sensitive receptors to substantial pollutant concentrations?

While there are no sensitive receptors close to the proposed project site, a further analysis will be done in the EIR to determine whether pollutant concentrations will be significant. This impact is **potentially significant.** The EIR will evaluate whether the project, including construction, could lead to potential exposure of sensitive receptors to substantial localized concentrations of air pollutant emissions, specifically carbon monoxide (CO) "hot spots."

d) ***Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?***

Wastewater treatment plants are considered by MBARD to be a potential odor source. Although the project site is 2 miles from the City of Gonzales, odor impacts may be **potentially significant** and will be further analyzed in the EIR.

4.4 Biological Resources

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES – Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

a-b, d) ***Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?***

Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

The proposed project would involve new construction of a wastewater treatment plant and a wastewater collection line that would potentially involve substantial adverse effects on protected species, sensitive natural communities, and/or native resident or migratory wildlife corridors or nursery sites. The project site is located close to the Salinas River and may include sensitive natural communities or riparian habitat. Species of particular concern include burrowing owl, nesting birds, San Joaquin kit fox, among others. These impacts would be **potentially significant.** While it is anticipated that biological impacts will be avoided through feasible mitigation measures, this potential impact will be further discussed in the EIR. The EIR will include the results of a biological investigation and habitat assessment to determine potential impacts and mitigation measures to reduce these impacts to less-than-significant levels, if necessary.

c) ***Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?***

The project site is located to the Salinas River and may include or intrude upon protected wetlands. This would be a **potentially significant** impact. The EIR will include the results of a jurisdictional delineation for the wastewater collection line and IWTP and will identify mitigation measures, if needed, to reduce these impacts to less-than-significant levels.

e) ***Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?***

The only trees in the vicinity of the project site are the trees lining Short Road. Gonzales River Road and the IWTP site both do not include any trees. If construction of the portion of the wastewater collection line through Short Road would affect any of these trees, it may result in a **potentially significant** impact per the City's tree protection ordinance (Chapter 9.16 of the Gonzales City Code). Potential impacts will be further discussed in the EIR.

f) ***Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?***

The proposed project site is not within any adopted habitat conservation plan and thus there would be **no impact.**

4.5 Cultural Resources

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
V. **CULTURAL RESOURCES** – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☒	☐	☐	☐
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☒	☐	☐	☐

a,b) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Dudek has requested a California Historic Resource Information System (CHRIS) records search for the project site and a 0.5 mile radius. In addition, a Sacred Lands File search from the Native American Heritage Commission has been requested. Dudek will conduct an intensive/reconnaissance-level field survey for archaeological resources within the project area that may not have been previously surveyed and to also document the current baseline conditions. Outreach will be conducted to the Native American community using the list of tribal contacts provided by Native American Heritage Commission for tribal groups associated with project area vicinity. Pending these results, impacts related to historic and archaeological resources are **potentially significant.** A summary of these record searches and engagement with Native American tribes will be included in the EIR, and mitigation measures will be proposed to reduce impacts to less-than-significant levels.

c) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Construction of the proposed project would have the potential to disturb or unearth human remains. Thus, this impact is **potentially significant** and would be further analyzed in the EIR.

4.6 Energy

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VI. Energy – Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☒	☐	☐	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☒	☐	☐	☐

a-b) ***Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?***

Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The proposed project could result in significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation, and has the potential to conflict with or obstruct a state or local plan for renewable energy or energy efficiency due to new energy uses. These impacts would be **potentially significant.** The EIR will include an analysis of potential impacts from electricity, natural gas, petroleum, and fuel consumption and will propose mitigation measures to reduce impacts to less than significant, if required.

4.7 Geology and Soils

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VII. GEOLOGY AND SOILS – Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☒	☐	☐	☐

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☒	☐	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐

a) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

The project site is not located within an Alquist-Priolo Fault Zone as designated by the California Geological Survey. There would be **no impact.**

ii) Strong seismic ground shaking?

Nearby active or potentially active faults include the Reliz fault, located approximately three miles southwest of the city; the Monterey Bay-Tularcitos fault, located approximately 11 miles southwest of the site; and a creeping segment of the San Andreas fault, located 15 miles northeast of the City (City of Gonzales 2018b). Because the area is located in an alluvium-filled valley, the ground responds strongly to seismic waves generated by an earthquake. According to the City's General Plan EIR, the project site is within an area of high seismic hazard. Action S-1.1.5 of the City's General Plan states that any major development proposals on areas of high seismic hazards will require a soils analysis and geotechnical investigation. The policies and actions contained in the Gonzales 2010 General Plan lessen the potential impacts related to seismic events, and the California Building Code (CBC) is designed to mitigate major seismic hazards. The project would also comply with recommendations set forth in the soils analysis and geotechnical investigation. Nevertheless, due to the presence of a high seismic hazard area, this issue is considered **potentially significant** and be further analyzed in the EIR.

iii) Seismic-related ground failure, including liquefaction?

Liquefaction is a type of ground failure that involves the temporary transformation of soil into a fluid mass. Liquefaction typically occurs in areas where groundwater is less than 30 feet below the surface, and where the soils are composed predominantly of poorly consolidated fine sand. The City's General Plan states that liquefaction typically occurs in areas where soils are sandy or water-saturated, including the existing WWTP site. The proposed project is adjacent to the existing WWTP site and is also within this area of high liquefaction hazard. Liquefaction hazards would be addressed in the required soils analysis and geotechnical investigation(s) for the proposed project, as detailed in General Plan Actions HS-1.1.4 and HS-1.1.5. Implementation of the recommendations included in these investigations, as well as compliance with the CBC and other applicable regulations related to seismic hazards, would lessen the potential impacts related to liquefaction and ground failure. However, per the General Plan analysis, the seismic impacts are **potentially significant** and will be analyzed in the EIR.

iv) Landslides?

The project site is located on relatively flat to gently sloping topography, adjacent to the Salinas River, with no nearby slopes susceptible to failure. There would be **no impact** related to landslides.

b) Would the project result in substantial soil erosion or the loss of topsoil?

The proposed project would involve ground disturbance for construction of the wastewater collection line and IWTP. The City's General Plan EIR indicates that the project site is in an area of low erosion potential. Nevertheless, all construction and grading activities for the proposed project would comply with Chapter 10.28, Storm Water Quality Management and Discharge Control, of the Gonzales City Code. This includes the implementation of pre- and post-construction Best Management Practices (BMPs). BMPs are required to be consistent with the Stormwater Pollution Prevention Plan (SWPPP) issued by the State Water Resources Control Board to eliminate run-off and erosion and sediment controls. All future construction would be reviewed for compliance with the County SWPPP. Impacts would be **less than significant.**

c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

As discussed above, the proposed project is an area that may be subject to seismic ground shaking and liquefaction. The project would implement the recommendations included in the required soils analysis and geotechnical investigation(s) and would adhere to the CBC guidelines. Thus, while it is anticipated that impacts will be avoided through feasible measures, this is a **potentially significant** impact that will be addressed in the EIR.

d) ***Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?***

Expansive soils are those that greatly increase in volume when they absorb water and shrink when they dry out. When buildings are placed on expansive soils, foundations may rise each wet season and fall each dry season. This movement may result in cracking foundations, distortion of structures, and warping of doors and windows. According to the General Plan EIR, the project site is in an area of low expansion potential. The project would be designed and constructed in compliance with applicable building standards and the CBC, and would be constructed to appropriate site-specific conditions identified by geotechnical investigations required to be conducted for the project site. Thus, impacts would be **less than significant.**

e) ***Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?***

The project does not propose the use of septic tanks or other alternative wastewater disposal systems. There would be **no impact.**

f) ***Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?***

According to the City's General Plan, most of the fossils found in Monterey County are of aquatic vertebrates. Due to the proximity to the ocean, the area lacks large, terrestrial fossils found in other regions of the United States. Most of Monterey County's fossils are micro-organisms or assemblages of mollusks and barnacles most commonly found in sedimentary rocks ranging from Cretaceous age (138 to 96 million years old) to Pleistocene age (1.6 million to 11 thousand years old). The project could potentially disturb previously unknown paleontological resources or unique geological features during project construction. This would be a **potentially significant** impact. Paleontological resources will be discussed in further detail in the EIR. The discussion will include the results of a paleontological records search at the Natural History Museum of Los Angeles County for the proposed project area. If needed, mitigation measures will be provided to ensure that impacts related to paleontological resources are less than significant.

4.8 Greenhouse Gas Emissions

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VIII. GREENHOUSE GAS EMISSIONS – Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

a-b) ***Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?***

Would the project generate conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

The proposed project would involve greenhouse gas (GHG) emissions from construction and operation that could potentially have a significant adverse effect on the environment or conflict with the City's Climate Action Plan (CAP) adopted in 2018. Thus, impacts would be **potentially significant** and would be discussed further in the EIR. The GHG emissions assessment in the EIR will include estimates of the GHG emissions associated with construction and operation of the proposed project, and will discuss the project's consistency with the CAP.

4.9 Hazards and Hazardous Materials

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
IX. HAZARDS AND HAZARDOUS MATERIALS – Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☒	☐	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☒	☐

a-b) ***Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?***

Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Plant operations would require routine delivery of common water treatment chemicals. All chemical uses are pre-existing and chemicals are transported, delivered, and dispensed by qualified, licensed vendors in accordance with applicable laws and regulations. Operational use of chemicals following implementation of the proposed project would be consistent with established practices for water treatment and existing plant operations. Hazardous materials used in construction and equipment and facilities maintenance activities include paints and sealant coatings, petroleum-based fuels, hydraulic fluids, and lubricants used in vehicles and equipment. These materials would be used, stored, and transported to the site in accordance with applicable regulations and product labeling and safety data sheets. All construction waste materials would be disposed of in compliance with state and federal hazardous waste requirements and at appropriate facilities. The proposed project would comply with all regulations related to hazardous materials and would prevent a significant risk of upset or accident conditions that would involve the release of hazardous materials into the environment. Construction would be carried out in compliance with a SWPPP prepared in compliance with the requirements of the State Construction General Permit. The SWPPP includes the use of appropriate best management practices (BMPs) for spill prevention during construction. Although the project may involve the use of hazardous materials, which may have a **potentially significant** impact on the environment. This issue will be addressed in the EIR.

c) ***Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?***

The proposed project would not emit hazardous emissions or handle hazardous materials or waste within one-quarter mile of a school. The closest school is La Gloria Elementary School, located approximately 0.65 miles northwest of Puente Del Monte Avenue. Impacts would be **less than significant.**

d) ***Would the project be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?***

Based on a search of the Department of Toxic Substances Control (DTSC) EnviroStor database, the project is not a site with known contamination (DTSC 2020). The project is not located on a hazardous materials site and there would be **no impact.**

e) ***For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?***

The proposed project site is not within an airport land use plan or within two miles of a public airport or public use airport. The closest airport is Quail Creek Airport located more than 8.4 miles northwest of the proposed project site. There would be **no impact.**

f) ***Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?***

Monterey County has designated Gonzales River Road as a "Pre-Designated Emergency Evacuation Route" to ensure the safe and efficient movement of people and personnel during declared emergencies (City of Gonzales 2010c). The proposed project would involve construction along Gonzales River Road but would not create any long-term impacts that would interfere with the evacuation plan. Thus, impacts would be **less than significant.**

g) ***Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?***

The proposed project is within a Local Responsibility Area (LRA) and is not designated as a Very High Fire Hazard Severity Zone by CAL FIRE. The closest Very High Fire Hazard Severity Zone is located in a State Responsibility Area (SRA) approximately 2.0 miles southwest of the proposed project site (CAL FIRE 2008). Impacts would be **less than significant.**

4.10 Hydrology and Water Quality

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
X. HYDROLOGY AND WATER QUALITY – Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☒	☐	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☒	☐	☐	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
i) result in substantial erosion or siltation on or off site;	☒	☐	☐	☐
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;	☒	☐	☐	☐
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☒	☐	☐	☐
iv) impede or redirect flood flows?	☒	☐	☐	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☒	☐	☐	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☒	☐	☐	☐

a) ***Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?***

The existing WWTP operates under a permit from the Central Coast Regional Water Quality Control Board (RWQCB) and has a permitted capacity of 1.3 million gallons per day. Negative impacts associated with ag-wash chemicals has resulted in the RWQCB requiring the City to develop a compliance work plan and long-term wastewater management plan to demonstrate the City's plan to improve effluent water quality and protect local groundwater resources. The project is located adjacent to the Salinas River, which extends throughout the Salinas Valley. The lower Salinas River, which extends from Gonzales Road to the estuary, has been impacted by numerous contaminants with established Total Maximum Daily Loads (TMDLs), including pesticides, bacteria, chloride, nitrates, total dissolved solids, pH, and PCBs. Project construction and operation could potentially involve impacts to water quality, and impacts would therefore be **potentially significant.** The EIR will discuss in detail the potential impacts to groundwater quality and surface water quality, with sources including applicant provided, site-specific geotechnical reports, if available; applicant provided hydrology/hydraulics report and water quality report, if available; and information provided in the City of Gonzales General Plan and General Plan EIR (City of Gonzales 2018b, 2010c).

b) ***Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?***

The proposed project would involve conversion of pervious surface to impervious surface, and would thus have the potentially to interfere with groundwater recharge. This impact is **potentially significant** and will be discussed in detail in the EIR.

c) ***Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:***

i-iii) ***result in substantial erosion or siltation on or off site;***

substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;

create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

The proposed project would result in the addition of impervious surfaces that could substantially alter the existing drainage pattern of the area. This would be a **potentially significant** impact. While a SWPPP would be prepared for the project to protect water quality during and following construction, potential impacts will be further analyzed in the EIR, and mitigation measures will be proposed to reduce impacts to less-than-significant levels, if necessary.

iv) ***impede or redirect flood flows?***

The proposed IWTP site is located within a 100-year flood zone (FEMA 2020). Impacts related to flood flows would be **potentially significant** and will be further analyzed in the EIR.

d) ***In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?***

Due to the absence of large bodies of water close to the planning area, the potential for tsunamis or seiches is considered nonexistent. However, the IWTP is within a 100-year flood zone and could potentially release pollutants due to project inundation. This impact would be **potentially significant** and will be discussed in further detail in the EIR.

e) ***Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?***

As discussed, project construction and operation could potentially involve impacts to water quality and groundwater recharge. These impacts would potentially conflict with applicable plans related to water quality or groundwater, and thus are **potentially significant**. The EIR will discuss in detail the potential impacts to water quality and groundwater will determine if the proposed project is consistent with applicable plans.

4.11 Land Use and Planning

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XI. LAND USE AND PLANNING – Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☒	☐	☐

a) Would the project physically divide an established community?

The project includes no components that would result in a physical division of any established communities, as no established communities are in the project vicinity and no above-ground linear features are proposed. There would be **no impact.**

b) Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

The proposed project would establish a wastewater treatment plan on agricultural land, adjacent to the existing WWTP. While impacts related to land use are anticipated to be **less than significant**, the EIR will discuss the consistency of the project with applicable plans intended to reduce or avoid an environmental impact. The EIR section will include a discussion of the General Plan and any specific plans or regional plans that apply to the proposed project.

4.12 Mineral Resources

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XII. MINERAL RESOURCES – Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

a-b) ***Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?***

Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

According to the General Plan EIR, the City does not contain any valuable mineral resources or mineral resource recovery site (City of Gonzales 2010c). Review of the California Department of Conservation (DOC) Geologic Map data shows that the project site is not within a mineral resource zone district (DOC 2015). There would be **no impact.**

4.13 Noise

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIII. NOISE – Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

a) ***Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?***

The proposed project would result in a temporary increase in ambient noise from construction activities, and a permanent increase in ambient noise from the new IWTP and its operations. The City of Gonzales does not have established standards for ambient noise. Additionally, the project is adjacent to the existing WWTP and is surrounded by agricultural land. There are no noise-sensitive land uses located near the project site. Therefore, impacts would be **less than significant.**

b) ***Would the project result in generation of excessive groundborne vibration or groundborne noise levels?***

The proposed project would not create a permanent new source of excessive groundborne vibration or groundborne noise. A temporary increase, not anticipated to exceed prescribed thresholds, in groundborne vibration and noise may result from construction activities. There are no sensitive receptors near the proposed project site. Impacts would be **less than significant.**

c) ***For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?***

The project site is not located within an airport land use plan or near a public or private airport/airstrip. There would be **no impact.**

4.14 Population and Housing

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV. POPULATION AND HOUSING – Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐

a-b) ***Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?***

Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

The proposed IWTP site does not include existing housing units. The project would not result in the direct construction of housing units. The proposed project could possibly induce additional population growth by providing for additional employment in the area. However, this growth is not expected to be substantial. The proposed project would allow the City to accommodate growth within the City that is already anticipated in the General Plan. Thus, impacts would be **less than significant.**

4.15 Public Services

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XV. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:

Fire protection?

Police protection?

Schools?

Parks?

Other public facilities?

The project would not result in additional population in the area (see Section 4.14, Population and Housing) and thus would require no new or expanded facilities to support adequate fire or police protection, schools, parks or other public facilities. Therefore, the project would result in **no impact** from physical impacts associated with providing new or modified facilities.

4.16 Recreation

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI. RECREATION				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

a-b) ***Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?***

Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

The project would not result in an increase of the use of existing neighborhood and regional parks or other recreational facilities because the project would not induce substantial population growth (see Section 4.14, Population and Housing), nor would it require the construction or expansion of recreational facilities. There would be **no impact.**

3.17 Transportation

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII.TRANSPORTATION – Would the project:				
a) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	☐	☐	☒	☐
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☒	☐

a) ***Would the project conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?***

The proposed project consists of the construction of a new wastewater collection line and IWTP adjacent to the existing WWTP. The wastewater collection line would be underground and would only involve minor, temporary construction impacts to Puente Del Monte Avenue, Gonzales River Road, and Short Road. Production rates and work hours may be reduced to accommodate for traffic procedures control and public safety. Access through these roads would be maintained during construction and would involve no long-term impact. The proposed project would not significantly intrude on any transit, bicycle, or pedestrian facilities. As mentioned above, impacts from construction of the wastewater collection line would be temporary in nature. Additionally, the project would be consistent with the City's General Plan, which contains actions such as Action CIR-1.1.9 which states that there shall be a periodic system of traffic monitoring to ensure that the impacts of new development are evaluated.

The IWTP site would be built on what is currently farmland, adjacent to the existing WWTP. The IWTP would be accessed through Short Road, as currently by the WWTP. Increase in vehicle trips to the IWTP would be minor, as the new facility would be adjacent to the WWTP and would likely be visited by the same personnel, delivery vehicles, and other services necessary for wastewater operations. Thus, the proposed project would not conflict with any programs, plans, ordinances, or policies addressing the circulation system. The impact would be **less than significant.**

b) ***Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?***

According to CEQA Guidelines section 15064.3 Subdivision (b)(1), a project's vehicle miles traveled or VMT that exceeds an applicable threshold of significance may indicate a significant impact. Projects that decrease VMT in the project area compared to existing conditions should be considered to have a less-than-significant transportation impact. The City has not yet adopted significance thresholds for VMT. The proposed project would include development of an undeveloped site; thereby potentially increasing VMT in comparison to existing conditions.

The project is currently proposing an IWTP and associated wastewater collections line. Wastewater facilities are typically low trip generators as compared to commercial uses and result in a lower than City-wide average VMT. With consideration of the above, this impact would be considered **less than significant.**

c) Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The proposed project does not include any geometric design features such as sharp curves or dangerous intersections, and would not involve any new and incompatible uses. There would be **no impact.**

d) Would the project result in inadequate emergency access?

Monterey County has designated Gonzales River Road as a "Pre-Designated Emergency Evacuation Route" to ensure the safe and efficient movement of people and personnel during declared emergencies (City of Gonzales 2010c). The proposed project would involve construction along Gonzales River Road but would not create any long-term impacts that would interfere with the evacuation plan. Thus, impacts would be **less than significant.**

4.18 Tribal Cultural Resources

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVIII. TRIBAL CULTURAL RESOURCES				
Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☒	☐	☐	☐
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	☒	☐	☐	☐

a) ***Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:***

   i) ***Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?***

   ii) ***A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?***

Refer to Section 4.5, Cultural Resources. Dudek has requested a Sacred Lands File search from the Native American Heritage Commission and will conduct outreach to the Native American community using the list of tribal contacts provided by Native American Heritage Commission for tribal groups associated with project area vicinity. Pending these results, impacts related to tribal cultural resources are **potentially significant.** A summary of these records searches and engagement with Native American tribes will be included in the EIR, and mitigation measures will be proposed to reduce impacts to less-than-significant levels.

4.19 Utilities and Service Systems

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIX. UTILITIES AND SERVICE SYSTEMS – Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

a) Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

The project is the construction of the IWTP and wastewater collections. Consideration of wastewater facilities is integral to the environmental analysis and will be considered throughout the EIR, rather than a specific utilities section. The IWTP is adjacent to the existing WWTP and would be served by extended utilities connections including electric power, water, natural gas, and telecommunications utilities and all disturbance associated with provision of utilities to serve the project is included in the analysis of each resource category in this Initial Study. On-site drainage would be routed to the existing drainage system on the premises. Impacts related to the extension of non-wastewater utilities would be **less than significant.**

b) Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?

The proposed project would accommodate industrial wastewater flows, which are tied to the use of process water for agricultural industries. Future projects served by the IWTP would comply with the City's General Plan, which contains actions related to water supply. Action FS-2.1.1 calls for the protection of existing water service, requiring that the City allow new development only "when public water can be supplied and delivered without threatening water supply or water quality in the rest of Gonzales." The General Plan EIR concluded that the policies and implementing actions of the General Plan, plus the requirement for collaborative planning and documentation of water sources required by Senate Bills 610 and 221, including preparation of Water Assessments, serve to protect groundwater supplies and to reduce the environmental effects associated with water supplies to a level of **less than significant.**

c) Would the project result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

The proposed project itself is the construction of a wastewater facility. As previously discussed, the proposed project would accommodate existing industrial wastewater flows and prevent future capacity shortfalls. This impact would be **less than significant.**

d-e) ***Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?***

Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

The proposed project is not expected to generate solid waste in amounts significantly greater than the existing WWTP or the amount typical for a wastewater facility. The Johnson Canyon Road Landfill is expected to provide landfill services through the year 2042 and had 2.2 million tons of capacity remaining as of 2010 (City of Gonzales 2010c). The project would also comply with the requirements of any federal, state, or local policies related to solid waste, recycling, and organic waste. Thus, impacts would be **less than significant.**

4.20 Wildfire

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XX. **WILDFIRE** – If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☒	☐
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

a-d) ***Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?***

Due to slope, prevailing winds, and other factors, would the project exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

The proposed project is within an LRA and is not designated as a Very High Fire Hazard Severity Zone by CAL FIRE. The closest Very High Fire Hazard Severity Zone is located in an SRA approximately 2.0 miles southwest of the proposed project site (CAL FIRE 2008). Impacts would be **less than significant.**

4.21 Mandatory Findings of Significance

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XXI. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

a) ***Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?***

As discussed in this IS, it is possible that the proposed project would degrade air quality, water quality, or have a substantial impact on cultural or archaeological resources, or wildlife population and habitat. These impacts are considered **potentially significant** and would be discussed in further detail in the EIR. Mitigation measures would be identified, as necessary, to address the potential impacts to air, water, and biological and cultural resources.

b) ***Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?***

The properties adjacent to the ITWP site are largely agricultural lands, with the exception of the existing WWTP to the south. It is possible that the construction of the IWTP would have cumulatively considerable impacts combined with the effects of past, current, and probably future projects in the City. This is a **potentially significant** impact. The EIR will further address the current and probable cumulative conditions within the City, air basin, and general project area and will provide mitigation measures to reduce impacts as necessary.

c) ***Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?***

As analyzed in this IS, it is possible that the proposed project would have an environmental effect that would cause significant adverse effects on human beings either directly or indirectly, such as air quality or water quality impacts. These impacts are considered **potentially significant** and will be thoroughly analyzed in the subsequent EIR.

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5 References and Preparers

5.1 References Cited

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5.2 List of Preparers

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July 28, 2020

Governor's Office of Planning & Research

Jul 28 2020

STATE CLEARINGHOUSE

Patrick M. Dobbins
Public Works Director/City Engineer
City of Gonzales
147 Fourth Street
Gonzales, California 93926

Subject: Industrial Wastewater Treatment Plan
Notice of Preparation
SCH# 2020069049

Dear Mr. Dobbins:

The California Department of Fish and Wildlife (CDFW) received a Notice of Preparation (NOP) from City of Gonzales for the Project pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

CDFW ROLE

CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statue for all the people of the State (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a)). CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (*Id*., § 1802). Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

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[1] CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

CDFW is also submitting comments as a **Responsible Agency** under CEQA (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381). CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority (Fish & G. Code, § 1600 et seq.). Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), related authorization as provided by the Fish and Game Code may be required.

Nesting Birds: CDFW has jurisdiction over actions with potential to result in the disturbance or destruction of active nest sites or the unauthorized take of birds. Fish and Game Code sections that protect birds, their eggs and nests include, sections 3503 (regarding unlawful take, possession or needless destruction of the nest or eggs of any bird), 3503.5 (regarding the take, possession or destruction of any birds-of-prey or their nests or eggs), and 3513 (regarding unlawful take of any migratory nongame bird).

Water Pollution: Pursuant to Fish and Game Code section 5650, it is unlawful to deposit in, permit to pass into, or place where it can pass into "Waters of the State" any substance or material deleterious to fish, plant life, or bird life, including non-native species. It is possible that without mitigation measures, activities associated with the Project could result in pollution of Waters of the State from storm water runoff or construction-related erosion. Potential impacts to the wildlife resources that utilize these watercourses include the following: increased sediment input from road or structure runoff; toxic runoff associated with development activities and implementation; and/or impairment of wildlife movement along riparian corridors. The Regional Water Quality Control Board and United States Army Corps of Engineers also has jurisdiction regarding discharge and pollution to Waters of the State.

PROJECT DESCRIPTION SUMMARY

Proponent: City of Gonzales

Objective: The objective of the Project is to construct an Industrial Wastewater Treatment Plant (IWTP) and a wastewater collection line. The new IWTP will be located adjacent to the existing Wastewater Treatment Plant (WWTP), where it will direct wastewater from Gonzales Agricultural Business Park to reduce workload for the WWTP. The 78-acre IWTP will include a headworks with influent screening to remove trash and debris and an influent flow meter; an influent lift station to pump water to the equalization basin; a 2-stage flow equalization basin to buffer flow to the ponds system; a deep-operated aerated pond systems to introduce oxygen into wastewater; and effluent percolation beds to dispose of treated effluent. A solids management area would be set aside for accumulated biosolids, sludge, and debris from the influent screening. A portion of the IWTP site is zoned as F/40 (Farmlands with minimum building site of 40 acres) while the remaining portion within the City boundary is designated as Pubic/Quasi Public but is not zoned. The wastewater collection line will be 11,100 linear feet of new gravity sewer pipe located within the right-of-way from Del Monte Ave to Gonzales River Road and Short Road which will end at the IWTP.

Location: Latitude: 36°29’32.98”N, Longitude: 121°28’37.94”W. At the end of Short Road, near Gonzales River Road in the city of Gonzales. The proposed IWTP would comprise of the entire Assessor’s Parcel Numbers (APNs) 223061017000, 223061020000, 223061019000, 223061014000, and partially of APNs 223061023000 and 223011032000.

Timeframe: Construction of the IWTP will start in 2021 and will take 8-12 months to complete. Construction of the wastewater collection line will start in 2020 and will take 3-6 months.

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist City of Gonzales in adequately identifying and/or mitigating the Project’s significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. Editorial comments or other suggestions may also be included to improve the document.

There are many special-status resources present in and adjacent to the Project area. These resources may need to be evaluated and addressed prior to any approvals that would allow ground-disturbing activities or land use changes. The NOP indicates there is potentially significant impact unless mitigation measures are taken but there are no mitigation measures listed. CDFW is concerned regarding potential impacts to special-status species including, but not limited to: the State endangered Southwest/South Coast Clade of foothill yellow-legged frog (*Rana boylii*), the federally threatened California red-legged frog (*Rana draytonii*), the State and federally threatened California tiger salamander (*Ambystoma californiense*), the State species of special concern burrowing owl (*Athene cunicularia*), western spadefoot (*Spea hammondii*), and western pond turtle (*Emys marmorata*). In order to adequately assess any potential impacts to biological resources, focused biological surveys should be conducted by a qualified wildlife biologist during the appropriate survey period(s) in order to determine whether any special-status species and/or suitable habitat features may be present within the Project area. Properly conducted biological surveys, and the information assembled from them, are essential to identify any mitigation, minimization, and avoidance measures and/or the need for additional or protocol-level surveys, especially in the areas not in irrigated agriculture, and to identify any Project-related impacts under CESA and other species of concern.

I. Project Description and Related Impact Shortcoming

COMMENT 1: Foothill Yellow-Legged Frog (FYLF) and California Red-Legged Frog (CRLF)

Issue: FYLF are primarily stream dwelling and requires shallow, flowing water in streams and rivers with at least some cobble-sized substrate; CRLF primarily inhabit ponds but can also be found in other waterways including marshes, streams, and lagoons, and the species will also breed in ephemeral waters (Thomson et al. 2016). FYLF and CRLF have been documented to occur near the vicinity of the Project site (CDFW 2020). The Project site is near the Salinas River which contains habitat that may support both species. Avoidance and minimization measures are necessary to reduce impacts to FYLF and CRLF to a level that is less than significant.

Specific impact: Without appropriate avoidance and minimization measures for FYLF and CRLF, potentially significant impacts associated with the Project's activities include burrow collapse, inadvertent entrapment, reduced reproductive success, reduction in health and vigor of eggs, larvae and/or young, and direct mortality of individuals.

Evidence impact would be significant: FYLF and CRLF populations throughout the State have experienced ongoing and drastic declines and many have been extirpated; historically, FYLF occurred in mountain streams from the San Gabriel River in Los Angeles County to southern Oregon west of the Sierra-Cascade crest (Thomson et al. 2016). Habitat loss from growth of cities and suburbs, invasion of nonnative plants, impoundments, water diversions, stream maintenance for flood control, degraded water quality, and introduced predators, such as bullfrogs are the primary threats to FYLF and CRLF (Thomson et al. 2016, USFWS 2017). Project activities have the potential to significantly impact both species.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to FYLF and CRLF, CDFW recommends conducting the following evaluation of the Project site, incorporating the following mitigation measures into the CEQA document prepared for this Project, and that these measures be made conditions of approval for the Project.

Recommended Mitigation Measure 1: FYLF and CRLF Surveys

CDFW recommends that a qualified wildlife biologist conduct surveys for FYLF and CRLF in accordance with the USFWS "Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog" (USFWS 2005) to determine if FYLF and CRLF are within or adjacent to the Project area; while this survey is designed for CRLF, the survey may be used for FYLF focusing on stream/river habitat.

Recommended Mitigation Measure 2: FYLF and CRLF Avoidance

If any FYLF or/and CRLF are found during pre-construction surveys or at any time during construction, consultation with CDFW is warranted to determine if the Project can avoid take. CDFW recommends that initial ground-disturbing activities be timed to avoid the period when FYLF and CRLF are most likely to be moving through upland areas (November 1 and March 31). When ground-disturbing activities must take place between November 1 and March 31, CDFW recommends a qualified biologist monitor construction activity daily for FYLF and CRLF.

Recommended Mitigation Measure 3: FYLF Take Authorization

The Southwest/South Coast Clade of FYLF is State endangered. If through surveys it is determined that FYLF are occupying or have the potential to occupy the Project site and take cannot be avoided, take authorization would be warranted prior to initiating ground-disturbing activities to comply with CESA. Take authorization would occur through issuance of a State Incidental Take Permit (ITP) by CDFW, pursuant to Fish and Game Code section 2081(b). In the absence of surveys, the applicant can assume presence of FYLF within the Project site and obtain an ITP from CDFW.

COMMENT 2: California Tiger Salamander (CTS)

Issue: CTS have been documented to occur near the vicinity of the Project site (CDFW 2020). Aerial imagery shows that the Project site is near of upland habitat which likely serve as refugia for CTS that are dispersing from and into the area. CTS have the potential to occur in the Project site.

Specific Impacts: Potential ground- and vegetation-disturbing activities associated with Project activities include: water inundation as a result of the proposed new pond systems and percolation beds, collapse of small mammal burrows, inadvertent entrapment, loss of upland refugia, water quality impacts to breeding sites, reduced reproductive success, reduction in health and vigor of eggs and/or young, and direct mortality of individuals.

Evidence impact would be significant: Up to 75% of historic CTS habitat has been lost to urban and agricultural development (Searcy et al. 2013). Loss, degradation, and fragmentation of habitat are the primary threats to CTS in both the Central and San Joaquin valleys. Contaminants and vehicle strikes are also sources of mortality for the species (CDFW 2015, USFWS 2017a). The Project site is within the range of CTS and may have suitable habitat (i.e., grasslands interspersed with burrows). CTS have been determined to be physiologically capable of dispersing up to approximately 1.5 miles from seasonally flooded wetlands (Searcy and Shaffer 2011) and have been documented within a mile of the Project site (CDFW 2020). Given the presence of suitable habitat within the Project site, ground-disturbing activities have the potential to significantly impact local populations of CTS.

Recommended Potentially Feasible Mitigation Measure(s)
CDFW recommends conducting the following evaluation of the Project site, incorporating the following mitigation measures into the CEQA document for this Project, and that these measures be made conditions of approval for the Project.

Recommended Mitigation Measure 4: Focused CTS Protocol-level Surveys

CDFW recommends that a qualified biologist conduct protocol-level surveys in accordance with the USFWS "Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander" (USFWS 2003) at the appropriate time of year to determine the existence and extent of CTS breeding and refugia habitat. The protocol-level surveys for CTS require more than one survey season and are dependent upon sufficient rainfall to complete. As a result, consultation with CDFW and the USFWS is recommended well in advance of beginning the surveys and prior to any planned vegetation- or ground-disturbing activities. CDFW advises that the protocol-level survey include a 100-foot buffer around the Project area in all areas of wetland and upland habitat that could support CTS. Please be advised that protocol-level survey results are viable for two years after the results are reviewed by CDFW.

Recommended Mitigation Measure 5: CTS Avoidance

CDFW advises that a minimum 50-foot no-disturbance buffer be delineated around all small mammal burrows in suitable upland refugia habitat within and/or adjacent to the Project site. Further, CDFW recommends potential or known breeding habitat within and/or adjacent to the Project site be delineated with a minimum 250-foot no-disturbance buffer. Both upland burrow and wetland breeding no-disturbance buffers are intended to minimize impacts to CTS habitat and avoid take of individuals.

Recommended Mitigation Measure 6: CTS Take Authorization

If through surveys it is determined that CTS are occupying or have the potential to occupy the Project site, consultation with CDFW is warranted to determine if the Project can avoid take. If take cannot be avoided, take authorization would be warranted prior to initiating ground-disturbing activities to comply with CESA. Take authorization would occur through issuance of an ITP by CDFW, pursuant to Fish and Game Code section 2081(b). In the absence of protocol surveys, the applicant can assume presence of CTS within the Project site and obtain an ITP from CDFW.

COMMENT 3: Burrowing Owl (BUOW)

Issue: BUOW may occur near the Project site (CDFW 2020). BUOW inhabit open grassland or adjacent canal banks, ROWs, vacant lots, etc. containing small mammal burrows, a requisite habitat feature used by BUOW for nesting and cover. Review of aerial imagery indicates that some of the Project site is bordered by potential fallow agricultural fields and may be present within the Project site.

Specific impact: Potentially significant direct impacts associated with subsequent activities include burrow collapse, inadvertent entrapment, nest abandonment, reduced reproductive success, reduction in health and vigor of eggs and/or young, and direct mortality of individuals.

Evidence impact is potentially significant: BUOW rely on burrow habitat year-round for their survival and reproduction. Habitat loss and degradation are considered the greatest threats to BUOW in California's Central Valley (Gervais et al. 2008). The Project site is bordered by some of the only remaining undeveloped land in the vicinity, which is otherwise intensively managed for agriculture. Therefore, subsequent ground-disturbing activities associated with the Project have the potential to significantly impact local BUOW populations. In addition, and as described in CDFW's "Staff Report on Burrowing Owl Mitigation" (CDFG 2012), excluding and/or evicting BUOW from their burrows is considered a potentially significant impact under CEQA.

Recommended Potentially Feasible Mitigation Measure(s)

To evaluate potential impacts to BUOW, CDFW recommends conducting the following evaluation of the Project site, incorporating the following mitigation measures into the CEQA document prepared for this Project, and that these measures be made conditions of approval for the Project.

Recommended Mitigation Measure 7: BUOW Surveys

CDFW recommends that a qualified biologist assess if suitable BUOW habitat features are present within or adjacent to the Project site (e.g., burrows). If suitable habitat features are present, CDFW recommends assessing presence/absence of BUOW by having a qualified biologist conduct surveys following the California Burrowing Owl Consortium's "Burrowing Owl Survey Protocol and Mitigation Guidelines" (CBOC 1993) and CDFW's Staff Report on Burrowing Owl Mitigation" (CDFG 2012). Specifically, CBOC and CDFW's Staff Report suggest three or more surveillance surveys conducted during daylight with each visit occurring at least three weeks apart during the peak breeding season (April 15 to July 15), when BUOW are most detectable.

Recommended Mitigation Measure 8: BUOW Avoidance

CDFW recommends no-disturbance buffers, as outlined in the "Staff Report on Burrowing Owl Mitigation" (CDFG 2012), be implemented prior to and during any ground-disturbing activities. Specifically, CDFW's Staff Report recommends that impacts to occupied burrows be avoided in accordance with the following table unless a qualified biologist approved by CDFW verifies through non-invasive methods that either: 1) the birds have not begun egg laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

* meters (m)

Recommended Mitigation Measure 9: BUOW Passive Relocation and Mitigation

If BUOW are found within these recommended buffers and avoidance is not possible, it is important to note that according to the Staff Report (CDFG 2012), exclusion is not a take avoidance, minimization, or mitigation method and is considered a potentially significant impact under CEQA. However, if necessary, CDFW recommends that burrow exclusion be conducted by qualified biologists and only during the non-breeding season, before breeding behavior is exhibited and after the burrow is confirmed empty through non-invasive methods, such as surveillance. CDFW recommends replacement of occupied burrows with artificial burrows at a ratio of 1 burrow collapsed to 1 artificial burrow constructed (1:1) as mitigation for the potentially significant impact of evicting BUOW. BUOW may attempt to colonize or re-colonize an area that will be impacted; thus, CDFW recommends ongoing surveillance, at a rate that is sufficient to detect BUOW if they return.

COMMENT 4: Western spadefoot

Issue: Western spadefoot inhabit grassland habitats, breed in seasonal wetlands, and seek refuge in upland habitat where they occupy burrows outside of the breeding season (Thomson et al. 2016). Review of aerial imagery indicates that the Project may contain these requisite habitat elements.

Specific impact: Aerial imagery shows that the proposed Project site has upland habitat. Without appropriate avoidance and minimization measures for western spadefoot, potentially significant impacts associated with ground disturbance include; collapse of small mammal burrows, inadvertent entrapment, loss of upland refugia, water quality impacts to breeding sites, reduced reproductive success, reduction in health and vigor of eggs and/or young, and direct mortality of individuals.

Evidence impact is potentially significant: Habitat loss and fragmentation resulting from agricultural and urban development is the primary threat to western spadefoot (Thomson et al. 2016). The Project area is within the range of western spadefoot, could contain suitable upland habitat (i.e., grasslands interspersed with burrows) and breeding habitat (i.e., vernal pools and swales). As a result, ground-disturbing activities associated with development of the Project site have the potential to significantly impact local populations of this species.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to western spadefoot associated with the Project, CDFW recommends conducting the following evaluation of the Project site, incorporating the following mitigation measures into the CEQA document prepared for this Project, and that these measures be made conditions of approval for the Project.

Recommended Mitigation Measure 10: Western Spadefoot Surveys

CDFW recommends that a qualified biologist conduct focused surveys for western spadefoot and their requisite habitat features to evaluate potential impacts resulting from ground- and vegetation-disturbance.

Recommended Mitigation Measure 11: Western Spadefoot Avoidance

Avoidance whenever possible is encouraged via delineation and observance of a 50-foot no-disturbance buffer around burrows. If western spadefoot are observed on the Project site, CDFW recommends that Project activities in their immediate vicinity cease and individuals be allowed to leave the Project site on their own accord. Alternatively, a qualified biologist with appropriate authorization can move them out of harm’s way and to a suitable location.

COMMENT 5: Western pond turtle (WPT)

Issue: The Project area is near Salinas River where WPT could have the potential to occur. WPT are known to nest in the spring or early summer within 100 meters of a water body, although nest sites as far away as 500 meters have also been reported (Thomson et al. 2016).

Specific impact: Without appropriate avoidance and minimization measures for WPT, potentially significant impacts associated with Project activities could include nest reduction, inadvertent entrapment, reduced reproductive success, reduction in health or vigor of eggs and/or young, and direct mortality.

Evidence impact is potentially significant: The Project site is in close proximity of potential WPT habitat. Additionally, noise, vegetation removal, movement of workers, and ground disturbance as a result of Project activities have the potential to significantly impact WPT populations.

Recommended Potentially Feasible Mitigation Measure(s)

To evaluate potential impacts to WPT, CDFW recommends conducting the following evaluation of the Project site, editing the MND to include the following measures specific to WPT, and that these measures be made conditions of approval for the Project.

Recommended Mitigation Measure 12: WPT Surveys

CDFW recommends that a qualified biologist conduct focused surveys for WPT ten days prior to Project implementation. In addition, CDFW recommends that focused surveys for nests occur during the egg-laying season (March through August) and that any nests discovered remain undisturbed until the eggs have hatched.

Recommended Mitigation Measure 13: WPT Relocation

CDFW recommends that if any WPT are discovered at the site immediately prior to or during Project activities, they be allowed to move out of the area on their own.

Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS?

COMMENT 6: Wetland and Riparian Habitats

Issue: The Project area is adjacent to the Salinas River which contains riparian and wetland habitat. Development within the Project has the potential to involve temporary and permanent impacts to these features.

Specific impact: Project activities have the potential to result in the loss of riparian and wetland vegetation, in addition to the degradation of wetland and riparian areas through grading, fill, and related development.

Evidence impact is potentially significant: Riparian and associated floodplain and wetland areas are valuable for their ecosystem processes such as protecting water quality by filtering pollutants and transforming nutrients; stabilizing stream banks to prevent erosion and sedimentation/siltation; and dissipating flow energy during flood conditions, thereby spreading the volume of surface water, reducing peak flows downstream, and increasing the duration of low flows by slowly releasing stored water into the channel through subsurface flow. Modifications of streams to accommodate human uses has resulted in damming, canalizing, and channelizing of many streams, though some natural stream channels and small wetland or wetted areas remain (Edminster 2002). The Fish and Game Commission policy regarding wetland resources discourages development or conversion of wetlands that results in any net loss of wetland acreage or habitat value. Construction activities within these features also has the potential to impact downstream waters as a result of Project site impacts leading to erosion, scour, and changes in stream morphology.

Recommended Mitigation Measure 14: Stream and Wetland Habitat Mitigation

CDFW recommends that the potential direct and indirect impacts to stream/riparian and wetland habitat be analyzed according to each Project activity. Based on those potential impacts, CDFW recommends that the CEQA document includes measures to avoid, minimize, and/or mitigate those impacts. CDFW recommends that impacts to riparian habitat (i.e., biotic and abiotic features) take into account the effects to stream function and hydrology from riparian habitat loss or damage, as well as potential effects from the loss of riparian habitat to special-status species already identified herein. CDFW recommends that losses to stream and wetland habitats be offset with corresponding riparian and wetland habitat restoration incorporating native vegetation to replace the value to fish and wildlife provided by the habitats lost from Project implementation. If on-site restoration to replace habitats is not feasible, CDFW recommends offsite mitigation by restoring or enhancing in-kind riparian or wetland habitat and providing for the long-term management and protection of the mitigation area, to ensure its persistence.

II. Editorial Comments and/or Suggestions

Lake and Streambed Alteration: The Project contains activities that may result in the Project site being subject to CDFW's regulatory authority pursuant Fish and Game Code section 1600 et seq. Fish and Game Code section 1602 requires an entity to notify CDFW prior to commencing any activity that may (a) substantially divert or obstruct the natural flow of any river, stream, or lake; (b) substantially change or use any material from the bed, bank, or channel of any river, stream, or lake; or (c) deposit debris, waste or other materials that could pass into any river, stream, or lake. "Any river, stream, or lake" includes those that are ephemeral or intermittent, such as the unnamed stream within the Project site, as well as those that are perennial in nature.

For additional information on notification requirements, please contact our staff in the Lake and Streambed Alteration Program at (559) 243-4593. It is important to note, CDFW is required to comply with CEQA, as a Responsible Agency, when issuing a Lake or Streambed Alteration Agreement (LSAA). If inadequate, or no environmental review, has occurred, for the Project activities that are subject to notification under Fish and Game Code section 1602, CDFW will not be able to issue the Final LSAA until CEQA analysis for the project is complete. V This may lead to considerable Project delays.

Nesting birds: CDFW encourages that Project implementation occur during the bird non-nesting season; however, if ground-disturbing or vegetation-disturbing activities must occur during the breeding season (February through mid-September), the Project applicant is responsible for ensuring that implementation of the Project does not result in violation of the Migratory Bird Treaty Act or relevant Fish and Game Code sections referenced above.

To evaluate Project-related impacts on nesting birds, CDFW recommends that a qualified wildlife biologist conduct pre-activity surveys for active nests no more than 10 days prior to the start of ground or vegetation disturbance to maximize the probability that nests that could potentially be impacted are detected. CDFW also recommends that surveys cover a sufficient area around the Project site to identify nests and determine their status. A sufficient area means any area potentially affected by the Project. In addition to direct impacts (i.e. nest destruction), noise, vibration, and movement of workers or equipment could also affect nests. Prior to initiation of construction activities, CDFW recommends that a qualified biologist conduct a survey to establish a behavioral baseline of all identified nests. Once construction begins, CDFW recommends having a qualified biologist continuously monitor nests to detect behavioral changes resulting from the Project. If behavioral changes occur, CDFW recommends halting the work causing that change and consulting with CDFW for additional avoidance and minimization measures.

If continuous monitoring of identified nests by a qualified wildlife biologist is not feasible, CDFW recommends a minimum no-disturbance buffer of 250 feet around active nests of non-listed bird species and a 500-foot no-disturbance buffer around active nests of non-listed raptors. These buffers are advised to remain in place until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or on-site parental care for survival. Variance from these no-disturbance buffers is possible when there is compelling biological or ecological reason to do so, such as when the construction area would be concealed from a nest site by topography. CDFW recommends that a qualified wildlife biologist advise and support any variance from these buffers and notify CDFW in advance of implementing a variance.

Federally Listed Species: CDFW recommends consulting with the USFWS on potential impacts to federally listed species including, but not limited to, CTS. Take under FESA is more broadly defined than CESA; take under FESA also includes significant habitat modification or degradation that could result in death or injury to a listed species by interfering with essential behavioral patterns such as breeding, foraging, or nesting. Consultation with the USFWS in order to comply with FESA is advised well in advance of any ground-disturbing activities.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a data base which may be used to make subsequent or supplemental environmental determinations. (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special-status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNDDB field survey form can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/CNDDB_FieldSurveyForm.pdf. The completed form can be mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.asp.

FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

CONCLUSION

CDFW appreciates the opportunity to comment on the NOP to assist City of Gonzales in identifying and mitigating Project impacts on biological resources.

More information on survey and monitoring protocols for sensitive species can be found at CDFW's website (https://www.wildlife.ca.gov/Conservation/Survey-Protocols). Please see the enclosed Mitigation Monitoring (MMRP) table which corresponds with recommended mitigation measures in this comment letter. Questions regarding this letter or further coordination should be directed to Aimee Braddock, Environmental Scientist at aimee.braddock@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Bob Stafford
5343A684FF02469...

Bob Stafford for Julie A. Vance
Regional Manager

Attachment 1

cc: Office of Planning and Research, State Clearinghouse, Sacramento

REFERENCES

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Attachment 1

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE RECOMMENDED MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)

PROJECT: Industrial Wastewater Treatment Plan
Notice of Preparation

SCH No.: 2020069049

RECOMMENDED MITIGATION MEASURE	**STATUS/DATE/INITIALS**
Before Disturbing Soil or Vegetation	
Mitigation Measure 1: FYLF and CRLF Surveys	
Mitigation Measure 3: FYLF Take Authorization	
Mitigation Measure 4: Focused CTS Protocol-level Surveys	
Mitigation Measure 6: CTS Take Authorization	
Mitigation Measure 7: BUOW Surveys	
Mitigation Measure 9: BUOW Passive Relocation and Mitigation	
Mitigation Measure 10: Western Spadefoot Surveys	
Mitigation Measure 12: WPT Surveys	
Mitigation Measure 13: WPT Relocation	
Mitigation Measure 14: Stream and Wetland Habitat Mitigation	
During Construction	
Mitigation Measure 2: FYLF and CRLF Avoidance	
Mitigation Measure 5: CTS Avoidance	
Mitigation Measure 8: BUOW Avoidance	
Mitigation Measure 11: Western Spadefoot Avoidance	

California
Department of Conservation
Division of Land Resource Protection

Gavin Newsom, Governor
David Shabazian, Director

JULY 9, 2020

VIA EMAIL: PDOBBINS@CI.GONZALES.CA.US
Patrick Dobbins, PE
City of Gonzales
147 Fourth Street
Gonzales, CA 93926

Governor's Office of Planning & Research
Jul 13 2020
STATE CLEARINGHOUSE

Dear Mr. Dobbins:

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT FOR THE INDUSTRIAL WASTEWATER TREATMENT PLANT PROJECT, SCH# 2020069049

The Department of Conservation's (Department) Division of Land Resource Protection (Division) has reviewed the Notice of Preparation of an Environmental Impact Report for the Industrial Wastewater Treatment Plant Project (Project). The Division monitors farmland conversion on a statewide basis, provides technical assistance regarding the Williamson Act, and administers various agricultural land conservation programs. We offer the following comments and recommendations with respect to the proposed project's potential impacts on agricultural land and resources.

Project Description

There are two components of the proposed project: the Industrial Wastewater Treatment Plant (IWTP), and the proposed wastewater collection line. The proposed IWTP would be located north of the existing Wastewater Treatment Plant on a 78-acre site and would be installed in a phased approach. Phase I would have a wastewater treatment capacity of 2.0 MGD. As the wastewater flows and number of industrial discharges increase, phase II of the IWTP will be constructed with a treatment capacity to 4.0 MGD. The proposed wastewater collection line includes approximately 11, 100 linear feet (LF) of new gravity sewer pipe located mainly on public street right-of-way. This collection line would convey flows starting near the intersection of Katherine Street and Puente Del Monte Avenue. The pipeline heads south on Puente Del Monte Avenue before turning west onto Gonzales River Road. The pipeline alignment continues on Gonzales River Road and continues west onto Short Road. The proposed collection line would convey flow on Short Road before finally terminating at the new IWTP site.

Currently, the project site is in agricultural use and contains Prime Farmland, as identified by the Department of Conservation's Farmland Mapping and Monitoring Program[1]. One of the proposed project site parcels is also under a Williamson Act contract, and is adjacent to a parcel which is subject to an agricultural easement.

Department Comments

The conversion of agricultural land represents a permanent reduction and significant impact to California's agricultural land resources. Under CEQA, a lead agency should not approve a project if there are feasible alternatives or feasible mitigation measures available that would lessen the significant effects of the project.[2] All mitigation measures that are potentially feasible should be included in the project's environmental review. A measure brought to the attention of the lead agency should not be left out unless it is infeasible based on its elements.

As the courts have shown[3], agricultural conservation easements on land of at least equal quality and size can mitigate project impacts in accordance with CEQA Guideline § 15370. The Department highlights agricultural conservation easements because of their acceptance and use by lead agencies as an appropriate mitigation measure under CEQA. Agricultural conservation easements are an available mitigation tool and should always be considered; however, any other feasible mitigation measures should also be considered.

A source that has proven helpful for regional and statewide agricultural mitigation banks is the California Council of Land Trusts. They provide helpful insight into farmland mitigation policies and implementation strategies, including a guidebook with model policies and a model local ordinance. The guidebook can be found at:

http://www.calandtrusts.org/resources/conserving-californias-harvest/

Conclusion

The Department recommends further discussion of the following issues under the Agricultural Resources section of the Environmental Impact Report:

- Type, amount, and location of farmland conversion resulting directly and indirectly from implementation of the proposed project.
- Impacts on any current and future agricultural operations in the vicinity; e.g., land-use conflicts, increases in land values and taxes, loss of agricultural support infrastructure such as processing facilities, etc.

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[1] California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program, https://maps.conservation.ca.gov/DLRP/CIFF/

[2] Public Resources Code section 21002.

[3] *Masonite Corp. v. County of Mendocino* (2013) 218 Cal.App.4th 230, 238.

- Incremental impacts leading to cumulative impacts on agricultural land. This would include impacts from the proposed project, as well as impacts from past, current, and likely future projects.
- Proposed mitigation measures for all impacted agricultural lands within the proposed project area.
- Projects compatibility with, or, potential contract resolutions for land in an agricultural preserve and/or enrolled in a Williamson Act contract.
- Potential impacts, and proposed mitigation for lands held under agricultural easements.

Thank you for giving us the opportunity to comment on the Notice of Intent to adopt a Mitigated Negative Declaration for the Parkwood Subdivision Project. Please provide this Department with notices of any future hearing dates as well as any staff reports pertaining to this project. If you have any questions regarding our comments, please contact Farl Grundy, Associate Environmental Planner at (916) 324-7347 or via email at Farl.Grundy@conservation.ca.gov.

Sincerely,

Monique Wilber

Monique Wilber

Conservation Program Support Supervisor

STATE OF CALIFORNIA Gavin Newsom, *Governor*

NATIVE AMERICAN HERITAGE COMMISSION

7/28/2020

Governor's Office of Planning & Research

Jul 03 2020

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June 30, 2020

Patrick M. Dobbins
City of Gonzales
147 Fourth Street
Gonzales, CA 93926

Re: 2020069049, Industrial Wastewater Treatment Plan Project, Monterey County

Dear Mr. Dobbins:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

- **a.** The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
- **b.** A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

- **a.** Avoidance and preservation of the resources in place, including, but not limited to:
  - **i.** Planning and construction to avoid the resources and protect the cultural and natural context.
  - **ii.** Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
- **b.** Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
  - **i.** Protecting the cultural character and integrity of the resource.
  - **ii.** Protecting the traditional use of the resource.
  - **iii.** Protecting the confidentiality of the resource.
- **c.** Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
- **d.** Protecting the resource. (Pub. Resource Code §21084.3 (b)).
- **e.** Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
- **f.** Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

- **a.** The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
- **b.** The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
- **c.** The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    - **a.** The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    - **b.** Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    - **a.** If part or all of the APE has been previously surveyed for cultural resources.
    - **b.** If any known cultural resources have already been recorded on or adjacent to the APE.
    - **c.** If the probability is low, moderate, or high that cultural resources are located in the APE.
    - **d.** If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    - **a.** The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    - **b.** The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

- **a.** A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
- **b.** A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

- **a.** Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
- **b.** Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
- **c.** Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez

Nancy Gonzalez-Lopez
Cultural Resources Analyst

cc: State Clearinghouse

Appendix B

Air Quality Data

Gonzales IWTP - Phase 1

Monterey County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	2.64	1000sqft	0.06	2,640.00	0
Other Asphalt Surfaces	3.00	Acre	3.00	130,680.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.6	**Precipitation Freq (Days)**	55
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	210	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Emission factors for CO2, CH4, and N2O are from the CalEEMod software version 2016.3.2 for PG&E. CO2 was adjusted based PG&E's reported intensity for 2017.

Land Use - 2,640 SF buildings and 3-acres paved surfaces (access roads/parking area)

Construction Phase - Construction schedule based on engineering input

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck

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Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck
Trips and VMT - On-road vehicle trips based on engineering input

On-road Fugitive Dust - Default on-road fugitive dust

Grading - Default acres graded based on grading/earthwork equipment specified, which is conservative based since only 27-acres to be disturbed. Material exported based on engineering input.

Architectural Coating - Default architectural coating assumptions

Vehicle Trips - No new employees. Only a water truck delivery anticipated per month, which would be negligble.

Vehicle Emission Factors - Default

Vehicle Emission Factors - Default

Vehicle Emission Factors - Default

Road Dust - Default

Consumer Products - Default consumer products

Area Coating - Default architectural coatings

Landscape Equipment - Default landscape maintenance

Energy Use - Revised energy use factors based on engineering input

Water And Wastewater - Revised water use based on engineering input

Solid Waste - Revised solid waste rate based on engineering input

Construction Off-road Equipment Mitigation - Accounts for water truck watering at least 2x per day

Stationary Sources - Emergency Generators and Fire Pumps - 750 kw diesel generator assumed to be tested up to 2 hours per day, once per month, and up to 50 hours annually

Stationary Sources - Emergency Generators and Fire Pumps EF - Default EFs for diesel generator

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	5.00	10.00
tblConstructionPhase	NumDays	18.00	120.00
tblConstructionPhase	NumDays	8.00	70.00
tblConstructionPhase	NumDays	8.00	40.00
tblConstructionPhase	NumDays	230.00	40.00
tblConstructionPhase	NumDays	18.00	50.00

tblEnergyUse	LightingElect	3.08	183.62
tblEnergyUse	NT24E	3.70	220.58
tblEnergyUse	NT24NG	6.67	0.00
tblEnergyUse	T24E	1.48	88.23
tblEnergyUse	T24NG	19.71	0.00
tblGrading	MaterialExported	0.00	50,000.00
tblGrading	MaterialExported	0.00	30,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
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tblOffRoadEquipment	UsageHours	6.00	0.00

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tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	6.00	4.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	210
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblSolidWaste	SolidWasteGenerationRate	3.27	27.50
tblStationaryGeneratorsPumpsUse	HorsePowerValue	0.00	1,006.00
tblStationaryGeneratorsPumpsUse	HoursPerDay	0.00	2.00
tblStationaryGeneratorsPumpsUse	HoursPerYear	0.00	50.00
tblStationaryGeneratorsPumpsUse	NumberOfEquipment	0.00	1.00
tblTripsAndVMT	HaulingTripNumber	0.00	600.00
tblTripsAndVMT	HaulingTripNumber	0.00	2,000.00
tblTripsAndVMT	HaulingTripNumber	6,250.00	7,000.00
tblTripsAndVMT	HaulingTripNumber	3,750.00	400.00
tblTripsAndVMT	HaulingTripNumber	0.00	110.00

tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	22.00	0.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	33.00	30.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	56.00	20.00
tblTripsAndVMT	WorkerTripNumber	11.00	30.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblWater	IndoorWaterUseRate	610,500.00	7,300.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year						tons/yr							MT/yr			
2022	0.4624	4.9468	2.8701	0.0107	0.5901	0.1571	0.7473	0.2259	0.1449	0.3709	0.0000	974.0992	974.0992	0.1881	0.0000	978.8008
Maximum	**0.4624**	**4.9468**	**2.8701**	**0.0107**	**0.5901**	**0.1571**	**0.7473**	**0.2259**	**0.1449**	**0.3709**	**0.0000**	**974.0992**	**974.0992**	**0.1881**	**0.0000**	**978.8008**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year						tons/yr							MT/yr			
2022	0.4624	4.9468	2.8701	0.0107	0.3401	0.1571	0.4972	0.1219	0.1449	0.2669	0.0000	974.0986	974.0986	0.1881	0.0000	978.8002
Maximum	**0.4624**	**4.9468**	**2.8701**	**0.0107**	**0.3401**	**0.1571**	**0.4972**	**0.1219**	**0.1449**	**0.2669**	**0.0000**	**974.0986**	**974.0986**	**0.1881**	**0.0000**	**978.8002**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**42.37**	**0.00**	**33.46**	**46.04**	**0.00**	**28.05**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
1	**1-2-2022**	**4-1-2022**	3.3234	3.3234
2	**4-2-2022**	**7-1-2022**	1.6565	1.6565
3	**7-2-2022**	**9-30-2022**	0.2436	0.2436
		Highest	3.3234	3.3234

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0233	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.4000e-004	1.4000e-004	0.0000	0.0000	1.5000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	123.8322	123.8322	0.0171	3.5400e-003	125.3140
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Stationary	0.0413	0.1846	0.1052	2.0000e-004		6.0700e-003	6.0700e-003		6.0700e-003	6.0700e-003	0.0000	19.1541	19.1541	2.6900e-003	0.0000	19.2212
Waste						0.0000	0.0000		0.0000	0.0000	5.5823	0.0000	5.5823	0.3299	0.0000	13.8298
Water						0.0000	0.0000		0.0000	0.0000	2.3200e-003	3.7600e-003	6.0800e-003	2.4000e-004	1.0000e-005	0.0137
Total	**0.0646**	**0.1846**	**0.1053**	**2.0000e-004**	**0.0000**	**6.0700e-003**	**6.0700e-003**	**0.0000**	**6.0700e-003**	**6.0700e-003**	**5.5846**	**142.9902**	**148.5747**	**0.3499**	**3.5500e-003**	**158.3789**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0233	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.4000e-004	1.4000e-004	0.0000	0.0000	1.5000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	123.8322	123.8322	0.0171	3.5400e-003	125.3140
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Stationary	0.0413	0.1846	0.1052	2.0000e-004		6.0700e-003	6.0700e-003		6.0700e-003	6.0700e-003	0.0000	19.1541	19.1541	2.6900e-003	0.0000	19.2212
Waste						0.0000	0.0000		0.0000	0.0000	5.5823	0.0000	5.5823	0.3299	0.0000	13.8298
Water						0.0000	0.0000		0.0000	0.0000	2.3200e-003	3.7600e-003	6.0800e-003	2.4000e-004	1.0000e-005	0.0137
Total	**0.0646**	**0.1846**	**0.1053**	**2.0000e-004**	**0.0000**	**6.0700e-003**	**6.0700e-003**	**0.0000**	**6.0700e-003**	**6.0700e-003**	**5.5846**	**142.9902**	**148.5747**	**0.3499**	**3.5500e-003**	**158.3789**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/2/2022	1/14/2022	5	10	
2	Offsite Sewer Collection System	Paving	1/3/2022	6/17/2022	5	120	
3	Grading	Grading	1/17/2022	4/22/2022	5	70	
4	Civil-Site Work	Grading	4/25/2022	6/17/2022	5	40	
5	Structural	Building Construction	6/20/2022	8/12/2022	5	40	
6	Mechanical-Elect-Architectural	Architectural Coating	8/15/2022	10/21/2022	5	50	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 210

Acres of Paving: 3

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 3,960; Non-Residential Outdoor: 1,320; Striped Parking Area: 7,841 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Off-Highway Trucks	1	8.00	402	0.38
Site Preparation	Rubber Tired Dozers	0	0.00	247	0.40
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Offsite Sewer Collection System	Cement and Mortar Mixers	0	0.00	9	0.56
Offsite Sewer Collection System	Cranes	1	4.00	231	0.29
Offsite Sewer Collection System	Excavators	1	8.00	158	0.38
Offsite Sewer Collection System	Pavers	1	2.00	130	0.42
Offsite Sewer Collection System	Paving Equipment	0	0.00	132	0.36

Offsite Sewer Collection System	Rollers	1	4.00	80	0.38
Offsite Sewer Collection System	Rubber Tired Dozers	1	8.00	247	0.40
Offsite Sewer Collection System	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	2	8.00	187	0.41
Grading	Off-Highway Trucks	2	8.00	402	0.38
Grading	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	2	6.00	247	0.40
Grading	Rubber Tired Loaders	2	8.00	203	0.36
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Civil-Site Work	Cement and Mortar Mixers	0	0.00	9	0.56
Civil-Site Work	Excavators	0	0.00	158	0.38
Civil-Site Work	Forklifts	1	8.00	89	0.20
Civil-Site Work	Graders	1	8.00	187	0.41
Civil-Site Work	Off-Highway Trucks	1	8.00	402	0.38
Civil-Site Work	Pavers	0	0.00	130	0.42
Civil-Site Work	Paving Equipment	0	0.00	132	0.36
Civil-Site Work	Rollers	1	8.00	80	0.38
Civil-Site Work	Rubber Tired Dozers	0	0.00	247	0.40
Civil-Site Work	Rubber Tired Loaders	1	8.00	203	0.36
Civil-Site Work	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Structural	Cranes	0	0.00	231	0.29
Structural	Excavators	1	4.00	158	0.38
Structural	Forklifts	1	4.00	89	0.20
Structural	Generator Sets	0	0.00	84	0.74
Structural	Off-Highway Trucks	1	2.00	402	0.38

Structural	Rollers	1	2.00	80	0.38
Structural	Rubber Tired Loaders	1	8.00	203	0.36
Structural	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Structural	Welders	0	0.00	46	0.45
Mechanical-Elect-Architectural	Air Compressors	0	0.00	78	0.48
Mechanical-Elect-Architectural	Cranes	1	2.00	231	0.29
Mechanical-Elect-Architectural	Forklifts	1	6.00	89	0.20
Mechanical-Elect-Architectural	Generator Sets	1	6.00	84	0.74
Mechanical-Elect-Architectural	Tractors/Loaders/Backhoes	1	4.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	5	20.00	2.00	600.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Offsite Sewer Collection System	5	20.00	2.00	2,000.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	13	30.00	0.00	7,000.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Civil-Site Work	5	20.00	2.00	400.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Structural	5	20.00	0.00	110.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Mechanical-Elect-Architectural	4	30.00	4.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.9500e-003	0.0000	7.9500e-003	8.6000e-004	0.0000	8.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0105	0.1078	0.0797	2.1000e-004		4.2100e-003	4.2100e-003		3.8800e-003	3.8800e-003	0.0000	18.1121	18.1121	5.8600e-003	0.0000	18.2586
Total	**0.0105**	**0.1078**	**0.0797**	**2.1000e-004**	**7.9500e-003**	**4.2100e-003**	**0.0122**	**8.6000e-004**	**3.8800e-003**	**4.7400e-003**	**0.0000**	**18.1121**	**18.1121**	**5.8600e-003**	**0.0000**	**18.2586**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.2300e-003	0.0758	0.0167	2.4000e-004	5.0900e-003	2.6000e-004	5.3500e-003	1.4000e-003	2.5000e-004	1.6500e-003	0.0000	22.8262	22.8262	8.5000e-004	0.0000	22.8475
Vendor	3.0000e-005	1.0300e-003	2.6000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2468	0.2468	1.0000e-005	0.0000	0.2471
Worker	5.3000e-004	4.8000e-004	4.3800e-003	1.0000e-005	1.2400e-003	1.0000e-005	1.2500e-003	3.3000e-004	1.0000e-005	3.4000e-004	0.0000	1.0853	1.0853	4.0000e-005	0.0000	1.0863
Total	**2.7900e-003**	**0.0773**	**0.0214**	**2.5000e-004**	**6.3900e-003**	**2.7000e-004**	**6.6600e-003**	**1.7500e-003**	**2.6000e-004**	**2.0100e-003**	**0.0000**	**24.1583**	**24.1583**	**9.0000e-004**	**0.0000**	**24.1809**

3.2 Site Preparation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.5800e-003	0.0000	3.5800e-003	3.9000e-004	0.0000	3.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0105	0.1078	0.0797	2.1000e-004		4.2100e-003	4.2100e-003		3.8800e-003	3.8800e-003	0.0000	18.1121	18.1121	5.8600e-003	0.0000	18.2585
Total	**0.0105**	**0.1078**	**0.0797**	**2.1000e-004**	**3.5800e-003**	**4.2100e-003**	**7.7900e-003**	**3.9000e-004**	**3.8800e-003**	**4.2700e-003**	**0.0000**	**18.1121**	**18.1121**	**5.8600e-003**	**0.0000**	**18.2585**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.2300e-003	0.0758	0.0167	2.4000e-004	5.0900e-003	2.6000e-004	5.3500e-003	1.4000e-003	2.5000e-004	1.6500e-003	0.0000	22.8262	22.8262	8.5000e-004	0.0000	22.8475
Vendor	3.0000e-005	1.0300e-003	2.6000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2468	0.2468	1.0000e-005	0.0000	0.2471
Worker	5.3000e-004	4.8000e-004	4.3800e-003	1.0000e-005	1.2400e-003	1.0000e-005	1.2500e-003	3.3000e-004	1.0000e-005	3.4000e-004	0.0000	1.0853	1.0853	4.0000e-005	0.0000	1.0863
Total	**2.7900e-003**	**0.0773**	**0.0214**	**2.5000e-004**	**6.3900e-003**	**2.7000e-004**	**6.6600e-003**	**1.7500e-003**	**2.6000e-004**	**2.0100e-003**	**0.0000**	**24.1583**	**24.1583**	**9.0000e-004**	**0.0000**	**24.1809**

3.3 Offsite Sewer Collection System - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0817	0.8430	0.5661	1.1400e-003		0.0399	0.0399		0.0367	0.0367	0.0000	100.5523	100.5523	0.0325	0.0000	101.3653
Paving	3.9300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0856**	**0.8430**	**0.5661**	**1.1400e-003**		**0.0399**	**0.0399**		**0.0367**	**0.0367**	**0.0000**	**100.5523**	**100.5523**	**0.0325**	**0.0000**	**101.3653**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.4200e-003	0.2526	0.0557	7.9000e-004	0.0170	8.8000e-004	0.0178	4.6600e-003	8.4000e-004	5.5000e-003	0.0000	76.0872	76.0872	2.8400e-003	0.0000	76.1583
Vendor	3.9000e-004	0.0124	3.1000e-003	3.0000e-005	7.1000e-004	3.0000e-005	7.5000e-004	2.1000e-004	3.0000e-005	2.4000e-004	0.0000	2.9621	2.9621	1.4000e-004	0.0000	2.9655
Worker	6.3000e-003	5.7900e-003	0.0525	1.4000e-004	0.0148	1.2000e-004	0.0149	3.9400e-003	1.1000e-004	4.0500e-003	0.0000	13.0238	13.0238	4.7000e-004	0.0000	13.0355
Total	**0.0141**	**0.2708**	**0.1113**	**9.6000e-004**	**0.0325**	**1.0300e-003**	**0.0335**	**8.8100e-003**	**9.8000e-004**	**9.7900e-003**	**0.0000**	**92.0732**	**92.0732**	**3.4500e-003**	**0.0000**	**92.1592**

3.3 Offsite Sewer Collection System - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0817	0.8430	0.5661	1.1400e-003		0.0399	0.0399		0.0367	0.0367	0.0000	100.5522	100.5522	0.0325	0.0000	101.3652
Paving	3.9300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0856**	**0.8430**	**0.5661**	**1.1400e-003**		**0.0399**	**0.0399**		**0.0367**	**0.0367**	**0.0000**	**100.5522**	**100.5522**	**0.0325**	**0.0000**	**101.3652**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.4200e-003	0.2526	0.0557	7.9000e-004	0.0170	8.8000e-004	0.0178	4.6600e-003	8.4000e-004	5.5000e-003	0.0000	76.0872	76.0872	2.8400e-003	0.0000	76.1583
Vendor	3.9000e-004	0.0124	3.1000e-003	3.0000e-005	7.1000e-004	3.0000e-005	7.5000e-004	2.1000e-004	3.0000e-005	2.4000e-004	0.0000	2.9621	2.9621	1.4000e-004	0.0000	2.9655
Worker	6.3000e-003	5.7900e-003	0.0525	1.4000e-004	0.0148	1.2000e-004	0.0149	3.9400e-003	1.1000e-004	4.0500e-003	0.0000	13.0238	13.0238	4.7000e-004	0.0000	13.0355
Total	**0.0141**	**0.2708**	**0.1113**	**9.6000e-004**	**0.0325**	**1.0300e-003**	**0.0335**	**8.8100e-003**	**9.8000e-004**	**9.7900e-003**	**0.0000**	**92.0732**	**92.0732**	**3.4500e-003**	**0.0000**	**92.1592**

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4329	0.0000	0.4329	0.1866	0.0000	0.1866	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2065	2.1315	1.3413	3.7000e-003		0.0853	0.0853		0.0785	0.0785	0.0000	325.1738	325.1738	0.1052	0.0000	327.8030
Total	**0.2065**	**2.1315**	**1.3413**	**3.7000e-003**	**0.4329**	**0.0853**	**0.5182**	**0.1866**	**0.0785**	**0.2651**	**0.0000**	**325.1738**	**325.1738**	**0.1052**	**0.0000**	**327.8030**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0260	0.8842	0.1951	2.7700e-003	0.0593	3.0800e-003	0.0624	0.0163	2.9500e-003	0.0193	0.0000	266.3053	266.3053	9.9500e-003	0.0000	266.5540
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5200e-003	5.0600e-003	0.0459	1.3000e-004	0.0130	1.0000e-004	0.0131	3.4500e-003	1.0000e-004	3.5400e-003	0.0000	11.3959	11.3959	4.1000e-004	0.0000	11.4060
Total	**0.0315**	**0.8892**	**0.2410**	**2.9000e-003**	**0.0723**	**3.1800e-003**	**0.0755**	**0.0198**	**3.0500e-003**	**0.0228**	**0.0000**	**277.7012**	**277.7012**	**0.0104**	**0.0000**	**277.9600**

3.4 Grading - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1948	0.0000	0.1948	0.0840	0.0000	0.0840	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2065	2.1315	1.3413	3.7000e-003		0.0853	0.0853		0.0785	0.0785	0.0000	325.1734	325.1734	0.1052	0.0000	327.8026
Total	**0.2065**	**2.1315**	**1.3413**	**3.7000e-003**	**0.1948**	**0.0853**	**0.2801**	**0.0840**	**0.0785**	**0.1625**	**0.0000**	**325.1734**	**325.1734**	**0.1052**	**0.0000**	**327.8026**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0260	0.8842	0.1951	2.7700e-003	0.0593	3.0800e-003	0.0624	0.0163	2.9500e-003	0.0193	0.0000	266.3053	266.3053	9.9500e-003	0.0000	266.5540
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5200e-003	5.0600e-003	0.0459	1.3000e-004	0.0130	1.0000e-004	0.0131	3.4500e-003	1.0000e-004	3.5400e-003	0.0000	11.3959	11.3959	4.1000e-004	0.0000	11.4060
Total	**0.0315**	**0.8892**	**0.2410**	**2.9000e-003**	**0.0723**	**3.1800e-003**	**0.0755**	**0.0198**	**3.0500e-003**	**0.0228**	**0.0000**	**277.7012**	**277.7012**	**0.0104**	**0.0000**	**277.9600**

3.5 Civil-Site Work - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0138	0.0000	0.0138	1.6300e-003	0.0000	1.6300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0303	0.3015	0.1925	6.0000e-004		0.0117	0.0117		0.0108	0.0108	0.0000	53.1259	53.1259	0.0172	0.0000	53.5554
Total	**0.0303**	**0.3015**	**0.1925**	**6.0000e-004**	**0.0138**	**0.0117**	**0.0255**	**1.6300e-003**	**0.0108**	**0.0124**	**0.0000**	**53.1259**	**53.1259**	**0.0172**	**0.0000**	**53.5554**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4800e-003	0.0505	0.0112	1.6000e-004	3.3900e-003	1.8000e-004	3.5700e-003	9.3000e-004	1.7000e-004	1.1000e-003	0.0000	15.2175	15.2175	5.7000e-004	0.0000	15.2317
Vendor	1.3000e-004	4.1300e-003	1.0300e-003	1.0000e-005	2.4000e-004	1.0000e-005	2.5000e-004	7.0000e-005	1.0000e-005	8.0000e-005	0.0000	0.9874	0.9874	5.0000e-005	0.0000	0.9885
Worker	2.1000e-003	1.9300e-003	0.0175	5.0000e-005	4.9400e-003	4.0000e-005	4.9800e-003	1.3100e-003	4.0000e-005	1.3500e-003	0.0000	4.3413	4.3413	1.6000e-004	0.0000	4.3452
Total	**3.7100e-003**	**0.0566**	**0.0297**	**2.2000e-004**	**8.5700e-003**	**2.3000e-004**	**8.8000e-003**	**2.3100e-003**	**2.2000e-004**	**2.5300e-003**	**0.0000**	**20.5461**	**20.5461**	**7.8000e-004**	**0.0000**	**20.5653**

3.5 Civil-Site Work - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					6.2200e-003	0.0000	6.2200e-003	7.3000e-004	0.0000	7.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0303	0.3015	0.1925	6.0000e-004		0.0117	0.0117		0.0108	0.0108	0.0000	53.1258	53.1258	0.0172	0.0000	53.5554
Total	**0.0303**	**0.3015**	**0.1925**	**6.0000e-004**	**6.2200e-003**	**0.0117**	**0.0179**	**7.3000e-004**	**0.0108**	**0.0115**	**0.0000**	**53.1258**	**53.1258**	**0.0172**	**0.0000**	**53.5554**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4800e-003	0.0505	0.0112	1.6000e-004	3.3900e-003	1.8000e-004	3.5700e-003	9.3000e-004	1.7000e-004	1.1000e-003	0.0000	15.2175	15.2175	5.7000e-004	0.0000	15.2317
Vendor	1.3000e-004	4.1300e-003	1.0300e-003	1.0000e-005	2.4000e-004	1.0000e-005	2.5000e-004	7.0000e-005	1.0000e-005	8.0000e-005	0.0000	0.9874	0.9874	5.0000e-005	0.0000	0.9885
Worker	2.1000e-003	1.9300e-003	0.0175	5.0000e-005	4.9400e-003	4.0000e-005	4.9800e-003	1.3100e-003	4.0000e-005	1.3500e-003	0.0000	4.3413	4.3413	1.6000e-004	0.0000	4.3452
Total	**3.7100e-003**	**0.0566**	**0.0297**	**2.2000e-004**	**8.5700e-003**	**2.3000e-004**	**8.8000e-003**	**2.3100e-003**	**2.2000e-004**	**2.5300e-003**	**0.0000**	**20.5461**	**20.5461**	**7.8000e-004**	**0.0000**	**20.5653**

3.6 Structural - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0125	0.1175	0.1008	2.7000e-004		4.8100e-003	4.8100e-003		4.4300e-003	4.4300e-003	0.0000	23.8219	23.8219	7.7000e-003	0.0000	24.0146
Total	**0.0125**	**0.1175**	**0.1008**	**2.7000e-004**		**4.8100e-003**	**4.8100e-003**		**4.4300e-003**	**4.4300e-003**	**0.0000**	**23.8219**	**23.8219**	**7.7000e-003**	**0.0000**	**24.0146**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.1000e-004	0.0139	3.0700e-003	4.0000e-005	9.3000e-004	5.0000e-005	9.8000e-004	2.6000e-004	5.0000e-005	3.0000e-004	0.0000	4.1848	4.1848	1.6000e-004	0.0000	4.1887
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-003	1.9300e-003	0.0175	5.0000e-005	4.9400e-003	4.0000e-005	4.9800e-003	1.3100e-003	4.0000e-005	1.3500e-003	0.0000	4.3413	4.3413	1.6000e-004	0.0000	4.3452
Total	**2.5100e-003**	**0.0158**	**0.0206**	**9.0000e-005**	**5.8700e-003**	**9.0000e-005**	**5.9600e-003**	**1.5700e-003**	**9.0000e-005**	**1.6500e-003**	**0.0000**	**8.5261**	**8.5261**	**3.2000e-004**	**0.0000**	**8.5339**

3.6 Structural - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0125	0.1175	0.1008	2.7000e-004		4.8100e-003	4.8100e-003		4.4300e-003	4.4300e-003	0.0000	23.8219	23.8219	7.7000e-003	0.0000	24.0145
Total	**0.0125**	**0.1175**	**0.1008**	**2.7000e-004**		**4.8100e-003**	**4.8100e-003**		**4.4300e-003**	**4.4300e-003**	**0.0000**	**23.8219**	**23.8219**	**7.7000e-003**	**0.0000**	**24.0145**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.1000e-004	0.0139	3.0700e-003	4.0000e-005	9.3000e-004	5.0000e-005	9.8000e-004	2.6000e-004	5.0000e-005	3.0000e-004	0.0000	4.1848	4.1848	1.6000e-004	0.0000	4.1887
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-003	1.9300e-003	0.0175	5.0000e-005	4.9400e-003	4.0000e-005	4.9800e-003	1.3100e-003	4.0000e-005	1.3500e-003	0.0000	4.3413	4.3413	1.6000e-004	0.0000	4.3452
Total	**2.5100e-003**	**0.0158**	**0.0206**	**9.0000e-005**	**5.8700e-003**	**9.0000e-005**	**5.9600e-003**	**1.5700e-003**	**9.0000e-005**	**1.6500e-003**	**0.0000**	**8.5261**	**8.5261**	**3.2000e-004**	**0.0000**	**8.5339**

3.7 Mechanical-Elect-Architectural - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0456					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0127	0.1218	0.1304	2.3000e-004		6.2800e-003	6.2800e-003		6.0000e-003	6.0000e-003	0.0000	19.7001	19.7001	3.4500e-003	0.0000	19.7863
Total	**0.0583**	**0.1218**	**0.1304**	**2.3000e-004**		**6.2800e-003**	**6.2800e-003**		**6.0000e-003**	**6.0000e-003**	**0.0000**	**19.7001**	**19.7001**	**3.4500e-003**	**0.0000**	**19.7863**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	0.0103	2.5900e-003	3.0000e-005	6.0000e-004	3.0000e-005	6.2000e-004	1.7000e-004	3.0000e-005	2.0000e-004	0.0000	2.4684	2.4684	1.1000e-004	0.0000	2.4712
Worker	3.9400e-003	3.6200e-003	0.0328	9.0000e-005	9.2700e-003	7.0000e-005	9.3400e-003	2.4600e-003	7.0000e-005	2.5300e-003	0.0000	8.1399	8.1399	2.9000e-004	0.0000	8.1472
Total	**4.2600e-003**	**0.0139**	**0.0354**	**1.2000e-004**	**9.8700e-003**	**1.0000e-004**	**9.9600e-003**	**2.6300e-003**	**1.0000e-004**	**2.7300e-003**	**0.0000**	**10.6083**	**10.6083**	**4.0000e-004**	**0.0000**	**10.6184**

3.7 Mechanical-Elect-Architectural - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0456					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0127	0.1218	0.1304	2.3000e-004		6.2800e-003	6.2800e-003		6.0000e-003	6.0000e-003	0.0000	19.7001	19.7001	3.4500e-003	0.0000	19.7863
Total	**0.0583**	**0.1218**	**0.1304**	**2.3000e-004**		**6.2800e-003**	**6.2800e-003**		**6.0000e-003**	**6.0000e-003**	**0.0000**	**19.7001**	**19.7001**	**3.4500e-003**	**0.0000**	**19.7863**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	0.0103	2.5900e-003	3.0000e-005	6.0000e-004	3.0000e-005	6.2000e-004	1.7000e-004	3.0000e-005	2.0000e-004	0.0000	2.4684	2.4684	1.1000e-004	0.0000	2.4712
Worker	3.9400e-003	3.6200e-003	0.0328	9.0000e-005	9.2700e-003	7.0000e-005	9.3400e-003	2.4600e-003	7.0000e-005	2.5300e-003	0.0000	8.1399	8.1399	2.9000e-004	0.0000	8.1472
Total	**4.2600e-003**	**0.0139**	**0.0354**	**1.2000e-004**	**9.8700e-003**	**1.0000e-004**	**9.9600e-003**	**2.6300e-003**	**1.0000e-004**	**2.7300e-003**	**0.0000**	**10.6083**	**10.6083**	**4.0000e-004**	**0.0000**	**10.6184**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	14.70	6.60	6.60	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.548528	0.027912	0.206330	0.127577	0.020437	0.005268	0.019586	0.027922	0.004162	0.002641	0.007642	0.001233	0.000761
Other Asphalt Surfaces	0.548528	0.027912	0.206330	0.127577	0.020437	0.005268	0.019586	0.027922	0.004162	0.002641	0.007642	0.001233	0.000761

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	123.8322	123.8322	0.0171	3.5400e-003	125.3140
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	123.8322	123.8322	0.0171	3.5400e-003	125.3140
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	1.30002e +006	123.8322	0.0171	3.5400e-003	125.3140
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**123.8322**	**0.0171**	**3.5400e-003**	**125.3140**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	1.30002e +006	123.8322	0.0171	3.5400e-003	125.3140
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**123.8322**	**0.0171**	**3.5400e-003**	**125.3140**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0233	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.4000e-004	1.4000e-004	0.0000	0.0000	1.5000e-004
Unmitigated	0.0233	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.4000e-004	1.4000e-004	0.0000	0.0000	1.5000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	4.5600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0188					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.4000e-004	1.4000e-004	0.0000	0.0000	1.5000e-004
Total	**0.0233**	**0.0000**	**7.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.4000e-004**	**1.4000e-004**	**0.0000**	**0.0000**	**1.5000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	4.5600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0188					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.4000e-004	1.4000e-004	0.0000	0.0000	1.5000e-004
Total	**0.0233**	**0.0000**	**7.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.4000e-004**	**1.4000e-004**	**0.0000**	**0.0000**	**1.5000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	6.0800e-003	2.4000e-004	1.0000e-005	0.0137
Unmitigated	6.0800e-003	2.4000e-004	1.0000e-005	0.0137

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	0.0073 / 0	6.0800e-003	2.4000e-004	1.0000e-005	0.0137
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**6.0800e-003**	**2.4000e-004**	**1.0000e-005**	**0.0137**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	0.0073 / 0	6.0800e-003	2.4000e-004	1.0000e-005	0.0137
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**6.0800e-003**	**2.4000e-004**	**1.0000e-005**	**0.0137**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	5.5823	0.3299	0.0000	13.8298
Unmitigated	5.5823	0.3299	0.0000	13.8298

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	27.5	5.5823	0.3299	0.0000	13.8298
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**5.5823**	**0.3299**	**0.0000**	**13.8298**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	27.5	5.5823	0.3299	0.0000	13.8298
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**5.5823**	**0.3299**	**0.0000**	**13.8298**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
Emergency Generator	1	2	50	1006	0.73	Diesel

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

10.1 Stationary Sources

Unmitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Emergency Generator - Diesel (750 - 9999 HP)	0.0413	0.1846	0.1052	2.0000e-004		6.0700e-003	6.0700e-003		6.0700e-003	6.0700e-003	0.0000	19.1541	19.1541	2.6900e-003	0.0000	19.2212
Total	**0.0413**	**0.1846**	**0.1052**	**2.0000e-004**		**6.0700e-003**	**6.0700e-003**		**6.0700e-003**	**6.0700e-003**	**0.0000**	**19.1541**	**19.1541**	**2.6900e-003**	**0.0000**	**19.2212**

11.0 Vegetation

Gonzales IWTP - Phase 1

Monterey County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	2.64	1000sqft	0.06	2,640.00	0
Other Asphalt Surfaces	3.00	Acre	3.00	130,680.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.6	**Precipitation Freq (Days)**	55
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	210	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Emission factors for CO2, CH4, and N2O are from the CalEEMod software version 2016.3.2 for PG&E. CO2 was adjusted based PG&E's reported intensity for 2017.

Land Use - 2,640 SF buildings and 3-acres paved surfaces (access roads/parking area)

Construction Phase - Construction schedule based on engineering input

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck
Trips and VMT - On-road vehicle trips based on engineering input

On-road Fugitive Dust - Default on-road fugitive dust

Grading - Default acres graded based on grading/earthwork equipment specified, which is conservative based since only 27-acres to be disturbed. Material exported based on engineering input.

Architectural Coating - Default architectural coating assumptions

Vehicle Trips - No new employees. Only a water truck delivery anticipated per month, which would be negligble.

Vehicle Emission Factors - Default

Vehicle Emission Factors - Default

Vehicle Emission Factors - Default

Road Dust - Default

Consumer Products - Default consumer products

Area Coating - Default architectural coatings

Landscape Equipment - Default landscape maintenance

Energy Use - Revised energy use factors based on engineering input

Water And Wastewater - Revised water use based on engineering input

Solid Waste - Revised solid waste rate based on engineering input

Construction Off-road Equipment Mitigation - Accounts for water truck watering at least 2x per day

Stationary Sources - Emergency Generators and Fire Pumps - 750 kw diesel generator assumed to be tested up to 2 hours per day, once per month, and up to 50 hours annually

Stationary Sources - Emergency Generators and Fire Pumps EF - Default EFs for diesel generator

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	5.00	10.00
tblConstructionPhase	NumDays	18.00	120.00
tblConstructionPhase	NumDays	8.00	70.00
tblConstructionPhase	NumDays	8.00	40.00
tblConstructionPhase	NumDays	230.00	40.00
tblConstructionPhase	NumDays	18.00	50.00

tblEnergyUse	LightingElect	3.08	183.62
tblEnergyUse	NT24E	3.70	220.58
tblEnergyUse	NT24NG	6.67	0.00
tblEnergyUse	T24E	1.48	88.23
tblEnergyUse	T24NG	19.71	0.00
tblGrading	MaterialExported	0.00	50,000.00
tblGrading	MaterialExported	0.00	30,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00

tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	6.00	4.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	210
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblSolidWaste	SolidWasteGenerationRate	3.27	27.50
tblStationaryGeneratorsPumpsUse	HorsePowerValue	0.00	1,006.00
tblStationaryGeneratorsPumpsUse	HoursPerDay	0.00	2.00
tblStationaryGeneratorsPumpsUse	HoursPerYear	0.00	50.00
tblStationaryGeneratorsPumpsUse	NumberOfEquipment	0.00	1.00
tblTripsAndVMT	HaulingTripNumber	0.00	600.00
tblTripsAndVMT	HaulingTripNumber	0.00	2,000.00
tblTripsAndVMT	HaulingTripNumber	6,250.00	7,000.00
tblTripsAndVMT	HaulingTripNumber	3,750.00	400.00
tblTripsAndVMT	HaulingTripNumber	0.00	110.00

tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	22.00	0.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	33.00	30.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	56.00	20.00
tblTripsAndVMT	WorkerTripNumber	11.00	30.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblWater	IndoorWaterUseRate	610,500.00	7,300.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	8.4448	104.2781	56.4613	0.2249	15.0546	3.2101	18.2647	6.0627	2.9571	9.0197	0.0000	22,647.9337	22,647.9337	4.2893	0.0000	22,755.1652
Maximum	**8.4448**	**104.2781**	**56.4613**	**0.2249**	**15.0546**	**3.2101**	**18.2647**	**6.0627**	**2.9571**	**9.0197**	**0.0000**	**22,647.9337**	**22,647.9337**	**4.2893**	**0.0000**	**22,755.1652**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	8.4448	104.2781	56.4613	0.2249	8.2523	3.2101	11.4624	3.1300	2.9571	6.0871	0.0000	22,647.9337	22,647.9337	4.2893	0.0000	22,755.1652
Maximum	**8.4448**	**104.2781**	**56.4613**	**0.2249**	**8.2523**	**3.2101**	**11.4624**	**3.1300**	**2.9571**	**6.0871**	**0.0000**	**22,647.9337**	**22,647.9337**	**4.2893**	**0.0000**	**22,755.1652**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**45.18**	**0.00**	**37.24**	**48.37**	**0.00**	**32.51**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1278	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Stationary	3.3018	14.7656	8.4190	0.0159		0.4857	0.4857		0.4857	0.4857		1,689.1024	1,689.1024	0.2368		1,695.0227
Total	**3.4297**	**14.7656**	**8.4195**	**0.0159**	**0.0000**	**0.4857**	**0.4857**	**0.0000**	**0.4857**	**0.4857**		**1,689.1036**	**1,689.1036**	**0.2368**	**0.0000**	**1,695.0240**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1278	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Stationary	3.3018	14.7656	8.4190	0.0159		0.4857	0.4857		0.4857	0.4857		1,689.1024	1,689.1024	0.2368		1,695.0227
Total	**3.4297**	**14.7656**	**8.4195**	**0.0159**	**0.0000**	**0.4857**	**0.4857**	**0.0000**	**0.4857**	**0.4857**		**1,689.1036**	**1,689.1036**	**0.2368**	**0.0000**	**1,695.0240**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/2/2022	1/14/2022	5	10	
2	Offsite Sewer Collection System	Paving	1/3/2022	6/17/2022	5	120	
3	Grading	Grading	1/17/2022	4/22/2022	5	70	
4	Civil-Site Work	Grading	4/25/2022	6/17/2022	5	40	
5	Structural	Building Construction	6/20/2022	8/12/2022	5	40	
6	Mechanical-Elect-Architectural	Architectural Coating	8/15/2022	10/21/2022	5	50	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 210

Acres of Paving: 3

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 3,960; Non-Residential Outdoor: 1,320; Striped Parking Area: 7,841 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Off-Highway Trucks	1	8.00	402	0.38
Site Preparation	Rubber Tired Dozers	0	0.00	247	0.40
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Offsite Sewer Collection System	Cement and Mortar Mixers	0	0.00	9	0.56
Offsite Sewer Collection System	Cranes	1	4.00	231	0.29
Offsite Sewer Collection System	Excavators	1	8.00	158	0.38
Offsite Sewer Collection System	Pavers	1	2.00	130	0.42
Offsite Sewer Collection System	Paving Equipment	0	0.00	132	0.36

Offsite Sewer Collection System	Rollers	1	4.00	80	0.38
Offsite Sewer Collection System	Rubber Tired Dozers	1	8.00	247	0.40
Offsite Sewer Collection System	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	2	8.00	187	0.41
Grading	Off-Highway Trucks	2	8.00	402	0.38
Grading	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	2	6.00	247	0.40
Grading	Rubber Tired Loaders	2	8.00	203	0.36
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Civil-Site Work	Cement and Mortar Mixers	0	0.00	9	0.56
Civil-Site Work	Excavators	0	0.00	158	0.38
Civil-Site Work	Forklifts	1	8.00	89	0.20
Civil-Site Work	Graders	1	8.00	187	0.41
Civil-Site Work	Off-Highway Trucks	1	8.00	402	0.38
Civil-Site Work	Pavers	0	0.00	130	0.42
Civil-Site Work	Paving Equipment	0	0.00	132	0.36
Civil-Site Work	Rollers	1	8.00	80	0.38
Civil-Site Work	Rubber Tired Dozers	0	0.00	247	0.40
Civil-Site Work	Rubber Tired Loaders	1	8.00	203	0.36
Civil-Site Work	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Structural	Cranes	0	0.00	231	0.29
Structural	Excavators	1	4.00	158	0.38
Structural	Forklifts	1	4.00	89	0.20
Structural	Generator Sets	0	0.00	84	0.74
Structural	Off-Highway Trucks	1	2.00	402	0.38

Structural	Rollers	1	2.00	80	0.38
Structural	Rubber Tired Loaders	1	8.00	203	0.36
Structural	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Structural	Welders	0	0.00	46	0.45
Mechanical-Elect-Architectural	Air Compressors	0	0.00	78	0.48
Mechanical-Elect-Architectural	Cranes	1	2.00	231	0.29
Mechanical-Elect-Architectural	Forklifts	1	6.00	89	0.20
Mechanical-Elect-Architectural	Generator Sets	1	6.00	84	0.74
Mechanical-Elect-Architectural	Tractors/Loaders/Backhoes	1	4.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	5	20.00	2.00	600.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Offsite Sewer Collection System	5	20.00	2.00	2,000.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	13	30.00	0.00	7,000.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Civil-Site Work	5	20.00	2.00	400.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Structural	5	20.00	0.00	110.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Mechanical-Elect-Architectural	4	30.00	4.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	2.0921	21.5661	15.9322	0.0412		0.8425	0.8425		0.7751	0.7751		3,993.0360	3,993.0360	1.2914		4,025.3218
Total	**2.0921**	**21.5661**	**15.9322**	**0.0412**	**1.5908**	**0.8425**	**2.4333**	**0.1718**	**0.7751**	**0.9469**		**3,993.0360**	**3,993.0360**	**1.2914**		**4,025.3218**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.4388	14.8698	3.2368	0.0479	1.0470	0.0522	1.0992	0.2868	0.0499	0.3367		5,075.3923	5,075.3923	0.1823		5,079.9496
Vendor	6.2500e-003	0.2046	0.0482	5.2000e-004	0.0122	5.5000e-004	0.0128	3.5200e-003	5.2000e-004	4.0400e-003		55.1594	55.1594	2.3900e-003		55.2191
Worker	0.1041	0.0843	0.9444	2.5500e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		254.1611	254.1611	9.0900e-003		254.3885
Total	**0.5492**	**15.1587**	**4.2294**	**0.0510**	**1.3147**	**0.0547**	**1.3694**	**0.3581**	**0.0523**	**0.4103**		**5,384.7129**	**5,384.7129**	**0.1938**		**5,389.5572**

3.2 Site Preparation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7158	0.0000	0.7158	0.0773	0.0000	0.0773			0.0000			0.0000
Off-Road	2.0921	21.5661	15.9322	0.0412		0.8425	0.8425		0.7751	0.7751	0.0000	3,993.0360	3,993.0360	1.2914		4,025.3217
Total	**2.0921**	**21.5661**	**15.9322**	**0.0412**	**0.7158**	**0.8425**	**1.5584**	**0.0773**	**0.7751**	**0.8524**	**0.0000**	**3,993.0360**	**3,993.0360**	**1.2914**		**4,025.3217**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.4388	14.8698	3.2368	0.0479	1.0470	0.0522	1.0992	0.2868	0.0499	0.3367		5,075.3923	5,075.3923	0.1823		5,079.9496
Vendor	6.2500e-003	0.2046	0.0482	5.2000e-004	0.0122	5.5000e-004	0.0128	3.5200e-003	5.2000e-004	4.0400e-003		55.1594	55.1594	2.3900e-003		55.2191
Worker	0.1041	0.0843	0.9444	2.5500e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		254.1611	254.1611	9.0900e-003		254.3885
Total	**0.5492**	**15.1587**	**4.2294**	**0.0510**	**1.3147**	**0.0547**	**1.3694**	**0.3581**	**0.0523**	**0.4103**		**5,384.7129**	**5,384.7129**	**0.1938**		**5,389.5572**

3.3 Offsite Sewer Collection System - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3609	14.0504	9.4345	0.0191		0.6648	0.6648		0.6116	0.6116		1,847.3322	1,847.3322	0.5975		1,862.2688
Paving	0.0655					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4264**	**14.0504**	**9.4345**	**0.0191**		**0.6648**	**0.6648**		**0.6116**	**0.6116**		**1,847.3322**	**1,847.3322**	**0.5975**		**1,862.2688**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1219	4.1305	0.8991	0.0133	0.2908	0.0145	0.3053	0.0797	0.0139	0.0935		1,409.8312	1,409.8312	0.0506		1,411.0971
Vendor	6.2500e-003	0.2046	0.0482	5.2000e-004	0.0122	5.5000e-004	0.0128	3.5200e-003	5.2000e-004	4.0400e-003		55.1594	55.1594	2.3900e-003		55.2191
Worker	0.1041	0.0843	0.9444	2.5500e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		254.1611	254.1611	9.0900e-003		254.3885
Total	**0.2322**	**4.4194**	**1.8917**	**0.0164**	**0.5585**	**0.0170**	**0.5756**	**0.1509**	**0.0162**	**0.1672**		**1,719.1518**	**1,719.1518**	**0.0621**		**1,720.7047**

3.3 Offsite Sewer Collection System - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3609	14.0504	9.4345	0.0191		0.6648	0.6648		0.6116	0.6116	0.0000	1,847.3322	1,847.3322	0.5975		1,862.2688
Paving	0.0655					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4264**	**14.0504**	**9.4345**	**0.0191**		**0.6648**	**0.6648**		**0.6116**	**0.6116**	**0.0000**	**1,847.3322**	**1,847.3322**	**0.5975**		**1,862.2688**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1219	4.1305	0.8991	0.0133	0.2908	0.0145	0.3053	0.0797	0.0139	0.0935		1,409.8312	1,409.8312	0.0506		1,411.0971
Vendor	6.2500e-003	0.2046	0.0482	5.2000e-004	0.0122	5.5000e-004	0.0128	3.5200e-003	5.2000e-004	4.0400e-003		55.1594	55.1594	2.3900e-003		55.2191
Worker	0.1041	0.0843	0.9444	2.5500e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		254.1611	254.1611	9.0900e-003		254.3885
Total	**0.2322**	**4.4194**	**1.8917**	**0.0164**	**0.5585**	**0.0170**	**0.5756**	**0.1509**	**0.0162**	**0.1672**		**1,719.1518**	**1,719.1518**	**0.0621**		**1,720.7047**

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.3679	0.0000	12.3679	5.3321	0.0000	5.3321			0.0000			0.0000
Off-Road	5.8987	60.8988	38.3238	0.1058		2.4384	2.4384		2.2433	2.2433		10,241.2208	10,241.2208	3.3122		10,324.0263
Total	**5.8987**	**60.8988**	**38.3238**	**0.1058**	**12.3679**	**2.4384**	**14.8063**	**5.3321**	**2.2433**	**7.5754**		**10,241.2208**	**10,241.2208**	**3.3122**		**10,324.0263**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.7314	24.7830	5.3947	0.0798	1.7450	0.0869	1.8319	0.4780	0.0832	0.5612		8,458.9872	8,458.9872	0.3038		8,466.5827
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1561	0.1265	1.4166	3.8300e-003	0.3832	2.9800e-003	0.3862	0.1016	2.7500e-003	0.1044		381.2417	381.2417	0.0136		381.5827
Total	**0.8875**	**24.9095**	**6.8113**	**0.0836**	**2.1282**	**0.0899**	**2.2181**	**0.5796**	**0.0859**	**0.6656**		**8,840.2289**	**8,840.2289**	**0.3175**		**8,848.1654**

3.4 Grading - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.5655	0.0000	5.5655	2.3994	0.0000	2.3994			0.0000			0.0000
Off-Road	5.8987	60.8988	38.3238	0.1058		2.4384	2.4384		2.2433	2.2433	0.0000	10,241.2208	10,241.2208	3.3122		10,324.0263
Total	**5.8987**	**60.8988**	**38.3238**	**0.1058**	**5.5655**	**2.4384**	**8.0039**	**2.3994**	**2.2433**	**4.6428**	**0.0000**	**10,241.2208**	**10,241.2208**	**3.3122**		**10,324.0263**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.7314	24.7830	5.3947	0.0798	1.7450	0.0869	1.8319	0.4780	0.0832	0.5612		8,458.9872	8,458.9872	0.3038		8,466.5827
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1561	0.1265	1.4166	3.8300e-003	0.3832	2.9800e-003	0.3862	0.1016	2.7500e-003	0.1044		381.2417	381.2417	0.0136		381.5827
Total	**0.8875**	**24.9095**	**6.8113**	**0.0836**	**2.1282**	**0.0899**	**2.2181**	**0.5796**	**0.0859**	**0.6656**		**8,840.2289**	**8,840.2289**	**0.3175**		**8,848.1654**

3.5 Civil-Site Work - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6911	0.0000	0.6911	0.0816	0.0000	0.0816			0.0000			0.0000
Off-Road	1.5147	15.0771	9.6258	0.0302		0.5840	0.5840		0.5373	0.5373		2,928.0632	2,928.0632	0.9470		2,951.7381
Total	**1.5147**	**15.0771**	**9.6258**	**0.0302**	**0.6911**	**0.5840**	**1.2751**	**0.0816**	**0.5373**	**0.6189**		**2,928.0632**	**2,928.0632**	**0.9470**		**2,951.7381**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0731	2.4783	0.5395	7.9800e-003	0.1745	8.6900e-003	0.1832	0.0478	8.3200e-003	0.0561		845.8987	845.8987	0.0304		846.6583
Vendor	6.2500e-003	0.2046	0.0482	5.2000e-004	0.0122	5.5000e-004	0.0128	3.5200e-003	5.2000e-004	4.0400e-003		55.1594	55.1594	2.3900e-003		55.2191
Worker	0.1041	0.0843	0.9444	2.5500e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		254.1611	254.1611	9.0900e-003		254.3885
Total	**0.1835**	**2.7672**	**1.5321**	**0.0111**	**0.4422**	**0.0112**	**0.4534**	**0.1191**	**0.0107**	**0.1297**		**1,155.2193**	**1,155.2193**	**0.0419**		**1,156.2659**

3.5 Civil-Site Work - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3110	0.0000	0.3110	0.0367	0.0000	0.0367			0.0000			0.0000
Off-Road	1.5147	15.0771	9.6258	0.0302		0.5840	0.5840		0.5373	0.5373	0.0000	2,928.0632	2,928.0632	0.9470		2,951.7381
Total	**1.5147**	**15.0771**	**9.6258**	**0.0302**	**0.3110**	**0.5840**	**0.8950**	**0.0367**	**0.5373**	**0.5740**	**0.0000**	**2,928.0632**	**2,928.0632**	**0.9470**		**2,951.7381**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0731	2.4783	0.5395	7.9800e-003	0.1745	8.6900e-003	0.1832	0.0478	8.3200e-003	0.0561		845.8987	845.8987	0.0304		846.6583
Vendor	6.2500e-003	0.2046	0.0482	5.2000e-004	0.0122	5.5000e-004	0.0128	3.5200e-003	5.2000e-004	4.0400e-003		55.1594	55.1594	2.3900e-003		55.2191
Worker	0.1041	0.0843	0.9444	2.5500e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		254.1611	254.1611	9.0900e-003		254.3885
Total	**0.1835**	**2.7672**	**1.5321**	**0.0111**	**0.4422**	**0.0112**	**0.4534**	**0.1191**	**0.0107**	**0.1297**		**1,155.2193**	**1,155.2193**	**0.0419**		**1,156.2659**

3.6 Structural - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6231	5.8758	5.0404	0.0136		0.2407	0.2407		0.2215	0.2215		1,312.9596	1,312.9596	0.4246		1,323.5756
Total	**0.6231**	**5.8758**	**5.0404**	**0.0136**		**0.2407**	**0.2407**		**0.2215**	**0.2215**		**1,312.9596**	**1,312.9596**	**0.4246**		**1,323.5756**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0201	0.6815	0.1484	2.1900e-003	0.0480	2.3900e-003	0.0504	0.0132	2.2900e-003	0.0154		232.6222	232.6222	8.3600e-003		232.8310
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1041	0.0843	0.9444	2.5500e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		254.1611	254.1611	9.0900e-003		254.3885
Total	**0.1242**	**0.7659**	**1.0928**	**4.7400e-003**	**0.3035**	**4.3800e-003**	**0.3078**	**0.0809**	**4.1200e-003**	**0.0850**		**486.7833**	**486.7833**	**0.0175**		**487.2195**

3.6 Structural - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6231	5.8758	5.0404	0.0136		0.2407	0.2407		0.2215	0.2215	0.0000	1,312.9596	1,312.9596	0.4246		1,323.5756
Total	**0.6231**	**5.8758**	**5.0404**	**0.0136**		**0.2407**	**0.2407**		**0.2215**	**0.2215**	**0.0000**	**1,312.9596**	**1,312.9596**	**0.4246**		**1,323.5756**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0201	0.6815	0.1484	2.1900e-003	0.0480	2.3900e-003	0.0504	0.0132	2.2900e-003	0.0154		232.6222	232.6222	8.3600e-003		232.8310
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1041	0.0843	0.9444	2.5500e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		254.1611	254.1611	9.0900e-003		254.3885
Total	**0.1242**	**0.7659**	**1.0928**	**4.7400e-003**	**0.3035**	**4.3800e-003**	**0.3078**	**0.0809**	**4.1200e-003**	**0.0850**		**486.7833**	**486.7833**	**0.0175**		**487.2195**

3.7 Mechanical-Elect-Architectural - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.8245					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.5083	4.8713	5.2143	9.0800e-003		0.2511	0.2511		0.2398	0.2398		868.6261	868.6261	0.1520		872.4262
Total	**2.3328**	**4.8713**	**5.2143**	**9.0800e-003**		**0.2511**	**0.2511**		**0.2398**	**0.2398**		**868.6261**	**868.6261**	**0.1520**		**872.4262**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0125	0.4091	0.0964	1.0500e-003	0.0245	1.0900e-003	0.0256	7.0500e-003	1.0400e-003	8.0900e-003		110.3189	110.3189	4.7800e-003		110.4383
Worker	0.1561	0.1265	1.4166	3.8300e-003	0.3832	2.9800e-003	0.3862	0.1016	2.7500e-003	0.1044		381.2417	381.2417	0.0136		381.5827
Total	**0.1686**	**0.5356**	**1.5130**	**4.8800e-003**	**0.4077**	**4.0700e-003**	**0.4117**	**0.1087**	**3.7900e-003**	**0.1125**		**491.5606**	**491.5606**	**0.0184**		**492.0210**

3.7 Mechanical-Elect-Architectural - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.8245					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.5083	4.8713	5.2143	9.0800e-003		0.2511	0.2511		0.2398	0.2398	0.0000	868.6261	868.6261	0.1520		872.4262
Total	**2.3328**	**4.8713**	**5.2143**	**9.0800e-003**		**0.2511**	**0.2511**		**0.2398**	**0.2398**	**0.0000**	**868.6261**	**868.6261**	**0.1520**		**872.4262**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0125	0.4091	0.0964	1.0500e-003	0.0245	1.0900e-003	0.0256	7.0500e-003	1.0400e-003	8.0900e-003		110.3189	110.3189	4.7800e-003		110.4383
Worker	0.1561	0.1265	1.4166	3.8300e-003	0.3832	2.9800e-003	0.3862	0.1016	2.7500e-003	0.1044		381.2417	381.2417	0.0136		381.5827
Total	**0.1686**	**0.5356**	**1.5130**	**4.8800e-003**	**0.4077**	**4.0700e-003**	**0.4117**	**0.1087**	**3.7900e-003**	**0.1125**		**491.5606**	**491.5606**	**0.0184**		**492.0210**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	14.70	6.60	6.60	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.548528	0.027912	0.206330	0.127577	0.020437	0.005268	0.019586	0.027922	0.004162	0.002641	0.007642	0.001233	0.000761
Other Asphalt Surfaces	0.548528	0.027912	0.206330	0.127577	0.020437	0.005268	0.019586	0.027922	0.004162	0.002641	0.007642	0.001233	0.000761

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.1278	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003
Unmitigated	0.1278	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0250					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1028					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0000e-005	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003
Total	**0.1278**	**1.0000e-005**	**5.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.2300e-003**	**1.2300e-003**	**0.0000**		**1.3200e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0250					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1028					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0000e-005	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003
Total	**0.1278**	**1.0000e-005**	**5.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.2300e-003**	**1.2300e-003**	**0.0000**		**1.3200e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
Emergency Generator	1	2	50	1006	0.73	Diesel

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

10.1 Stationary Sources

Unmitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Emergency Generator - Diesel (750 - 9999 HP)	3.3018	14.7656	8.4190	0.0159		0.4857	0.4857		0.4857	0.4857		1,689.1024	1,689.1024	0.2368		1,695.0227
Total	**3.3018**	**14.7656**	**8.4190**	**0.0159**		**0.4857**	**0.4857**		**0.4857**	**0.4857**		**1,689.1024**	**1,689.1024**	**0.2368**		**1,695.0227**

11.0 Vegetation

Gonzales IWTP - Phase 1

Monterey County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	2.64	1000sqft	0.06	2,640.00	0
Other Asphalt Surfaces	3.00	Acre	3.00	130,680.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.6	**Precipitation Freq (Days)**	55
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	210	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Emission factors for CO2, CH4, and N2O are from the CalEEMod software version 2016.3.2 for PG&E. CO2 was adjusted based PG&E's reported intensity for 2017.

Land Use - 2,640 SF buildings and 3-acres paved surfaces (access roads/parking area)

Construction Phase - Construction schedule based on engineering input

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck

Off-road Equipment - Offroad equipment mix and hours/day based on engineering input. Off-highway truck used to represent water truck
Trips and VMT - On-road vehicle trips based on engineering input

On-road Fugitive Dust - Default on-road fugitive dust

Grading - Default acres graded based on grading/earthwork equipment specified, which is conservative based since only 27-acres to be disturbed. Material exported based on engineering input.

Architectural Coating - Default architectural coating assumptions

Vehicle Trips - No new employees. Only a water truck delivery anticipated per month, which would be negligble.

Vehicle Emission Factors - Default

Vehicle Emission Factors - Default

Vehicle Emission Factors - Default

Road Dust - Default

Consumer Products - Default consumer products

Area Coating - Default architectural coatings

Landscape Equipment - Default landscape maintenance

Energy Use - Revised energy use factors based on engineering input

Water And Wastewater - Revised water use based on engineering input

Solid Waste - Revised solid waste rate based on engineering input

Construction Off-road Equipment Mitigation - Accounts for water truck watering at least 2x per day

Stationary Sources - Emergency Generators and Fire Pumps - 750 kw diesel generator assumed to be tested up to 2 hours per day, once per month, and up to 50 hours annually

Stationary Sources - Emergency Generators and Fire Pumps EF - Default EFs for diesel generator

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	5.00	10.00
tblConstructionPhase	NumDays	18.00	120.00
tblConstructionPhase	NumDays	8.00	70.00
tblConstructionPhase	NumDays	8.00	40.00
tblConstructionPhase	NumDays	230.00	40.00
tblConstructionPhase	NumDays	18.00	50.00

tblEnergyUse	LightingElect	3.08	183.62
tblEnergyUse	NT24E	3.70	220.58
tblEnergyUse	NT24NG	6.67	0.00
tblEnergyUse	T24E	1.48	88.23
tblEnergyUse	T24NG	19.71	0.00
tblGrading	MaterialExported	0.00	50,000.00
tblGrading	MaterialExported	0.00	30,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00

tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	6.00	4.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	210
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblSolidWaste	SolidWasteGenerationRate	3.27	27.50
tblStationaryGeneratorsPumpsUse	HorsePowerValue	0.00	1,006.00
tblStationaryGeneratorsPumpsUse	HoursPerDay	0.00	2.00
tblStationaryGeneratorsPumpsUse	HoursPerYear	0.00	50.00
tblStationaryGeneratorsPumpsUse	NumberOfEquipment	0.00	1.00
tblTripsAndVMT	HaulingTripNumber	0.00	600.00
tblTripsAndVMT	HaulingTripNumber	0.00	2,000.00
tblTripsAndVMT	HaulingTripNumber	6,250.00	7,000.00
tblTripsAndVMT	HaulingTripNumber	3,750.00	400.00
tblTripsAndVMT	HaulingTripNumber	0.00	110.00

tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	22.00	0.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	33.00	30.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	56.00	20.00
tblTripsAndVMT	WorkerTripNumber	11.00	30.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblWater	IndoorWaterUseRate	610,500.00	7,300.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	8.5073	104.9106	56.8627	0.2225	15.0546	3.2131	18.2677	6.0627	2.9599	9.0226	0.0000	22,405.9920	22,405.9920	4.3135	0.0000	22,513.8286
Maximum	**8.5073**	**104.9106**	**56.8627**	**0.2225**	**15.0546**	**3.2131**	**18.2677**	**6.0627**	**2.9599**	**9.0226**	**0.0000**	**22,405.9920**	**22,405.9920**	**4.3135**	**0.0000**	**22,513.8286**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	8.5073	104.9106	56.8627	0.2225	8.2523	3.2131	11.4653	3.1300	2.9599	6.0899	0.0000	22,405.9920	22,405.9920	4.3135	0.0000	22,513.8286
Maximum	**8.5073**	**104.9106**	**56.8627**	**0.2225**	**8.2523**	**3.2131**	**11.4653**	**3.1300**	**2.9599**	**6.0899**	**0.0000**	**22,405.9920**	**22,405.9920**	**4.3135**	**0.0000**	**22,513.8286**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**45.18**	**0.00**	**37.24**	**48.37**	**0.00**	**32.50**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1278	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Stationary	3.3018	14.7656	8.4190	0.0159		0.4857	0.4857		0.4857	0.4857		1,689.1024	1,689.1024	0.2368		1,695.0227
Total	**3.4297**	**14.7656**	**8.4195**	**0.0159**	**0.0000**	**0.4857**	**0.4857**	**0.0000**	**0.4857**	**0.4857**		**1,689.1036**	**1,689.1036**	**0.2368**	**0.0000**	**1,695.0240**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1278	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Stationary	3.3018	14.7656	8.4190	0.0159		0.4857	0.4857		0.4857	0.4857		1,689.1024	1,689.1024	0.2368		1,695.0227
Total	**3.4297**	**14.7656**	**8.4195**	**0.0159**	**0.0000**	**0.4857**	**0.4857**	**0.0000**	**0.4857**	**0.4857**		**1,689.1036**	**1,689.1036**	**0.2368**	**0.0000**	**1,695.0240**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/2/2022	1/14/2022	5	10	
2	Offsite Sewer Collection System	Paving	1/3/2022	6/17/2022	5	120	
3	Grading	Grading	1/17/2022	4/22/2022	5	70	
4	Civil-Site Work	Grading	4/25/2022	6/17/2022	5	40	
5	Structural	Building Construction	6/20/2022	8/12/2022	5	40	
6	Mechanical-Elect-Architectural	Architectural Coating	8/15/2022	10/21/2022	5	50	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 210

Acres of Paving: 3

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 3,960; Non-Residential Outdoor: 1,320; Striped Parking Area: 7,841 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Off-Highway Trucks	1	8.00	402	0.38
Site Preparation	Rubber Tired Dozers	0	0.00	247	0.40
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Offsite Sewer Collection System	Cement and Mortar Mixers	0	0.00	9	0.56
Offsite Sewer Collection System	Cranes	1	4.00	231	0.29
Offsite Sewer Collection System	Excavators	1	8.00	158	0.38
Offsite Sewer Collection System	Pavers	1	2.00	130	0.42
Offsite Sewer Collection System	Paving Equipment	0	0.00	132	0.36

Offsite Sewer Collection System	Rollers	1	4.00	80	0.38
Offsite Sewer Collection System	Rubber Tired Dozers	1	8.00	247	0.40
Offsite Sewer Collection System	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	2	8.00	187	0.41
Grading	Off-Highway Trucks	2	8.00	402	0.38
Grading	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	2	6.00	247	0.40
Grading	Rubber Tired Loaders	2	8.00	203	0.36
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Civil-Site Work	Cement and Mortar Mixers	0	0.00	9	0.56
Civil-Site Work	Excavators	0	0.00	158	0.38
Civil-Site Work	Forklifts	1	8.00	89	0.20
Civil-Site Work	Graders	1	8.00	187	0.41
Civil-Site Work	Off-Highway Trucks	1	8.00	402	0.38
Civil-Site Work	Pavers	0	0.00	130	0.42
Civil-Site Work	Paving Equipment	0	0.00	132	0.36
Civil-Site Work	Rollers	1	8.00	80	0.38
Civil-Site Work	Rubber Tired Dozers	0	0.00	247	0.40
Civil-Site Work	Rubber Tired Loaders	1	8.00	203	0.36
Civil-Site Work	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Structural	Cranes	0	0.00	231	0.29
Structural	Excavators	1	4.00	158	0.38
Structural	Forklifts	1	4.00	89	0.20
Structural	Generator Sets	0	0.00	84	0.74
Structural	Off-Highway Trucks	1	2.00	402	0.38

Structural	Rollers	1	2.00	80	0.38
Structural	Rubber Tired Loaders	1	8.00	203	0.36
Structural	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Structural	Welders	0	0.00	46	0.45
Mechanical-Elect-Architectural	Air Compressors	0	0.00	78	0.48
Mechanical-Elect-Architectural	Cranes	1	2.00	231	0.29
Mechanical-Elect-Architectural	Forklifts	1	6.00	89	0.20
Mechanical-Elect-Architectural	Generator Sets	1	6.00	84	0.74
Mechanical-Elect-Architectural	Tractors/Loaders/Backhoes	1	4.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	5	20.00	2.00	600.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Offsite Sewer Collection System	5	20.00	2.00	2,000.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	13	30.00	0.00	7,000.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Civil-Site Work	5	20.00	2.00	400.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Structural	5	20.00	0.00	110.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Mechanical-Elect-Architectural	4	30.00	4.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	2.0921	21.5661	15.9322	0.0412		0.8425	0.8425		0.7751	0.7751		3,993.0360	3,993.0360	1.2914		4,025.3218
Total	**2.0921**	**21.5661**	**15.9322**	**0.0412**	**1.5908**	**0.8425**	**2.4333**	**0.1718**	**0.7751**	**0.9469**		**3,993.0360**	**3,993.0360**	**1.2914**		**4,025.3218**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.4539	15.1665	3.4999	0.0469	1.0470	0.0537	1.1007	0.2868	0.0514	0.3382		4,972.8133	4,972.8133	0.1954		4,977.6975
Vendor	6.6700e-003	0.2056	0.0560	5.1000e-004	0.0122	5.8000e-004	0.0128	3.5200e-003	5.5000e-004	4.0700e-003		53.3976	53.3976	2.6300e-003		53.4634
Worker	0.1172	0.1062	0.8972	2.3900e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		237.8729	237.8729	8.5100e-003		238.0856
Total	**0.5778**	**15.4782**	**4.4531**	**0.0498**	**1.3147**	**0.0562**	**1.3709**	**0.3581**	**0.0537**	**0.4118**		**5,264.0838**	**5,264.0838**	**0.2065**		**5,269.2464**

3.2 Site Preparation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7158	0.0000	0.7158	0.0773	0.0000	0.0773			0.0000			0.0000
Off-Road	2.0921	21.5661	15.9322	0.0412		0.8425	0.8425		0.7751	0.7751	0.0000	3,993.0360	3,993.0360	1.2914		4,025.3217
Total	**2.0921**	**21.5661**	**15.9322**	**0.0412**	**0.7158**	**0.8425**	**1.5584**	**0.0773**	**0.7751**	**0.8524**	**0.0000**	**3,993.0360**	**3,993.0360**	**1.2914**		**4,025.3217**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.4539	15.1665	3.4999	0.0469	1.0470	0.0537	1.1007	0.2868	0.0514	0.3382		4,972.8133	4,972.8133	0.1954		4,977.6975
Vendor	6.6700e-003	0.2056	0.0560	5.1000e-004	0.0122	5.8000e-004	0.0128	3.5200e-003	5.5000e-004	4.0700e-003		53.3976	53.3976	2.6300e-003		53.4634
Worker	0.1172	0.1062	0.8972	2.3900e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		237.8729	237.8729	8.5100e-003		238.0856
Total	**0.5778**	**15.4782**	**4.4531**	**0.0498**	**1.3147**	**0.0562**	**1.3709**	**0.3581**	**0.0537**	**0.4118**		**5,264.0838**	**5,264.0838**	**0.2065**		**5,269.2464**

3.3 Offsite Sewer Collection System - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3609	14.0504	9.4345	0.0191		0.6648	0.6648		0.6116	0.6116		1,847.3322	1,847.3322	0.5975		1,862.2688
Paving	0.0655					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4264**	**14.0504**	**9.4345**	**0.0191**		**0.6648**	**0.6648**		**0.6116**	**0.6116**		**1,847.3322**	**1,847.3322**	**0.5975**		**1,862.2688**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1261	4.2129	0.9722	0.0130	0.2908	0.0149	0.3057	0.0797	0.0143	0.0939		1,381.3370	1,381.3370	0.0543		1,382.6938
Vendor	6.6700e-003	0.2056	0.0560	5.1000e-004	0.0122	5.8000e-004	0.0128	3.5200e-003	5.5000e-004	4.0700e-003		53.3976	53.3976	2.6300e-003		53.4634
Worker	0.1172	0.1062	0.8972	2.3900e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		237.8729	237.8729	8.5100e-003		238.0856
Total	**0.2499**	**4.5247**	**1.9254**	**0.0159**	**0.5585**	**0.0175**	**0.5760**	**0.1509**	**0.0166**	**0.1676**		**1,672.6075**	**1,672.6075**	**0.0654**		**1,674.2427**

3.3 Offsite Sewer Collection System - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3609	14.0504	9.4345	0.0191		0.6648	0.6648		0.6116	0.6116	0.0000	1,847.3322	1,847.3322	0.5975		1,862.2688
Paving	0.0655					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4264**	**14.0504**	**9.4345**	**0.0191**		**0.6648**	**0.6648**		**0.6116**	**0.6116**	**0.0000**	**1,847.3322**	**1,847.3322**	**0.5975**		**1,862.2688**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1261	4.2129	0.9722	0.0130	0.2908	0.0149	0.3057	0.0797	0.0143	0.0939		1,381.3370	1,381.3370	0.0543		1,382.6938
Vendor	6.6700e-003	0.2056	0.0560	5.1000e-004	0.0122	5.8000e-004	0.0128	3.5200e-003	5.5000e-004	4.0700e-003		53.3976	53.3976	2.6300e-003		53.4634
Worker	0.1172	0.1062	0.8972	2.3900e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		237.8729	237.8729	8.5100e-003		238.0856
Total	**0.2499**	**4.5247**	**1.9254**	**0.0159**	**0.5585**	**0.0175**	**0.5760**	**0.1509**	**0.0166**	**0.1676**		**1,672.6075**	**1,672.6075**	**0.0654**		**1,674.2427**

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.3679	0.0000	12.3679	5.3321	0.0000	5.3321			0.0000			0.0000
Off-Road	5.8987	60.8988	38.3238	0.1058		2.4384	2.4384		2.2433	2.2433		10,241.2208	10,241.2208	3.3122		10,324.0263
Total	**5.8987**	**60.8988**	**38.3238**	**0.1058**	**12.3679**	**2.4384**	**14.8063**	**5.3321**	**2.2433**	**7.5754**		**10,241.2208**	**10,241.2208**	**3.3122**		**10,324.0263**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.7565	25.2774	5.8332	0.0782	1.7450	0.0895	1.8344	0.4780	0.0856	0.5636		8,288.0222	8,288.0222	0.3256		8,296.1625
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1758	0.1593	1.3458	3.5800e-003	0.3832	2.9800e-003	0.3862	0.1016	2.7500e-003	0.1044		356.8093	356.8093	0.0128		357.1283
Total	**0.9323**	**25.4367**	**7.1790**	**0.0818**	**2.1282**	**0.0924**	**2.2206**	**0.5796**	**0.0883**	**0.6680**		**8,644.8315**	**8,644.8315**	**0.3384**		**8,653.2908**

3.4 Grading - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.5655	0.0000	5.5655	2.3994	0.0000	2.3994			0.0000			0.0000
Off-Road	5.8987	60.8988	38.3238	0.1058		2.4384	2.4384		2.2433	2.2433	0.0000	10,241.2208	10,241.2208	3.3122		10,324.0263
Total	**5.8987**	**60.8988**	**38.3238**	**0.1058**	**5.5655**	**2.4384**	**8.0039**	**2.3994**	**2.2433**	**4.6428**	**0.0000**	**10,241.2208**	**10,241.2208**	**3.3122**		**10,324.0263**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.7565	25.2774	5.8332	0.0782	1.7450	0.0895	1.8344	0.4780	0.0856	0.5636		8,288.0222	8,288.0222	0.3256		8,296.1625
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1758	0.1593	1.3458	3.5800e-003	0.3832	2.9800e-003	0.3862	0.1016	2.7500e-003	0.1044		356.8093	356.8093	0.0128		357.1283
Total	**0.9323**	**25.4367**	**7.1790**	**0.0818**	**2.1282**	**0.0924**	**2.2206**	**0.5796**	**0.0883**	**0.6680**		**8,644.8315**	**8,644.8315**	**0.3384**		**8,653.2908**

3.5 Civil-Site Work - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6911	0.0000	0.6911	0.0816	0.0000	0.0816			0.0000			0.0000
Off-Road	1.5147	15.0771	9.6258	0.0302		0.5840	0.5840		0.5373	0.5373		2,928.0632	2,928.0632	0.9470		2,951.7381
Total	**1.5147**	**15.0771**	**9.6258**	**0.0302**	**0.6911**	**0.5840**	**1.2751**	**0.0816**	**0.5373**	**0.6189**		**2,928.0632**	**2,928.0632**	**0.9470**		**2,951.7381**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0757	2.5277	0.5833	7.8200e-003	0.1745	8.9400e-003	0.1834	0.0478	8.5600e-003	0.0564		828.8022	828.8022	0.0326		829.6163
Vendor	6.6700e-003	0.2056	0.0560	5.1000e-004	0.0122	5.8000e-004	0.0128	3.5200e-003	5.5000e-004	4.0700e-003		53.3976	53.3976	2.6300e-003		53.4634
Worker	0.1172	0.1062	0.8972	2.3900e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		237.8729	237.8729	8.5100e-003		238.0856
Total	**0.1995**	**2.8395**	**1.5365**	**0.0107**	**0.4422**	**0.0115**	**0.4537**	**0.1191**	**0.0109**	**0.1300**		**1,120.0727**	**1,120.0727**	**0.0437**		**1,121.1652**

3.5 Civil-Site Work - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3110	0.0000	0.3110	0.0367	0.0000	0.0367			0.0000			0.0000
Off-Road	1.5147	15.0771	9.6258	0.0302		0.5840	0.5840		0.5373	0.5373	0.0000	2,928.0632	2,928.0632	0.9470		2,951.7381
Total	**1.5147**	**15.0771**	**9.6258**	**0.0302**	**0.3110**	**0.5840**	**0.8950**	**0.0367**	**0.5373**	**0.5740**	**0.0000**	**2,928.0632**	**2,928.0632**	**0.9470**		**2,951.7381**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0757	2.5277	0.5833	7.8200e-003	0.1745	8.9400e-003	0.1834	0.0478	8.5600e-003	0.0564		828.8022	828.8022	0.0326		829.6163
Vendor	6.6700e-003	0.2056	0.0560	5.1000e-004	0.0122	5.8000e-004	0.0128	3.5200e-003	5.5000e-004	4.0700e-003		53.3976	53.3976	2.6300e-003		53.4634
Worker	0.1172	0.1062	0.8972	2.3900e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		237.8729	237.8729	8.5100e-003		238.0856
Total	**0.1995**	**2.8395**	**1.5365**	**0.0107**	**0.4422**	**0.0115**	**0.4537**	**0.1191**	**0.0109**	**0.1300**		**1,120.0727**	**1,120.0727**	**0.0437**		**1,121.1652**

3.6 Structural - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6231	5.8758	5.0404	0.0136		0.2407	0.2407		0.2215	0.2215		1,312.9596	1,312.9596	0.4246		1,323.5756
Total	**0.6231**	**5.8758**	**5.0404**	**0.0136**		**0.2407**	**0.2407**		**0.2215**	**0.2215**		**1,312.9596**	**1,312.9596**	**0.4246**		**1,323.5756**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0208	0.6951	0.1604	2.1500e-003	0.0480	2.4600e-003	0.0505	0.0132	2.3500e-003	0.0155		227.9206	227.9206	8.9500e-003		228.1445
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1172	0.1062	0.8972	2.3900e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		237.8729	237.8729	8.5100e-003		238.0856
Total	**0.1380**	**0.8013**	**1.0576**	**4.5400e-003**	**0.3035**	**4.4500e-003**	**0.3079**	**0.0809**	**4.1800e-003**	**0.0851**		**465.7935**	**465.7935**	**0.0175**		**466.2300**

3.6 Structural - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6231	5.8758	5.0404	0.0136		0.2407	0.2407		0.2215	0.2215	0.0000	1,312.9596	1,312.9596	0.4246		1,323.5756
Total	**0.6231**	**5.8758**	**5.0404**	**0.0136**		**0.2407**	**0.2407**		**0.2215**	**0.2215**	**0.0000**	**1,312.9596**	**1,312.9596**	**0.4246**		**1,323.5756**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0208	0.6951	0.1604	2.1500e-003	0.0480	2.4600e-003	0.0505	0.0132	2.3500e-003	0.0155		227.9206	227.9206	8.9500e-003		228.1445
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1172	0.1062	0.8972	2.3900e-003	0.2555	1.9900e-003	0.2575	0.0678	1.8300e-003	0.0696		237.8729	237.8729	8.5100e-003		238.0856
Total	**0.1380**	**0.8013**	**1.0576**	**4.5400e-003**	**0.3035**	**4.4500e-003**	**0.3079**	**0.0809**	**4.1800e-003**	**0.0851**		**465.7935**	**465.7935**	**0.0175**		**466.2300**

3.7 Mechanical-Elect-Architectural - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.8245					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.5083	4.8713	5.2143	9.0800e-003		0.2511	0.2511		0.2398	0.2398		868.6261	868.6261	0.1520		872.4262
Total	**2.3328**	**4.8713**	**5.2143**	**9.0800e-003**		**0.2511**	**0.2511**		**0.2398**	**0.2398**		**868.6261**	**868.6261**	**0.1520**		**872.4262**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0133	0.4112	0.1120	1.0100e-003	0.0245	1.1500e-003	0.0256	7.0500e-003	1.1000e-003	8.1500e-003		106.7952	106.7952	5.2600e-003		106.9267
Worker	0.1758	0.1593	1.3458	3.5800e-003	0.3832	2.9800e-003	0.3862	0.1016	2.7500e-003	0.1044		356.8093	356.8093	0.0128		357.1283
Total	**0.1891**	**0.5705**	**1.4578**	**4.5900e-003**	**0.4077**	**4.1300e-003**	**0.4118**	**0.1087**	**3.8500e-003**	**0.1125**		**463.6045**	**463.6045**	**0.0180**		**464.0550**

3.7 Mechanical-Elect-Architectural - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.8245					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.5083	4.8713	5.2143	9.0800e-003		0.2511	0.2511		0.2398	0.2398	0.0000	868.6261	868.6261	0.1520		872.4262
Total	**2.3328**	**4.8713**	**5.2143**	**9.0800e-003**		**0.2511**	**0.2511**		**0.2398**	**0.2398**	**0.0000**	**868.6261**	**868.6261**	**0.1520**		**872.4262**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0133	0.4112	0.1120	1.0100e-003	0.0245	1.1500e-003	0.0256	7.0500e-003	1.1000e-003	8.1500e-003		106.7952	106.7952	5.2600e-003		106.9267
Worker	0.1758	0.1593	1.3458	3.5800e-003	0.3832	2.9800e-003	0.3862	0.1016	2.7500e-003	0.1044		356.8093	356.8093	0.0128		357.1283
Total	**0.1891**	**0.5705**	**1.4578**	**4.5900e-003**	**0.4077**	**4.1300e-003**	**0.4118**	**0.1087**	**3.8500e-003**	**0.1125**		**463.6045**	**463.6045**	**0.0180**		**464.0550**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	14.70	6.60	6.60	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.548528	0.027912	0.206330	0.127577	0.020437	0.005268	0.019586	0.027922	0.004162	0.002641	0.007642	0.001233	0.000761
Other Asphalt Surfaces	0.548528	0.027912	0.206330	0.127577	0.020437	0.005268	0.019586	0.027922	0.004162	0.002641	0.007642	0.001233	0.000761

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.1278	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003
Unmitigated	0.1278	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0250					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1028					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0000e-005	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003
Total	**0.1278**	**1.0000e-005**	**5.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.2300e-003**	**1.2300e-003**	**0.0000**		**1.3200e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0250					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1028					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0000e-005	1.0000e-005	5.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.2300e-003	1.2300e-003	0.0000		1.3200e-003
Total	**0.1278**	**1.0000e-005**	**5.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.2300e-003**	**1.2300e-003**	**0.0000**		**1.3200e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
Emergency Generator	1	2	50	1006	0.73	Diesel

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

10.1 Stationary Sources

Unmitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Emergency Generator - Diesel (750 - 9999 HP)	3.3018	14.7656	8.4190	0.0159		0.4857	0.4857		0.4857	0.4857		1,689.1024	1,689.1024	0.2368		1,695.0227
Total	**3.3018**	**14.7656**	**8.4190**	**0.0159**		**0.4857**	**0.4857**		**0.4857**	**0.4857**		**1,689.1024**	**1,689.1024**	**0.2368**		**1,695.0227**

11.0 Vegetation

Gonzales IWTP - Phase 1

Monterey County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Civil-Site Work	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mechanical-Elect-Architectural	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Sewer Collection System	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Structural	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Air Compressors	Diesel	No Change	0	0	No Change	0.00
Cement and Mortar Mixers	Diesel	No Change	0	0	No Change	0.00
Cranes	Diesel	No Change	0	2	No Change	0.00
Excavators	Diesel	No Change	0	3	No Change	0.00
Forklifts	Diesel	No Change	0	3	No Change	0.00
Generator Sets	Diesel	No Change	0	1	No Change	0.00
Graders	Diesel	No Change	0	4	No Change	0.00
Off-Highway Trucks	Diesel	No Change	0	5	No Change	0.00
Pavers	Diesel	No Change	0	1	No Change	0.00
Paving Equipment	Diesel	No Change	0	0	No Change	0.00
Rollers	Diesel	No Change	0	5	No Change	0.00
Rubber Tired Dozers	Diesel	No Change	0	3	No Change	0.00
Rubber Tired Loaders	Diesel	No Change	0	4	No Change	0.00
Scrapers	Diesel	No Change	0	3	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	3	No Change	0.00
Welders	Diesel	No Change	0	0	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Air Compressors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Cement and Mortar Mixers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Cranes	1.35200E-002	1.51680E-001	6.86000E-002	2.10000E-004	6.30000E-003	5.79000E-003	0.00000E+000	1.83774E+001	1.83774E+001	5.94000E-003	0.00000E+000	1.85260E+001
Excavators	2.12500E-002	1.86580E-001	3.41790E-001	5.40000E-004	9.02000E-003	8.30000E-003	0.00000E+000	4.76287E+001	4.76287E+001	1.54000E-002	0.00000E+000	4.80138E+001
Forklifts	5.54000E-003	5.14300E-002	5.62500E-002	7.00000E-005	3.41000E-003	3.13000E-003	0.00000E+000	6.54670E+000	6.54670E+000	2.12000E-003	0.00000E+000	6.59963E+000
Generator Sets	6.19000E-003	5.49000E-002	6.89200E-002	1.20000E-004	2.75000E-003	2.75000E-003	0.00000E+000	1.05976E+001	1.05976E+001	5.00000E-004	0.00000E+000	1.06102E+001
Graders	3.94200E-002	4.99470E-001	1.63570E-001	6.30000E-004	1.58800E-002	1.46100E-002	0.00000E+000	5.52671E+001	5.52671E+001	1.78700E-002	0.00000E+000	5.57139E+001
Off-Highway Trucks	5.28400E-002	4.01370E-001	3.35870E-001	1.32000E-003	1.46000E-002	1.34300E-002	0.00000E+000	1.16028E+002	1.16028E+002	3.75300E-002	0.00000E+000	1.16966E+002
Pavers	3.10000E-003	3.14800E-002	4.32600E-002	7.00000E-005	1.50000E-003	1.38000E-003	0.00000E+000	6.19505E+000	6.19505E+000	2.00000E-003	0.00000E+000	6.24514E+000
Paving Equipment	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Rollers	2.07900E-002	2.15740E-001	2.32540E-001	3.30000E-004	1.24300E-002	1.14400E-002	0.00000E+000	2.88149E+001	2.88149E+001	9.32000E-003	0.00000E+000	2.90479E+001
Rubber Tired Dozers	9.41700E-002	9.89290E-001	4.02970E-001	9.60000E-004	4.69500E-002	4.32000E-002	0.00000E+000	8.44058E+001	8.44058E+001	2.73000E-002	0.00000E+000	8.50883E+001
Rubber Tired Loaders	3.20500E-002	3.32750E-001	1.68430E-001	6.90000E-004	1.11600E-002	1.02700E-002	0.00000E+000	6.04394E+001	6.04394E+001	1.95500E-002	0.00000E+000	6.09281E+001
Scrapers	6.14400E-002	6.70760E-001	4.78190E-001	1.14000E-003	2.61800E-002	2.40900E-002	0.00000E+000	1.00037E+002	1.00037E+002	3.23500E-002	0.00000E+000	1.00846E+002
Tractors/Loaders/ Backhoes	3.71000E-003	3.77000E-002	5.03500E-002	7.00000E-005	2.03000E-003	1.87000E-003	0.00000E+000	6.14879E+000	6.14879E+000	1.99000E-003	0.00000E+000	6.19850E+000
Welders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Mitigated tons/yr							Mitigated mt/yr					
Air Compressors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Cement and Mortar Mixers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Cranes	1.35200E-002	1.51680E-001	6.86000E-002	2.10000E-004	6.30000E-003	5.79000E-003	0.00000E+000	1.83774E+001	1.83774E+001	5.94000E-003	0.00000E+000	1.85260E+001
Excavators	2.12500E-002	1.86580E-001	3.41790E-001	5.40000E-004	9.02000E-003	8.30000E-003	0.00000E+000	4.76286E+001	4.76286E+001	1.54000E-002	0.00000E+000	4.80137E+001
Forklifts	5.54000E-003	5.14300E-002	5.62500E-002	7.00000E-005	3.41000E-003	3.13000E-003	0.00000E+000	6.54669E+000	6.54669E+000	2.12000E-003	0.00000E+000	6.59963E+000
Generator Sets	6.19000E-003	5.49000E-002	6.89200E-002	1.20000E-004	2.75000E-003	2.75000E-003	0.00000E+000	1.05976E+001	1.05976E+001	5.00000E-004	0.00000E+000	1.06102E+001
Graders	3.94200E-002	4.99470E-001	1.63570E-001	6.30000E-004	1.58800E-002	1.46100E-002	0.00000E+000	5.52670E+001	5.52670E+001	1.78700E-002	0.00000E+000	5.57139E+001
Off-Highway Trucks	5.28400E-002	4.01370E-001	3.35870E-001	1.32000E-003	1.46000E-002	1.34300E-002	0.00000E+000	1.16027E+002	1.16027E+002	3.75300E-002	0.00000E+000	1.16966E+002
Pavers	3.10000E-003	3.14800E-002	4.32600E-002	7.00000E-005	1.50000E-003	1.38000E-003	0.00000E+000	6.19504E+000	6.19504E+000	2.00000E-003	0.00000E+000	6.24513E+000
Paving Equipment	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Rollers	2.07900E-002	2.15740E-001	2.32540E-001	3.30000E-004	1.24300E-002	1.14400E-002	0.00000E+000	2.88149E+001	2.88149E+001	9.32000E-003	0.00000E+000	2.90478E+001
Rubber Tired Dozers	9.41700E-002	9.89280E-001	4.02970E-001	9.60000E-004	4.69500E-002	4.32000E-002	0.00000E+000	8.44057E+001	8.44057E+001	2.73000E-002	0.00000E+000	8.50882E+001
Rubber Tired Loaders	3.20500E-002	3.32750E-001	1.68430E-001	6.90000E-004	1.11600E-002	1.02700E-002	0.00000E+000	6.04394E+001	6.04394E+001	1.95500E-002	0.00000E+000	6.09281E+001
Scrapers	6.14400E-002	6.70760E-001	4.78180E-001	1.14000E-003	2.61800E-002	2.40900E-002	0.00000E+000	1.00037E+002	1.00037E+002	3.23500E-002	0.00000E+000	1.00846E+002
Tractors/Loaders/Backhoes	3.71000E-003	3.77000E-002	5.03500E-002	7.00000E-005	2.03000E-003	1.87000E-003	0.00000E+000	6.14878E+000	6.14878E+000	1.99000E-003	0.00000E+000	6.19849E+000
Welders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Air Compressors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Cement and Mortar Mixers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Cranes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.63244E-006	1.63244E-006	0.00000E+000	0.00000E+000	1.61935E-006
Excavators	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.04979E-006	1.04979E-006	0.00000E+000	0.00000E+000	1.24964E-006
Forklifts	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.52749E-006	1.52749E-006	0.00000E+000	0.00000E+000	0.00000E+000
Generator Sets	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	9.43606E-007	9.43606E-007	0.00000E+000	0.00000E+000	1.88497E-006
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.08564E-006	1.08564E-006	0.00000E+000	0.00000E+000	1.25642E-006
Off-Highway Trucks	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.12042E-006	1.12042E-006	0.00000E+000	0.00000E+000	1.19693E-006
Pavers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.61419E-006	1.61419E-006	0.00000E+000	0.00000E+000	1.60125E-006
Paving Equipment	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Rollers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.38817E-006	1.38817E-006	0.00000E+000	0.00000E+000	1.03278E-006
Rubber Tired Dozers	0.00000E+000	1.01083E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.18475E-006	1.18475E-006	0.00000E+000	0.00000E+000	1.17525E-006
Rubber Tired Loaders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.32364E-006	1.32364E-006	0.00000E+000	0.00000E+000	1.14889E-006
Scrapers	0.00000E+000	0.00000E+000	2.09122E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.09959E-006	1.09959E-006	0.00000E+000	0.00000E+000	1.18993E-006
Tractors/Loaders/Backhoes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.62634E-006	1.62634E-006	0.00000E+000	0.00000E+000	1.61329E-006
Welders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		

No	Replace Ground Cover of Area Disturbed	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	0.00		
No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Civil-Site Work	Fugitive Dust	0.01	0.00	0.01	0.00	0.55	0.55
Civil-Site Work	Roads	0.01	0.00	0.01	0.00	0.00	0.00
Grading	Fugitive Dust	0.43	0.19	0.19	0.08	0.55	0.55
Grading	Roads	0.07	0.02	0.07	0.02	0.00	0.00
Mechanical-Elect-Architectural	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Mechanical-Elect-Architectural	Roads	0.01	0.00	0.01	0.00	0.00	0.00
Offsite Sewer Collection System	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Sewer Collection System	Roads	0.03	0.01	0.03	0.01	0.00	0.00
Site Preparation	Fugitive Dust	0.01	0.00	0.00	0.00	0.55	0.55
Site Preparation	Roads	0.01	0.00	0.01	0.00	0.00	0.00
Structural	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Structural	Roads	0.01	0.00	0.01	0.00	0.00	0.00

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	0.01	0.17		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			

No	Neighborhood Enhancements	Improve Pedestrian Network					
No	Neighborhood Enhancements	Provide Traffic Calming Measures					
No	Neighborhood Enhancements	Implement NEV Network	0.00				
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00				
No	Parking Policy Pricing	Limit Parking Supply	0.00				
No	Parking Policy Pricing	Unbundle Parking Costs	0.00				
No	Parking Policy Pricing	On-street Market Pricing	0.00				
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00				
No	Transit Improvements	Provide BRT System	0.00				
No	Transit Improvements	Expand Transit Network	0.00				
No	Transit Improvements	Increase Transit Frequency	0.00				
	Transit Improvements	Transit Improvements Subtotal	0.00				
		Land Use and Site Enhancement Subtotal	0.00				
No	Commute	Implement Trip Reduction Program					
No	Commute	Transit Subsidy					
No	Commute	Implement Employee Parking "Cash Out"					
No	Commute	Workplace Parking Charge					
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00				
No	Commute	Market Commute Trip Reduction Option	0.00				
No	Commute	Employee Vanpool/Shuttle	0.00			2.00	
No	Commute	Provide Ride Sharing Program					
	Commute	Commute Subtotal	0.00				

No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	100.00
No	Use Low VOC Paint (Residential Exterior)	100.00
No	Use Low VOC Paint (Non-residential Interior)	150.00
No	Use Low VOC Paint (Non-residential Exterior)	150.00
No	Use Low VOC Paint (Parking)	150.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy		
No	Use Reclaimed Water		
No	Use Grey Water		
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction		
No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape		

Solid Waste Mitigation

Mitigation Measures	Input Value

Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

Appendix C

Aquatic Resources Delineation Report

DRAFT

AQUATIC RESOURCES DELINEATION
CITY OF GONZALES INDUSTRIAL WASTEWATER TREATMENT PLANT
MONTEREY COUNTY, CALIFORNIA

Prepared for:

City of Gonzaless
147 4th street
Gonzales, California 93926
Contact: Patrick M. Dobbins PE

Prepared by:

DUDEK
853 Lincoln Way, Suite 208
Auburn, California 95603
Contact: Paul Keating

JULY 2020

Printed on 30% post-consumer recycled material.

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APPENDICES

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FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
ACOE	Army Corps of Engineers
CDFW	California Department of Fish and Wildlife
CWA	Clean Water Act
EPA	Environmental Protection Agency
GIS	Geographic Information Systems
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OHWM	ordinary high water mark
RWQCB	Regional Water Quality Control Board
SWANCC	Solid Waste Agency of Northern Cook County
TNW	traditionally navigable waters
USGS	U.S. Geological Survey

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1 INTRODUCTION

This report documents the results of an aquatic resources delineation of potentially jurisdictional wetlands and other waters of the United States conducted for the City of Gonzales Industrial Wastewater Treatment Plant Project (proposed project) located near the City of Gonzales in Monterey County, California. This report was produced in accordance with the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports (ACOE 2016). The results of this delineation are preliminary until verified by the San Francisco District of the U.S. Army Corps of Engineers (ACOE).

1.1 Project Location

The approximately 50-acre site ("Study Area") is located on the east side of the Salinas River just off of Gonzales River Road; approximately 1.5 miles south west of the City of Gonzales in Monterey County, California (see Figure 1, Project Location and Figure 2, Project Site). The center of the Study Area corresponds to 36.493225 north latitude and -121.478563 west longitude, in township 16 south, range 5 east, sections 31 and 32 of the "Gonzales, California" U.S. Geological Survey 7.5-minute quadrangle and west longitude, in township 17 south, range 5 east, section 5 of the "Palo Escrito Peak, California" U.S. Geological Survey 7.5-minute quadrangle.

1.2 Directions to the Study Area

From the City of Salinas, take US 101 south to the City of Gonzales to exit 313 for Alta St., continue on Alta Street to Gonzales River Road and then turn right. Continue on Gonzales River Road for approximately 1.5 miles to the Salinas River and turn right to the site.

1.3 Contact Information

City of Gonzales
147 4th St
Gonzales, California 93926
Contact: Patrick M. Dobbins, PE

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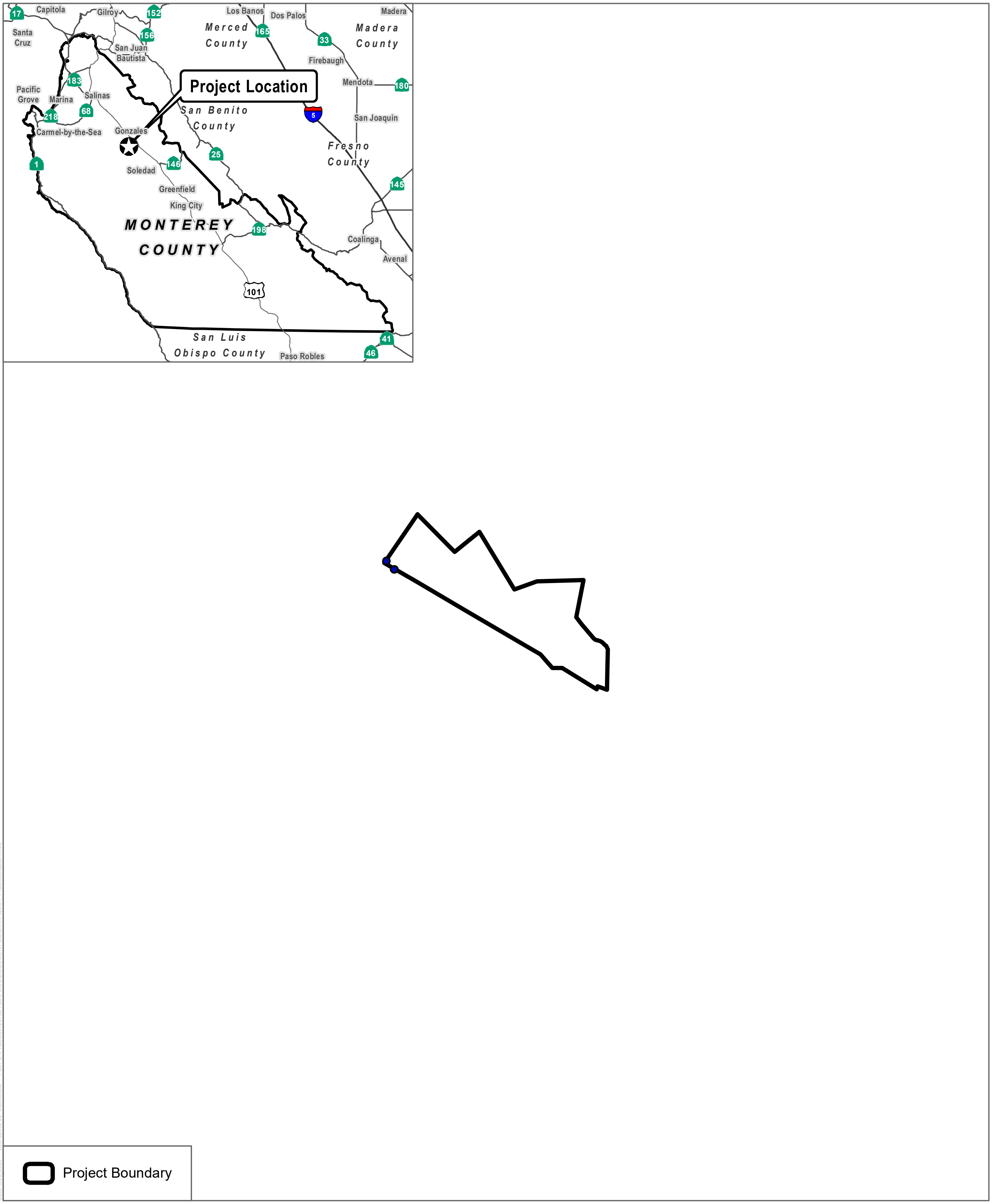

SOURCE: USGS 7.5-Minute Series Gonzales and Palo Escrito Creek Quadrangles

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FIGURE 1

Project Location

Gonzales Industrial Wastewater Treatment Plant Project

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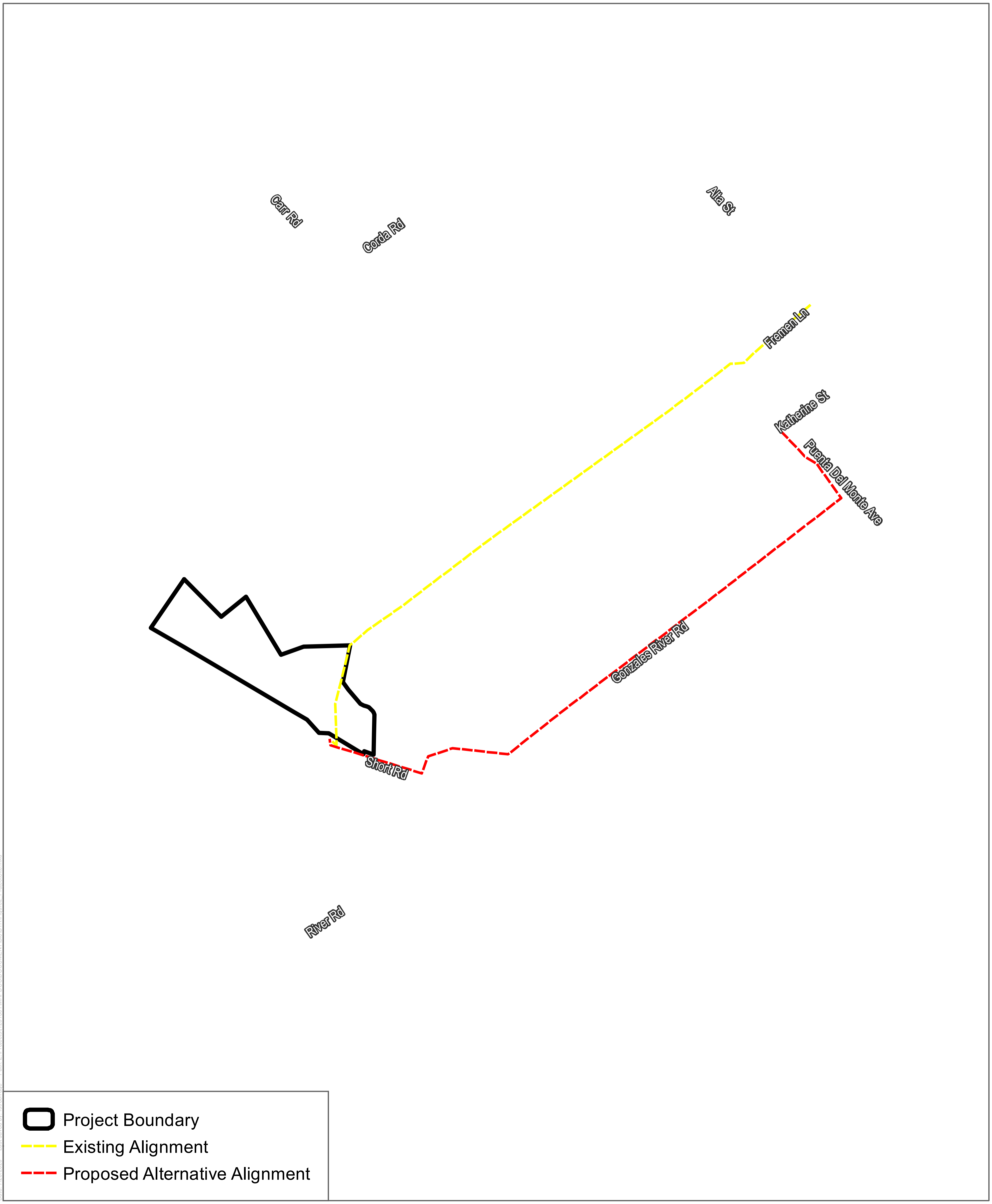

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SOURCE: Esri Clarity Basemap 2020

[redacted]

FIGURE 2

Project Site

Gonzales Industrial Wastewater Treatment Plant Project

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2 PROJECT DESCRIPTION

The proposed project consists of an upgrade to The City of Gonzales's wastewater treatment infrastructure and management with the planned construction of a new separate Industrial Wastewater Treatment Plant (IWTP) that could process up to 4 million gallons per day (MGD) at full buildout. The City's existing municipal waste water treatment plant (WWTP) has been challenged the past few years due to the nature of flows discharged to the WWTP by local industrial dischargers. The new plant would treat wastewater from the Gonzales Agricultural Business Industrial Park separately from the City's domestic wastewater system.

There are two components of the proposed project: the IWTP, and the proposed wastewater collection line. The proposed IWTP is located north of the existing WWTP. The Project includes a headworks with influent screening to remove trash and debris and an influent flow meter; an influent lift station to pump water to the equalization basin; a 2-stage flow equalization basin to buffer flow to the ponds system; a deep-operated aerated pond system to introduce oxygen into wastewater, and effluent percolation beds to dispose of treated effluent. A solids management area would be set aside for accumulated biosolids, sludge, and debris from the influent screening. The project is designed to be installed in a phased approach with Phase I having wastewater treatment capacity of 2.0 MGD. As the industrial wastewater flows increase, Phase II of the IWTP would be constructed, for a combined treatment capacity of 4.0 MGD.

The proposed wastewater collection line includes approximately 11,100 linear feet (LF) of new gravity sewer pipe located mainly on public street right-of-way. An alternative wastewater collection line follows an existing dirt road through privately owned agricultural fields.

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3 REGULATORY SETTING

3.1 Federal

U.S. Army Corps of Engineers

Under Section 404 of the Clean Water Act (CWA), ACOE regulates activities that involve a discharge of dredged or fill material, including but not limited to grading, placing riprap for erosion control, pouring concrete, laying sod, and stockpiling excavated material into waters of the United States. Activities that generally do not involve a regulated discharge (if performed specifically in a manner to avoid discharges) include driving pilings, providing some drainage channel maintenance activities, and excavating without stockpiling. Any person or public agency proposing to discharge dredged or fill material into waters of the United States, including jurisdictional wetlands, must obtain a permit from the ACOE.

Wetlands are “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3). The ACOE predominantly uses Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (ACOE 2010a), or Arid West Region (ACOE 2008) methodology to determine the presence of jurisdictional wetlands in California. According to the manuals (ACOE 2008 and 2010a), three criteria must be satisfied to classify an area as a wetland: (1) a predominance of plant life that is adapted to life in wet conditions (hydrophytic vegetation); (2) soils that saturate, flood, or pond long enough during the growing season to develop anaerobic conditions in the upper part (hydric soils); and (3) permanent or periodic inundation or soils saturation, at least seasonally (wetland hydrology).

For linear waters of the United States (e.g., perennial, intermittent, or ephemeral streams), the lateral limits of ACOE jurisdiction extend to the ordinary high water mark (OHWM) when no adjacent wetlands are present. As defined in the Code of Federal Regulations, Title 33, Section 328.3(e), the OHWM is “that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.” If adjacent wetlands are present, the jurisdiction extends to the limit of these wetlands. Further guidance for determining jurisdictional limits in riverine systems in California is detailed in A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (ACOE 2010b) or A Guide to Ordinary High Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States (ACOE 2014).

The Environmental Protection Agency and the Department of the Army published a final rule (85 FR 22250), effective June 22, 2020, redefining the scope of waters federally regulated under the Clean Water Act. The Navigable Waters Protection Rule amends Title 33, Section 328.3 of the Code of Federal Regulations and defines jurisdictional and non-jurisdictional waters as follows: Jurisdictional waters or waters of the United States are: 1) The territorial seas, and waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide; 2) Tributaries; 3) Lakes and ponds, and impoundments of jurisdictional waters; and 4) Adjacent wetlands. Non-jurisdictional waters or features that are not waters of the United States are: 1) Waters or water features that are not identified as one of the four categories listed in the previous paragraph; 2) Groundwater, including groundwater drained through subsurface drainage systems; 3) Ephemeral features, including ephemeral streams, swales, gullies, rills, and pools; 4) Diffuse stormwater run-off and directional sheet flow over upland; 5) Ditches that are not waters identified as the first two categories of jurisdictional waters in the paragraph above, and those portions of ditches constructed in waters that do not meet the adjacent wetlands definition; 6) Prior converted cropland; 7) Artificially irrigated areas, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease; 8) Artificial lakes and ponds, including water storage reservoirs and farm, irrigation, stock watering, and log cleaning ponds, constructed or excavated in upland or in non-jurisdictional waters, so long as those artificial lakes and ponds are not impoundments of jurisdictional waters that meet the definition of the third category of jurisdictional waters in the previous paragraph; 9) Water-filled depressions constructed or excavated in upland or in non-jurisdictional waters incidental to mining or construction activity, and pits excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel; 10) Stormwater control features constructed or excavated in upland or in nonjurisdictional waters to convey, treat infiltrate, or store storwater runoff; 11) Groundwater recharge, water reuse, and wastewater recycling structures, including detention, retention, and infiltration basins and ponds, contructed or excavated in upland or in non-jurisdictional waters; and 12) Waste treatment systems. Even when not jurisdictional under Section 404 of the CWA, these features may still be jurisdictional at state or local levels, such as under Section 401 of the CWA, the Porter-Cologne Water Quality Control Act (Porter-Cologne Act), and Section 1602 of the California Fish and Game Code.

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3.2 State

California Department of Fish and Wildlife

Pursuant to Section 1602 of the California Fish and Game Code, the California Department of Fish and Wildlife (CDFW) regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or other aquatic wildlife.

In Title 14 of the California Code of Regulations, Section 1.56, CDFW's definition of "lake" includes "natural lakes or man-made reservoirs." Diversion, obstruction, or change to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or other aquatic wildlife requires authorization from CDFW by entering into an agreement pursuant to Section 1602 of the Fish and Game Code.

In Title 14 of the California Code of Regulations, Section 1.72, CDFW defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation."

California Regional Water Quality Control Board

Pursuant to Section 401 of the federal CWA, the Regional Water Quality Control Board (RWQCB) regulates discharging waste, or proposing to discharge waste, within any region that could affect a water of the state (California Water Code, Section 13260(a)), pursuant to provisions of the Porter-Cologne Act. "Waters of the state" are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code, Section 13050(e)). Before ACOE will issue a CWA Section 404 permit, applicants must receive a CWA Section 401 Water Quality Certification from the RWQCB. If a CWA Section 404 permit is not required for the project, the RWQCB may still require a permit (i.e., Waste Discharge Requirement) for impacts to waters of the state under the Porter-Cologne Act.

4 METHODOLOGY

4.1 Literature Review

Prior to conducting fieldwork, Dudek biologists reviewed the following available resources to identify portions of the Study Area with a probability for containing potential jurisdictional aquatic resources.

- 1:200-scale aerial photograph (Google Earth 2020)
- USGS 7.5-minute topographic quadrangles (USGS 2020a)

- USGS historical topographic map explorer (USGS 2020b)
- Natural Resources Conservation Services (NRCS) Web Soil Survey (USDA 2020)
- National Wetland Inventory (USFWS 2020)

4.2 Aquatic Resources Delineation

Dudek biologists Paul Keating and Michelle Leis conducted an aquatic resources delineation within the Study Area on April 13, 2020. Potential wetlands or other waters of the United States were delineated based on methodology described in the 1987 Corps of Engineers Wetlands Delineation Manual (ACOE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (ACOE 2008). Non-wetland waters of the United States are delineated based on the presence of an OHWM, as determined using the methodology in A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (ACOE 2010b). Representative photographs of the Study Area are included in Appendix A.

To the extent feasible due to the timing of the surveys and the phenology of the plants, all plant species encountered were identified to the lowest taxonomic level needed to determine wetland plant indicator status. Those species that could not be immediately identified were brought into the laboratory for further investigation. Wetland plant indicator status for each plant was determined using the Arid West 2016 Regional Wetland Plant List (ACOE 2016a). Appendix B contains a complete list of plant species observed during the field delineation.

Mr. Keating took a sample point on standardized wetland delineation data forms in representative locations to assess the potential for hydric soils, hydrophytic vegetation, and hydrology. Sample point data forms are included in this report as Appendix C. Results of the wetland sample points are presented in Section 5.3, Results of Data Points.

5 RESULTS

5.1 Environmental Setting

5.1.1. General Description

The Study Area is located in an agricultural setting and is relatively flat and has been under consistent cultivation. The project site is surrounded by agricultural lands in active cultivation and the existing water treatment plant which is adjacent to the Salinas River.

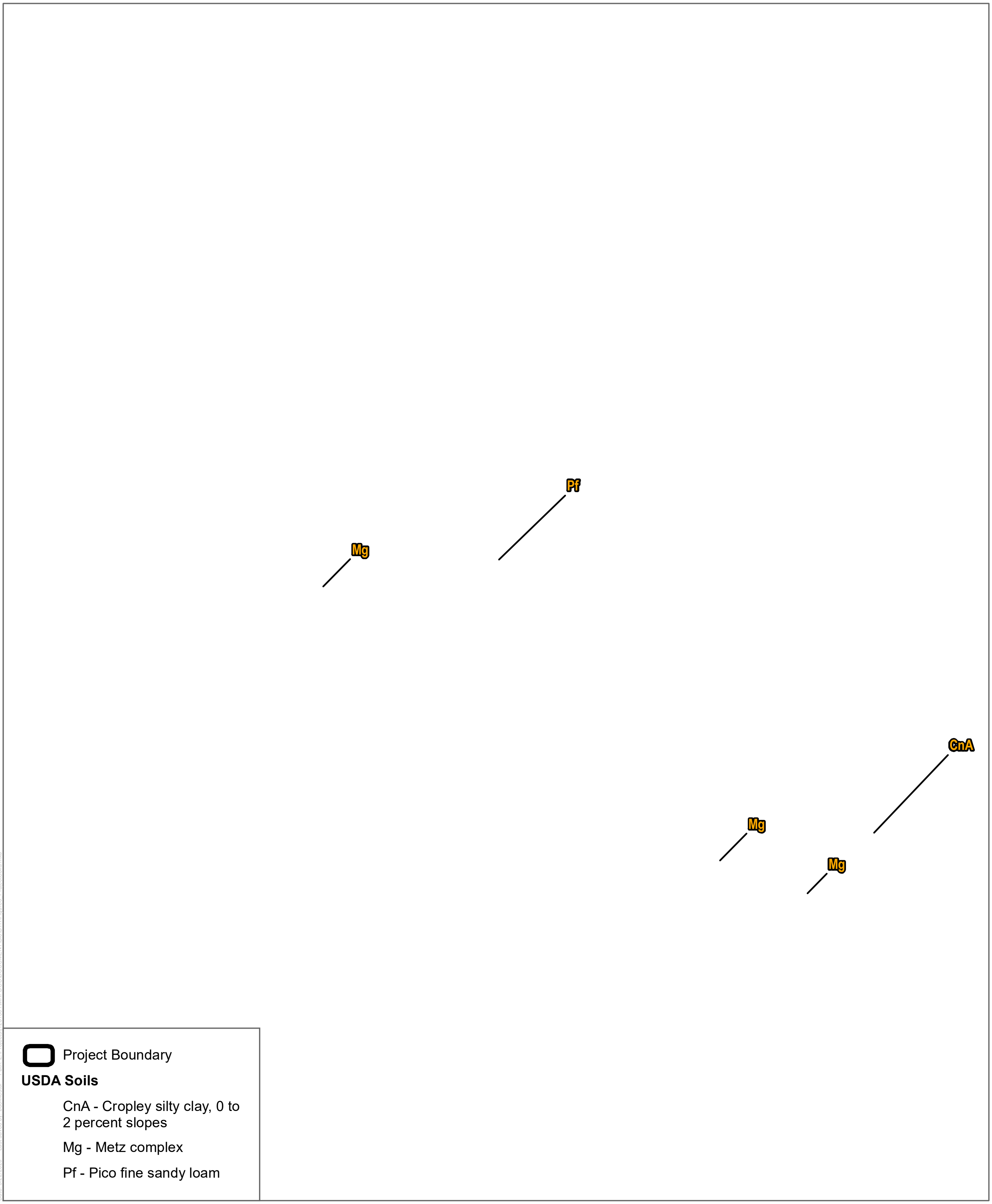
5.1.2. Climate and Rainfall

The Study Area region receives approximately 14.5 inches of precipitation annually. Average temperatures range from approximate 40 to 75 degrees Fahrenheit, with the coolest temperatures occurring in January and December and the warmest temperatures occurring in September (WRCC 2020).

5.1.3. Topography and Soils

Topography is generally flat with a gentle gradient to the southwest, ranging in elevation from 130 feet above mean sea level (amsl) along Puenta Del Monte Avenue, to approximately 100 feet amsl near the existing WWTP.

According to the NRCS (USDA 2020a), three soil types are mapped in the Study Area: Metz complex, Pico fine sandy loam, and Cropley silty clay 0 to 2 percent slopes (Figure 3, Project Soils). Both Pico fine sandy loam and Cropley silty clay soil types are listed as hydric by the NRCS (USDA 2020b). Although these soils represent the native soils in the area, the Study Area has been repeatedly planted and tilled, which likely changed the soil characteristics. Soils encountered during the 2020 field visit were generally sandy clay loam.



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SOURCE: Esri Clarity Basemap 2020, USDA (Accessed 2020)

[redacted]

FIGURE 3

Project Soils

Gonzales Industrial Wastewater Treatment Plant Project

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5.1.4. Watershed and Hydrology

The Study Area is located within the Salinas River Watershed, which is the largest watershed in the Central Coast of California, draining approximately 4,240 square miles of land in Monterey and San Luis Obispo counties. The Salinas River, which eventually connects to Monterey Bay, is the only potential water mapped in the Study Area (USGS 2020b; USFWS 2020). The National Wetlands Inventory (NWI) formally classifies the Salinas River as riverine, intermittent, streambed, seasonally flooded (R4SBC) (Figure 4, Hydrological Setting; USFWS 2020). At the time of the field survey, the Salinas River was dry. There are no other potential wetlands previously mapped in the Study Area outside the Salinas River and the existing treatment plant (USGS 2020b; USFWS 2020).

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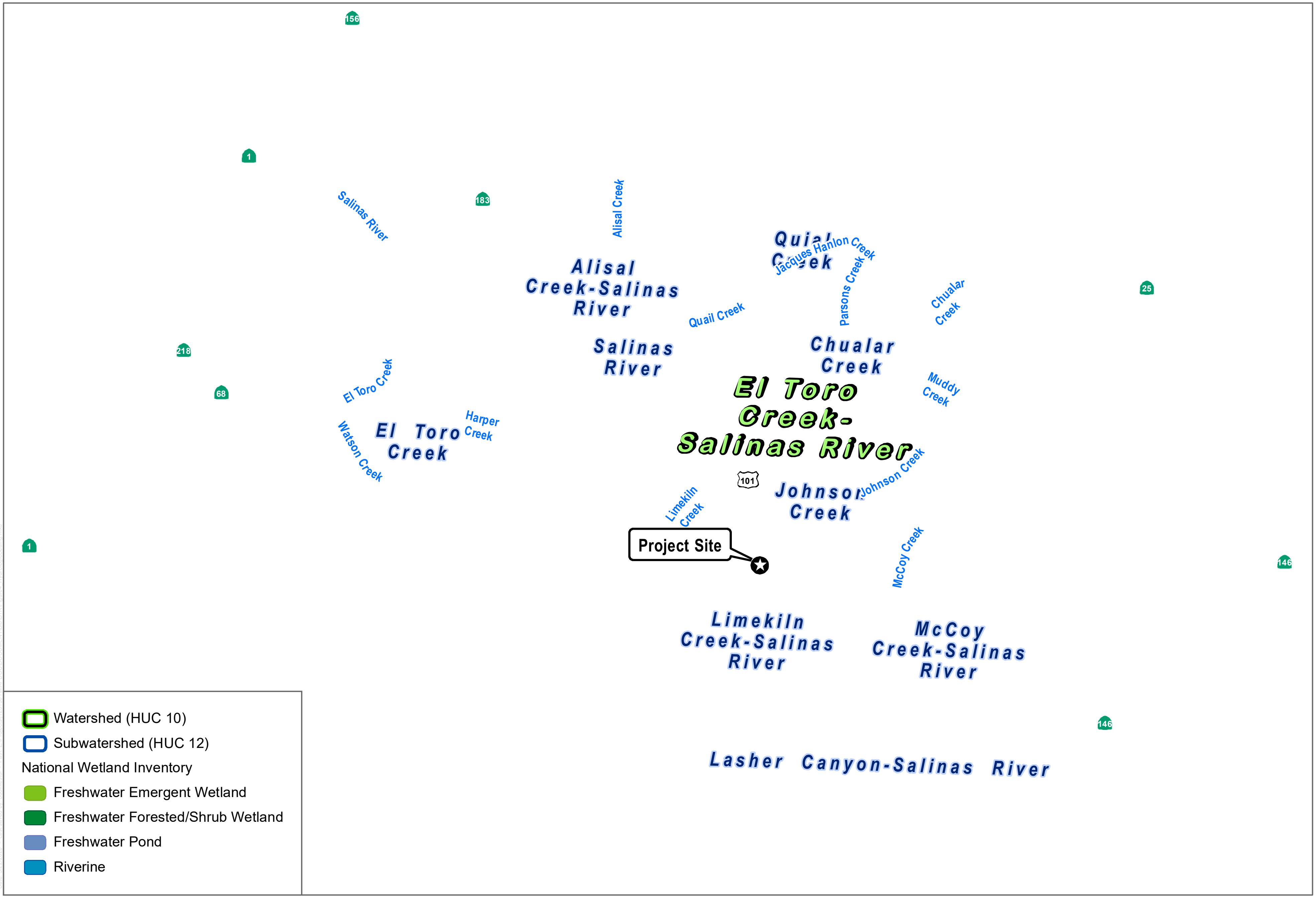

SOURCE: USGS 2019, USFWS 2019, ESRI (Accssed 2020)

0 12,000 24,000
Feet

FIGURE 4

Hydrologic Setting

Gonzales Industrial Wastewater Treatment Plant Project

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5.2 Vegetation Communities and Land Cover Types

Land cover in the Study Area consists of one non-natural land cover, Agricultural. The following land cover description is adapted from the California Wildlife Habitat Relationships System (CDFW 2020a) and the Manual of California Vegetation, Online Edition (CNPS 2020).

Agricultural. This mapping unit identifies areas where various types of food production and harvesting are actively being conducted. These areas may also support non-native grass species and have little biological resource value due to the limited habitat value provided for most native species. During the site reconnaissance, much of the Study Area was prepared for row crops but not undergoing observable planting. Active agriculture on adjacent properties consisted of cauliflower and asparagus, or fallow lands. The agriculture land cover is an anthropogenic mapping unit and is not recognized by the Natural Communities List.

5.3 Results of Data Points

Results from two wetland sampling points do not indicate any potentially jurisdictional aquatic resources in the Study Area, based on observable field indicators (see Table 1 and see Figure 5 Aquatic Resources Delineation). The data collected at two data points are included in Appendix C, on the ACOE’s Wetland Determination Data Forms for the Arid West Region and the OHWM Delineation Cover Sheet for the Arid West Region.

Table 1. Data Point Summary

Data Point	Wetland Determination Field Indicators			Location (Lat/Long)	Determination
	Vegetation	*Hydric Soils*	*Hydrology*		
1	YES	NO	YES	36.494311, -121.482822	Upland
2	YES	No	No	36.493962, -121.482407	Upland

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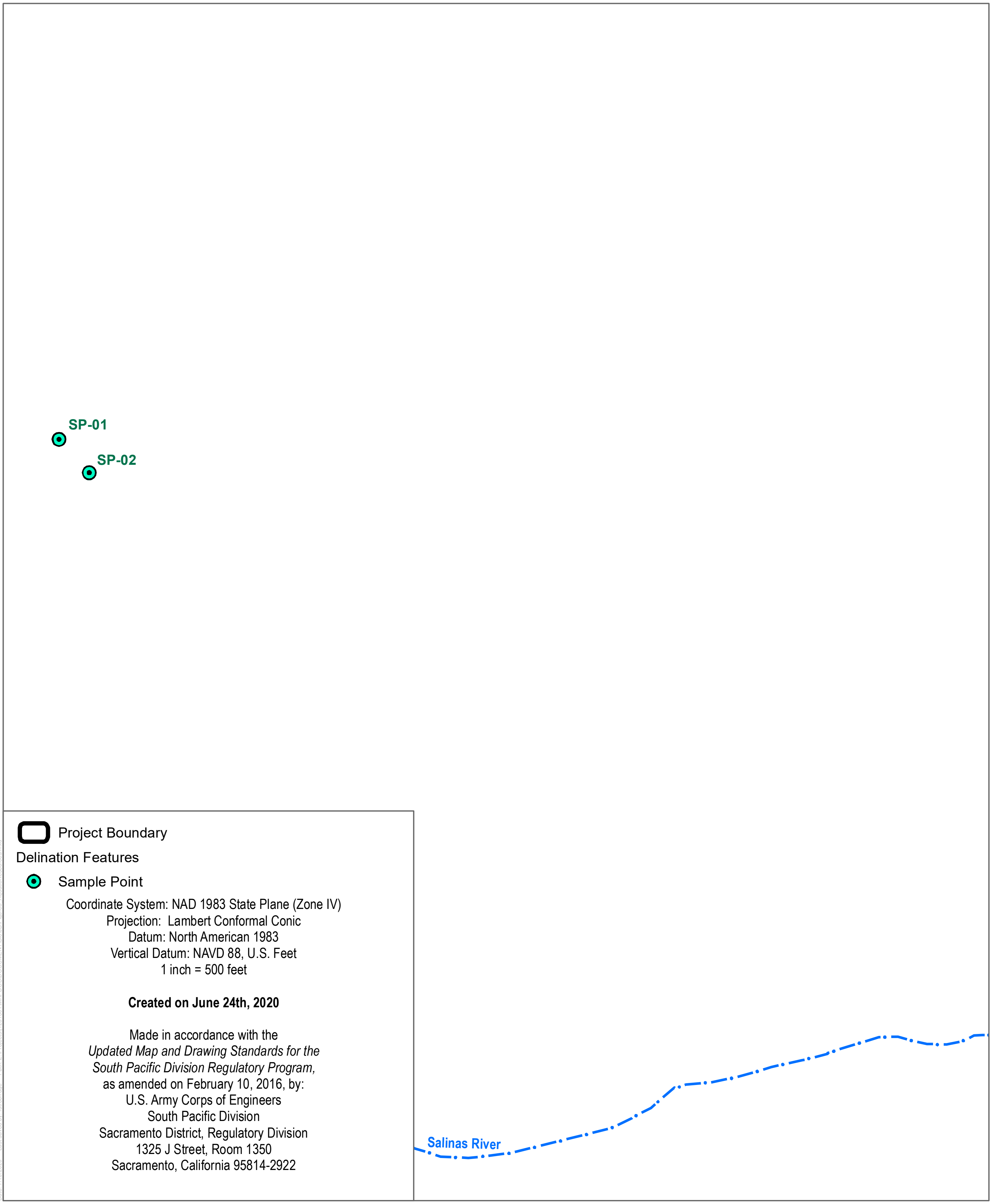

Coordinate System: NAD 1983 State Plane (Zone IV)
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD 88, U.S. Feet
1 inch = 500 feet

Created on June 24th, 2020

Made in accordance with the
Updated Map and Drawing Standards for the
South Pacific Division Regulatory Program,
as amended on February 10, 2016, by:
U.S. Army Corps of Engineers
South Pacific Division
Sacramento District, Regulatory Division
1325 J Street, Room 1350
Sacramento, California 95814-2922

Date: 7/10/2020 - Last saved by: rstrobridge - Path: Z:\Projects\j1231301\MAPDOC\DOCUMENT\Bio\JD\Figure5_AquaticResources.mxd

SOURCE: ESRI 2020, Placer County 2020

[redacted]

FIGURE 5

Preliminary Aquatic Resources Delineation

Gonzales Industrial Wastewater Treatment Plant Project

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6 CONCLUSIONS

Based on the data from desktop studies and that collected during the field delineation, no potentially jurisdictional waters are present in the Study Area. An aquatic resources table prepared in accordance with the ACOE format is provided in Appendix D. These findings are preliminary until verified by the San Francisco District of the ACOE.

6.1 Waters of the U.S.

The Study Area does not support TNWs, interstate waters, or waters that support interstate commerce; therefore, potential ACOE jurisdiction would be determined based on connectivity or adjacency to off-site waters of the U.S.

Based on the review presented herein, the Study Area does not support TNWS or other waters that may meet the criteria for waters of the U.S. subject to ACOE jurisdiction. All findings herein are preliminary until verified by the ACOE

6.2 Waters of the State

The Study Area does not support waters that are anticipated to meet the criteria for jurisdictional waters of the State. Riparian vegetation associated with the Salinas River is under the jurisdiction of CDFW and impacts to riparian vegetation may require CDFW consultation and potential issuance of a CDFG Section 1600 Streambed Alteration Agreement.

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APPENDIX A

Representative Site Photographs

APPENDIX A
Representative Site Photographs

1. Representative site photos, inactive agricultural field. View looking NE towards Gonzales

2. Representative site photos, active agricultural field. View looking N down Short Road

3. SP01
4. SP02

APPENDIX B

Plant Species Observed

ATTACHMENT B
Plant Species Observed within the Project Area

VASCULAR SPECIES

EUDICOTS

APIACEAE—CARROT FAMILY

Conium maculatum—poison hemlock*

ASTERACEAE—SUNFLOWER FAMILY

Matricaria discoidea—disc mayweed
Sonchus asper—spiny sowthistle*

BORAGINACEAE—BORAGE FAMILY

Amsinckia menziesii—Menzies' fiddleneck

BRASSICACEAE—MUSTARD FAMILY

Lepidium didymium—lesser swinecress*

FABACEAE—LEGUME FAMILY

Medicago polymorpha—burclover*

FABACEAE—LEGUME FAMILY

Medicago polymorpha—burclover*

FABACEAE—LEGUME FAMILY

Medicago polymorpha—burclover*

MONOCOTS

POACEAE—GRASS FAMILY

Avena fatua—wild oat*
Bromus diandrus—ripgut brome*

* signifies introduced (non-native) species

APPENDIX C

Data Sheets

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Gonzales Waste Water Treatment Plant City/County: Monterey Sampling Date: 04/13/2020

Applicant/Owner: City of Gonzales State: CA Sampling Point: SP01

Investigator(s): M. Leis, P. Keating Section, Township, Range: S31,32 R5E T16

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): ____ Lat: 36.494311 Long: -121.482822 Datum: ____

Soil Map Unit Name: Pico fine sandy loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are “Normal Circumstances” present? Yes ✓ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ☐

Hydric Soil Present? Yes ☐ No ✓

Wetland Hydrology Present? Yes ✓ No ☐

Is the Sampled Area within a Wetland? Yes ☐ No ✓

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ____)			
1. sonchus asper	10	N	FAC
2. Conium maculatum	1	N	FACW
3. Salix exigua	1	N	FACW
4.			
5.			
6.			
7.			
8.			
= Total Cover	12		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 68 % Cover of Biotic Crust 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	2	x 2 =	4
FAC species	10	x 3 =	30
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	12 (A)		34 (B)

Prevalence Index = B/A = 2.83

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ☐

Remarks:

SOIL

Sampling Point: SP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-8	10YR4/2	100						Sandy Clay
8-18	10YR5/3	100						Clay Sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5) (**LRR C**)
☐ 1 cm Muck (A9) (**LRR D**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (**LRR C**)
☐ 2 cm Muck (A10) (**LRR B**)
☐ Reduced Vertic (F18)
☐ Red Parent Material (TF2)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water Marks (B1) (**Nonriverine**)
☐ Sediment Deposits (B2) (**Nonriverine**)
☐ Drift Deposits (B3) (**Nonriverine**)
☑ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Water-Stained Leaves (B9)
☐ Salt Crust (B11)
☐ Biotic Crust (B12)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Thin Muck Surface (C7)
☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

☐ Water Marks (B1) (**Riverine**)
☐ Sediment Deposits (B2) (**Riverine**)
☐ Drift Deposits (B3) (**Riverine**)
☑ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches):
Water Table Present? Yes ☐ No ☑ Depth (inches):
Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches):

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Gonzales Waste Water Treatment Plant City/County: Monterey Sampling Date: 04/13/2020
Applicant/Owner: City of Gonzales State: CA Sampling Point: SP02
Investigator(s): M. Leis, P. Keating Section, Township, Range: S31,32 R5E T16
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): none Slope (%): 0
Subregion (LRR): ____ Lat: 36.493962 Long: -121.482407 Datum: ____
Soil Map Unit Name: Pico fine sandy loam NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____ No ✓	
Wetland Hydrology Present?	Yes ____ No ✓	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: ____)			
1. Salix exigua	1	N	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	1	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 99 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)
Total Number of Dominant Species Across All Strata: ____ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	1	x 2 =	2
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	1 (A)		2 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks:

SOIL

Sampling Point: SP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR4/2	100					Sandy Cla	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5) (**LRR C**)
☐ 1 cm Muck (A9) (**LRR D**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)

☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (**LRR C**)
☐ 2 cm Muck (A10) (**LRR B**)
☐ Reduced Vertic (F18)
☐ Red Parent Material (TF2)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ☐ **No** ☑

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water Marks (B1) (**Nonriverine**)
☐ Sediment Deposits (B2) (**Nonriverine**)
☐ Drift Deposits (B3) (**Nonriverine**)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Water-Stained Leaves (B9)

☐ Salt Crust (B11)
☐ Biotic Crust (B12)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Thin Muck Surface (C7)
☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

☐ Water Marks (B1) (**Riverine**)
☐ Sediment Deposits (B2) (**Riverine**)
☐ Drift Deposits (B3) (**Riverine**)
☑ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): ____
Water Table Present? Yes ☐ No ☑ Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): ____

Wetland Hydrology Present? Yes ☐ **No** ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX D

Aquatic Resources Spreadsheet

APPENDIX A

Appendix D

Biological Technical Report

DRAFT

Biological Technical Report for the City of Gonzales Separate Industrial Water Recycling Facility Project

Prepared for:

City of Gonzales
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JULY 2020

Printed on 30% post-consumer recycled material.

Biological Technical Report for the City of Gonzales Separate Industrial Water Recycling Facility Project

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
ACOE	U.S. Army Corps of Engineers
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
CWA	Clean Water Act
FESA	Federal Endangered Species Act
HCP	Habitat Conservation Plan
IWTP	Industrial Waste Water Treatment Plant
MGD	Million gallons per day
MBTA	Migratory Bird Treaty Act
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
USFWS	U.S. Fish and Wildlife Service
WWTP	Waste Water Treatment Plant
WEAT	worker environmental awareness training

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SUMMARY OF FINDINGS

On April 13th, 2020, Dudek Biologists Michelle Leis and Paul Keating conducted a biological field survey and preliminary jurisdictional delineation of aquatic resources at the Industrial Water Recycling Facility Project (project) site in the City of Gonzales, California. The Study Area for these efforts was the proposed water recycling facility and the pipeline route leading to the facility. The focus of the survey was to identify and characterize existing onsite biological resources, with particular focus on the potential of the site to support special-status plant and wildlife species and other sensitive resources such as wetlands and other aquatic features and wildlife movement corridors. This Biological Technical Report summarizes the survey methods, results, and also evaluates, and provides a summary of, potential impacts on onsite biological resources as a result of eventual implementation of the proposed project.

No natural vegetation community types are present in the Study Area. Two non-natural land cover types were mapped in the Study Area: general agriculture and disturbed/ruderal. No jurisdictional waters were located within the Study Area. However, the Salinas River does run adjacent to the proposed water recycling facility site and does meet the definition of jurisdictional waters of the U.S. and/or State, regulated by the U.S. Army Corps of Engineers, Regional Water Quality Control Board, and/or California Department of Fish and Wildlife through Sections 401 and 404 of the Clean Water Act and/or Fish and Game Code Sections 1600–1602. A discussion of this aquatic feature and potential project impacts is included within this report in Section 4.2, Jurisdictional Aquatic Resources.

No special-status plant species were documented onsite and due to the disturbed nature and intensive agricultural practices on the site, none are expected to occur within the Study Area.

No special-status wildlife species were documented onsite. The Study Area provides potential habitat for burrowing owl (*Athene cunicularia*) and other migratory birds and birds of prey protected by Fish and Game Code Sections 3503 and 3513 and/or the federal Migratory Bird Treaty Act, western pond turtle (*Emys marmorata*), Townsend's big-ear bat (*Corynorhinus townsendii*), and pallid bat (*Antrozous pallidus*). The adjacent river provides suitable habitat for multiple amphibian species but it is unlikely the species would be present on the Study Area due to the developed areas that separate the two. In addition, the Study Area provides potential roosting habitat for other non-special-status native bats protected by Fish and Game Code Section 4150. However, land covers onsite provide generally poor quality habitat for these species due to regular human disturbance and/or a lack of suitable microhabitat features.

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1 INTRODUCTION

The proposed project consists of an upgrade to the City of Gonzales’ wastewater treatment infrastructure and management with the planned construction of a new separate Industrial Wastewater Treatment Plant (IWTP) that could process up to 4 million gallons per day (MGD) at full buildout. The City’s existing municipal waste water treatment plant (WWTP) has been challenged the past few years due to the nature of flows discharged to the WWTP by local industrial dischargers. The new plant would treat wastewater from the Gonzales Agricultural Business Industrial Park separately from the City’s domestic wastewater system.

There are two components of the proposed project: the IWTP, and the proposed wastewater collection line. The proposed IWTP is located north of the existing WWTP, and includes a headworks with influent screening to remove trash and debris and an influent flow meter; an influent lift station to pump water to the equalization basin; a 2-stage flow equalization basin to buffer flow to the ponds system; a deep-operated aerated pond system to introduce oxygen into wastewater, and effluent percolation beds to dispose of treated effluent. A solids management area would be set aside for accumulated biosolids, sludge, and debris from the influent screening. The project is designed to be installed in a phased approach with Phase I having wastewater treatment capacity of 2.0 MGD. As the industrial wastewater flows increase, Phase II of the IWTP would be constructed, for a combined treatment capacity of 4.0 MGD.

The proposed wastewater collection line includes approximately 11,100 linear feet (LF) of new gravity sewer pipe located mainly on public street right-of-way.

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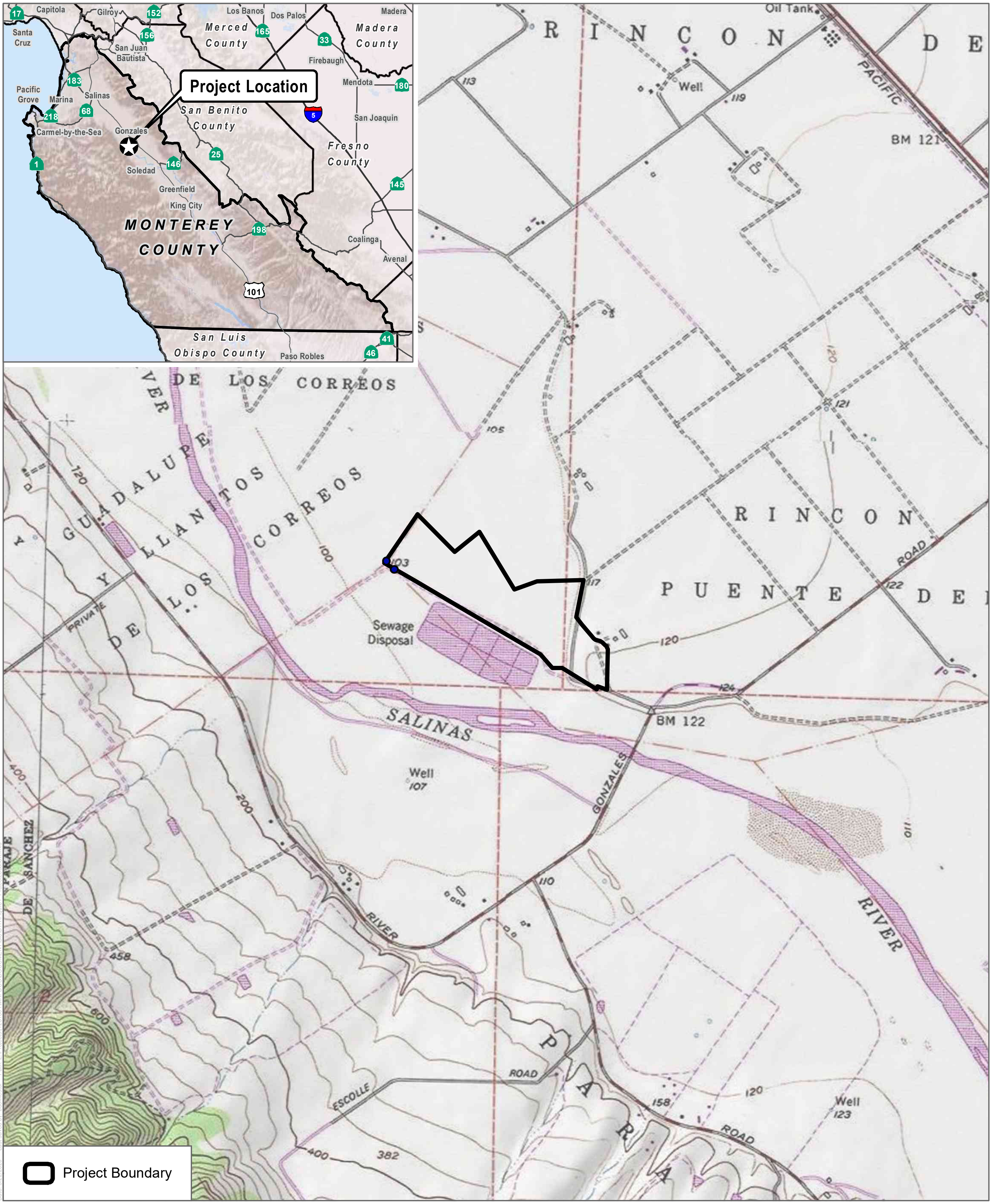

SOURCE: USGS 7.5-Minute Series Gonzales and Palo Escrito Creek Quadrangles

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0 1,000 2,000 Feet

FIGURE 1

Project Location

Gonzales Industrial Wastewater Treatment Plant Project

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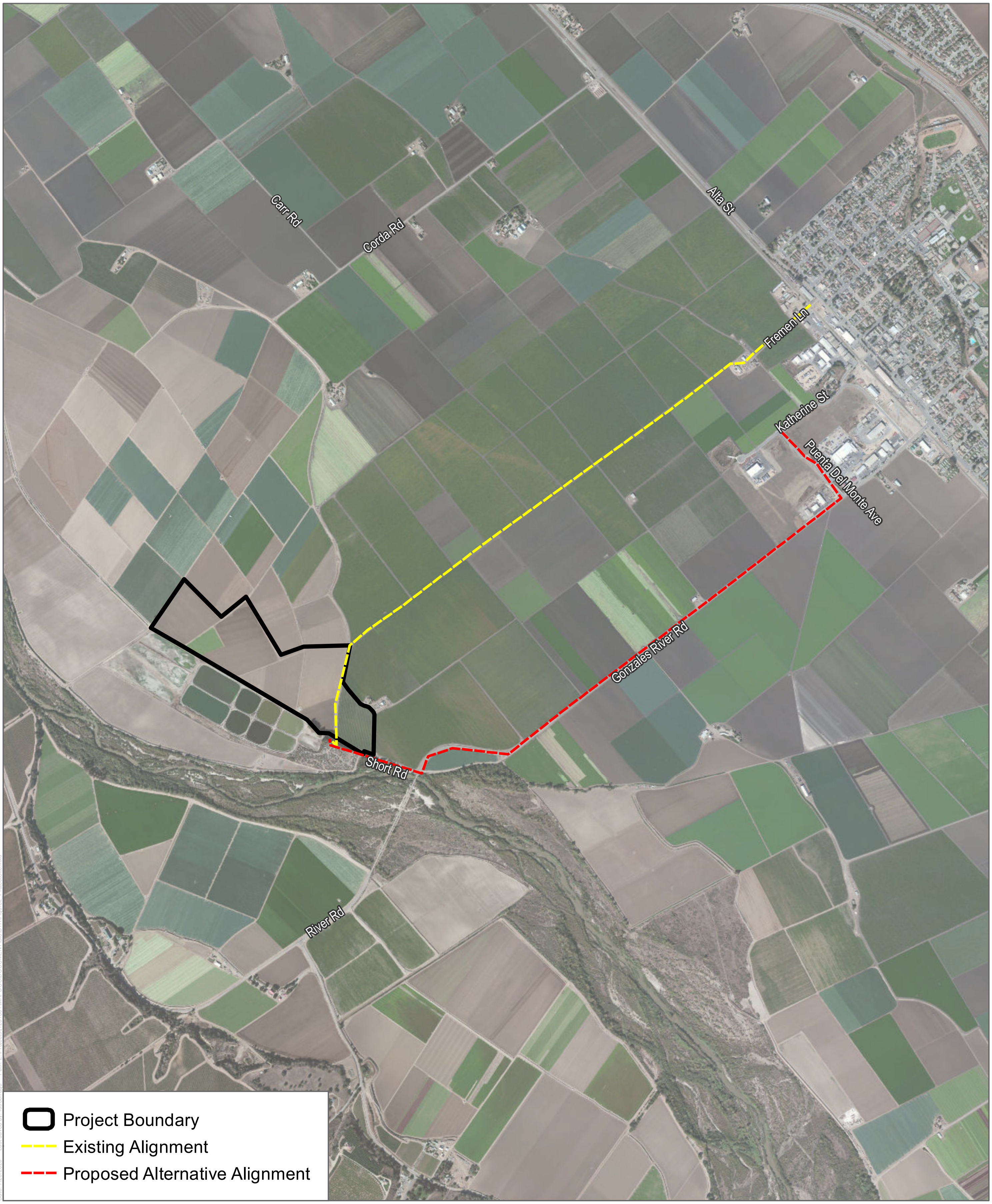

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SOURCE: Esri Clarity Basemap 2020

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FIGURE 2

Project Site

Gonzales Industrial Wastewater Treatment Plant Project

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2 PROJECT SETTING

2.1 Environmental Setting

2.1.1 Project Location

The approximately 78 acre Industrial Water Recycling Facility Project (project) is situated within the Salinas Valley, just north of the Salinas River and southwest of the City of Gonzales (Figure 1, Project Location). The Salinas River Valley is bound by the Gabilan Range to the northeast and the Sierra de Salinas range to the southwest. The Salinas River drains to the Pacific Ocean 26 miles to the northwest. The project area falls within Township 16S/Range 4E, Section 36; Township 16S/Range 5E, Sections 31 and 32; and Township 17S/Range 5E, Section 5 of the Gonzales and Palo Escrito Peak 7.5-minute U.S. Geological Survey Quadrangle maps.

The 78-acre Study Area analyzed herein consists of all areas of potential ground disturbance and potential indirect effects (Figure 2, Study Area). Additionally, the auto junkyard in the WWTP area was analyzed to help determine whether that would be removed as part of the project. Consistency with the Salinas River Long-Term Management Plan and eventual Habitat Conservation Plan (HCP) was also considered.

2.1.2 Land Uses

The Study Area is located in an agricultural setting with active agriculture fields being present throughout the Study Area. To the northeast is the City of Gonzales which is comprised of commercial and residential development. The Salinas River is located to the southwest of the site and outside of the Study Area.

2.1.3 Climate

The Study Area region receives approximately 14.5 inches of precipitation annually. Average temperatures range from approximate 40 to 75 degrees Fahrenheit, with the coolest temperatures occurring in January and December and the warmest temperatures occurring in September (WRCC 2020).

2.1.4 Topography and Soils

The Study Area is located within the Salinas Valley and bounded by the Gabilan Range to the northeast and the Sierra de Salinas range to the southwest. Elevations within the Study Area range from 109 to 130 feet above mean sea level. Topography is generally sloped toward the Salinas River, which flows southwest of the Study Area.

According to the NRCS (USDA 2020a), six soil types are mapped in the Study Area and are discussed below. None of the soil types are known to support edaphic special-status plant species (i.e. the soils of the site are neither serpentine nor alkaline) (Figure 3, Project Soils).

- Cropley silty clay is 0 to 2 slopes and makes up ~79. of the Study Area. Cropley silty clay is a well-drained soil that formed in silty and clayey alluvium derived from sedimentary rock.
- Metz complex is 2 to 9 percent slopes and makes up ~0.1% of the Study Area. Metz complex is somewhat excessively drained and is sandy alluvium derived from sedimentary rock.
- Pico fine sandy loam is 0 to 2 percent slopes and makes up ~0.4% of the Study Area. Pico fine sandy loam is well drained and coarse-loamy alluvium derived from sedimentary rock.
- Salinas clay loam is 0 to 2 percent slopes and makes up ~2.9% of the Study Area. Salinas

2.1.5 Hydrology

The Study Area is located within the Salinas River Watershed, which is the largest watershed in the Central Coast of California, draining approximately 4,240 square miles of land in Monterey and San Luis Obispo counties. The Salinas River, which eventually connects to Monterey Bay, is the only potential water mapped in the Study Area (USGS 2020b; USFWS 2020). The National Wetlands Inventory (NWI) formally classifies the Salinas River as riverine, intermittent, streambed, seasonally flooded (R4SBC) (Figure 4, Hydrological Setting; USFWS 2020). At the time of the field survey, the Salinas River was dry. There are no other potential wetlands previously mapped in the Study Area outside the Salinas River and the existing treatment plant (USGS 2020b; USFWS 2020).

The predominant direction of groundwater flow is to the north, mostly driven when there is flow in the river and by runoff (that recharges the groundwater basin) from the mountains in the west. The Salinas River bed is about 5 feet below land surface at the site. The water table (at its highest peak) is about 10 ft. below grade. Therefore, groundwater from the Study Area appears unlikely or unable to discharge to the river. This hypothesis is supported by the fact the river is dry during the summer months and when there were no releases of water from the upstream reservoirs, Lake San Antonio and Lake Nacimiento. Percolation rates may decline due to a high water table, which would result from recharge to the groundwater basin either from infiltrating rainfall over the basin or leakage from the river.

SOURCE: Esri Clarity Basemap 2020, USDA (Accessed 2020)

FIGURE 3

Project Soils

Gonzales Industrial Wastewater Treatment Plant Project

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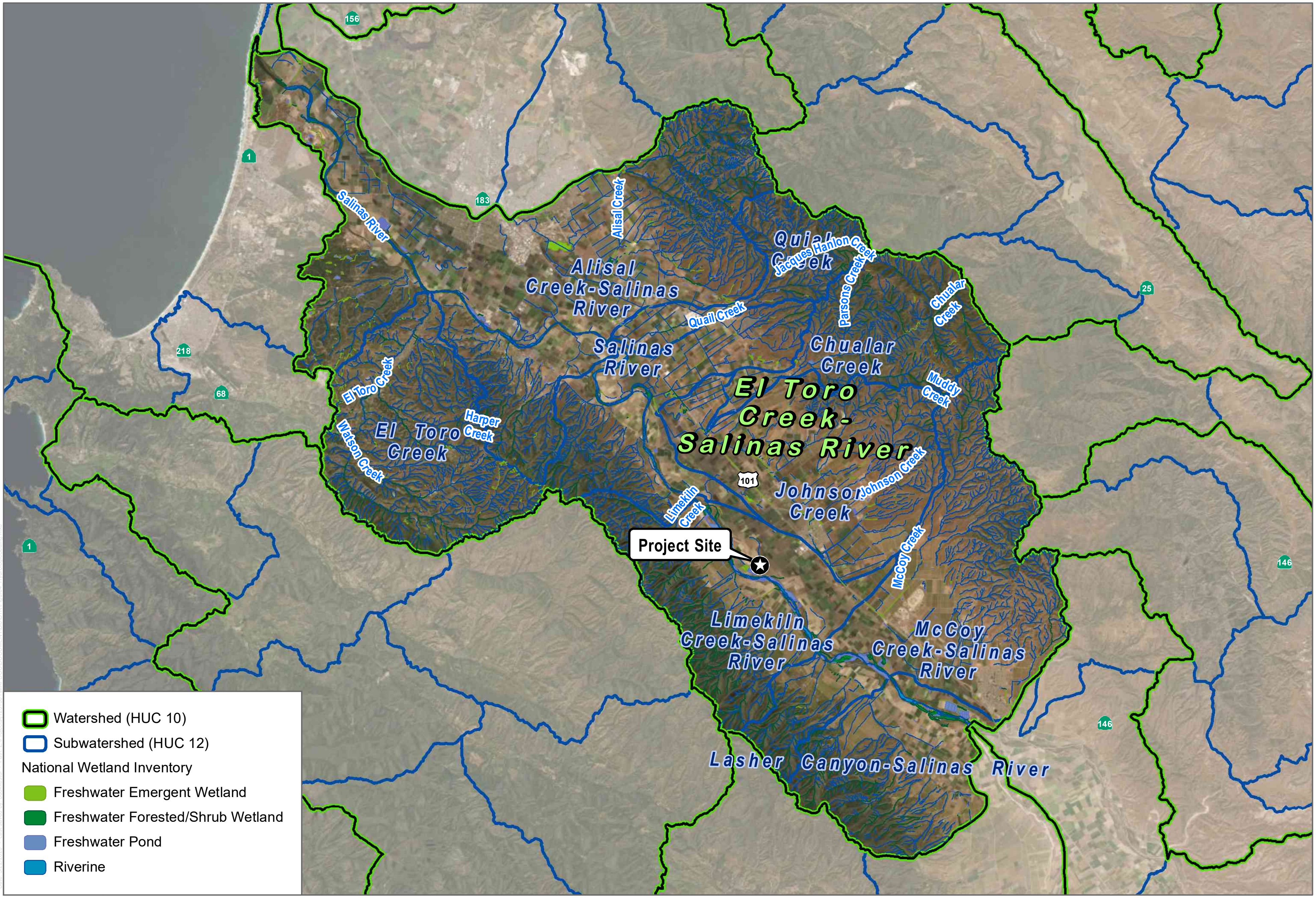

SOURCE: USGS 2019, USFWS 2019, ESRI (Accssed 2020)

DUDEK

FIGURE 4

Hydrologic Setting

Gonzales Industrial Wastewater Treatment Plant Project

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2.2 Regulatory Setting

2.2.1 Federal

Federal Endangered Species Act

The federal Endangered Species Act (FESA) prohibits the taking, possession, sale, or transport of endangered species. “Take” is defined to mean “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 U.S.C. § 1532 (19)). Pursuant to the requirements of FESA, a federal agency reviewing a project within its jurisdiction must determine whether any federally listed threatened or endangered wildlife species could be present in the Study Area and determine the extent to which the project will have an effect on such species. In addition, federal agencies are required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under FESA, or if it would result in the destruction or adverse modification of critical habitat designated for such species (16 USC 1536[3]–[4]). Projects that would result in “take” of any federally listed threatened or endangered wildlife species are required to obtain authorization from the National Marine Fisheries Service (NMFS) and/or U.S. Fish and Wildlife Service (USFWS) through either Section 7 (interagency consultation) or Section 10(a) (incidental take permit) of FESA, depending on whether the federal government is involved in permitting or funding the project.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act regulates or prohibits taking, killing, possession of, or harm to migratory bird species listed in Title 50, Section 10.13 of the Code of Federal Regulations. The Migratory Bird Treaty Act is an international treaty for the conservation and management of bird species that migrate through more than one country, and is enforced in the United States by USFWS. Hunting of specific migratory game birds is permitted under the regulations listed in Title 50, Section 20 of the Code of Federal Regulations. The Migratory Bird Treaty Act was amended in 1972 to include protection for migratory birds of prey (raptors). In late December 2017, the Department of Interior issued an opinion that interprets the above prohibitions as only applying to direct and purposeful actions the intent of which is to kill, take, or harm migratory birds; their eggs; or their active nests. Incidental take of birds, eggs, or nests that are not the purpose of such an action, even if there are direct and foreseeable results, are not prohibited.

Federal Clean Water Act (Section 404)

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the nation’s waters. Under Section 404 of the CWA, the U.S. Army Corps of Engineers (ACOE) has the authority to regulate activities that could discharge fill or dredge material or otherwise adversely modify wetlands or other waters of the United States. The ACOE implements the federal policy embodied in Executive Order 11990, which, when implemented, is intended to result in no net loss of wetland values or function.

Federal Clean Water Act (Section 401)

The State Water Resources Control Board has authority over wetlands through Section 401 of the CWA, as well as the Porter–Cologne Act, California Code of Regulations Section 3831(k), and California Wetlands Conservation Policy. The CWA requires that an applicant for a Section 404 permit (to discharge dredge or fill material into waters of the United States) first obtain certification from the appropriate state agency stating that the fill is consistent with the state’s water quality standards and criteria. In California, the authority to either grant certification or waive the requirement for permits is delegated by the State Water Resources Control Board to the nine regional boards. The Central Valley Regional Water Quality Control Board has authority for Section 401 compliance in the project area. A request for certification is submitted to the regional board at the same time that an application is filed with the ACOE.

2.2.2 State

California Endangered Species Act

Under the California Endangered Species Act (CESA), the California Fish and Game Commission has the responsibility of maintaining a list of threatened and endangered species. CESA prohibits the take of state-listed threatened or endangered animals and plants unless otherwise permitted pursuant to CESA. Take under CESA is defined as any of the following: “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill” (Fish and Game Code Section 86). Unlike the federal ESA, CESA does not include harassment or harm (e.g., habitat degradation) in its definition of take. Species determined by the State of California to be candidates for listing as threatened or endangered are treated as if listed as threatened or endangered and are, therefore, protected from take. Pursuant to CESA, a state agency reviewing a project within its jurisdiction must determine whether any state-listed endangered or threatened species, or candidate species, could be potentially impacted by that project.

Fish and Game Code Sections 3503, 3511, 3513

Section 3503 of the Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 protects all birds of prey (raptors) and their eggs and nests. Section 3511 states that fully protected birds or parts thereof may not be taken or possessed at any time. Section 3513 states that it is unlawful to take or possess any migratory non-game bird as designated in the MBTA.

Fish and Game Code Section 4150

California Fish and Game Code Section 4150 states a mammal occurring naturally in California that is not a game mammal, fully protected mammal, or fur-bearing mammal is a non-game mammal. A non-game mammal may not be taken or possessed under this code. All bat species occurring naturally in California are considered non-game mammals and are therefore prohibited from take as stated in California Fish and Game Code Section 4150.

Fish and Game Code Section 1600 – Lake and Streambed Alteration Agreement

Under Sections 1600–1616 of the California Fish and Game Code, the CDFW regulates activities that would alter the flow, bed, channel, or bank of streams and lakes. The limits of CDFW's jurisdiction are defined in the code as the "bed, channel or bank of any river, stream, or lake designated by the department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit" (Section 1601). In practice, the CDFW usually marks its jurisdictional limit at the top of the stream or bank, or at the outer edge of the riparian vegetation, whichever is wider.

Fish and Game Code Section 1940 – Sensitive Natural Communities

Section 1940 of the California Fish and Game Code requires CDFW to develop and maintain a vegetation mapping standard for the state. More than half of the vegetation communities in the state have been mapped through the Vegetation Classification and Mapping Program.

Natural vegetation communities are evaluated by CDFW and are assigned global (G) and state (S) ranks based on rarity of and threats to these vegetation communities in California. Natural communities with ranks of S1–S3 are considered sensitive natural communities to be addressed in the environmental review processes of CEQA and its equivalents. Sensitive natural communities are defined by CDFW as vegetation alliances with state ranks of S1–S3 (S1: critically imperiled; S2: imperiled; S3: vulnerable), as identified in the List of Vegetation Alliances and Associations (CDFG 2010) and subsequent updates. Additionally, all vegetation associations within the alliances with ranks of S1–S3 are considered sensitive habitats. CEQA requires that impacts to sensitive natural communities be evaluated and mitigated to the extent feasible.

Sensitive natural communities are communities that have a limited distribution and are often vulnerable to the environmental effects of projects. These communities may or may not contain special-status species or their habitats. For purposes of this assessment, sensitive natural communities are considered to include vegetation communities listed in CDFW's California Natural Diversity Database and communities listed in the Natural Communities List with a rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

California Department of Fish and Wildlife Special Plants

For the purposes of this analysis, special plant species are defined as plants that are legally protected or that are otherwise considered sensitive by federal, state, or local resource conservation agencies. These species fall into one or more of the following categories:

- Listed by the federal government under the Federal Endangered Species Act of 1973 or the State of California under the California Endangered Species Act of 1970 as endangered, threatened, or rare.
- A candidate for federal or state listing as endangered or threatened.
- Taxa that are biologically rare, very restricted in distribution, or declining throughout their range but not currently threatened with extirpation.
- Population(s) in California that may be peripheral to the major portion of a taxon's range but are threatened with extirpation in California.
- Taxa closely associated with a habitat that is declining in California at a significant rate (e.g., wetlands, riparian, vernal pools, old growth forests, desert aquatic systems, native grasslands, valley shrubland habitats).

Taxa considered to be "rare, threatened, or endangered in California" as defined by the California Department of Fish and Wildlife (CDFW) and assigned a California Rare Plant Rank (CRPR). The CDFW system includes six rarity and endangerment ranks for categorizing plant species of concern, as follows:

- CRPR 1A – Plants presumed to be extinct in California
- CRPR 1B – Plants that are rare, threatened, or endangered in California and elsewhere
- CRPR 2A – Plants presumed to be extinct in California, but more common elsewhere
- CRPR 2B – Plants that are rare, threatened, or endangered in California, but more common elsewhere
- CRPR 3 – Plants about which more information is needed (a review list)

- CRPR 4 – Plants of limited distribution (a watch list)

Plants ranked as CRPR 1A, 1B, 2A, or 2B may qualify as endangered, rare, or threatened species within the definition of California Environmental Quality Act (CEQA) Guidelines Section 15380. CDFW recommends that potential impacts to CRPR 1 and 2 species be evaluated in CEQA review documents. In general, CRPR 3 and 4 species do not meet the definition of endangered, rare, or threatened pursuant to State CEQA Guidelines Section 15380, but these species may be evaluated on a case-by-case basis.

California Department of Fish and Wildlife Species of Special Concern

CDFW maintains a list of vertebrate animal species considered of "special concern" because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction. A Species of Special Concern is a species, subspecies, or distinct population of an animal native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria:

- Is extirpated from the state or, in the case of birds, is in its primary seasonal or breeding role
- Is listed as threatened or endangered federally, but not by the state
- Meets the state definition of threatened or endangered, but has not formally been listed
- Is experiencing, or formerly experienced, serious noncyclical population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for threatened or endangered status by the state
- Has naturally small populations exhibiting high susceptibility to risk from any factor(s) that, if realized, could lead to declines that would qualify it for threatened or endangered status by the state

Impacts to Species of Special Concern are typically evaluated and mitigated within the context of an Environmental Impact Report or other document prepared pursuant to CEQA.

California Department of Fish and Wildlife Wetlands Protection Regulations

CDFW derives its authority to oversee activities that affect wetlands from state legislation. This authority includes Sections 1600–1616 of the California Fish and Game Code (lake and streambed alteration agreements), the California Endangered Species Act (protection of state-listed species and their habitats, which could include wetlands), and the Keene–Nejedly California Wetlands

Preservation Act of 1976 (states a need for an affirmative and sustained public policy program directed at wetlands preservation, restoration, and enhancement). In general, the CDFW asserts authority over wetlands within the state through any of the following: review and comment on ACOE Section 404 permits, review and comment on California Environmental Quality Act (CEQA) documents, preservation of state-listed species, or lake and streambed alteration agreements

Porter–Cologne Water Quality Control Act

The Porter–Cologne Water Quality Control Act established the State Water Resources Control Board (SWRCB) and each RWQCB as the principal state agencies responsible for the protection of water quality in California. The North Coast RWQCB has regulatory authority over the project area.

The RWQCB regulates discharging waste, or proposing to discharge waste, within any region that could affect a water of the state (California Water Code, Section 13260(a)), pursuant to provisions of the Porter-Cologne Water Quality Control Act. The SWRCB defines a waters of the State as “any surface water or groundwater, including saline waters, within the boundaries of the state” (California Water Code, Section 13050(e)). As of April 2020, the SWRCB has narrowed their definition of a waters of the state to include the following:

1. *Natural wetlands,*
2. *Wetlands created by modification of a surface water of the state,*
3. *Artificial wetlands that meet any of the following criteria:*
    a. *Approved by an agency as compensatory mitigation for impacts to other waters of the state, except where the approving agency explicitly identifies the mitigation as being of limited duration;*
    b. *Specifically identified in a water quality control plan as a wetland or other water of the state;*
    c. *Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape; or*
    d. *Greater than or equal to one acre in size unless the artificial wetland was constructed and is currently used and maintained, primarily for one or more of the*

> *following purposes: industrial or municipal wastewater treatment or disposal; settling of sediment; detention, retention, infiltration, or treatment of stormwater run-off and other pollutants or run-off subject to regulation under a municipal, construction, or industrial permitting program; treatment of surface waters; agricultural crop irrigation or stock watering; fire suppression; industrial processing or cooling water; active surface mining – even if the site is managed for interim wetlands functions and values; log storage; treatment, storage, or distribution of recycled water; maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits); or fields flooded for rice growing.*

All waters of the U.S. are waters of the state. Wetlands such as isolated seasonal wetlands that are not generally considered waters of the U.S. are considered waters of the state if, "under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation." (State Water Resources Control Board 2020).

Before ACOE will issue a CWA Section 404 permit, applicants must receive a CWA Section 401 Water Quality Certification from the RWQCB. If a CWA Section 404 permit is not required for the project, the RWQCB may still require a permit (i.e., Waste Discharge Requirement) for impacts to waters of the state under the Porter-Cologne Water Quality Control Act.

3 METHODS

3.1 Literature and Database Review

Special-status biological plant and wildlife species present or potentially present in the Study Area were identified through a desktop literature search using the following sources: USFWS Information, Planning, and Conservation (IPaC) Trust Resource Report; CDFW California Natural Diversity Database (CNDDB); and the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Vascular Plants. Additionally, the Study Area was queried to determine soil types that exist within the boundary of the Study Area (USDA 2020a). Additionally, Dudek queried the Natural Resources Conservation Service's Web Soil Survey to determine soil types mapped in the Study Area and reviewed current and historical aerial photography to identify any potentially jurisdictional aquatic resources based on aerial signatures.

The above-referenced databases were searched for Gonzales and Palo Escrito Peak and ten surrounding USGS 7.5-minute quadrangles: Natividad, Mt. Harlan, Paicines, Mount Johnson, Soledad, Paraiso Springs, Sycamore Flat, Chews Ridge, Rana Creek, and Chualar. CNDDB search results within 2 miles of the Study Area were overlain on aerial imagery to assess proximity of known occurrences to the Study Area. The IPaC search included the Study Area and a 2-mile buffer (Figure 5, CNDDB Occurrences). Special-status species include those that are considered threatened, endangered, or species of special concern by CDFW, USFWS, or the CNPS (see Section 2.2.2 for definitions). California Rare Plant Rank 1 and 2 plant species were included in the CNPS search.

3.2 Field Assessments

3.2.1 Biological Survey

On April 13, 2020, Dudek biologists Michelle Leis and Paul Keating performed a biological field survey of the Study Area. The survey consisted of walking throughout the Study Area and along its periphery to map and characterize vegetation communities; collect data on the relative quality of, and potential for, existing habitats to support the special-status species identified during the preliminary database and resources review; and to identify any other sensitive biological resources present or potentially present on the Study Area or adjacent areas. Field notes and an aerial photograph (Google Earth 2020) with an overlay of the property boundary were used to map vegetation communities and record any sensitive biological resources while in the field.

All plant species encountered during the field surveys were identified to the lowest taxonomic group possible and recorded directly into a field notebook. Common and scientific names for plant species with a California Rare Plant Rank (formerly CNPS List) follow the CNPS online Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2020). Nomenclature for all other plant species observed on the site follow The Jepson Manual, Vascular Plants of California, Second Edition (Jepson Flora Project 2020).

Wildlife species detected during the field surveys by sight, calls, tracks, scat, or other signs were recorded directly into a field notebook. The site was visually scanned with and without binoculars to identify wildlife. No focused or protocol-level surveys for special-status plants or wildlife species were conducted. A list of plant and wildlife species identified during the April 2020 survey is included in Attachment A, and representative photographs of the Study Area are in Attachment B.

3.2.2 Aquatic Resources Delineation

Concurrent with the biological reconnaissance survey described above, Mr. Keating performed a delineation of aquatic resources (i.e., wetlands and other waters) to identify and map the extent of aquatic features on or adjacent to the Study Area that are potentially subject to regulation under Sections 401 and 404 of the federal CWA, Section 1602 of California Fish and Game Code, or under the provisions of the Porter-Cologne Act. The specific methodology for the delineation is described below.

Prior to conducting fieldwork at the Study Area, Dudek reviewed a 1:200-scale aerial photograph (Google Earth 2020), historic aerial photographs (Historicaerials.com 2020), the USGS Roseville 7.5-minute topographic quadrangle (USGS 2020), U.S. Department of Agriculture Natural Resources Conservation Services (NRCS) Web Soil Survey (USDA 2020a), and National Wetland Inventory (USFWS 2020).

Potential aquatic resources were delineated based on methodology described in the 1987 Corps of Engineers Wetlands Delineation Manual (ACOE 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (ACOE 2008), and applicable regulatory guidance provided by the ACOE, U.S. Environmental Protection Agency, and/or RWQCB, including the geographic extent of jurisdiction based on the respective agency's interpretation of the CWA (see Section 2.2, Regulatory Setting). Non-wetland waters of the U.S. were delineated based on the presence of an OHWM, as determined using the methodology in *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western U.S.* (ACOE 2010b). Mr. Keating took two sample points to assess the potential for hydric soils, hydrophytic vegetation, and hydrology in the Study Area. Wetland plant indicator status for each plant was determined using the Arid West region of the National Wetland Plant List: 2016 (ACOE 2016a).

No wetlands or waters of the US were found to be present within the Study Area. Results of the delineation are summarized in a separately-bound Aquatic Resources Delineation Report (Dudek 2020).

4 RESULTS

4.1 Vegetation Communities and Land Cover Types

Land cover in the Study Area consists of one non-natural land cover, Agricultural (Figure 6, Vegetation Communities and Land Cover Types). The following land cover description is adapted from the California Wildlife Habitat Relationships System (CDFW 2020a) and the Manual of California Vegetation, Online Edition (CNPS 2020). Refer to Attachment B for representative photographs of onsite vegetation communities and land cover types.

Table 1
Vegetation Communities and Land Cover Types in the Study Area

Macrogroup	Vegetation Community/ Land Cover Type	Acres	Linear Feet
Terrestrial			
Non-natural	Agricultural	77.77	NA

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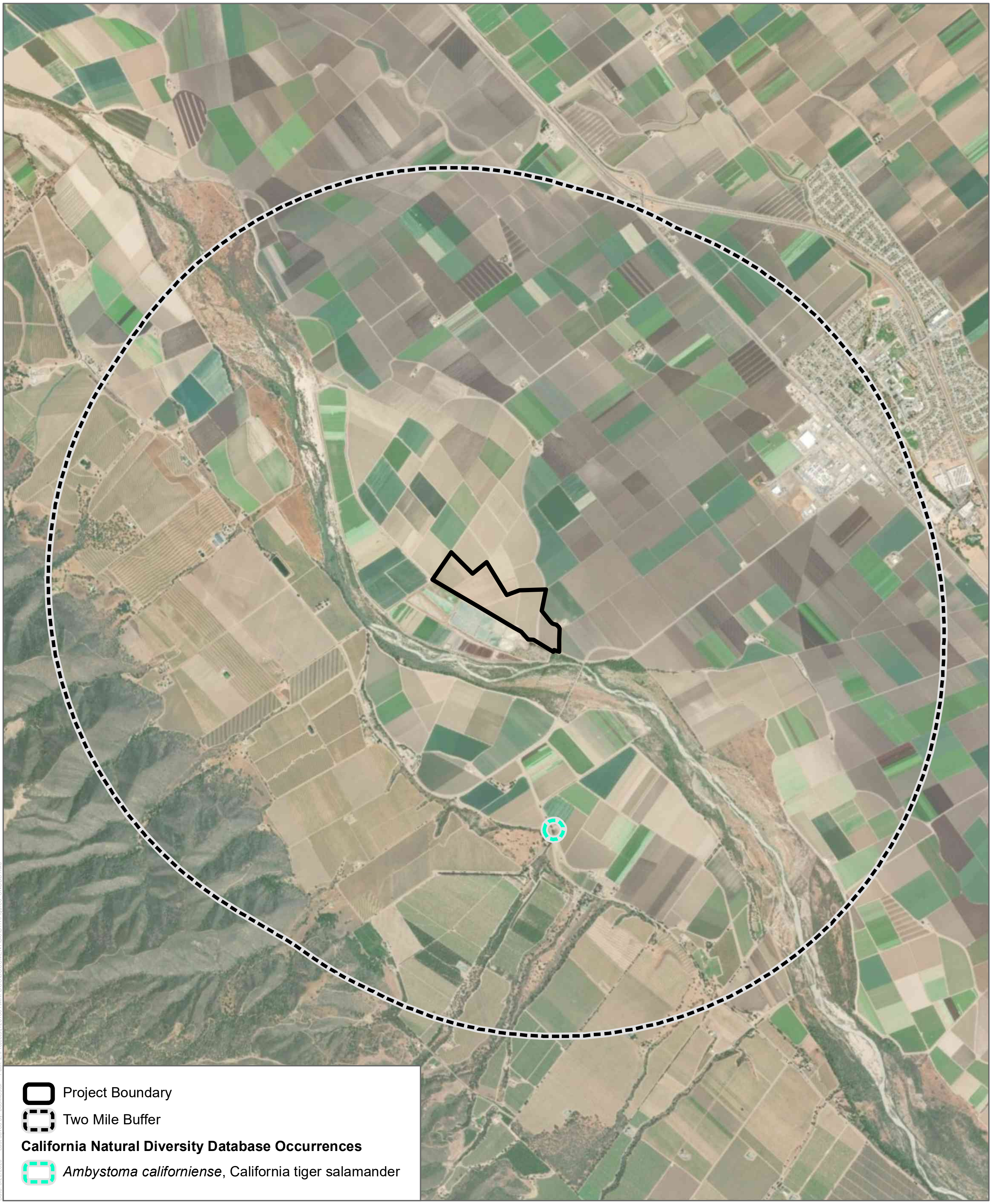

Date: 5/22/2020 - Last saved by: bdokkestul - Path: Z:\Projects\j1231301\MAPDOC\DOCUMENT\Bio\BTR\Figure5_CNDDB.mxd

SOURCE: CDFW 2020, ESRI (Accessed 2020)

DUDEK

0 1,750 3,500 Feet
0 500 1,000 Meters
1:42,190

FIGURE 5

California Natural Diversity Database Occurrences

Gonzales Industrial Wastewater Treatment Plant Project

Figure 6 Vegetation Communities and Land Cover Types

SOURCE: Esri Clarity Basemap 2020

FIGURE 6

Vegetation Communities and Land Cover

Gonzales Industrial Wastewater Treatment Plant Project

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4.1.1 Terrestrial Land Cover Types

Agricultural. This mapping unit identifies areas where various types of food production and harvesting are actively being conducted. These areas may also support non-native grass species and have little biological resource value due to the limited habitat value provided for most native species. During the site reconnaissance, much of the Study Area was prepared for row crops but not undergoing observable planting. Active agriculture on adjacent properties consisted of cauliflower and asparagus, or fallow lands. Two potential alignments are proposed as part of the project. One alignment follows a dirt road through active agricultural fields with roadside ditches relatively free of vegetation. The second alignment is along Gonzales River Road through agricultural fields and roadside ditches with a higher preponderance of non-native species. The agriculture land cover is an anthropogenic mapping unit and is not recognized by the Natural Communities List.

4.3 Plant and Wildlife Species Observed

A total of 10 species of vascular plant species, 3 native (30%) and 7 non-native (70%) species, were recorded in the Study Area during the April 13, 2020 field survey. There were no rare plant surveys conducted for the proposed project; therefore, the species list is not comprehensive. The list of plant species observed within the Study Area includes those species observed during general surveys of the Study Area and likely does not include plant species that are indeed present but were not blooming at the time of the surveys.

The Dudek biologists directly observed, or documented via scat, sign, or call, 16 wildlife species in the Study Area during the field survey. Many wildlife species common to the region are mobile, cryptic, and/or active during limited periods of day, and could therefore be easily missed during a single daytime survey. A list of plant and wildlife species detected during the field survey is included in Attachment A.

4.4 Special-Status Species Potentially Occurring on the Property

This section discusses special-status plant and wildlife species determined to have the potential to occur on the Study Area, based on the preliminary review discussed above and on the field assessment of existing habitats. Tables summarizing the potential occurrence of special-status plant and wildlife species are included in Attachment C and D, respectively. Species are not expected to occur if the Study Area is clearly outside the known geographic range of the species, or if no suitable habitat for the species is present on or adjacent to the site.

4.4.1 Special-Status Plants

Results of USFWS, CNDDB, and CNPS searches revealed 25 special-status plant species that have potential to occur or that are known to occur in the Study Area region (see Attachment C). All of the 25 special-status plant species were removed from consideration due to lack of suitable habitat within or adjacent to the Study Area, or due to the site being outside of the species' known geographic or elevation range.

4.4.2 Special-Status Wildlife

Results of the USFWS and CNDDB searches revealed 33 special-status wildlife species as present or potentially present in the project region (see Attachment D). Of these, 23 species were removed from consideration due to lack of suitable habitat on or adjacent to the Study Area, or due to the site being outside of the species' known geographic or elevation range. The remaining ten special-status wildlife species have a potential to occur on the Study Area and are discussed further below.

California Tiger Salamander (*Ambystoma californiense*). California tiger salamander is a federally and state threatened species with low potential to occur on the Study Area. This species occurs within annual grassland, valley–foothill hardwood, valley–foothill riparian habitats, vernal pools, other ephemeral pools, and (uncommonly) along stream courses and man-made pools if predatory fishes are absent. Some riparian vegetation is present on site along the banks of the Salinas River but the quality of upland habitat is poor and the overall disturbed nature of the site make it unlikely the species is present.

California Red-legged Frog (*Rana draytonii*). California red-legged frog is a federally threatened species and a CDFW Species of Special Concern with a low potential to occur on the Study Area. This species prefers lowland streams, wetlands, riparian woodlands, or livestock ponds with dense, shrubby or emergent vegetation often associated with deep, still or slow-moving water. Breeding habitat includes freshwater pools and backwaters within streams and creeks, ponds, marshes, springs, and lagoons. Species may use adjacent uplands to hide from predators. Riparian vegetation is present adjacent to the Study Area due to the presence of the Salinas River which provides potential aquatic habitat for the species. However, when flowing this river has fast-moving water and is not suitable for breeding.

Western Spadefoot (*Spea hammondii*). Western spadefoot is a CDFW Species of Special Concern with a low potential to occur on the Study Area. Species is primarily found in grassland and vernal pools, but also in ephemeral wetlands that persist at least 3 weeks. Species is also associated with chaparral, coastal scrub, valley–foothill woodlands, pastures, and sometimes agriculture. Some wetland vegetation is present outside of the project area adjacent to the Salinas

River. The Study Area is mainly composed of agriculture fields with other habitat-defining vegetation not present.

Northwestern Pond Turtle (*Actinemys marmorata*). Northwestern pond turtle is a CDFW Species of Special Concern with a low potential to occur on the Study Area. This species utilizes ponds, small lakes, slow-moving permanent or intermittent streams, and reservoirs with emergent basking sites and adjacent uplands for nesting and overwintering (CDFW 2020). No emergent basking sites are present within Salinas River and adjacent upland habitat is not suitable for nesting.

San Joaquin Whipsnake (*Masticophis flagellum ruddocki*). San Joaquin whipsnake is a CDFW Species of Special Concern with a low potential to occur on the Study Area. This species prefers open, dry, treeless areas including grassland and saltbrush scrub. The agriculture fields within the land provide treeless areas however; no grassland or saltbush scrub is present.

Burrowing Owl (*Athene cunicularia*). Burrowing owl is a CDFW Species of Special Concern with moderate potential to occur on the Study Area. This species nests and forages in grassland, open scrub, and agriculture, particularly when ground squirrel burrows are present. Agriculture fields on the Study Area provide foraging habitat and suitable burrows and ground squirrels were both present during the site visit on April 13, 2020.

Least Bell's Vireo (*Vireo bellii pusillus*). Least Bell's vireo is a Federally and State endangered species with a low potential to nest on the Study Area. This species nests and forages in low, dense riparian thickets along water or along dry parts of intermittent streams. It is also known to forage in riparian and adjacent shrubland late in the nesting season. Foraging habitat is present adjacent to the Salinas River but riparian vegetation is sparse, making nesting unlikely.

Pallid Bat (*Antrozous pallidus*). Pallid bat is a CDFW Species of Special Concern with low potential to roost on the Study Area. This species prefers grasslands, shrublands, woodlands, and forests. It is most common in open, dry habitats with rocky outcrops for roosting, but also roosts in man-made structures and trees. Agriculture fields present on site provide foraging opportunities, and the bridge on Gonzales River Road over the Salinas River adjacent to the Study Area provides potential roosting habitat.

Townsend's Big-eared Bat (Corynorhinus townsendii). Townsend's big-eared bat is a CDFW Species of Special Concern with low potential to roost on the Study Area. Species prefers mesic habitats characterized by coniferous and deciduous forests and riparian habitat, but also xeric areas. Often roosts in limestone caves and lava tubes, man-made structures, and tunnels. Riparian vegetation is present providing foraging opportunities. The bridge on Gonzales River Road over the Salinas River adjacent to the Study Area provides potential roosting habitat.

American Badger (*Taxidea taxus*). The American badger is a CDFW Species of Special Concern with a low potential to occur on site. This species prefers dry, open, treeless areas as well as grasslands, coastal scrub, agriculture, and pastures, especially with friable soils. Although the agricultural fields and soils present on the Study Area are suitable for this species, the overall disturbed nature of the site and the agricultural fields being highly active and consistently disked make it unlikely the species would be present on site.

Nesting and Migratory Birds and Birds of Prey. Native migratory bird species are protected by the federal MBTA and California Fish and Game Code 3503.5 (which specifically protects raptors). The existing vegetation within the Study Area provides suitable nesting habitat for migratory birds and raptors, and the bridge where the Salinas River cross underneath the road adjacent to the Study Area could provide nesting habitat for birds that build mud nests, such as swallows, swifts, phoebes, and others. Certain ground-nesting species, such as killdeer (*Charadrius vociferous*), may nest in disturbed areas where gravels are present. No active nests were noted on Study Area during the April 2020 field survey.

4.6 Sensitive Natural Communities

There are no communities identified as sensitive vegetation communities in CDFW's California Natural Community List (CDFW 2020) within the Study Area.

4.7 Wildlife Corridors and Habitat Linkages

Wildlife corridors are typically linear landscape features that connect large patches of often disjunct natural open space and provide avenues for dispersal or migration of animals, as well as dispersal of plants (e.g., via wildlife vectors). Corridors can be small and even man-made (e.g., highway underpasses, culverts, bridges), narrow linear habitat areas (e.g., riparian strips, hedgerows), or wider landscape-level extensions of habitat that ultimately connect even larger core habitat areas. Wildlife corridors contribute to population viability in several ways: (1) they ensure continual exchange of genes between populations, which helps maintain genetic diversity; (2) they provide access to adjacent habitat areas representing additional territory for foraging and breeding; (3) they allow for an improved carrying capacity; and (4) they provide routes for colonization of habitat lands following local population extinctions or habitat recovery from ecological catastrophes.

Habitat linkages are patches of native habitat that function to join two larger patches of habitat and help reduce the adverse effects of habitat fragmentation. Although often used as movement corridors for larger animal species, habitat linkages may also serve as habitat and avenues of gene flow for small animals such as reptiles, amphibians, and rodents. Habitat linkages may be represented by continuous patches of habitat or by nearby habitat "islands" that function as stepping stones for dispersal and movement (especially for birds and flying insects).

The Study Area is composed of active agriculture and bounded by a combination of agriculture and urban development causing a high level of habitat disturbance. The Salinas River located southwest of the Study Area could provide a potential link between habitats but the Study Area itself does not function as a wildlife movement corridor due to the surrounding development and lack of connectivity with other undeveloped areas.

5 IMPACTS AND MITIGATION

This section addresses potential impacts to special-status species or sensitive resources that could result from construction of the proposed project and provides recommendations to avoid and minimize potential impacts to sensitive biological resources.

5.1 Definition of Impacts

This section defines the types of impacts that would occur as a result of the proposed project's implementation, including direct, permanent impacts; direct, temporary impacts; and indirect impacts.

5.1.1 Direct Impacts

Direct, permanent impacts refer to the absolute and permanent physical loss of a biological resource due to clearing and grading associated with implementation of the proposed project. Direct, permanent impacts are analyzed in four ways: (1) permanent loss of vegetation communities and land covers, and general wildlife and their habitat; (2) permanent loss of or harm to individuals of special-status plant and wildlife species; (3) permanent loss of suitable habitat for special-status species; or (4) permanent loss of wildlife movement and habitat connectivity in the project vicinity.

Direct, temporary impacts refer to a temporal loss of vegetation communities and land covers resulting from vegetation and land cover clearing and grading associated with implementation of the proposed project. The main criterion for direct, temporary impacts is that impacts would occur for a short period of time and would be reversible.

5.1.2 Indirect Impacts

Indirect impacts are reasonably foreseeable effects caused by project implementation on remaining or adjacent biological resources outside the direct disturbance zone that may occur during grading or maintenance activities (i.e., short-term construction-related indirect impacts) or later in time as a result of the program (i.e., long-term, or operational, indirect impacts). Short-term indirect impacts can include dust, human activity, pollutants (including potential erosion), and noise that extend beyond the identified construction area. Long-term indirect impacts can include changes to hydrology, introduction of invasive species, dust, and noise that are operations related or occur over the long term.

For each of the following impact sections, direct and indirect impacts for biological resources are identified and a significance determination is made for each impact. For each significant impact, mitigation measures that would reduce the impact to less than significant are proposed.

5.2 Impacts to Vegetation Communities

The project is not expected to directly or indirectly impact sensitive vegetation communities since none are present within the Study Area.

5.3 Impacts to Jurisdictional Aquatic Resources

No potential waters are present within the Study Area, so no direct or indirect effects to waters within the Study Area would occur. Based on the surface and subsurface hydrology of the Study Area and Salinas River (Section 2.1.5), which prevents surface or groundwater exchange with the river, there would also be no direct impacts or indirect impacts to the Salinas River. Therefore, no impacts to jurisdictional aquatic resources are anticipated.

5.4 Impacts to Special-Status Plants

The project is not expected to directly or indirectly impact populations of special-status plant species since none have the potential to occur within the Study area.

5.5 Impacts to Special-Status Wildlife

The sole special-status wildlife species with a moderate potential to occur in or near the Study Area is burrowing owl. Special-status wildlife species with a low potential to occur in or near the Study Area include California tiger salamander, California red-legged frog, western spadefoot, northwestern pond turtle, San Joaquin whipsnake, least Bell's vireo, pallid bat, Townsend's big-eared bat, American badger, and other nesting birds or native bats (see Attachment E). No special-status species or their sign were observed during the April 2020 field survey.

The Study Area lacks breeding/nesting habitat for California tiger salamander, California red-legged frog, western spadefoot, and northwestern pond turtle. These species are mostly associated with the Salinas River which is adjacent to the Study Area and is unlikely to be impacted by project activaties. There is no suitable aquatic habitat on the Study Area. American badgers are also unlikely to be present due to the disturbed nature of the site. Nesting habitat for least Bell's vireo is not present but the Study Area could support other native or migratory birds such as burrowing owl. Townsend's big-eared bat and pallid bat are not expected to roost onsite due to regular human disturbance, as well as a limited roost sites, such as expansive riparian areas and rocky outcrops. Other native bats less sensitive to disturbance could roost in trees onsite with sufficient foliage or crevices, but roosting opportunities are generally limited, especially for maternity colonies. No evidence of roosting (e.g., guano, urine staining, prey remains) was noted in the Study Area during the April 2020 field survey.

Construction of the proposed project, especially involving vegetation removal, could result in direct, temporary impacts to native and migratory birds, should any nest onsite during construction. Direct impacts could include mortality or injury or destruction of nests if there is nesting in or adjacent to the Study Area prior to vegetation removal or ground-disturbing activities. In addition, loud construction activities could cause an adult bird to abandon an active nest that is in close proximity to construction, which could lead to nest failure. Potential impacts to active bird nests would be considered potentially significant without implementation of mitigation measures. With implementation of MM-BIO-1, potential impacts would be less than significant.

Due to the proximity of the Study Area to the Salinas River which provides habitat for multiple special-status species, indirect impacts to these species, if present, could occur. Indirect impacts due to construction activities could include an increase in human disturbance and loud noise associated with the Project. As noted in Section 5.3, due to the topography of the Study Area, any potential groundwater infiltration or overflow of the treatment ponds would travel away from the Salinas River and be contained within agricultural lands. With implementation of MM-BIO-2, potential impacts to special-status species would be less than significant.

MM-BIO-1 A qualified biologist shall conduct a survey for nesting birds approximately two days prior to vegetation removal or ground-disturbing activities during the nesting season (March through August). The survey shall cover the limits of construction and suitable nesting habitat within 500 feet for raptors and 100 feet for other nesting birds, as feasible.

If any active nests are observed during surveys, a qualified biologist shall establish a suitable avoidance buffer from the active nest. The buffer distance will typically range from 50 to 300 feet, depending on the species, and shall be determined based on consideration of such factors as the species of bird, topographic features, intensity and extent of the disturbance, timing relative to the nesting cycle, and anticipated ground disturbance schedule. Limits of construction to avoid active nests shall be established in the field with flagging, fencing, or other appropriate barriers and shall be maintained until the chicks have fledged and the nests are no longer active, as determined by the qualified biologist.

MM-BIO-2 A qualified biologist shall conduct a pre-construction survey for all special-status species with the potential to occur on site two weeks prior to the initiation of construction activities within 100 feet of suitable habitat. Any special-status species found within the construction area will be avoided and allowed to leave of its own volition, or alternatively and with CDFW approval, captured by the qualified biologist and relocated out of harm's way to the nearest suitable habitat.

5.6 Impacts to Wildlife Migration Corridors

As discussed in Section 4.7, Wildlife Corridors and Habitat Linkages, the Study Area is composed of active agriculture and bounded by a combination of agriculture and urban development, causing a high level of habitat disturbance. No substantial direct impacts to local or regional wildlife movements is expected to occur as a result of project implementation.

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ATTACHMENT A

Plant and Wildlife Species Observed in the Study Area

BIRDS

BLACKBIRDS, ORIOLES & ALLIES
- ICTERIDAE—BLACKBIRDS
  - Agelaius phoeniceus—red-winged blackbird
  - Euphagus cyanocephalus—Brewer's blackbird

FINCHES
- FRINGILLIDAE—FRINGILLINE & CARDUELINE FINCHES & ALLIES
  - Haemorhous mexicanus—house finch

FLYCATCHERS
- TYRANNIDAE—TYRANT FLYCATCHERS
  - Sayornis nigricans—black phoebe

HAWKS
- ACCIPITRIDAE—HAWKS, KITES, EAGLES, & ALLIES
  - Buteo jamaicensis—red-tailed hawk

JAYS, MAGPIES & CROWS
- CORVIDAE—CROWS & JAYS
  - Corvus brachyrhynchos—American crow

MOCKINGBIRDS & THRASHERS
- MIMIDAE—MOCKINGBIRDS & THRASHERS
  - Mimus polyglottos—northern mockingbird

NEW WORLD VULTURES
- CATHARTIDAE—NEW WORLD VULTURES
  - Cathartes aura—turkey vulture

PIGEONS & DOVES
- COLUMBIDAE—PIGEONS & DOVES
  - Zenaida macroura—mourning dove

SHOREBIRDS
- CHARADRIIDAE—LAPWINGS & PLOVERS
  - Charadrius vociferus—killdeer
- SCOLOPACIDAE—SANDPIPERS, PHALAROPES, & ALLIES
  - Calidris minutilla—least sandpiper

SWALLOWS
- HIRUNDINIDAE—SWALLOWS
  - Tachycineta bicolor—tree swallow

WATERFOWL
- ANATIDAE—DUCKS, GEESE, & SWANS
  - Anas platyrhynchos—mallard

NEW WORLD SPARROWS
- PASSERELLIDAE—NEW WORLD SPARROWS
  - Melospiza melodia—song sparrow

MAMMALS

SQUIRRELS

SCIURIDAE—SQUIRRELS

Spermophilus (Otospermophilus) beecheyi—California ground squirrel

REPTILES

LIZARDS

PHRYNOSOMATIDAE—IGUANID LIZARDS

Sceloporus occidentalis—western fence lizard

ATTACHMENT B

Representative Study Area Photographs

Photo 1. View looking north of inactive agricultural fields representative of most of the Study Area. Trees along the left are located along existing waste water treatment plant.

Photo 2. View looking north along agricultural road. Existing wastewater treatment on the left (west). Agricultural fields on the left (east).

Photo 3. View looking east towards eastern edge of the Study Area. Vehicles parked in the distance are for active harvesting of row crops on adjacent property.

Photo 4. View looking east towards Gonzales of the proposed alignment through active ag fields.

Photo 5. View looking east along Gonzales River Road for the proposed alternate alignment.

Photo 3. View looking northwest of the Salinas river; taken from existing waste water treatment facility.

ATTACHMENT C

Special-Status Plant Potential to Occur

Scientific Name	Common Name	Status (Federal/State/ CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Abies bracteata	bristlecone fir	None/None/1B.3	Broadleafed upland forest, Chaparral, Lower montane coniferous forest, Riparian woodland; rocky/perennial evergreen tree/N.A./ 605–5,100	**Not expected to occur.** The site is outside of the species' known elevation range and there is no suitable vegetation present.
Amorpha californica var. *napensis*	Napa false indigo	None/None/1B.2	Broadleafed upland forest (openings), Chaparral, Cismontane woodland/perennial deciduous shrub/Apr–July/390–6,560	**Not expected to occur.** No suitable vegetation present.
Arctostaphylos gabilanensis	Gabilan Mountains manzanita	None/None/1B.2	Chaparral, Cismontane woodland; granitic/perennial evergreen shrub/Jan/ 980–2,295	**Not expected to occur.** The site is outside of the species' known elevation range and there is no suitable vegetation present.
Arctostaphylos montereyensis	Toro manzanita	None/None/1B.2	Chaparral (maritime), Cismontane woodland, Coastal scrub; sandy/ perennial evergreen shrub/Feb–Mar/95–2,395	**Not expected to occur.** No suitable vegetation present.
Arctostaphylos pajaroensis	Pajaro manzanita	None/None/1B.1	Chaparral (sandy)/ perennial evergreen shrub/Dec–Mar/95–2,490	**Not expected to occur.** No suitable vegetation present.
Arenaria paludicola	marsh sandwort	FE/SE/1B.1	Marshes and swamps (freshwateror brackish); sandy, openings/perennial stoloniferous herb/May–Aug/5–560	**Not expected to occur.** No suitable vegetation present.
Astragalus tener var. *tener*	alkali milk-vetch	None/None/1B.2	Playas, Valley and foothill grassland (adobe clay), Vernal pools; alkaline/annual herb/Mar–June/0–195	**Not expected to occur.** No suitable vegetation present.
Calyptridium parryi var. *hesseae*	Santa Cruz Mountains pussypaws	None/None/1B.1	Chaparral, Cismontane woodland; sandy or gravelly, openings/annual herb/May–Aug/1,000–5,015	**Not expected to occur.** The site is outside of the species' known elevation range and there is no suitable vegetation present.
Caulanthus lemmonii	Lemmon's jewelflower	None/None/1B.2	Pinyon and juniper woodland, Valley and foothill grassland/ annual herb/Feb–May/260–5,180	**Not expected to occur.** The site is outside of the species' known elevation range.
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	None/None/1B.1	Valley and foothill grassland (alkaline)/ annual herb/May–Oct(Nov)/0–755	**Not expected to occur.** No suitable vegetation present.
Chorizanthe pungens var. *pungens*	Monterey spineflower	FT/None/1B.2	Chaparral (maritime), Cismontane woodland, Coastal dunes, Coastal scrub, Valley and foothill grassland; sandy/annual herb/Apr–June(July–Aug)/5–1,475	**Not expected to occur.** No suitable vegetation present.

Chorizanthe robusta var. *robusta*	robust spineflower	FE/None/1B.1	Chaparral (maritime), Cismontane woodland (openings), Coastal dunes, Coastal scrub; sandy or gravelly/ annual herb/Apr–Sep/ 5–985	**Not expected to occur.** No suitable vegetation present.
Clarkia jolonensis	Jolon clarkia	None/None/1B.2	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland/ annual herb/Apr–June/ 65–2,165	**Not expected to occur.** No suitable vegetation present.
Delphinium umbraculorum	umbrella larkspur	None/None/1B.3	Chaparral, Cismontane woodland/ perennial herb/Apr–June/1,310–5,245	**Not expected to occur.** The site is outside of the species' known elevation range and there is no suitable vegetation present.
Eriogonum nortonii	Pinnacles buckwheat	None/None/1B.3	Chaparral, Valley and foothill grassland; sandy, often on recent burns/annual herb/ (Apr)May–Aug(Sep)/ 980–3,195	**Not expected to occur.** The site is outside of the species' known elevation range.
Fritillaria liliacea	fragrant fritillary	None/None/1B.2	Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland; Often serpentinite/ perennial bulbiferous herb/Feb–Apr/5–1,345	**Not expected to occur.** No suitable vegetation present.
Galium clementis	Santa Lucia bedstraw	None/None/1B.3	Lower montane coniferous forest, Upper montane coniferous forest; granitic or serpentinite, rocky/perennial herb/(Apr)May–July/3,705–5,835	**Not expected to occur.** The site is outside of the species' known elevation range and there is no suitable vegetation present.
Juncus luciensis	Santa Lucia dwarf rush	None/None/1B.2	Chaparral, Great Basin scrub, Lower montane coniferous forest, Meadows and seeps, Vernal pools/annual herb/Apr–July/980–6,690	**Not expected to occur.** The site is outside of the species' known elevation range and there is no suitable vegetation present.
Malacothamnus aboriginum	Indian Valley bush-mallow	None/None/1B.2	Chaparral, Cismontane woodland; Rocky, granitic, often in burned areas/ perennial deciduous shrub/Apr–Oct/490–5,575	**Not expected to occur.** The site is outside of the species' known elevation range and there is no suitable vegetation present.
Malacothamnus davidsonii	Davidson's bush-mallow	None/None/1B.2	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland/ perennial deciduous shrub/June–Jan/605–3,740	**Not expected to occur.** The site is outside of the species' known elevation range.
Malacothamnus palmeri var. *involucratus*	Carmel Valley bush-mallow	None/None/1B.2	Chaparral, Cismontane woodland, Coastal scrub/ perennial deciduous shrub/Apr–Oct/95–3,605	**Not expected to occur.** No suitable vegetation present.
Malacothrix saxatilis var. *arachnoidea*	Carmel Valley malacothrix	None/None/1B.2	Chaparral (rocky), Coastal scrub/ perennial rhizomatous	**Not expected to occur.** No suitable vegetation present.

APPENDIX A (Continued)

			herb/(Mar)June–Dec/80–3,395	
Navarretia nigelliformis ssp. *radians*	shining navarretia	None/None/1B.2	Cismontane woodland, Valley and foothill grassland, Vernal pools; Sometimes clay/annual herb/(Mar)Apr–July/210–3,280	**Not expected to occur.** The site is outside of the species' known elevation range.
Plagiobothrys uncinatus	hooked popcornflower	None/None/1B.2	Chaparral (sandy), Cismontane woodland, Valley and foothill grassland/annual herb/Apr–May/980–2,490	**Not expected to occur.** The site is outside of the species' known elevation range.
Rosa pinetorum	pine rose	None/None/1B.2	Closed-cone coniferous forest, Cismontane woodland/perennial shrub/May,July/5–3,100	**Not expected to occur.** No suitable vegetation present.

ATTACHMENT D

Special-Status Wildlife Potential to Occur

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Amphibians				
Ambystoma californiense	California tiger salamander	FT/ST, WL	Annual grassland, valley–foothill hardwood, and valley–foothill riparian habitats; vernal pools, other ephemeral pools, and (uncommonly) along stream courses and man-made pools if predatory fishes are absent	**Low potential to occur.** Some riparian vegetation is present along the Salinas River but overall vegetation does not support this species. The disturbed nature of the site as well as the poor quality of the upland habitat make it unlikely the species is present within the project area. The nearest occurrence record for this species is approximately 2.2 miles to the northeast of the project site and was documented in 1995.
Rana boylii	foothill yellow-legged frog	None/ST, SSC	Rocky streams and rivers with open banks in forest, chaparral, and woodland	**Not expected to occur.** Salinas River is adjacent to the project site, but does not provide appropriate seasonal flow or microhabitat characteristics for the species. Chaparral, woodland and other habitat defining vegetation is not present. The nearest occurrence record for this species is approximately 9 miles to the southwest of the project site in 1975.
Rana draytonii	California red-legged frog	FT/SSC	Lowland streams, wetlands, riparian woodlands, livestock ponds; dense, shrubby or emergent vegetation associated with deep, still or slow-moving water; uses adjacent uplands	**Low potential to occur.** Riparian vegetation is present adjacent to the project site due to the presence of the Salinas River which provides potential aquatic habitat for the species. However, when flowing this river is fast moving and not suitable for breeding. The nearest occurrence record is approximately 8 miles to the northwest of the project site and was documented in 2006.
Spea hammondii	western spadefoot	None/SSC	Primarily grassland and vernal pools, but also in ephemeral wetlands that persist at least 3 weeks in chaparral, coastal scrub, valley–foothill woodlands, pastures, and other agriculture	**Low potential to occur.** Some wetland vegetation is present just outside of the project area adjacent to the Salinas River. The project site is mainly composed of agriculture fields. Chaparral, coastal scrub and other habitat-defining vegetation is not present. The nearest occurrence record for this species is approximately 2.5 miles to the northeast of the project site and was documented in 2001.
Taricha torosa	California newt	None/SSC	Wet forests, oak forests, chaparral, and rolling grassland	**Not expected to occur.** Habitat is not present on site to support this species.
Reptiles				
Actinemys marmorata	northwestern pond turtle	None/SSC	Slow-moving permanent or intermittent streams, ponds, small lakes, and reservoirs with emergent basking sites; adjacent uplands used for nesting and during winter	**Low potential to occur.** No emergent basking sites within Salinas River are present. Adjacent upland habitat is not suitable for nesting. The nearest occurrence record for this species is approximately 15.7 miles to the northwest of the project site and was documented in 1993.
Anniella pulchra	northern California legless lizard	None/SSC	Coastal dunes, stabilized dunes, beaches, dry washes, valley–foothill, chaparral, and scrubs; pine, oak, and riparian woodlands; associated with sparse vegetation and sandy or loose, loamy soils	**Not expected to occur.** Habitat is not present on site to support this species.
Masticophis flagellum ruddocki	San Joaquin whipsnake	None/SSC	Open, dry, treeless areas including grassland and saltbush scrub	**Low potential to occur.** The agriculture fields within the land provide treeless areas however, no grassland or saltbush scrub is present. The nearest occurrence record for this species is approximately 14.6 miles southeast of the project site and was documented in 1987.

Phrynosoma blainvillii	Blainville's horned lizard	None/SSC	Open areas of sandy soil in valleys, foothills, and semi-arid mountains including coastal scrub, chaparral, valley–foothill hardwood, conifer, riparian, pine–cypress, juniper, and annual grassland habitats	**Not expected to occur.** Habitat is not present on site to support this species.
Birds				
Agelaius tricolor (nesting colony)	tricolored blackbird	BCC/SSC, ST	Nests near freshwater, emergent wetland with cattails or tules, but also in Himalayan blackberrry; forages in grasslands, woodland, and agriculture	**Not expected to nest on site.** The agriculture fields provide suitable foraging habitat but no cattails or tules are present within Salinas River making nesting adjacent to the project site unlikely. Additionally, no vegetation within the project site would provide suitable nesting habitat for this species. The nearest nesting occurrence record for this species is approximately 8.2 miles to the southeast of the project site and was documented in 2014.
Aquila chrysaetos (nesting & wintering)	golden eagle	BCC/FP, WL	Nests and winters in hilly, open/semi-open areas, including shrublands, grasslands, pastures, riparian areas, mountainous canyon land, open desert rimrock terrain; nests in large trees and on cliffs in open areas and forages in open habitats	**Not expected to nest or winter on site.** The agriculture fields provide suitable foraging habitat but nesting and wintering habitat is not present. The nearest occurrence record for this species is approximately 10 miles to the southeast of the project site and was documented in 2006.
Athene cunicularia (burrow sites & some wintering sites)	burrowing owl	BCC/SSC	Nests and forages in grassland, open scrub, and agriculture, particularly with ground squirrel burrows	**Moderate potential to occur.** Agriculture fields provide foraging habitat. Suitable burrows and ground squirrels were both present during the site visit on April 13, 2020. The nearest occurrence is approximately 2.4 miles to the northeast of the project site and was documented in 1998.
Buteo swainsoni (nesting)	Swainson's hawk	BCC/ST	Nests in open woodland and savanna, riparian, and in isolated large trees; forages in nearby grasslands and agricultural areas such as wheat and alfalfa fields and pasture	**Not expected to nest.** The agriculture fields provide suitable foraging habitat but nesting habitat is not present. The nearest occurrence record for this species is approximately 9.3 miles to the northwest of the project site and was documented in 1915.
Coccyzus americanus occidentalis (nesting)	western yellow-billed cuckoo	FT, BCC/SE	Nests in dense, wide riparian woodlands and forest with well-developed understories	**Not expected to nest on site.** Habitat is not present on site to support this species.
Coturnicops noveboracensis	yellow rail	BCC/SSC	Nesting requires wet marsh/sedge meadows or coastal marshes with wet soil and shallow, standing water	**Not expected to nest on site.** Habitat is not present on site to support this species.
Empidonax traillii extimus (nesting)	southwestern willow flycatcher	FE/SE	Nests in dense riparian habitats along streams, reservoirs, or wetlands; uses variety of riparian and shrubland habitats during migration	**Not expected to nest on site.** Habitat is not present on site to support this species.
Gymnogyps californianus	California condor	FE/FP, SE	Nests in rock formations, deep caves, and occasionally in cavities in giant sequoia trees (Sequoiadendron giganteus); forages in relatively open habitats where large animal carcasses can be detected	**Not expected to nest on site.** Habitat is not present on site to support this species.
Icteria virens (nesting)	yellow-breasted chat	None/SSC	Nests and forages in dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush	**Not expected to nest on site.** Habitat is not present on site to support this species.

Riparia riparia (nesting)	bank swallow	None/ST	Nests in riparian, lacustrine, and coastal areas with vertical banks, bluffs, and cliffs with sandy soils; open country and water during migration	**Not expected to nest** on site due to lack of suitable bank habitat but open country that may be occupied during migration is present. The nearest occurrence record for this species is approximately 17.4 miles to the southeast of the project site and was documented in 1972.
Vireo bellii pusillus (nesting)	least Bell's vireo	FE/SE	Nests and forages in low, dense riparian thickets along water or along dry parts of intermittent streams; forages in riparian and adjacent shrubland late in nesting season	**Low potential to nest** on site. Riparian vegetation is present but sparse making nesting unlikely. Foraging habitat is present adjacent to the Salinas River. This species has not been historically documented within the project site.
Fishes				
Oncorhynchus mykiss irideus pop. 9	steelhead - south-central California coast DPS	FT/None	Coastal basins from Redwood Creek south to the Gualala River, inclusive; does not include summer-run steelhead	**Not expected to occur.** The site is outside of the species' known geographic range and there is no suitable vegetation present.
Mammals				
Antrozous pallidus	pallid bat	None/SSC	Grasslands, shrublands, woodlands, forests; most common in open, dry habitats with rocky outcrops for roosting, but also roosts in man-made structures and trees	**Low potential to roost on site.** Agriculture fields provide foraging opportunities as well as the bridge where the Salinas River crosses under the road adjacent to the project site could provide roosting habitat. The nearest occurrence record for this species is approximately 10.7 miles to the south of the project site and was documented in 1936.
Corynorhinus townsendii	Townsend's big-eared bat	None/SSC	Mesic habitats characterized by coniferous and deciduous forests and riparian habitat, but also xeric areas; roosts in limestone caves and lava tubes, man-made structures, and tunnels	**Low potential to roost on site.** Riparian vegetation is present providing foraging opportunities as well as the bridge where the Salinas River crosses under the road adjacent to the project site could provide roosting habitat. The nearest occurrence record for this species is approximately 10 miles south of the project site and was documented in 1937.
Dipodomys venustus elephantinus	big-eared kangaroo rat	None/SSC	Chaparral-covered slopes in the southern part of the Gabilan Range	**Not expected to occur.** Habitat is not present on site to support this species.
Eumops perotis californicus	western mastiff bat	None/SSC	Chaparral, coastal and desert scrub, coniferous and deciduous forest and woodland; roosts in crevices in rocky canyons and cliffs where the canyon or cliff is vertical or nearly vertical, trees, and tunnels	**Not expected to occur.** Habitat is not present on site to support this species.
Lasiurus blossevillii	western red bat	None/SSC	Forest, woodland, riparian, mesquite bosque, and orchards, including fig, apricot, peach, pear, almond, walnut, and orange; roosts in tree canopy	**Not expected to occur.** Habitat is not present on site to support this species.
Neotoma macrotis luciana	Monterey dusky-footed woodrat	None/SSC	Dense forest, oak woodland, and chaparral with a moderately dense understory and abundant dead wood	**Not expected to occur.** Habitat is not present on site to support this species.
Perognathus inornatus psammophilus	Salinas pocket mouse	None/SSC	Habitat not well known; annual grassland, desert scrub, and oak savanna communities on sandy and other friable soils	**Not expected to occur.** Habitat is not present on site to support this species.
Taxidea taxus	American badger	None/SSC	Dry, open, treeless areas; grasslands, coastal scrub, agriculture, and pastures, especially with friable soils	**Low potential to occur**. Agriculture fields on project site are very active making it unlikely for the species to be preset. The nearest occurrence record for this species is approximately 8.3 miles east of the project site and was documented in 2007.

Vulpes macrotis mutica	San Joaquin kit fox	FE/ST	Grasslands and scrublands, including those that have been modified; oak woodland, alkali sink scrubland, vernal pool, and alkali meadow	**Not expected to occur.** Habitat is not present on site to support this species.
Invertebrates				
Bombus crotchii	Crotch bumble bee	None/PSE	Open grassland and scrub communities supporting suitable floral resources.	**Not expected to occur.** Habitat is not present on site to support this species.
Branchinecta lynchi	vernal pool fairy shrimp	FT/None	Vernal pools, seasonally ponded areas within vernal swales, and ephemeral freshwater habitats	**Not expected to occur.** Habitat is not present on site to support this species.
Euphydryas editha bayensis	Bay checkerspot butterfly	FT/None	Serpentine or serpentine-like grasslands	**Not expected to occur.** Habitat is not present on site to support this species.

Appendix E

Cultural Resources Investigation

CULTURAL RESOURCES INVENTORY REPORT FOR THE CITY OF GONZALES SEPARATE INDUSTRIAL WATER RECYCLING FACILITY PROJECT

GONZALES, MONTEREY COUNTY, CALIFORNIA

Privileged and Confidential Information Not for Public View

PREPARED FOR:

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PREPARED BY:

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OCTOBER 2020

Archaeological and other heritage resources can be damaged or destroyed through uncontrolled public disclosure of information regarding their location. This document contains sensitive information regarding the nature and location of archaeological sites that should not be disclosed to the general public or unauthorized persons.

Information regarding the location, character, or ownership of a cultural resource is exempt from the Freedom of Information Act pursuant to 16 U.S.C. 470w-3 (National Historic Preservation Act) and 16 U.S.C. Section 470(h) (Archaeological Resources Protections Act).

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SUMMARY OF FINDINGS

The City of Gonzales proposes to upgrade its wastewater treatment infrastructure and management with the planned construction of a new separate Industrial Wastewater Treatment Plant (IWTP) that would service 2.0 million gallons per day (Project). The City's existing municipal Wastewater Treatment Plant (WWTP) has been challenged the past several years due to the nature of flows discharged to the WWTP by local industrial dischargers. The new plant would treat wastewater from the Gonzales Agricultural Business Industrial Park separately from the City's domestic wastewater system. The Project includes the IWTP, constructed adjacent to the existing WWTP, and a wastewater collection line of 11,100 linear feet mainly along existing public street rights-of-way.

This report presents the results of the archaeological assessment, which includes a records search of the California Historical Resources Information System (CHRIS), outreach to Native American tribes, and an intensive archaeological pedestrian survey of the Project Area/Area of Potential Effect (APE). The intent of the assessment is to evaluate potential impacts to cultural resources along the project alignment. This report satisfies cultural resource compliance for both the California Environmental Quality Act (CEQA) and Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended). The report is NHPA-compliant because the City may pursue State Revolving Fund (SRF) financing, as administered by the State Water Resources Control Board, which includes federal funding.

The results of the archaeological assessment are as follows. There were no previously recorded archaeological resources identified within the Project Area or 0.5-mile study area as a result of the CHRIS records search conducted at the Northwest Information Center (NWIC). The Native American Heritage Commission (NAHC) Sacred Lands File search indicated no sacred sites recorded within the Project area and/or surrounding 0.5-mile study area. Dudek sent outreach letters via email to each tribal contact provided by NAHC and followed up with telephone calls. In addition, Dudek assisted the City of Gonzales with AB52 consultation with the Salinan Tribe. Dudek archaeologists surveyed all accessible portions of the Project Area using an intensive strategy of 10-15 meter transects and recorded one isolated prehistoric artifact (GZ-ISO-1).

If buried or previously undiscovered cultural materials are encountered during construction, work should stop in that area until a qualified archaeologist can evaluate the nature and significance of the find.

1 INTRODUCTION

Dudek was retained by the City of Gonzales to complete a cultural resources study for the planned construction of a new wastewater treatment plant that will be adjacent to but separate from the City's municipal treatment plant. The current and proposed wastewater plants are located approximately two miles southwest of Gonzales, adjacent to the Salinas River.

This study was conducted in accordance with Section 106 of the NHPA and Section 15064.5(a)(2)-(3) of the CEQA Guidelines, and applicable Monterey County regulations.

1.1 Project Location

The Project is situated within the Salinas Valley, just north of the Salinas River. The Salinas River Valley is bound by the Gabilan Range to the northeast and the Sierra de Salinas range to the southwest. The Salinas River drains to the Pacific Ocean, which is 26 miles to the northwest (Figure 1). The Project area falls within Township 16S/Range 4E, Section 36; Township 16S/Range 5E, Sections 29, 30, 31 and 32; and Township 17S/Range 5E, Section 6 of the Gonzales and Palo Escrito Peak 7.5-minute U.S. Geological Survey Quadrangle maps. Elevations within the project area range from 109 to 130 feet above mean sea level.

The Project is located southwest of the City of Gonzales, immediately north of the existing Wastewater Treatment Plant (WWTP) and includes two collection pipeline options along existing streets and dirt roads. One collection line option runs along Fremen Lane from the railroad tracks to the proposed Industrial Wastewater Treatment Plant (IWTP) site. The other collection line option starts near the intersection of Katherine Street and Puente Del Monte Avenue, turns southeast on Puente Del Monte Avenue, turns south onto Gonzales River Road, then turns west onto Short Road terminating at the proposed IWTP site. The Project Area of Potential Effect (APE), per 36 CFR 800.16(d), is depicted in Figure 2.

1.2 Scope of Project

The City of Gonzales proposes a significant upgrade to its wastewater treatment infrastructure and management with the planned construction of a new separate Industrial Wastewater Treatment Plant (IWTP) that services 2 million gallons per day (MGD). The City's existing municipal WWTP has been challenged the past few years due to the nature of flows discharged to the WWTP by local industrial dischargers. The new plant would treat wastewater from the Gonzales Agricultural Business Industrial Park separately from the City's domestic wastewater system.

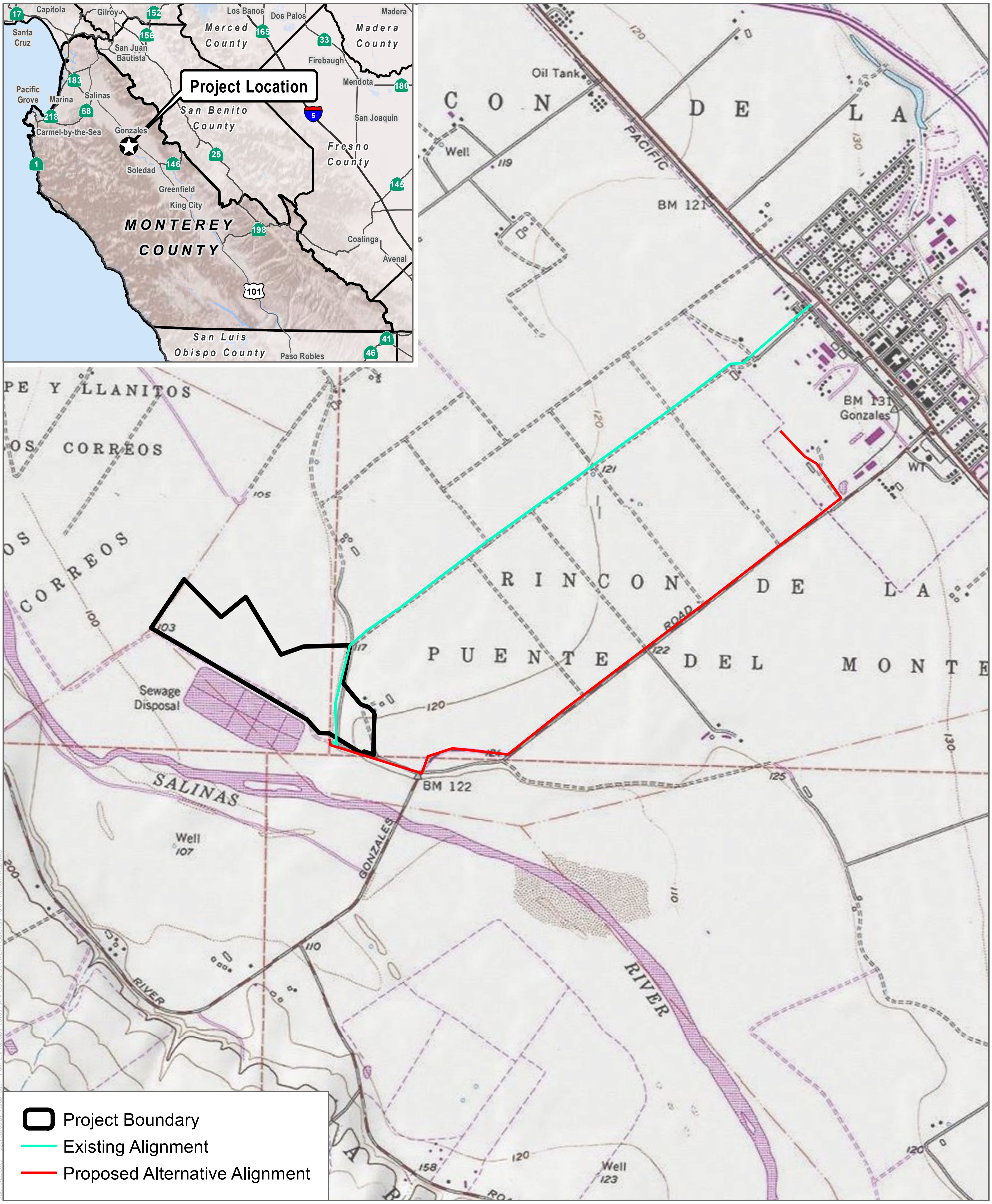
There are two components of the proposed project: the IWTP, and the proposed wastewater collection lines. The footprints of the two components and a 50-foot buffer comprise the Project APE (Figure 2). The APE encompasses a total of 104 acres.

The proposed IWTP, depicted as the Project Boundary in Figure 2, is located north of the existing WWTP. The Project includes a headworks with influent screening to remove trash and debris and an influent flow meter; an influent lift station to pump water to the equalization basin; a 2-stage flow equalization basin to buffer flow to the ponds system; a deep-operated aerated pond systems to introduce oxygen into wastewater, and effluent percolation beds to dispose of treated effluent. A solids management area would be set aside for accumulated biosolids, sludge, and debris from the influent screening. The Project is designed to be installed in a phased approach with Phase I having wastewater treatment capacity of 2.0 MGD. As the wastewater flows and number of industrial discharges increase, phase II of the IWTP will be constructed with a treatment capacity to 4.0 MGD.

The proposed wastewater collection lines include approximately 11,100 linear feet (LF) of new gravity sewer pipe located mainly on public street right-of-way. This is depicted as the Proposed Alternative Alignment in Figure 2.

1.3 Project Personnel

All Dudek Project personnel meet the Secretary of Interior’s Standards for their roles on the Project. Ryan Brady, M.A., RPA, was the Archaeological Principal Investigator for the Project. Sarah Brewer, BA, led the survey effort, analyzed the records search, conducted outreach with Native American groups, and completed the reporting. Julie Royer, MA, assisted with the fieldwork and reporting, and Dustin Ponko also assisted with the fieldwork. Rachel Strobridge and Brayden Dokkestul provided GIS and graphics support for the Project.



SOURCE: USGS 7.5-Minute Series Gonzales and Palo Escrito Creek Quadrangles

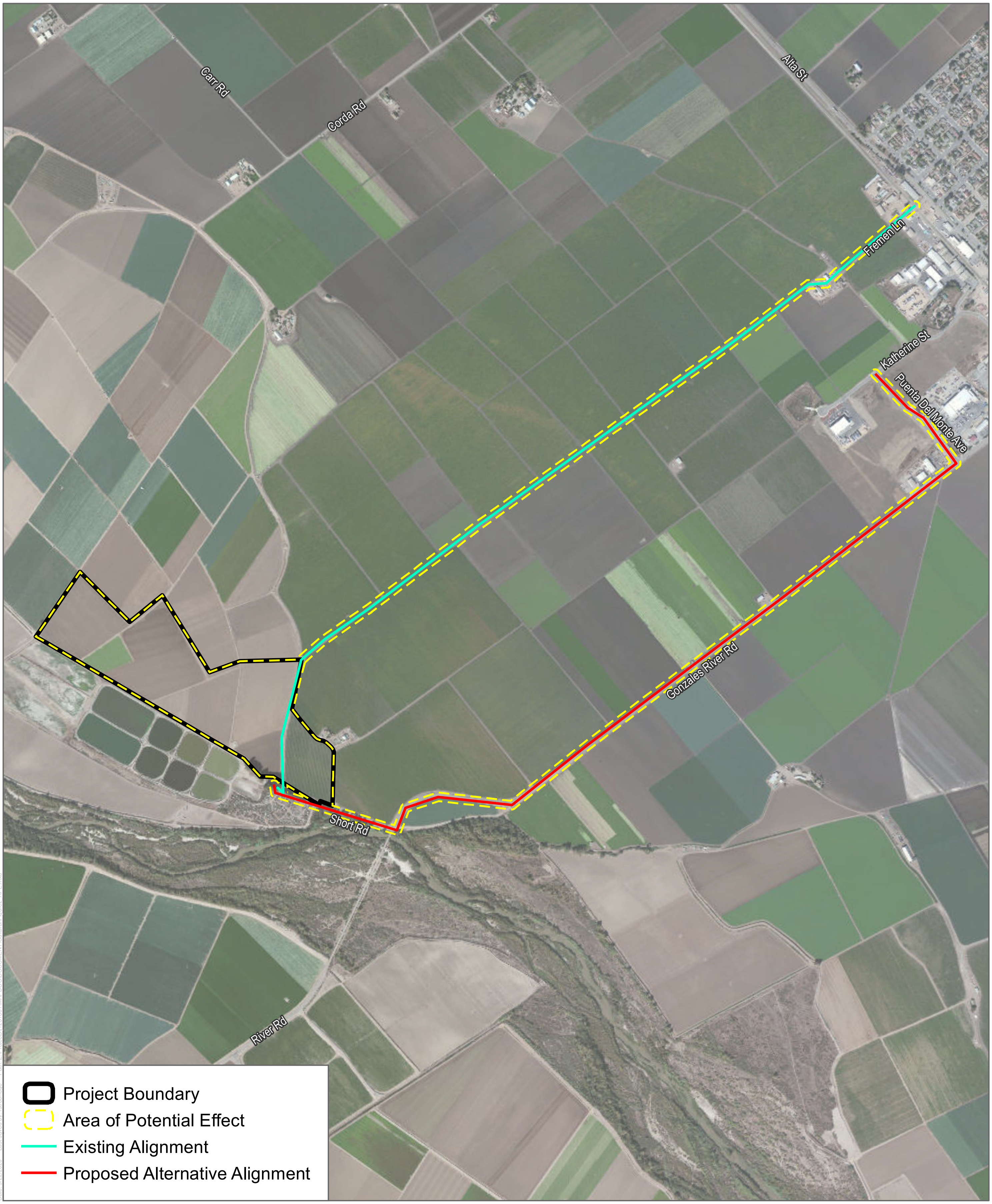
FIGURE 1

Project Location

City of Gonzales Separate Industrial Water Recycling Facility - Technical Memo

DUDEK

0 1,000 2,000
Feet



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SOURCE: Esri Clarity Basemap 2019

0 750 1,500 Feet

FIGURE 2

Area of Potential Effect

City of Gonzales Separate Industrial Water Recycling Facility - Technical Memo

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2 REGULATORY CONTEXT

2.1 Federal

2.1.1 Section 106 of the National Historic Preservation Act

The NHPA established the National Register of Historic Places (NRHP) and the President's Advisory Council on Historic Preservation (ACHP), and provided that states may establish State Historic Preservation Officers (SHPOs) to carry out some of the functions of the NHPA. Most significantly for federal agencies responsible for managing cultural resources, Section 106 of the Act directs that "[t]he head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP." Section 106 also affords the ACHP a reasonable opportunity to comment on the undertaking (16 U.S.C. 470f).

Title 36 of the Code of Federal Regulations, Part 800 (36 CFR 800), implements Section 106 of the NHPA (ACHP 2004). It defines the steps necessary to identify historic properties (those cultural resources listed in or eligible for listing in the NRHP), including consultation with federally recognized Native American tribes to identify resources of concern to them; to determine whether or not they may be adversely affected by a proposed undertaking; and the process for eliminating, reducing, or mitigating the adverse effects.

The content of 36 CFR 60.4 also defines criteria for determining eligibility for listing in the NRHP (NPS 2012). The BLM evaluates the significance of cultural resources identified during inventory phases in consultation with the California SHPO to determine if the resources are eligible for inclusion in the NRHP. Cultural resources may be considered eligible for listing if they possess integrity of location, design, setting, materials, workmanship, feeling, and association. A resource may be considered historically significant and eligible for NRHP listing if it is found to meet one of the following criteria:

A. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

B. It is associated with the lives of persons important to local, California, or national history.

C. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values.

D. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Integrity is defined in NRHP guidance, *How to Apply the National Register Criteria for Evaluation*, as "the ability of a property to convey its significance. To be listed in the NRHP, a property must not only be shown to be significant under the NRHP criteria, but it also must have integrity" (NPS 1990). NRHP guidance further states that properties must have been completed at least 50 years ago to be considered for eligibility. Properties completed fewer than 50 years before evaluation must be proven to be "exceptionally important" (criteria consideration G) to be considered for listing.

A historic property is defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria" (36 Code of Federal Regulations (CFR) Section 800.16(i)(1)).

Effects on historic properties under Section 106 of the National Historic Preservation Act are defined in the assessment of adverse effects in 36 CFR Sections 800.5(a)(1) as follows:

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

Adverse effects on historic properties are defined as follows (36 CFR 800.5 (2)):

i. Physical destruction of or damage to all or part of the property;

ii. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines;

iii. Removal of the property from its historic location;

iv. Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;

v. Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

vi. Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

vii. Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's
historic significance.

To comply with Section 106 of the National Historic Preservation Act, the criteria of adverse effects are applied to historic properties, if any exist in the project area of potential effects, pursuant to 36 CFR Sections 800.5(a)(1). If no historic properties are identified in the area of potential effects, a finding of "no historic properties affected" would be made for the proposed project. If there are historic properties in the area of potential effects, application of the criteria of adverse effect (as described above) would result in project-related findings of either "no adverse effect" or of "adverse effect." A finding of no adverse effect may be appropriate when the undertaking's effects do not meet the thresholds in criteria of adverse effect (36 CFR Sections 800.5(a)(1)), in certain cases when the undertaking is modified to avoid or lessen effects, or if conditions are imposed to ensure review of rehabilitation plans for conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (codified in 36 CFR Part 68).

If adverse effects were expected to result from a project, mitigation would be required, as feasible, and resolution of those adverse effects by consultation may occur to avoid, minimize, or mitigate adverse effects on historic properties pursuant to 36 CFR Part 800.6(a).

2.2 State of California

2.2.1 The California Register of Historical Resources

In California, the term "historical resource" includes "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (Public Resources Code (PRC) Section 5020.1(j)). In 1992, the California legislature established the California Register of Historical Resources (CRHR) "to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1(a)). The criteria for listing resources on the CRHR, enumerated in the following text, were developed to be in accordance with previously established criteria developed for listing in the NRHP. According to PRC Section 5024.1(c)(1–4), a resource is considered historically significant if it (i) retains "substantial integrity," and (ii) meets at least one of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage

(2) Is associated with the lives of persons important in our past

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values

(4) Has yielded, or may be likely to yield, information important in prehistory or history

To understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than 50 years old may be considered for listing in the CRHR if it can be demonstrated that sufficient time has passed to understand its historical importance (see 14 CCR 4852(d)(2)).

The CRHR protects cultural resources by requiring evaluations of the significance of prehistoric and historic resources. The criteria for the CRHR are nearly identical to those for the NRHP, and properties listed or formally designated as eligible for listing in the NRHP are automatically listed in the CRHR, as are state landmarks and points of interest. The CRHR also includes properties designated under local ordinances or identified through local historical resource surveys.

2.2.2 California Environmental Quality Act

Under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an historical resource" (PRC Section 21084.1; CEQA Guidelines Section 15064.5(b)). If a site is either (i) listed or eligible for listing in the CRHR, (ii) included in a local register of historic resources, or (iii) identified as significant in a historical resources survey (meeting the requirements of Public Resources Code Section 5024.1(q)), then it qualifies as a "historical resource" for purposes of CEQA (PRC Section 21084.1; CEQA Guidelines Section 15064.5(a)(1)-(3)). The CEQA lead agency also is not precluded from determining, based on substantial evidence, that a resource that does not meet one of these three specific criteria nevertheless qualifies as a historic resource for CEQA purposes (PRC Section 21084.1; CEQA Guidelines Section 15064.5(a)).

A "substantial adverse change in the significance of an historical resource" is defined to mean "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines Section 15064.5(b)(1); PRC Section 5020.1(q)). In turn, the significance of an historical resource is materially impaired when a project "demolishes or materially alters in an adverse manner those physical characteristics" that account for the resource being identified as an historic resource under CEQA (CEQA Guidelines Section 15064.5(b)(2)).

With respect to archaeological sites, the first issue is whether the site qualifies as a historic resource under the provisions discussed above. If the archaeological site does not qualify as an historic resource, and if the site also does not meet the definition of a "unique archaeological resource" or a "tribal cultural resource," then any impacts to the resource are not considered significant and further evaluation is not required (PRC Section 21083.2(h); CEQA Guidelines Section 15064.5(c)). A "unique archaeological resource" is defined to mean an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria: (1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information; (2) Has a special and particular quality such as being the oldest of its type or the best available example of its type; (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC Sections 21083.2(g)).

"Tribal cultural resources" are defined as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe" that are either (a) included, or determined to be eligible for inclusion, in the CRHR; (b) included in a local register of historic resources; or (c) otherwise determined to be significant, based on substantial evidence, according to specified statutory criteria (PRC Sections 5024.1(c) & 21074).

2.2.3 Native American Historic Cultural Sites

State law (PRC Section 5097 et seq.) addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and established the Native American Heritage Commission (NAHC) to resolve disputes regarding the disposition of such remains. In addition, the Native American Historic Resource Protection Act makes it a misdemeanor punishable by up to 1 year in jail to deface or destroy an Indian historic or cultural site that is listed or may be eligible for listing in the CRHR.

2.2.4 California Health and Safety Code section 7050.5

In the event that Native American human remains or related cultural material are encountered, Section 15064.5(e) of the CEQA Guidelines (as incorporated from PRC Section 5097.98) and California Health and Safety Code Section 7050.5 define the subsequent protocol. If human remains are encountered, excavation or other disturbances shall be suspended of the site or any nearby area reasonably suspected to overlie adjacent human remains or related material. Protocol requires that a county-approved coroner be contacted in order to determine if the remains are of Native American origin. Should the coroner determine the remains to be Native American, the coroner must contact the NAHC within 24 hours. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating, with appropriate dignity, the human remains and any associated grave goods as provided in PRC Section 5097.98 (14 CCR 15064.5(e)).

2.3 Local Regulations

This report also satisfies Section 21.66.050 Standards for Archaeological and Tribal Cultural Resource Protection from the Monterey County Zoning Ordinance, Title 21.

3 BACKGROUND

3.1 Environment

Gonzales is located in the central Salinas River Valley. The Salinas River runs in a northwestern direction, draining into the Pacific Ocean. Within the Salinas River Valley, the towns of Chular and Salinas lie to the northwest of Gonzales, and the towns of Soledad, Greenfield and King City lie to the southeast. The Salinas River Valley bisects the larger Coastal Range, with the Gabilan Range at the east and the Sierra de Salinas to the west. The Geology of the area is Pliocene to Holocene era Quaternary alluvium and marine deposits and is made up of alluvium from the Salinas River floodplain (USGS 2020). Soils are characterized as Salinas-Mocho-Metz-Cropley and are not likely to harbor buried "A" horizons that may contain buried archaeological deposits (USDA NRCS 2020). The vegetation community is known as California prairie, composed mainly of grasses (*Stipa spp.)* (Küchler 1977), although agricultural crops now dominate the area. The climate is Mediterranean with mild summers and cooler wet winters. Mean annual temperature ranges between 35°F and 86°F, with 11.25 inches of annual rainfall (Western Regional Climate Center 2020).

3.2 Cultural Context

3.2.1 Prehistory

The prehistory of indigenous groups living within Monterey County follows general patterns identified within the archaeological record of the greater Central Coast area of California. These patterns represent adaptive shifts in settlement, subsistence strategies and technological innovation demonstrated by prehistoric people throughout the Holocene and earlier. The California Central Coast Chronology (Jones et al. 2007) presents an overview of prehistoric life ranging upwards of 10,000 years. Six temporal periods describe changes in prehistoric settlement patterns, subsistence practices, and technological advances (Table 1).

Table 1. California Central Coast Chronology

Temporal Period	Date (BP)	Artifact Assemblage
Paleo-Indian	10,000 or older	Flaked stone: isolated fluted points, sparse lithic scatters
Millingstone/ Early Archaic	5,500 – 10,000	Groundstone: millingstones, handstones Flaked stone: core-cobble tools, lanceolate or large side-notched projectile points, eccentric crescents, Olivella beads: L-series
Early	2,600 – 5500	Groundstone: mortar/pestle technology introduced, millingstone/ handstones Flaked stone: formalized tools (Rossi Square-stem, Año Nuevo long-stem) Olivella beads: A, B2b, B2c, B4, L-series
Middle	950 – 2,600	Groundstone: mortars/pestles, millingstone/handstones Flaked stone: contracting-stemmed projectile points Olivella beads: greater variety Haliotis ornaments: circular shell fishhooks; bone tools, grooved stone net sinkers
Middle-Late Transition	700 – 950	Groundstone: mortars/pestles, millingstone/handstones, hopper mortars Flaked stone: bow/arrow technology introduced, notched net sinkers Olivella bead types: B2, B3, G1, G2, G6, and K1 Haliotis ornaments: circular shell fishhooks
Late	181 – 700	Groundstone: mostly mortars/pestles (but still some millingstone/handstones) Flaked stone: Cottonwood (or Canaliño), Desert side-notched, flaked stone drills Olivella bead types: E1, E2, B2, B3, G1, G6, K1 types, Haliotis disc beads, steatite and clamshell disc beads,

Source: Jones et al. (2007)

3.2.1.1 Paleo-Indian (10,000 BP or older)

The Paleo-Indian era represents people's initial occupation of the region. The people were highly mobile hunters who focused subsistence efforts on large mammals. Multiple migrations into the region may have occurred both terrestrially and by sea (Erlandson et al. 2007). Although no coastal Paleo-Indian sites in the Central California Coast region have been discovered, they may have been inundated as a result of rising ocean levels throughout the Holocene (Jones and Jones 1992).

Evidence of this era is generally found through isolated artifacts or sparse lithic scatters (Bertrando 2004). In the San Luis Obispo area, fluted points characterizing this era are documented near the town of Nipomo (Mills et al. 2005) and Santa Margarita (Gibson 1996), but so far, no fluted points have been found in the Central Coast north of the Santa Barbara area. Possible evidence for Paleo-Indian occupation is reported in buried contexts in CA-SCL-178 in the Santa Clara Valley and at CA-SCR-177 in Scotts Valley (Cartier 1993). The early radiocarbon dates from charcoal, however, pose questions of validity (Jones et al. 2007).

3.2.1.2 Millingstone (5,500 – 10,000 BP)

Settlement in the Central Coast appears with more frequency in the Millingstone Period. Sites of this era have been discovered in Big Sur (Jones 1993; Jones 2003; Fitzgerald and Jones 1999), Moss Landing (Dietz et al. 1988; Jones and Jones 1992; Milliken et al. 1999), Watsonville (Culleton et al. 2005) and in the Coyote Creek area of Santa Clara (Hildebrandt and Mikkelsen 1993). Similar to the Paleo-Indian era, people living during the Millingstone era were likely highly mobile. Assemblages are characterized by abundant millingstones and handstones, cores and core-cobble tools, thick rectangular (L-series) *Olivella* beads, and a low incidence of projectile points, which are generally lanceolate or large side-notched varieties (Jones et al. 2007). Eccentric crescents are also found in Millingstone components. Sites are often associated with shellfish remains and small mammal bone, which suggest a collecting-focused economy. Stable isotope studies on human bone, from a coastal Millingstone component at CA-SCR-60/130, indicate a diet composed of 70%–84% marine resources (Newsome et al. 2004). Contrary to these findings, deer remains are abundant at other Millingstone sites (cf. Jones et al. 2008), which suggests a flexible subsistence focus.

3.2.1.3 Early (2,600 – 5500 BP)

The Early Period corresponds with the earliest era the "Hunting Culture" which continues through the Middle-Late Transition (Rogers 1929). The Early Period is marked by a greater emphasis on formalized flaked stone tools, such as projectile points and bifaces, and the initial use of mortar and pestle technology. Early Period sites are located in more varied environmental contexts than millingstone sites, suggesting more intensive use of the landscape than practiced previously (Jones and Waugh 1997).

Early Period artifact assemblages are characterized by Large Side-notched points, Rossi Square-stemmed points, Spire-lopped (A), End-ground (B2b and B2c), Cap (B4), and Rectangular (L-series) *Olivella* beads. Other artifacts include less temporally diagnostic Contracting-stemmed and Año Nuevo long-stemmed points, and bone gorges. Ground stone artifacts are less common relative to flaked stone tools when compared with Millingstone-era sites.

Early Period sites are common and often found in estuary settings along the coast or along river terraces inland. Coastal sites dating to this period include CA-MNT-108 (Breschini and Haversat 1992a), CA-SCR-7 (Jones and Hildebrandt 1990), and CA-SCR-38/123 (Bryne 2002, Jones and

Hildebrandt 1994). Inland sites include CA-SCL-33, CA-SCL-178 and CA-SCL-163 (Hildebrandt and Mikkelsen 1993).

Archaeologists have long debated whether the shift in site locations and artifact assemblages during this time represent either population intrusion as a result of mid-Holocene warming trends, or an in-situ adaptive shift (cf. Mikkelsen et al. 2000). The initial use of mortars and pestles during this time appears to reflect a more labor-intensive economy associated with the adoption of acorn processing (cf. Basgall 1987)

3.2.1.4 Middle (950 – 2,600 BP)

The trend toward greater labor investment is apparent in the Middle Period. During this time, there is increased use of plant resources, more long-term occupation at habitation sites, and a greater variety of smaller "use-specific" localities. Artifacts common to this era include contracting-stemmed projectile points, a greater variety of *Olivella* shell beads and *Haliotis* ornaments that include discs and rings (Jones 2003). Bone tools and ornaments are also common, especially in the richer coastal contexts (Jones and Ferneau 2002a; Jones and Waugh 1995), and circular shell fishhooks are present for the first time. Grooved stone net sinkers are also found in coastal sites. Mortars and pestles become more common than millingstones and handstones at some sites (Jones et al. 2007). Important Middle Period sites include CA-MNT-282 at Willow Creek (Jones 2003; Pohorecky 1976), CA-SCR-9 in the Santa Cruz Mountains (Hylkema 1991), CA-SMA 218 at Año Nuevo (Hylkema 1991), CA-SCL-613 at San Francisquito Creek, and a continued presence at CA-SCL-178, and CA-SCL-163 (Rosenthal and Meyer 2004).

The Middle Period is a continuation of the "Hunting Culture" because of the greater emphasis on labor-intensive technologies that include projectile and plant processing (Jones et al. 2007; Rogers 1929). Additionally, faunal evidence highlights a shift toward prey species that are more labor intensive to capture, either by search and processing time or technological needs. These labor-intensive species include small schooling fishes, sea otters, rabbits, and plants such as acorn. Early and Middle Period sites are difficult to distinguish without shell beads due to the similarity of artifact assemblages (Jones and Haney 2005).

3.2.1.5 Middle-Late Transition (700 – 950 BP)

The Middle-Late Transition corresponds with the end of the "Hunting Culture" (Rogers 1929). It also corresponds with social reorganization across the region due to a period of rapid climatic change known as the Medieval Climatic Anomaly (cf. Stine 1994). The Medieval Climatic Anomaly is characterized by drastic fluctuations between cool-wet and warm-dry climatic conditions (Jones et al. 1999). Archaeological sites are rarer during this period, which may reflect a decline in regional population (Jones and Ferneau 2002b). Artifacts associated with the Middle-Late Transition include contracting-stemmed, double side-notched, and small leaf-shaped projectile points. The latter are thought to represent the introduction of bow and arrow technology to the region. A variety of *Olivella* shell bead types are found in these deposits and include B2, B3, G1, G2, G6, and K1 varieties, notched line sinkers, hopper mortars, and circular shell fishhooks (Jones 1995; Jones et al. 2007). Sites that correspond with this time are CA-MNT-1233 and CA-MNT-281 at Willow Creek (Pohorecky 1976), CA-MNT-1754, and CA-MNT-745 in Priest Valley (Hildebrandt 2006) and CA-SCL-690 in San Jose (Hylkema 2007).

3.2.1.6 Late (181 – 700 BP)

Late Period sites are found in a variety of environmental conditions and include newly occupied task sites and encampments, as well as previously occupied localities. Artifacts associated with this era include Cottonwood (or Canaliño) and Desert Side-notched arrow points, flaked stone drills, steatite and clamshell disc beads, *Haliotis* disc beads, *Olivella* bead types E1 and E2, and earlier used B2, B3, G1, G6, and K1 types. Millingstones, handstones, mortars, pestles, and circular shell fishhooks also continue to be used (Jones et al. 2007). Sites dating to this era are found in coastal and interior contexts. Coastal sites dating to the Late Period tend to be resource acquisition or processing sites, while evidence for residential occupation is more common inland (Jones et al. 2007). Late Period sites include CA-MNT-143 at Asilomar State Beach (Brady et al. 2009), CA-MNT-1765 at Moro Cojo Slough (Fitzgerald et al. 1995), CA-MNT-1485/H and -1486/H at Rancho San Carlos (Breschini and Haversat 1992b), and CA-SCR-177 at Davenport Landing (Fitzgerald and Ruby 1997). Late sites in Santa Clara County include CA-SCL-119/SBN-24/H, CA-SCL-272, CA-SCL-341 and CA-SCL-828 (Rosenthal and Meyer 2004).

3.2.1.7 Ethnohistoric

The Project Area lies within the territory occupied by people called “Costanoan” by the Europeans at the time of contact. Many modern descendants prefer to be called by their specific tribal band, but “Ohlone” is often preferred over “Costanoan”, and will be used hereafter. The Ohlone spoke eight separate Penutian dialects and lived between the vicinities of what is now Richmond in the north to Big Sur in the south. They were organized under approximately fifty autonomous polities or tribelets (Levy 1978). At the time of European contact, the Chalon tribelet occupied the area around the current-day City of Gonzales. Ethnographic accounts of Ohlone at the time of contact described them as living in permanent villages, but also spending time in smaller camps to collect or process seasonal resources such as acorn or shellfish (Levy 1978).

3.2.2 History

3.2.2.1 Spanish Period (1770–1822)

One of the earliest known European exploration of the Monterey Bay was a Spanish envoy mission led by Sebastián Vizcaíno in 1602. The purpose of the voyage was to survey the California coastline to locate feasible ports for shipping, and Vizcaíno had explicit instructions prohibiting the creation of settlements and interacting with local Native Americans. Finding the bay to be commodious, fertile, and extremely favorable for anchorage between Manila and Acapulco, Vizcaíno named the Bay "Monterey" after the Conde de Monterey, the present Viceroy in Mexico (Chapman 1920; Kyle 2002).

Despite being mapped as an advantageous berth for Spanish shipping efforts, the epicenter of Spanish settlement in Alta California did not make its way to the Monterey Bay until the second half of the eighteenth century. In an effort to prevent the establishment of English and Russian colonies in northern Alta California, Don Gaspar de Portolá, the Governor of Baja, embarked on a voyage in 1769 to establish military and religious control over the area. This overland expedition by Portolá marks the beginning of California's Historic period, occurring just after King Carlos III of Spain installed the Franciscan Order to direct religious colonization in assigned territories of the Americas. (Kyle 2002; Lehmann 2000; Koch 1973).

On their quest to locate the Monterey Bay from the 160-year-old accounts of Sebastián Vizcaíno, the overland Portolá expedition first reached the present-day territory of the City of Monterey on May 24, 1770. Father Junípero Serra sailed on the San Antonio from San Diego and met the Portolá expedition one week later. Following a mass by Father Serra, Portolá officially claimed the territory as part of Alta California on June 3, 1770.

It was not long before the Spanish settlers of the Franciscan order began to establish Missions across California with the intention of taking in Native Americans and converting them to Catholicism. Mission Nuestra Señora de la Soledad, or "Our Lady of Solitude" was established in nearby Soledad on October 9, 1791 by Fermín Francisco de Lasuén. It was the 13th of a total of 21 missions constructed in California between 1769 and 1823. The Chalon Ohlone, along with Esselen and Yokut people were brought to the mission in Soledad as neophytes and were forced to adapt to a European lifestyle and ideology. Domestic farm animals such as cattle, sheep, goats, horses, chickens and pigs were raised at the Soledad mission, and the hides and tallow became a primary trade product. The Mission also developed 20,000 acres of farmland, which included crops such as corn, wheat, barley, beans, flax, hemp, cotton tobacco and various orchard fruits to sustain itself. Native American neophytes, forced into labor by the missionaries, built a 15-mile aqueduct in order to water the crops of the mission. Many indigenous people were killed resisting capture or perished from European diseases which they lacked the immunity to fight off (Clark 2000).

3.2.2.2 Mexican Period (1822–1846)

After more than a decade of intermittent rebellion and warfare, New Spain (Mexico and the California territory) won independence from Spain in 1821. In 1822, the Mexican legislative body in California ended isolationist policies designed to protect the Spanish monopoly on trade, and decreed California ports open to foreign merchants. Cattle that had arrived with early settlers to the Monterey area had multiplied plentifully, and when Monterey was designated as a port of entry, leather and tallow became Monterey County's first major commodity (Cleland 2005; Dallas 1955; Conway et al. 2003).

The news of Mexican independence reached Monterey County in the spring of 1822, nearly one and a half years following the end of war. The war of independence had stimulated new Mexican leadership that promoted ideals of freedom, enlightened thought, and economic expansion in California, extending far beyond the antediluvian Spanish perception of the area as a stagnant dominion lacking viability. (Conway et al. 2003).

Due to the strategic central location of Monterey, it was at the center of Mexican political and economic power in California. In addition to opening the port of Monterey and reforming the strict policies governing foreign trade, Mexico abolished the Spanish law prohibiting the private ownership of land. Under Spanish rule, less than 20 Spanish land grants had been offered to private citizens in all of the California territory. Extensive land grants were offered to citizens of California during the Mexican Period in order to incentivize settlers to develop uninhabited surrounding lands and to increase the population inland from the more settled coastal areas where the Spanish had first concentrated its colonization efforts (Koch 1973; Conway et al. 2003). The Soberanes family applied for the land grant formerly belonging to the Soledad Mission, and their offer was accepted by the Mexican governor. The Sobranes family built four adobes, each serving as the headquarters for one of their farming or ranching operations (Clark 2000).

Although the period of Mexican control was brief overall, Mexican policies produced a lasting reputation of California as a desirable location filled with economic opportunity. Eventually, the reputation would become too advantageous for their American neighbors to the east to ignore.

The Mexican-American War began following the U.S. annexation of Texas in 1845, and the ensuing disagreement between the United States and Mexico regarding the boundary of the annexed territory. The United States officially declared war on Mexico in May of 1846, after Mexican troops crossed the Rio Grande into Texas and attacked U.S. troops stationed there (Encyclopedia Britannica 2018).

3.2.2.3 American Period (post 1846)

The Mexican–American War ended with the Treaty of Guadalupe Hidalgo in 1848. The Compromise of 1850 led California to officially became a state, and Monterey was designated as one of the 27 original counties. (Horne 2007; Cleland 2005; Waugh 2003; Koch 1973).

Growth in Monterey County following statehood was nominal in comparison to other areas in California that saw massive influxes of people seeking gold and towns seemingly materialize overnight during the Gold Rush. As economic centers moved towards the central areas of the state following the location of gold-bearing veins, the culture of a Hispanic, trade-dependent coastal economy of Monterey seemed antiquated in comparison to the new, American-style developments emerging throughout the state. However, the deficiency of American influence in Monterey during the Gold Rush would ultimately help to maintain Monterey's Hispanic cultural heritage (Conway et al. 2003).

By 1875 and through the end of the nineteenth century, many of the Mexican land grants were subdivided and re-sold to some of the influx of settlers from the east that had come in hopes of striking it rich in the Gold Rush. In the Salinas Valley, many farmsteads developed, and farming became a central industry to the region, an industry that still holds strong. Most of the early farmers in the Salinas Valley grew wheat and barley. The Southern Pacific Railroad Company was extended to the Salinas Valley in 1873. The addition of the railroad not only enabled large-scale farms to produce larger yields to distribute to more distant markets, but small towns emerged at the railroad stops (Clark 2000).

In 1836, brothers Dr. Mariano and Alfredo Gonzalez inherited the 15,200-acre land grant, Rancho Rincon de la Puente del Monte, from their father, who served as an alcalde (mayor). The Gonzalez brothers donated an easement of their land to the railroad and developed a small town there in 1874. The area supported grain and cattle farms, and in the 1890s, numerous dairies developed with the arrival of many Swiss immigrants. The town of Gonzales, which differs in spelling from the founders by using an "s" at the end instead of a "z," now supports mostly vegetable farming (Clark 1991).

4 SOURCES CONSULTED

4.1 Records Search

On May 6, 2020, Dudek received the results from the CHRIS records search (19-1796) conducted by the Northwest Information Center (NWIC). The records search covered the Project Area and a 0.5-mile buffer for the study area. An additional records search that included the Fremen Lane collection line (20-0418) was conducted by NWIC on September 4, 2020. (The complete results of the CHRIS records searches are provided in Confidential Appendix B.) The searches included any previously recorded cultural resources including archaeological and historic built environment resources within the project area, and archaeological resources within the 0.5-mile study buffer. They also searched for any previously conducted cultural resources investigations within the Project Area and 0.5-mile study buffer. In addition to official maps and records, the following sources of information were consulted as part of the records searches:

- OHP Historic Properties Directory
- OHP Archaeological Determinations of Eligibility
- California Inventory of Historical Resources (1976)
- Historical Maps
- Local Inventories
- GLO and/or rancho Plat Maps

4.1.1 Previous Cultural Resources Studies within the Project Area

Three previously conducted cultural resource studies intersect the Project Area/APE, and ten previous studies have been conducted within the 0.5-mile study area buffer. Two of the three studies within the Project Area are associated with the Gonzales River Road Bridge, and the third study was a broad survey recording historical resources related to agriculture in the Salinas Valley. These studies are annotated below. Studies within the 0.5-mile study buffer include surveys and monitoring reports for parks, communications towers, private parcels, and HUD rehabilitation projects (Table 2; Appendix B).

Table 2. Previous Technical Studies within the Study Area

Report No.	Authors	Year	Title	Publisher
Within Project Area				
S-021501	Mary Doane	1999	Prehistoric Property Survey Report and Historic Property Clearance Report for the Proposed Seismic Retrofit Project for the Gonzales River Road Bridge at the Salinas River West of Gonzales, Monterey County, California	Archaeological Consulting
S-030213		2000	Agriculturally Related Historic Resources Located in the Unincorporated Areas Between Salinas and Soledad, Monterey County, California	Clark Historic Resource Consultants
S-030213a		2001	Agriculturally Related Historic Resources Located in the Unincorporated Areas Between Salinas and Soledad, Monterey County, California: Phase II	Clark Historic Resource Consultants, Inc.
S-050445	Neal Kaptain	2016	Historic Property Survey Report, Gonzales Road Bridge Replacement Project, Bridge #44C-035, 5-MNT, Federal Project #BRLO-5944(098), Monterey County, California	LSA Associates
S-050445a	Neal Kaptain	2016	Archaeological Survey Report, Gonzales Road Bridge Replacement Project, Monterey County, California, Caltrans District 4, Bridge #44C-035, 5-MNT-0-CR, Federal ID #BHLO-5944(098)	LSA Associates
Within 0.5-mile Study Buffer				
S-003366	Lynne H. Mounday	1976	An Archaeological Survey of the Centennial Park Site in Gonzales (letter report)	
S-013995	Anna Runnings and Gary S. Breschini	1992	Preliminary Cultural Resources Reconnaissance of Assessor's Parcel Number 020-111-31, Gonzales, Monterey County, California	Archaeological Consulting
S-020567	Barry A. Price	1998	Cultural Resources Assessment, Pacific Bell Mobile Services Facility SF-705-02, Gonzales, Monterey County, California (letter report)	Applied EarthWorks, Inc.
S-022819	Wendy J. Nelson, Maureen Carpenter, and Julia G. Costello	2000	Cultural Resources Survey for the Level (3) Communications Long Haul Fiber Optics Project, Segment WS05: San Jose to San Luis Obispo	Far Western Anthropological Research Group, Inc.; Foothill Resources, Ltd.
S-024242	Robert Cartier	2001	Negative Archaeological Survey Report for the Proposed Safe Route to Schools Project in Gonzales, Monterey County, California	Archaeological Resource Management
S-024242a	Robert Cartier	2001	Memorandum of Understanding for the Proposed Safe Route to Schools Project in Gonzales, Monterey County, California	Archaeological Resource Management

Report No.	Authors	Year	Title	Publisher
S-024242b	Robert Cartier	2001	Cultural Resource Evaluation of Lands for the Gonzales Safe Route to Schools Project in the County of Monterey	Archaeological Resource Management
S-024242c	Robert Cartier	2001	Historic Structures Evaluation for the Gonzales Safe Route to Schools Project in the County of Monterey	Archaeological Resource Management
S-033061	Nancy Sikes, Cindy Arrington, Bryon Bass, Chris Corey, Kevin Hunt, Steve O'Neil, Catherine Pruett, Tony Sawyer, Michael Tuma, Leslie Wagner, and Alex Wesson	2006	Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project, State of California	SWCA Environmental Consultants
S-033061a		2006	Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project, State of California	SWCA Environmental Consultants
S-033061b	Nancy E. Sikes	2007	Final Report of Monitoring and Findings for the Qwest Network Construction Project (letter report)	SWCA Environmental Consultants
S-049101	Susan Morley	2017	Preliminary Cultural Resources Reconnaissance, Assessor's Parcel Numbers APNs 020-021-002, 005, 007, 008, and 223-081-001 in the City of Gonzales, County of Monterey	
S-050378	Logan Young	2015	Request for Section 106 Review for Scattered Site 103, 8th, 9th, and 10th Street, Belden Street, Alta Street, Gonzales, California, Monterey, 92926, EMG Project No. 114042.15R-001.096 (letter report)	EMG, Inc.
S-050378a	Logan Young and Julianne Polanco	2015	HUD_2015_1009_006, Rehabilitation Project Located at 8th, 9th, 10th Streets, et. al, Gonzales	EMG, Inc.; Office of Historic Preservation
S-050379	Logan Young	2015	Request for Section 106 Review for Casa de Oro (105) / Los Ositos (112), 48th C Street, Gonzales, CA, Monterey, 93926, 1083 Elm Street, Greenfield, CA, Monterey, 93927, EMG Project No. 114042.15R-002.96 (letter report)	EMG, Inc.
S-050379a	Logan Young and Julianne Polanco	2015	HUD_2015_1009_007, Rehabilitation Project Located at 48 C Street, Gonzales	EMG, Inc.; Office of Historic Preservation

Report No.	Authors	Year	Title	Publisher
S-050459	Susan Morley	2017	Preliminary Cultural Resources Reconnaissance, Assessor's Parcel Numbers 223-081-017, 223-081-018, 223-081-019, City of Gonzales, County of Monterey	

4.1.1.1 Studies that intersect the Project Area

S-21501

Mary Doane of Archaeological Consulting conducted this study in 1999. The report documents an archaeological survey for a seismic retrofit for the Gonzales River Road Bridge, which crosses the Salinas River west of the Project APE. No archaeological or historical sites were identified.

S-30213

Clark Historic Resource Consultants prepared this report, *Agriculturally Related Historic Resources Located in the Unincorporated Areas between Salinas and Soledad, Monterey County, California,* in September 2000, for the Monterey County Historic Resources Review Board of the Monterey County Parks Department. It is a thematic study of agriculturally related historic resources. This study provides a detailed account of the history of the area and, as a result of the survey, a considerable number of historic resources were documented, including four adobes dating between 1840 and 1875, and many farmsteads and historic structures from the American Period that date between 1875 and the late 20th century.

S-50445

This report describes the undertaking of the replacement of the Gonzales River Road Bridge. Neal Kaptain of LSA Associates, Inc. prepared the report in August of 2016. No archaeological resources were identified.

4.2 Summary of Native American Coordination

Formal notification of the project was sent to the Salinan Tribe, which had filed standing letters of request for project notification and consultation with the City of Gonzales on June 19, 2020. To date, the Salinan Tribe has not responded to the City's notification about the project.

Dudek requested a NAHC search of their Sacred Lands File on May 18, 2020 for the proposed Project area and a 0.5-mile buffer. NAHC responded on May 19, 2020, stating that the results of the Sacred Lands File search were negative. Dudek sent emails to the Native American representatives provided by the NAHC on May 28, 2020 to request additional information on sites within the Project vicinity. Dudek made follow up telephone calls and/or emails to all contacts on the NAHC list on June 22, 2020. Valentin Lopez (Amah Mutsun Tribal Band) commented that Native Americans often lived close to natural waterways, and he requested a Native American monitor to be present for ground disturbance within 400 feet of the Salinas River. Sue Morley and Tom Nason (Esselen Tribe of Monterey County) also provided comments. The Esselen Tribe of Monterey County would like to be informed if any cultural resources are found during ground-disturbing activities from the Project. Finally, Irenne Zwierlein of the Amah Mutsun Tribal Band of Mission San Juan Bautista requested that all construction crew involved in earth disturbance for the project undergo Cultural Sensitivity training (Table 3; Confidential Appendix C).

Table 3. Native American Outreach

Date	Contact Type	From	To	Communications
5/18/2020	Email	Dudek	Native American Heritage Commission (NAHC)	Request Sacred Lands file (SLF) search and list of Native American contacts in the Project Area
5/19/2020	Email	Native American Heritage Commission (NAHC)	Dudek	Sacred Lands File indicated **negative** results. Included list of Native American contacts for the Project Area.
5/28/2020	Email	Dudek	Valentin Lopez, Chair of the Amah Mutsun Tribal Band	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Ann Marie Sayers, Chair of Indian Canyon Mutsun Band of Costanoan	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Irenne Zwierlein, Chair of Amah Mutsun Tribal Band of Mission San Juan Bautista Ohlone Costanoan	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Tony Cerda, Chairman, Costanoan Rumsen-Carmel Tribe	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Tom “Little Bear” Nason, Chairman Esselen Tribe of Monterey County	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Sue Morley, Esselen Tribe of Monterey County	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Louise Miranda-Ramirez, Chairperson, Ohlone/Costanoan-Esselen Nation	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Christanne Arias, Vice Chairperson, Ohlone/Costanoan-Esselen Nation	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Valentin Lopez, Chair of the Amah Mutsun Tribal Band	Dudek	Requests a Native American Monitor be present for ground disturbance within 400 feet of the Salinas River.
6/22/2020	Telephone call	Dudek	Ann Marie Sayers, Chair of Indian Canyon Mutsun Band of Costanoan	Follow up call requesting information on resources within the Project Area and/or comments. Dudek spoke with an associate of Ms. Sayers, who requested the information by email one more time to review.
6/22/2020	Email	Dudek	Ann Marie Sayers, Chair of Indian Canyon Mutsun Band of Costanoan	Follow up email requesting information on resources within the Project Area and/or comments.
6/22/2020	Telephone call	Dudek	Irenne Zwierlein, Chair of Amah Mutsun Tribal Band of Mission San Juan Bautista Ohlone Costanoan	Follow up call requesting information on resources within the Project Area and/or comments. Ms. Zwierlein did not pick up so Dudek left a voicemail message.
6/22/2020	Telephone call	Dudek	Tony Cerda, Chairman, Costanoan Rumsen-Carmel Tribe	Follow up call requesting information on resources within the Project Area and/or comments. Mr. Cerda did not pick up so Dudek left a voicemail message.
6/22/2020	Telephone call	Dudek	Tom “Little Bear” Nason, Chairman Esselen Tribe of Monterey County	Follow up call requesting information on resources within the Project Area and/or comments. Mr. Nason was not available, so Dudek left a message with the answering service.

Date	Contact Type	From	To	Communications
6/22/2020	Telephone call	Dudek	Sue Morley, Esselen Tribe of Monterey County	Follow up call requesting information on resources within the Project Area and/or comments. Ms. Morley said she would review the project and get back to me soon.
6/22/2020	Email	Sue Morley, Esselen Tribe of Monterey County	Dudek	Ms. Morley emailed to see if the Information Center found any sites in the records search and requested copies of the information. Dudek responded that the NWIC found no recorded sites within the Project area or 0.5-mile buffer.
6/22/2020	Email	Sue Morley, Esselen Tribe of Monterey County	Dudek	Ms. Morley emailed a letter of response from the Esselen Tribe of Monterey County requesting to be kept informed as the project moves forward. The letter states, "The ETMC wants to be consulted should cultural resources be encountered as a result of excavation or grading during the project."
6/22/2020	Telephone call	Dudek	Louise Miranda-Ramirez, Chairperson, Ohlone/Costanoan-Esselen Nation	Follow up call requesting information on resources within the Project Area and/or comments. Ms. Miranda-Ramirez did not pick up so Dudek left a voicemail message.
6/22/2020	Telephone call	Dudek	Christanne Arias, Vice Chairperson, Ohlone/Costanoan-Esselen Nation	Follow up call requesting information on resources within the Project Area and/or comments. Ms. Arias did not pick up so Dudek left a voicemail message.
7/22/2020	Email	Irenne Zwierlein, Chair of Amah Mutsun Tribal Band of Mission San Juan Bautista Ohlone Costanoan	Dudek	Two emails. One asked results from NWIC records search. The other email recommended that all crews involved in earth moving receive Cultural Sensitivity training.

5 FIELD METHODS

5.1 Methods

Dudek archaeologists surveyed the Project Area/APE using intensive 15-meter transects. They used an iPad with an ESRI Collector application to record any new cultural resources identified during the survey. The crew generated site records for any new recorded resources using standard Department of Parks and Recreation (DPR) forms (Confidential Appendix D). Addressing built environment resources such as buildings, structures, roads, or bridges were not part of the scope of the project. Digital photographs that document the survey area are on file at Dudek's Santa Cruz office.

5.2 Results

On May 19, 2020, Dudek Archaeologists Sarah Brewer, BA, and Julie Royer, MA, performed an intensive pedestrian survey of the southernmost collection line and all accessible portions of the Project Area/APE. On September 21, 2020, Sarah Brewer and Dustin Ponko, BA surveyed the northernmost collection line and the remaining unsurveyed portions of the Project Area/APE. Ground surface visibility was excellent (80-100%). The terrain was relatively flat with a gentle slope to the southwest. Native soils range from dark brown silty clay loams in the eastern portion of the Project to medium brown silty sand loams in the western portion of the Project. The ground surface was heavily impacted by agriculture, which dominates the landscape. Much of the survey took place within fields tilled for crops (Figure 3).

Dudek archaeologists recorded one prehistoric isolate, a Monterey chert flake, as GZ-I-01. The flake was located along the proposed collection pipeline alignment, adjacent to Gonzales River Road. Dudek created a DPR 523 Primary Record and Location Map to document this resource. (Confidential Attachment D).

Figure 3. Overview of Survey Area. View SW 235°

5.2.1 Newly Recorded Resources

5.2.1.1 GZ-I-01

Dudek archaeologists recorded one prehistoric isolate during the pedestrian survey. It is a small, brown Monterey chert tertiary flake measuring 14 mm x 10 mm x 3 mm (Figure 4). It was located along a dirt farm road adjacent to Gonzales Road in an area heavily disturbed by farming. No other indication of a site was present, such as midden soil, fire-affected rock or other artifacts. Because this resource is an isolate and offset from the proposed collection pipeline, it will not be adversely affected by the Project.

Figure 4. Chert isolate GZ-I-01

6 SUMMARY AND RECOMMENDATIONS

Neither the NWIC records searches nor the NAHC Sacred Lands File Search identified any previously recorded resources within the Project Area/APE or 0.5-mile buffer. Dudek performed an intensive-level archaeological survey and recorded one prehistoric isolate within an area highly disturbed by agricultural activities. Due to the lack of potentially significant historical resources or historic properties, Dudek proposes two mitigation measures, outlined in section 6.1, to ensure that no previously undiscovered resources are affected by the Project. Based on the results of this archaeological assessment, and with the proposed mitigation measures in place, no historic resources will be affected by the Project and it will have *no adverse effect* on a historic property (per 36 CFR 800.5[a]).

6.1 Management Recommendations

Dudek recommends the following mitigation measures to ensure that potential Project impacts to previously undiscovered potentially significant historical resources or historic properties are less than significant.

MM-CULT-1: Unidentified Cultural Materials

In the event that cultural resources (sites, features, artifacts, or fossilized material) are exposed during construction activities for the proposed project, all construction work occurring within 100 feet of the find shall immediately stop until a qualified specialist, meeting the Secretary of the Interior's Professional Qualification Standards, can evaluate the significance of the find and determine whether additional study is warranted. Prehistoric archaeological deposits may be indicated by the presence of discolored or dark soil, fire-affected material, concentrations of fragmented or whole shell, burned or complete bone, non-local lithic materials, or the characteristic observed to be atypical of the surrounding area. Common prehistoric artifacts may include modified or battered lithic materials; lithic or bone tools that appeared to have been used for chopping, drilling, or grinding; projectile points; fired clay ceramics or non-functional items; and other items. Historic-age deposits are often indicated by the presence of glass bottles and shards, ceramic material, building or domestic refuse, ferrous metal, or features such as concrete foundations or privies.

MM-CULT-2: Unanticipated Discovery of Human Remains

The discovery of human remains is always a possibility during ground disturbances; State of California Health and Safety Code Section 7050.5 covers these findings. This code section states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the human remains are determined to be prehistoric, the Coroner will notify the NAHC, which will determine and notify a Most Likely Descendant (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

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APPENDIX A

National Archaeological Database Information

NATIONAL ARCHAEOLOGICAL DATABASE (NADB) INFORMATION

Authors: Sarah Brewer, BA, and Ryan Brady, MA, RPA

Firm: Dudek

Project Proponent: City of Gonzales

Report Date: October 2020

Report Title: Cultural Resources Inventory Report For The City of Gonzales Separate Industrial Water Recycling Facility Project, Gonzales, Monterey County, California

Type of Study: Archaeological Inventory

Resources: GZ-I-01

USGS Quads: Gonzales and Palo Escrito Peak 1:24,000 Township 16S/Range 4E, Section 36; Township 16S/Range 5E, Sections 29, 30, 31 and 32; and Township 17S/Range 5E, Section 6

Acreage: 124.86 acres

Permit Numbers: Permit Pending

Keywords: Positive, pedestrian survey, GZ-I-01, Gonzales

APPENDIX B

CONFIDENTIAL NWIC Records Search Results

California Historical Resources Information System

CHRIS Data Request Form

ACCESS AND USE AGREEMENT NO.: 10 **IC FILE NO.:**

To: Northwest Information Center

Print Name: Sarah Brewer Date: 4/13/2020

Affiliation: Dudek

Address: 725 Front Street, Suite 400

City: Santa Cruz State: CA Zip: 95060

Phone: 831 227 6301 Fax: Email: sbrewer@dudek.com

Billing Address (if different than above): 605 Third Street, Encinitas CA 92024

Billing Email: Billing Phone:

Project Name / Reference: 12313: Gonzales WWTP

Project Street Address: Southwest of the City of Gonzales

County or Counties: Monterey

Township/Range/UTMs: T16S,R4E, S 35, 36; T16S, R5E, S 29, 30, 31, 32; (con't below)

USGS 7.5' Quad(s):

PRIORITY RESPONSE (Additional Fee): yes ☐ / no ☐

TOTAL FEE NOT TO EXCEED: $
(If blank, the Information Center will contact you if the fee is expected to exceed $1,000.00)

Special Instructions:

(con't) T17S, R4E, S1;T17S, R53, S 5,6

Information Center Use Only

Date of CHRIS Data Provided for this Request:

Confidential Data Included in Response: yes ☐ / no ☐

Notes:

CHRIS Data Request Form

Mark the request form as needed. Attach a PDF of your project area (with the radius if applicable) mapped on a 7.5' USGS topographic quadrangle to scale 1:24000 ratio 1:1 neither enlarged nor reduced and include a shapefile of your project area, if available. Shapefiles are the current CHRIS standard for submitting digital spatial data for your project area or radius. **Check with the appropriate IC for current availability of digital data products.**

- Documents will be provided in PDF format. Paper copies will only be provided if PDFs are not available at the time of the request or under specially arranged circumstances.
- Location information will be provided as a digital map product (Custom Maps or GIS data) unless the area has not yet been digitized. In such circumstances, the IC may provide hand drawn maps.
- In addition to the $150/hr. staff time fee, client will be charged the Custom Map fee when GIS is required to complete the request [e.g., a map printout or map image/PDF is requested and no GIS Data is requested, or an electronic product is requested (derived from GIS data) but no mapping is requested].

For product fees, see the CHRIS IC Fee Structure on the OHP website.

1. Map Format Choice:

Select One: Custom GIS Maps ☐ GIS Data ☒ Custom GIS Maps **and** GIS Data ☐ No Maps ☐

Any selection below left unmarked will be considered a "no."

2. Location Information:

	Within project area	Within 1/2 mi. radius
ARCHAEOLOGICAL Resource Locations[1]	yes ☒ / no ☐	yes ☒ / no ☐
NON-ARCHAEOLOGICAL Resource Locations	yes ☒ / no ☐	yes ☐ / no ☒
Report Locations[1]	yes ☒ / no ☐	yes ☐ / no ☒
"Other" Report Locations[2]	yes ☐ / no ☒	yes ☐ / no ☒

3. Database Information:

(contact the IC for product examples, or visit the SSJVIC website for examples)

	Within project area	Within 1/2 mi. radius
ARCHAEOLOGICAL Resource Database[1]		
List (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Detail (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Excel Spreadsheet	yes ☒ / no ☐	yes ☒ / no ☐
NON-ARCHAEOLOGICAL Resource Database		
List (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Detail (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Excel Spreadsheet	yes ☒ / no ☐	yes ☐ / no ☒
Report Database[1]		
List (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Detail (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Excel Spreadsheet	yes ☒ / no ☐	yes ☒ / no ☐
Include "Other" Reports [2]	yes ☐ / no ☒	yes ☐ / no ☒

4. Document PDFs (paper copy only upon request):

	Within project area	Within 1/2 mi. radius
ARCHAEOLOGICAL Resource Records[1]	yes ☒ / no ☐	yes ☐ / no ☐
NON-ARCHAEOLOGICAL Resource Records	yes ☒ / no ☐	yes ☐ / no ☒
Reports[1]	yes ☒ / no ☐	yes ☐ / no ☒
"Other" Reports[2]	yes ☐ / no ☒	yes ☐ / no ☒

5. Eligibility Listings and Documentation:

	Within project area	Within 1/2 mi. radius
OHP Built Environment Resources Directory[3]:		
Directory listing only (Excel format)	yes ☐ / no ☒	yes ☐ / no ☒
Associated documentation[4]	yes ☐ / no ☒	yes ☐ / no ☒
OHP Archaeological Resources Directory[1,5]:		
Directory listing only (Excel format)	yes ☐ / no ☒	yes ☐ / no ☒
Associated documentation[4]	yes ☐ / no ☒	yes ☐ / no ☒
***California Inventory of Historic Resources* (1976):**		
Directory listing only (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Associated documentation[4]	yes ☐ / no ☒	yes ☐ / no ☒

6. Additional Information:

The following sources of information may be available through the Information Center. However, several of these sources are now available on the OHP website and can be accessed directly. The Office of Historic Preservation makes no guarantees about the availability, completeness, or accuracy of the information provided through these sources. Indicate below if the Information Center should review and provide documentation (if available) of any of the following sources as part of this request.

Caltrans Bridge Survey	yes ☐ / no ☐
Ethnographic Information	yes ☐ / no ☐
Historical Literature	yes ☐ / no ☐
Historical Maps	yes ☒ / no ☐
Local Inventories	yes ☐ / no ☐
GLO and/or Rancho Plat Maps	yes ☐ / no ☐
Shipwreck Inventory	yes ☐ / no ☐
Soil Survey Maps	yes ☐ / no ☐

---

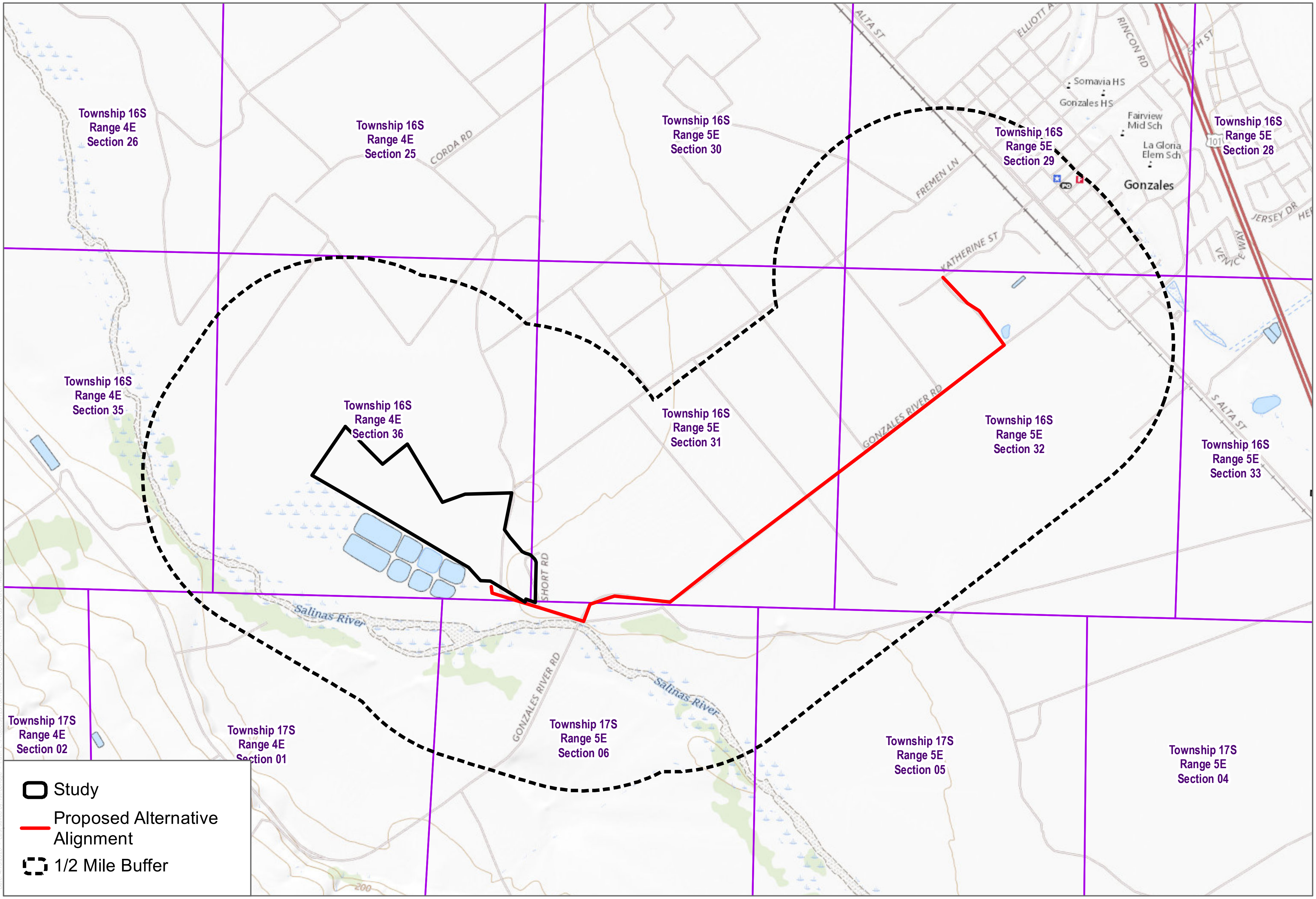
[1] In order to receive archaeological information, requestor must meet qualifications as specified in Section III of the current version of the California Historical Resources Information System Information Center Rules of Operation Manual and be identified as an Authorized User or Conditional User under an active CHRIS Access and Use Agreement.

[2] "Other" Reports GIS layer consists of report study areas for which the report content is almost entirely non-fieldwork related (e.g., local/regional history, or overview) and/or for which the presentation of the study area boundary may or may not add value to a record search.

[3] Provided as Excel spreadsheets with no cost for the rows; the only cost for this component is IC staff time. Includes, but not limited to, information regarding National Register of Historic Places, California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and historic building surveys. Previously known as the HRI and then as the HPD, it is now known as the Built Environment Resources Directory (BERD). The Office of Historic Preservation compiles this documentation and it is the source of the official status codes for evaluated resources.

[4] Associated documentation will vary by resource. Contact the IC for further details.

[5] Provided as Excel spreadsheets with no cost for the rows; the only cost for this component is IC staff time. Previously known as the Archaeological Determinations of Eligibility, now it is known as the Archaeological Resources Directory (ARD). The Office of Historic Preservation compiles this documentation and it is the source of the official status codes for evaluated resources.



SOURCE: USGS 7.5-Minute Series Gonzales & Palo Escrito Peak Quadrangles

DUDEK

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Feet

Records Search

City of Gonzales Separate Industrial Water Recycling Faciliyu

CALIFORNIA
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RESOURCES
INFORMATION
SYSTEM

ALAMEDA
COLUSA
CONTRA COSTA
DEL NORTE
HUMBOLDT
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO
SAN FRANCISCO
SAN MATEO
SANTA CLATA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
150 Professional Center Drive, Suite E
Rohnert Park, California 94928-3609
Tel: 707.588.8455
nwic@sonoma.edu
http://www.sonoma.edu/nwic

5/6/2020 NWIC File No.: 19-1796

Sarah Brewer
Dudek
725 Front Street, Suite 400
Santa Cruz, CA 95060

re: 12313: Gonzales WWTP

The Northwest Information Center received your record search request for the project area referenced above, located on the Gonzales & Palo Escrito Peak USGS 7.5' quads. The following reflects the results of the records search for the project area and a 0.5 mile radius:

Resources within project area:	None
Archaeological resources within 0.5 mile radius:	None
Reports within project area:	S-30213, 50445, & 21301.
Reports within 0.5 mile radius:	S-3366, 20567, 22819, 24242, 33061, 49101, 50378, 50379, & 50459.

Resource Database Printout (list):	☐ enclosed	☒ not requested	☐ nothing listed
Resource Database Printout (details):	☐ enclosed	☒ not requested	☐ nothing listed
Resource Digital Database Records:	☐ enclosed	☐ not requested	☒ nothing listed
Report Database Printout (list):	☐ enclosed	☒ not requested	☐ nothing listed
Report Database Printout (details):	☐ enclosed	☒ not requested	☐ nothing listed
Report Digital Database Records:	☒ enclosed	☐ not requested	☐ nothing listed
Resource Record Copies:	☐ enclosed	☐ not requested	☒ nothing listed
Report Copies:	☒ enclosed	☐ not requested	☐ nothing listed
OHP Built Environment Resources Directory:	☐ enclosed	☒ not requested	☐ nothing listed
Archaeological Determinations of Eligibility:	☐ enclosed	☒ not requested	☐ nothing listed
CA Inventory of Historic Resources (1976):	☐ enclosed	☒ not requested	☐ nothing listed
Caltrans Bridge Survey:	☐ enclosed	☒ not requested	☐ nothing listed
Ethnographic Information:	☐ enclosed	☒ not requested	☐ nothing listed
Historical Literature:	☐ enclosed	☒ not requested	☐ nothing listed
Historical Maps:	☒ enclosed	☐ not requested	☐ nothing listed
Local Inventories:	☐ enclosed	☒ not requested	☐ nothing listed
GLO and/or Rancho Plat Maps:	☐ enclosed	☒ not requested	☐ nothing listed

Shipwreck Inventory: ☐ enclosed ☐ not requested ☐ nothing listed

*Notes:

** Current versions of these resources are available on-line:
Caltrans Bridge Survey: http://www.dot.ca.gov/hq/structur/strmaint/historic.htm
Soil Survey: http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=CA
Shipwreck Inventory: http://www.slc.ca.gov/Info/Shipwrecks.html

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Thank you for using the California Historical Resources Information System (CHRIS).

Sincerely,

Lisa C. Hagel
Researcher

Previously Conducted Reports within the Study Area

Report No.	Authors	Year	Title	Publisher
Within Project Area				
S-021501	Mary Doane	1999	Prehistoric Property Survey Report and Historic Property Clearance Report for the Proposed Seismic Retrofit Project for the Gonzales River Road Bridge at the Salinas River West of Gonzales, Monterey County, California	Archaeological Consulting
S-030213		2000	Agriculturally Related Historic Resources Located in the Unincorporated Areas Between Salinas and Soledad, Monterey County, California	Clark Historic Resource Consultants
S-030213a		2001	Agriculturally Related Historic Resources Located in the Unincorporated Areas Between Salinas and Soledad, Monterey County, California: Phase II	Clark Historic Resource Consultants, Inc.
S-050445	Neal Kaptain	2016	Historic Property Survey Report, Gonzales Road Bridge Replacement Project, Bridge #44C-035, 5-MNT, Federal Project #BRLO-5944(098), Monterey County, California	LSA Associates
S-050445a	Neal Kaptain	2016	Archaeological Survey Report, Gonzales Road Bridge Replacement Project, Monterey County, California, Caltrans District 4, Bridge #44C-035, 5-MNT-0-CR, Federal ID #BHLO-5944(098)	LSA Associates
Within 0.5-mile Study Buffer				
S-003366	Lynne H. Mounday	1976	An Archaeological Survey of the Centennial Park Site in Gonzales (letter report)	
S-020567	Barry A. Price	1998	Cultural Resources Assessment, Pacific Bell Mobile Services Facility SF-705-02, Gonzales, Monterey County, California (letter report)	Applied EarthWorks, Inc.
S-022819	Wendy J. Nelson, Maureen Carpenter, and Julia G. Costello	2000	Cultural Resources Survey for the Level (3) Communications Long Haul Fiber Optics Project, Segment WS05: San Jose to San Luis Obispo	Far Western Anthropological Research Group, Inc.; Foothill Resources, Ltd.
S-024242	Robert Cartier	2001	Negative Archaeological Survey Report for the Proposed Safe Route to Schools Project in Gonzales, Monterey County, California	Archaeological Resource Management
S-024242a	Robert Cartier	2001	Memorandum of Understanding for the Proposed Safe Route to Schools Project in Gonzales, Monterey County, California	Archaeological Resource Management
S-024242b	Robert Cartier	2001	Cultural Resource Evaluation of Lands for the Gonzales Safe Route to Schools Project in the County of Monterey	Archaeological Resource Management
S-024242c	Robert Cartier	2001	Historic Structures Evaluation for the Gonzales Safe Route to Schools Project in the County of Monterey	Archaeological Resource Management
S-033061	Nancy Sikes, Cindy Arrington, Bryon Bass, Chris Corey, Kevin Hunt, Steve O'Neil, Catherine Pruett, Tony Sawyer, Michael Tuma, Leslie Wagner, and Alex Wesson	2006	Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project, State of California	SWCA Environmental Consultants

Report No.	Authors	Year	Title	Publisher
S-033061a		2006	Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project, State of California	SWCA Environmental Consultants
S-033061b	Nancy E. Sikes	2007	Final Report of Monitoring and Findings for the Qwest Network Construction Project (letter report)	SWCA Environmental Consultants
S-049101	Susan Morley	2017	Preliminary Cultural Resources Reconnaissance, Assessor's Parcel Numbers APNs 020-021-002, 005, 007, 008, and 223-081-001 in the City of Gonzales, County of Monterey	
S-050378	Logan Young	2015	Request for Section 106 Review for Scattered Site 103, 8th, 9th, and 10th Street, Belden Street, Alta Street, Gonzales, California, Monterey, 92926, EMG Project No. 114042.15R-001.096 (letter report)	EMG, Inc.
S-050378a	Logan Young and Julianne Polanco	2015	HUD_2015_1009_006, Rehabilitation Project Located at 8th, 9th, 10th Streets, et. al, Gonzales	EMG, Inc.; Office of Historic Preservation
S-050379	Logan Young	2015	Request for Section 106 Review for Casa de Oro (105) / Los Ositos (112), 48th C Street, Gonzales, CA, Monterey, 93926, 1083 Elm Street, Greenfield, CA, Monterey, 93927, EMG Project No. 114042.15R-002.96 (letter report)	EMG, Inc.
S-050379a	Logan Young and Julianne Polanco	2015	HUD_2015_1009_007, Rehabilitation Project Located at 48 C Street, Gonzales	EMG, Inc.; Office of Historic Preservation
S-050459	Susan Morley	2017	Preliminary Cultural Resources Reconnaissance, Assessor's Parcel Numbers 223-081-017, 223-081-018, 223-081-019, City of Gonzales, County of Monterey	

Records Search 19-1796 Reports

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ALAMEDA
COLUSA
CONTRA COSTA
DEL NORTE

HUMBOLDT
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO

SAN FRANCISCO
SAN MATEO
SANTA CLATA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
150 Professional Center Drive, Suite E
Rohnert Park, California 94928-3609
Tel: 707.588.8455
nwic@sonoma.edu
http://www.sonoma.edu/nwic

9/15/2020 NWIC File No.: 20-0418

Sarah Brewer
Dudek
725 Front Street, Suite 400
Santa Cruz, CA 95060

re: 12313: Gonzales WWTP

The Northwest Information Center received your record search request for the project area referenced above, located on the Gonzales & Palo Escrito Peak USGS 7.5' quads. The following reflects the results of the records search for the project area and a 0.5 mile radius (not including the information from search #19-1796):

Resources within project area:	None
Archaeological resources within 0.5 mile radius:	None
Additional reports within project area:	None
Additional reports within 0.5 mile radius:	S-13995.

Resource Database Printout (list): ☐ enclosed ☒ not requested ☐ nothing listed
Resource Database Printout (details): ☐ enclosed ☒ not requested ☐ nothing listed
Resource Digital Database Records: ☐ enclosed ☐ not requested ☒ nothing listed
Report Database Printout (list): ☐ enclosed ☒ not requested ☐ nothing listed
Report Database Printout (details): ☐ enclosed ☒ not requested ☐ nothing listed
Report Digital Database Records: ☒ enclosed ☐ not requested ☐ nothing listed
Resource Record Copies: ☐ enclosed ☐ not requested ☒ nothing listed
Report Copies: ☐ enclosed ☐ not requested ☒ nothing listed
OHP Built Environment Resources Directory: ☐ enclosed ☒ not requested ☐ nothing listed
Archaeological Determinations of Eligibility: ☐ enclosed ☒ not requested ☐ nothing listed
CA Inventory of Historic Resources (1976): ☐ enclosed ☒ not requested ☐ nothing listed
Caltrans Bridge Survey: ☐ enclosed ☒ not requested ☐ nothing listed
Ethnographic Information: ☐ enclosed ☒ not requested ☐ nothing listed
Historical Literature: ☐ enclosed ☒ not requested ☐ nothing listed
Historical Maps: ☐ enclosed ☒ not requested ☐ nothing listed
Local Inventories: ☐ enclosed ☒ not requested ☐ nothing listed

GLO and/or Rancho Plat Maps: ☐ enclosed ☒ not requested ☐ nothing listed
Shipwreck Inventory: ☐ enclosed ☒ not requested ☐ nothing listed

*Notes:
** Current versions of these resources are available on-line:
Caltrans Bridge Survey: http://www.dot.ca.gov/hq/structur/strmaint/historic.htm
Soil Survey: http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=CA
Shipwreck Inventory: http://www.slc.ca.gov/Info/Shipwrecks.html

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Thank you for using the California Historical Resources Information System (CHRIS).

Sincerely,

Lisa C. Hagel
Researcher

Previously Conducted Reports within the 0.5-Mile Buffer

Report No.	Authors	Year	Title	Publisher
S-013995	Anna Runnings and Gary S. Breschini	1992	Preliminary Cultural Resources Reconnaissance of Assessor's Parcel Number 020-111-31, Gonzales, Monterey County, California	Archaeological Consulting

APPENDIX C

NAHC Sacred Lands File Search (Confidential) and Record of Native American Correspondence

Sacred Lands File & Native American Contacts List Request

Native American Heritage Commission
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
916-373-3710
916-373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: Dudek Project 12313: City of Gonzales IWTP EIR

County: Monterey

USGS Quadrangle Name: Gonzales and Palo Escrito Peak

Township: 16S, 17S **Range:** 4E, 5E **Section(s):** 36, 31, 32, 5

Company/Firm/Agency: Dudek

Street Address: 725 Front Street, Suite 400

City: Santa Cruz, CA **Zip:** 95060

Phone: (831) 227-6301

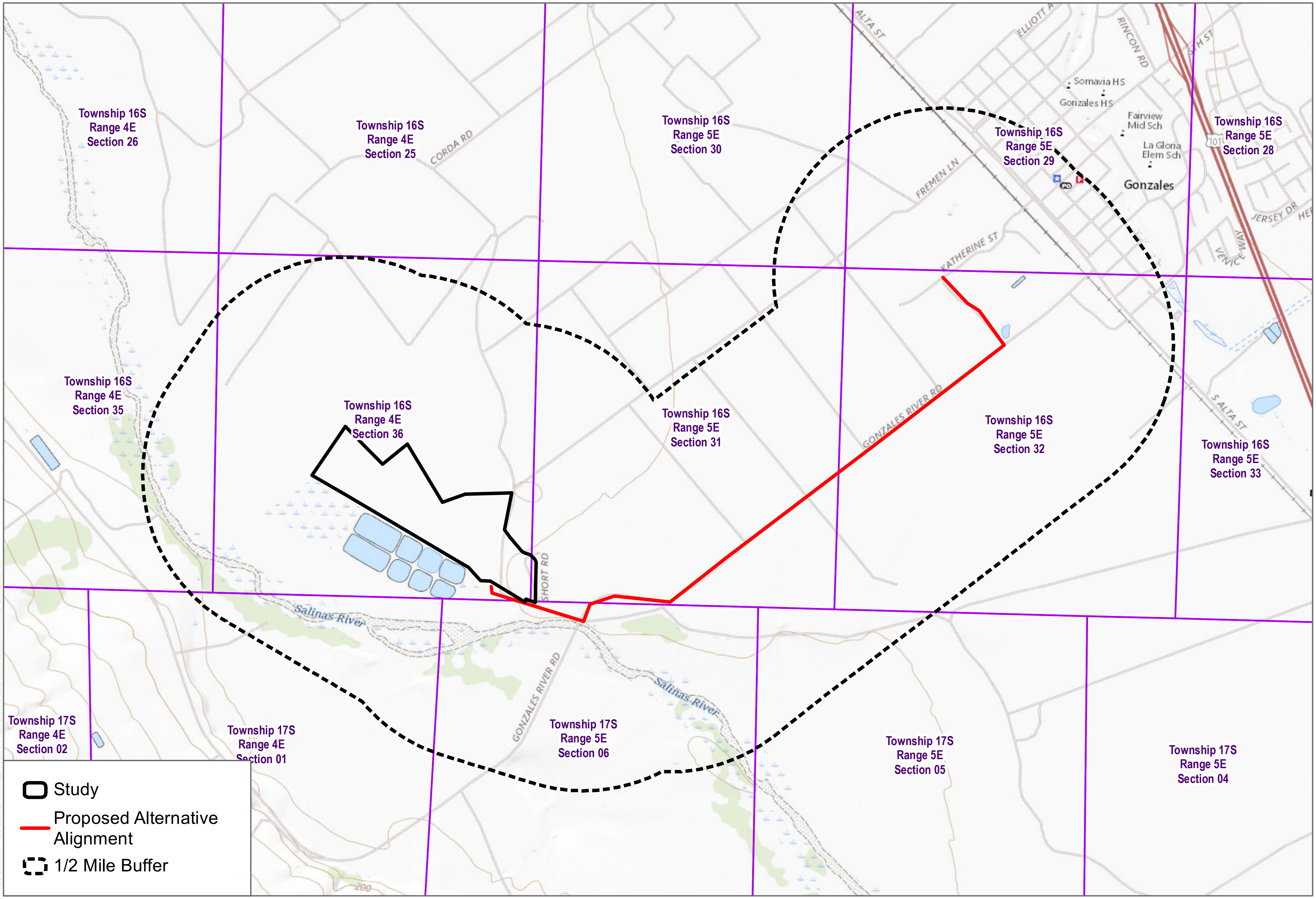
Fax:

Email: sbrewer@dudek.com

Project Description:

The City of Gonzales proposes to install an Industrial Wastewater Treatment Plant adjacent to the existing City Wastewater Treatment Plant and install a collection line within the roadway right-of-way between Puente Del Monte Avenue to Gonzales River Road and Short Road.

Dudek is requesting a NAHC search of the Sacred Lands Files or other Native American cultural resources that may fall within the proposed project location or a surrounding one-half-mile buffer. Please provide a Contact List with all Native American tribal representatives that may have traditional interests in the project location or surrounding area.



SOURCE: USGS 7.5-Minute Series Gonzales & Palo Escrito Peak Quadrangles

DUDEK

0 1,000 2,000 Feet

Records Search

City of Gonzales Separate Industrial Water Recycling Facility

STATE OF CALIFORNIA **Gavin Newsom, *Governor***

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

May 19, 2020

Sarah Brewer, Archaeologist
Dudek

Via Email to: sbrewer@dudek.com

Re: Dudek Project 12313: City of Gonzales IWTP EIR Project, Monterey County

Dear Ms. Brewer:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Sarah.Fonseca@nahc.ca.gov.

Sincerely,

Sarah Fonseca
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Monterey County
5/19/2020

Amah MutsunTribal Band
Valentin Lopez, Chairperson
P.O. Box 5272
Galt, CA, 95632
Phone: (916) 743 - 5833
vlopez@amahmutsun.org
Costanoan
Northern Valley Yokut

Amah MutsunTribal Band of Mission San Juan Bautista
Irenne Zwierlein, Chairperson
789 Canada Road
Woodside, CA, 94062
Phone: (650) 851 - 7489
Fax: (650) 332-1526
amahmutsuntribal@gmail.com
Costanoan

Costanoan Rumsen Carmel Tribe
Tony Cerda, Chairperson
244 E. 1st Street
Pomona, CA, 91766
Phone: (909) 629 - 6081
Fax: (909) 524-8041
rumsen@aol.com
Costanoan

Esselen Tribe of Monterey County
Tom Little Bear Nason, Chairman
P. O. Box 95
Carmel Valley, CA, 93924
Phone: (831) 659 - 2153
Fax: (831) 659-0111
TribalChairman@EsselenTribe.org
Costanoan
Esselen

Esselen Tribe of Monterey County
Sue Morley, Cultural Resources
3059 Bostick Avenue
Marina, CA, 93933
Phone: (831) 262 - 2300
Cultural-Resources@EsselenTribe.org
Costanoan
Esselen

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister, CA, 95024
Phone: (831) 637 - 4238
ams@indiancanyon.org
Costanoan

Ohlone/Costanoan-Esselen Nation
Louise Miranda-Ramirez, Chairperson
P.O. Box 1301
Monterey, CA, 93942
Phone: (408) 629 - 5189
ramirez.louise@yahoo.com
Costanoan
Esselen

Ohlone/Costanoan-Esselen Nation
Christanne Arias, Vice Chairperson
519 Viejo Gabriel
Soledad, CA, 93960
Phone: (831) 235 - 4590
Costanoan
Esselen

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Dudek Project 12313: City of Gonzales IWTP EIR Project, Monterey County.

May 28, 2020 PN: 12313

Chairperson Ann Marie Sayers (Typical)
P.O. Box 28
Hollister, CA 95024

Subject: City of Gonzales Separate Industrial Water Recycling Facility Project, Monterey County-Native American Outreach

Dear Chairperson Sayers,

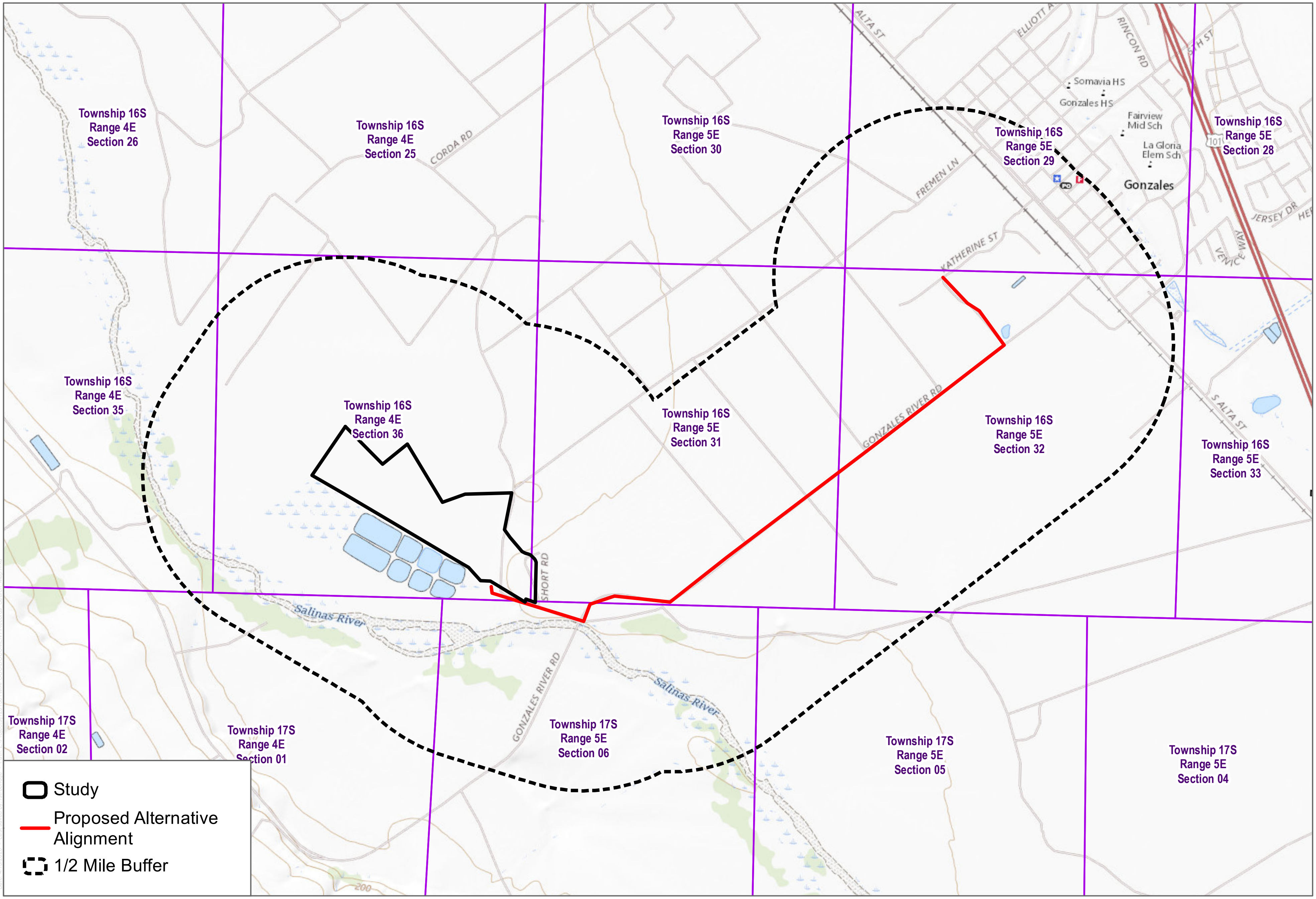
Dudek is conducting a cultural resources study for an Environmental Impact Report (EIR) for a proposed water recycling facility project (Project) in the City of Gonzales, Monterey County, California (Figure 1). The Project is an upgrade to the City of Gonzales's wastewater treatment infrastructure and management, with a proposed construction of a new separate Industrial Wastewater Treatment Plant (IWTP) that would service 2.0 million gallons per day. The City's existing municipal Wastewater Treatment Plant (WWTP) has been challenged the past several years due to the nature of flows discharged to the WWTP by local industrial dischargers. The new plant would treat wastewater from the Gonzales Agricultural Business Industrial Park separately from the City's domestic wastewater system. The Project includes the IWTP, constructed adjacent to the existing WWTP, and a wastewater collection line of 11,100 linear feet, mainly along existing public street right-of-ways.

As part of our efforts to identify cultural resources that may be affected by the project, Dudek is reaching out to Native American tribes with local knowledge of the Project vicinity. Dudek requested a Sacred Lands File (SLF) search from the Native American Heritage Commission (NAHC). The NAHC found negative results for the SLF search. The NAHC provided us your contact as someone who may have additional information regarding cultural resources or sacred sites in the vicinity. Any information you provide will remain confidential and be used for planning purposes for this project only.

Please review the records search maps attached to this letter and respond within 14 days if you have any questions or comments. You may respond by mail, e-mail, telephone, or in person. You may also visit our office to review our research files. If you have any questions or comments, you can reach me by telephone at (831) 226-9472, or by e-mail at sbrewer@dudek.com. All comments and letters received will be included in our confidential report. Thank you very much for your time regarding our request.

Sincerely,

Sarah Brewer, BA
Cultural Resources
DUDEK
725 Front Street, Suite 400 Santa Cruz, California 95060 T: 831.226.9472 sbrewer@dudek.com



SOURCE: USGS 7.5-Minute Series Gonzales & Palo Escrito Peak Quadrangles

DUDEK

Records Search

City of Gonzales Separate Industrial Water Recycling Facility

Sarah Brewer

From:	Val Lopez <vlopez@amahmutsun.org>
Sent:	Thursday, May 28, 2020 1:19 PM
To:	Sarah Brewer; Rob Cuthrell; Aerieways
Subject:	Re: Outreach for City of Gonzales Industrial Wastewater Treatment Plant (Dudek Project 12313)

HI Sarah,

I did notice the NAHC negative finding statement in the letter. However, when I look at the map I notice the facility and pipeline run very close to the Salinas River. As you know, our members lived very close to natural waterways. For this reason we request that a Native American Monitor be used for and any ground disturbance activity within 400 feet of the natural waterway.

Please feel free to contact me if you have any questions.

Thank you,

Valentin Lopez, Chairman
Amah Mutsun Tribal Band
916-743-5833

On Thu, May 28, 2020 at 9:56 AM Sarah Brewer <sbrewer@dudek.com> wrote:

> Dear Chairman Lopez,
>
> I hope this message finds you well. Please see the attached letter regarding a proposed wastewater treatment plant in Gonzales, CA. If you have any information regarding any cultural resources within the project area, please let us know.
>
> Please note that Dudek is not sending out certified letters at this time due to Covid-19. Please respond by email or telephone. Thank you!
>
> Kind regards,
>
> Sarah
>
> DUDEK
>
> **Sarah Brewer**
>
> *Archaeologist*

The local and historic
Esselen Tribe of Monterey County
PO Box 95, Carmel Valley, CA 93924
Esselentribe.org

June 22, 2020

Sarah Brewer, BA
Cultural Resources
DUDEK
725 Front Street, Suite 400
Santa Cruz, California 95060

Dear Sarah,

Thank you for informing the Esselen Tribe of Monterey County (ETMC) of the results of your record search for the City of Gonzales Waste Water Treatment Plant near the Carmel River in Gonzales. As we now understand the record search did not reveal cultural resources for that location.

Please continue to keep us informed as the proposed project moves forward. The ETMC wants to be consulted should cultural resources be encountered as a result of excavation or grading during the project.

Sincerely,

Susan Morley

Sue Morley
Cultural Resources Consultant
Esselen Tribe of Monterey County

Our Mission Statement

To preserve and to protect our cultural heritage and ancestral sacred sites, namely of the Esselen, Rumsen, Chalone, Sureño and Guatcharrone people, which includes but is not limited to the villages of Achasta, Chalon, Echilat, Ensen, Excelen, Esslenajan, Ixchenta, Jojopan, Kuchun, Pachepas, Sargenta-Ruc, Soccoronda, ad Tucutnut, located within sacred pre-historic and historic tribal lands of Monterey County, California.

From: Amah Mutsun <amahmutsuntribal@gmail.com>
Sent: Wednesday, July 22, 2020 1:12 PM
To: Sarah Brewer
Subject: Re: Outreach for City of Gonzales Wastewater Treatment Plant (Dudek Project 12313)
Attachments: image001.jpg

Thank you. We recommend all crews that are involved in earth movement be Cultural Sensitivity Training.

On Wed, Jul 22, 2020, 1:05 PM Sarah Brewer <sbrewer@dudek.com> wrote:

> Hi Ms. Zwierlein,
>
> Yes, the NWIC reported zero previously recorded sites within the Project Area or 0.5-mile buffer.
>
> Please let me know if you have any additional questions.
>
> Thank you!
>
> **Sarah Brewer**
>
> *Archaeologist*
>
> **DUDEK**
>
> 725 Front Street, Suite 400
>
> Santa Cruz, CA 95060
>
> m: 831.227.6301
>
> www.dudek.com
>
> ---
>
> **From:** Amah Mutsun <amahmutsuntribal@gmail.com>
> **Sent:** Wednesday, July 22, 2020 12:26 PM
> **To:** Sarah Brewer <sbrewer@dudek.com>
> **Subject:** Re: Outreach for City of Gonzales Wastewater Treatment Plant (Dudek Project 12313)

> Did you get a report from CHRIS on this project?
>
> On Thu, May 28, 2020 at 9:58 AM Sarah Brewer <sbrewer@dudek.com> wrote:
>
>> Dear Chairperson Zwierlein,
>>
>> I hope this message finds you well. Please see the attached letter regarding a proposed wastewater treatment plant in Gonzales, CA. If you have any information regarding any cultural resources within the project area, please let us know.
>>
>> Please note that Dudek is not sending out certified letters at this time due to Covid-19. Please respond by email or telephone. Thank you!
>>
>> Kind regards,
>>
>> Sarah
>>
>> **Sarah Brewer**
>>
>> *Archaeologist*
>>
>> 725 Front Street, Suite 400
>>
>> Santa Cruz, CA 95060
>>
>> m: 831.227.6301
>>
>> www.dudek.com
>
> --
>
> *Michelle Zimmer*
>
> ***Enrollment and Communications Officer of the***

Native American Contact (as of July 22, 2020)

Date	Contact Type	From	To	Communications
5/18/2020	Email	Dudek	Native American Heritage Commission (NAHC)	Request Sacred Lands file (SLF) search and list of Native American contacts in the Project Area
5/19/2020	Email	Native American Heritage Commission (NAHC)	Dudek	Sacred Lands File indicated **negative** results. Included list of Native American contacts for the Project Area.
5/28/2020	Email	Dudek	Valentin Lopez, Chair of the Amah Mutsun Tribal Band	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Ann Marie Sayers, Chair of Indian Canyon Mutsun Band of Costanoan	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Irenne Zwierlein, Chair of Amah Mutsun Tribal Band of Mission San Juan Bautista Ohlone Costanoan	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Tony Cerda, Chairman, Costanoan Rumsen-Carmel Tribe	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Tom "Little Bear" Nason, Chairman Esselen Tribe of Monterey County	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Sue Morley, Esselen Tribe of Monterey County	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Louise Miranda-Ramirez, Chairperson, Ohlone/Costanoan-Esselen Nation	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Dudek	Christanne Arias, Vice Chairperson, Ohlone/Costanoan-Esselen Nation	Introduction to the project and request for information on additional resources in the Project Area
5/28/2020	Email	Valentin Lopez, Chair of the Amah Mutsun Tribal Band	Dudek	Requests a Native American Monitor be present for ground disturbance within 400 feet of the Salinas River.
6/22/2020	Telephone call	Dudek	Ann Marie Sayers, Chair of Indian Canyon Mutsun Band of Costanoan	Follow up call requesting information on resources within the Project Area and/or comments. Dudek spoke with an associate of Ms. Sayers, who requested the information by email one more time to review.
6/22/2020	Email	Dudek	Ann Marie Sayers, Chair of Indian Canyon Mutsun Band of Costanoan	Follow up email requesting information on resources within the Project Area and/or comments.
6/22/2020	Telephone call	Dudek	Irenne Zwierlein, Chair of Amah Mutsun Tribal Band of Mission San Juan Bautista Ohlone Costanoan	Follow up call requesting information on resources within the Project Area and/or comments. Ms. Zwierlein did not pick up so Dudek left a voicemail message.
6/22/2020	Telephone call	Dudek	Tony Cerda, Chairman, Costanoan Rumsen-Carmel Tribe	Follow up call requesting information on resources within the Project Area and/or comments. Mr. Cerda did not pick up so Dudek left a voicemail message.
6/22/2020	Telephone call	Dudek	Tom "Little Bear" Nason, Chairman Esselen Tribe of Monterey County	Follow up call requesting information on resources within the Project Area and/or comments. Mr. Nason was not available, so Dudek left a message with the answering service.
6/22/2020	Telephone call	Dudek	Sue Morley, Esselen Tribe of Monterey County	Follow up call requesting information on resources within the Project Area and/or comments. Ms. Morley said she would review the project and get back to me soon.
6/22/2020	Email	Sue Morley, Esselen Tribe of Monterey County	Dudek	Ms. Morley emailed to see if the Information Center found any sites in the records search and requested copies of the information. Dudek responded that the NWIC found no recorded sites within the Project area or 0.5-mile buffer.
6/22/2020	Email	Sue Morley, Esselen Tribe of Monterey County	Dudek	Ms. Morley emailed a letter of response from the Esselen Tribe of Monterey County requesting to be kept informed as the project moves forward. The letter states, "The ETMC wants to be consulted should cultural resources be encountered as a result of excavation or grading during the project."

Date	Contact Type	From	To	Communications
6/22/2020	Telephone call	Dudek	Louise Miranda-Ramirez, Chairperson, Ohlone/Costanoan-Esselen Nation	Follow up call requesting information on resources within the Project Area and/or comments. Ms. Miranda-Ramirez did not pick up so Dudek left a voicemail message.
6/22/2020	Telephone call	Dudek	Christanne Arias, Vice Chairperson, Ohlone/Costanoan-Esselen Nation	Follow up call requesting information on resources within the Project Area and/or comments. Ms. Arias did not pick up so Dudek left a voicemail message.
7/22/2020	Email	Irenne Zwierlein, Chair of Amah Mutsun Tribal Band of Mission San Juan Bautista Ohlone Costanoan	Dudek	Two emails. One asked results from NWIC records search. The other email recommended that all crews involved in earth moving receive Cultural Sensitivity training.

APPENDIX D

CONFIDENTIAL DPR Forms for Newly Recorded Resources

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code **Reviewer** **Date**

Page 1 **of** 2 *__Resource Name or #:__ GZ-I-01

P1. Other Identifier:

***P2. Location:** ☒ **Not for Publication** ☐ **Unrestricted** ***a. County:** Monterey

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Palo Escrito Peak **Date:** 2018 **T** 16S; **R** 5E ; S **½ of** SW **¼ of Sec** 31**;** M.D. **B.M.**

c. Address: City: Zip:

d. UTM: Zone: 10S; 637376.47 mE/ 4039346.72 mN (G.P.S.)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation: 123 f amsl

From the Alta Street Exit off Hwy 101, travel southeast 1.9 miles. Turn right onto Gonzales River Road. Continue 1.9 miles and park. Resource is on the right, along a dirt farm road adjacent to Gonzales River Road.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The resource is an isolated brown chert tertiary flake measuring 14 mm x 10 mm x 3 mm. It is located along a dirt farm road adjacent to Gonzales Road in an area heavily disturbed by farming. No other indication of a site were present, such as midden soil, fire-affected rock or other artifacts.

***P3b. Resource Attributes:** (List attributes and codes) AP2. Lithic Scatter

***P4. Resources Present:** ☐Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☒Other (Isolates, etc.)

P5a. Photo or Drawing

P5b. Description of Photo: (View, date, accession #) Chert tertiary flake, plan view. 5/19/2020 (IMG_2022)

***P6. Date Constructed/Age and Sources:** ☐Historic ☒Prehistoric ☐Both

***P7. Owner and Address:**
City of Gonzales
147 4th Street
Gonzales, CA 93926

***P8. Recorded by:**
S. Brewer and J. Royer
Dudek
725 Front Street, Suite 400
Santa Cruz, CA 95060

***P9. Date Recorded:** 5/19/2020

***P10. Survey Type:**
Intensive (15 meter transects)

***P11. Report Citation:** Brewer, S. and R. Brady. 2020. Cultural Resources Inventory Report for the City of Gonzales Separate Industrial Water Recycling Facility Project, Gonzales, Monterey County, California. Prepared for the City of Gonzales.

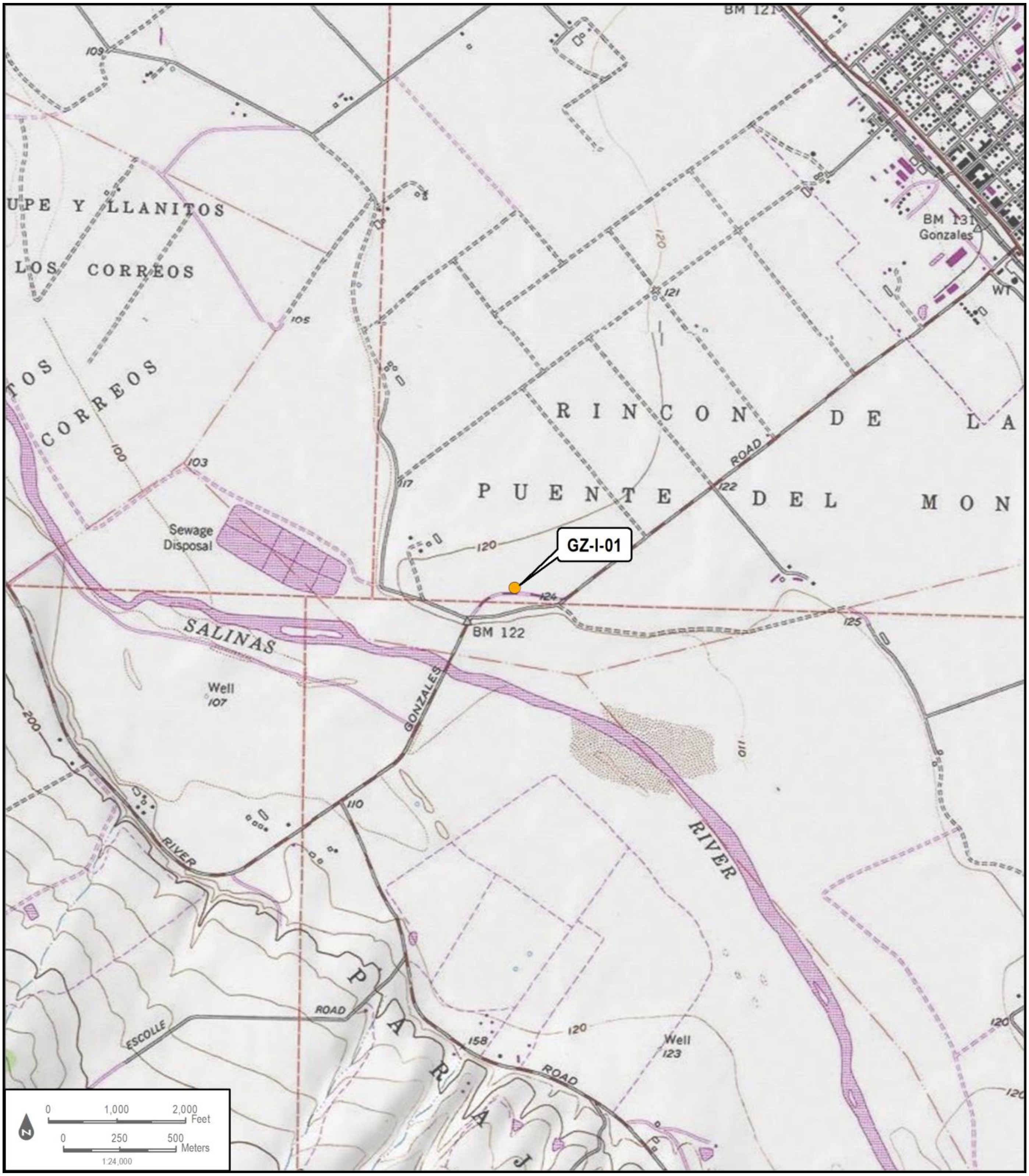
***Attachments:** ☐NONE ☒Location Map ☐Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

Page 1 **of** 1 ***Resource Name or #:** GZ-I-01

***Map Name:** GZ-I-01 Location Map ***Scale:** 1:24,000 ***Date of Map:** 6/25/2020



DPR 523J (1/95) ***Required information**

Appendix F

Geological Investigation

GEOTECHNICAL INVESTIGATION

GONZALES INDUSTRIAL WASTEWATER RECYCLING FACILITY
GONZALES, CALIFORNIA

FOR
DUDEK CONSULTING
ENCINITAS, CALIFORNIA

Pacific Crest
ENGINEERING INC

CONSULTING GEOTECHNICAL ENGINEERS

19125-M267-D41
MARCH 2020
www.4pacific-crest.com

Pacific Crest
ENGINEERING INC

GEOTECHNICAL | ENVIRONMENTAL | CHEMICAL | MATERIAL TESTING | SPECIAL INSPECTIONS

March 2, 2020 Project No. 19125-M267-D41

Phillip Giori, P.E.
DUDEK Consulting
750 Second Street
Encinitas, CA 92024

Subject: **Geotechnical Investigation – Design Phase**
Gonzales Industrial Wastewater Recycling Facility
APN 223-061-002, 223-061-014, 223-061-017, 223-061-019, 223-061-020
Short Road
Gonzales, California

Dear Mr. Giori,

In accordance with your authorization, we have performed a geotechnical investigation for the proposed industrial wastewater recycling facility (IWRF) located at the terminus of Short Road in Gonzales, California.

The accompanying report presents our conclusions and recommendations as well as the results of the geotechnical investigation on which they are based. The conclusions and recommendations presented in this report are contingent upon our review of the plans during the design phase of the project, and our observation and testing during the construction phase of the project.

Very truly yours,

PACIFIC CREST ENGINEERING INC.

Elizabeth Mae Mitchell

ELIZABETH MAE MITCHELL
GE2718
Exp. 12/31/20

Elizabeth M. Mitchell, GE
President/Principal Geotechnical Engineer
GE 2718
Expires 12/31/20

Copies: 3 to Client

TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION REPORT
Gonzales Industrial Wastewater Recycling Facility
Gonzales, Santa Cruz

I. INTRODUCTION

PURPOSE AND SCOPE

This report describes the geotechnical investigation and presents our conclusions and recommendations for the proposed industrial wastewater recycling facility (IWRF) located at the terminus of Short Road in Gonzales, California. For purposes of this report, "site" refers to the proposed location of the IWRF and associated pipeline alignment as described in this report.

Our scope of services for this project has consisted of:

1. Site reconnaissance to observe the existing conditions and review of geologic and topographic maps, subsurface boring data from a 2005 geotechnical study performed for this site, and other available literature.
2. Review of the Draft Preliminary Engineering Report (DPER), prepared by Wallace Group dated February, 2020.
3. The advancement of four (4) cone penetration test (CPT) soundings.
4. The drilling and logging of four (4) test borings.
5. Laboratory analysis of retrieved soil samples.
6. Engineering analysis and review of data collected from our literature review and prior field exploration programs. This information was used to develop qualitative and quantitative geotechnical recommendations pertinent to the design and construction of the proposed project. Our analysis included quantitative evaluation of seismically-induced settlement, development of lateral earth pressures and foundation design criteria, development of general earthwork, materials and utility trench recommendations, and discussion of pertinent seismic and geotechnical hazards.
7. Preparation of this report documenting our investigation and presenting geotechnical recommendations for the design and construction of the project.

PROJECT LOCATION

The subject site is located immediately adjacent to the north side of the existing Gonzales Wastewater Treatment Plant (WWTP) facility located at the terminus of Short Road in the City of Gonzales. Please refer to the Regional Site Map, Figure No. 1, in Appendix A for the general vicinity of the project site, which is approximately located by the following coordinates:

Latitude = 36.493690 degrees
Longitude = -121.477531 degrees

PROPOSED IMPROVEMENTS

Based on discussions with DUDEK Consulting and review of February 2020 DPER, it is our understanding that the City of Gonzales intends to construct a new industrial wastewater recycling facility (IWRF) to be sited across five (5) parcels located immediately adjacent to the north side of the City's existing waste water treatment facility. The new facility will receive and treat industrial wastewater from the Gonzales Agricultural Business Industrial Park (GAIBP) located approximately 1.5 miles to the west. The proposed treatment system for the new IWFR will be a deep-aerated pond system along with associated infrastructure. The project is still in early stages of design, however it is our understanding that Phase 1 design and construction will include the following components:

Influent pump station situated approximately 14 feet below grade
Influent flow metering and screening structures
Two flow equalization (EQ) basins approximately 10 feet in depth (lined)
Three deep-aerated process treatment ponds approximately 25 feet in depth (lined)
32 acres of effluent rapid percolation beds approximately 3 feet in depth (unlined)

The industrial wastewater will be conveyed from the GAIBP to the new facility via a 21-inch trunk sewer line. The proposed pipeline alignment will traverse approximately 2.24 miles (11,800 linear feet) from Puente del Monte (near Catherine Street), along Gonzales River Road and Short Road, entering the headworks at the east end of the proposed facility.

If the proposed development differs significantly from that described above, our office should be contacted for additional recommendations.

II. INVESTIGATION METHODS

FIELD INVESTIGATION

Four (4), 8-inch diameter test borings were drilled along the proposed pipeline alignment on December 10, 2019. The approximate location of the test borings is shown on Figure No. 2A, in Appendix A. The drilling method used was hydraulically operated continuous flight augers on a truck mounted drill rig. A staff geologist from Pacific Crest Engineering Inc. was present during the drilling operations to log the soil encountered and to choose sampler type and locations.

Relatively undisturbed soil samples were obtained at various depths by driving a split spoon sampler 18 inches into the ground. This was achieved by dropping a 140-pound hammer a vertical height of 30 inches. The hammer was actuated with a wire winch. The number of blows required to drive the sampler each 6-inch increment and the total number of blows required to drive the last 12 inches was recorded by the field engineer. The outside diameter of the samplers used was 3-inch or 2-inch and is designated on the Boring Logs as "L" or "T", respectively.

The field blow counts in 6-inch increments are reported on the Boring Logs adjacent to each sample as well as the Standard Penetration Test data (SPT). All SPT data has been normalized to a 2-inch O.D. sampler and is reported on the Boring Logs as SPT "N" values. The normalization method used was derived from the second edition of the Foundation Engineering Handbook (H.Y. Fang, 1991). The method utilizes a Sampler Hammer Ratio which is dependent on the weight of the hammer, height of hammer drop, outside diameter of sampler, and inside diameter of sample.

The soils encountered in the borings were continuously logged in the field and visually described in accordance with the Unified Soil Classification System (ASTM D2488) as described in the Boring Log Explanation, Figures No. 3 and 4, in Appendix A. The soil classification was verified upon completion of laboratory testing in accordance with ASTM D2487.

Appendix A contains the site plan showing the locations of the test borings, our borings logs and an explanation of the soil classification system used. Stratification lines on the boring logs are approximate as the actual transition between soil types may be gradual.

CONE PENETROMETER TESTING

Four (4) cone penetrometer (CPT) soundings were advanced on November 13, 2019. The CPT soundings were located at accessible locations (compacted dirt farm roads) within the proposed footprint of the new IWRF facility. A staff geologist from Pacific Crest Engineering Inc. was present to supervise the field operations. The soundings were performed in accordance with the ASTM D5778 test method. The locations of the CPT soundings are shown on Figure No. 2B of Appendix A.

The CPT soundings were advanced using a 15 cm^2 piezocone penetrometer with a friction sleeve. A saturated piezo element is placed between the cone and the friction sleeve to obtain dynamic pore pressure parameters. Continuous measurements were made of the tip resistance, the friction sleeve resistance, and the dynamic pore pressure as the cone was pushed into the ground. Please refer to the CPT Report in Appendix B for a more comprehensive discussion of the Cone Penetration Test and associated references regarding CPT interpretations and calculated geotechnical parameters.

Real time data along with correlations between these measurements and soil properties were observed as the probe was advanced so that PCE could determine the depth of soundings required. CPT-1 (Elevation 109 feet), advanced along the southern perimeter of the site in the vicinity of the proposed process ponds. was terminated at a depth of 51.76 feet. CPT-2 (Elevation 107 feet) and CPT-3 (Elevation 110 feet) were located within the area of the proposed rapid infiltration ponds and were advanced to depths of 35.68 and 51.1 feet, respectively. CPT-4 (Elevation 114 feet) was located near the proposed headworks and advanced to a depth of 38.71 feet.

The results of the CPT site investigation, including plots with interpreted soil types, are presented in Appendix B.

LABORATORY TESTING

The laboratory testing program was developed to aid in evaluating the engineering properties of the materials encountered at the site. Laboratory tests performed include:

- Moisture Density relationships in accordance with ASTM D2937.
- Field penetrometer testing to approximate unconfined compressive strength.
- Gradation testing in accordance with ASTM D1140.
- Atterberg Limits testing in accordance with ASTM D4318.
- Expansion Index testing in accordance with ASTM D4829.
- Unconfined Compression testing in accordance with ASTM D2166.
- Corrosivity testing in accordance with California 643 (Minimum Resistivity), California 422 (Chlorides), California 417 (Sulfates) and California 643 (pH).

The results of the laboratory testing are presented on the boring logs opposite the sample tested and/or presented graphically in Appendix A.

III. FINDINGS AND ANALYSIS

GEOLOGIC SETTING

The surficial geology in the area of the project site is mapped as Alluvial Deposits (Dibblee Jr. 2006). The deposits locally are described as *"Alluvial gravel, sand and silt/clay of valley areas and stream channels."* The alluvium materials encountered during our field investigation are generally consistent with this description.

SURFACE CONDITIONS

The proposed IWRF site is currently occupied by agricultural fields. The agricultural fields are currently used by local farmers who grow and harvest a variety of crops. During our field investigation, approximately 30% to 40% of the land was planted with crop. The remaining land was disked in preparation for new crops. Most of the site was saturated due to recent storm activity; therefore the CPT soundings were located at accessible locations (compacted dirt farm roads) within the proposed footprint of the new IWRF facility. Areas that were planted, recently harvested or disked in preparation for planting were soft and therefore inaccessible to our drilling equipment.

The proposed pipeline alignment will traverse approximately 2.24 miles (11,800 linear feet) from Puente del Monte (near Catherine Street), along Gonzales River Road and Short Road. Puente del Monte and Gonzales River Road are developed, well-travelled roads, subject to moderate traffic volumes by cars, trucks, semi-trucks and trucks and equipment associated with the agriculture industry.

Short Road is an unpaved farm road composed primarily of well compacted soil but moderately rutted. Areas consisting of asphaltic concrete (AC) are generally relatively thin and very worn. This road is subject to light traffic volumes of large trucks and vehicles associated with nearby farming and composting operations off of Short Road. This road also provides vehicle access to the existing WWTP.

SUBSURFACE CONDITIONS

2020 Investigation

Our subsurface exploration consisted of four (4) shallow test borings drilled along the proposed pipeline alignment, and four (4) CPT soundings advanced within the proposed IWRF site. The borings advanced along the pipeline alignment were generally sited within the road shoulder.

The following briefly describes the general subsurface soil conditions encountered within the test borings and CPT soundings. The Logs of Test Borings in Appendix A and CPT plots in Appendix B provide, in more descriptive terms, the soil profiles and classifications, laboratory test results and groundwater conditions encountered at each boring location.

Subsurface conditions encountered along the proposed pipeline alignment consisted of interbedded sandy clay, sandy silt, and clayey to silty sand. The coarser grained sand material was generally described as poorly graded and very fine to fine grained with a trace amount of medium grains. The alluvial deposits are overlain by pavement sections ranging from five (5) to six (6) inches of asphaltic concrete (AC) and seven (7) to nine (9) inches of aggregate baserock. The exception was B-4 which was advanced in Short Road. Neither AC nor AB were encountered within this boring.

Subsurface conditions within the proposed IWRF footprint, as interpreted by the CPT, was consistent with alluvial materials. According to the “Presentation of Site Investigation Results” presented within Appendix B of this report, the subsurface soils within the proposed IWRF site consist of thick beds of sand with relatively thin, discontinuous lenses of sand mixtures, silt mixtures and clay.

Phreatic surfaces were noted within all four CPT soundings with initial depths ranging from 11.4 to 23.1 feet. Groundwater was not encountered within any of the four shallow test borings along the pipeline alignment. The below table lists the locations and corresponding depths in which the groundwater was encountered.

TABLE No. 1 – Groundwater[1] Summary

Location	Depth to Groundwater
CPT-1	20.0 feet
CPT-2	11.4 feet
CPT-3	23.1 feet
CPT-4	22.8 feet

NOTE 1: Groundwater, or the assumed phreatic surface was based on the results of the shallowest pore pressure dissipation test. The dissipation test was performed within each sounding and hydrostatic conditions were assumed.

It should be noted that actual groundwater levels level may be higher or lower than initially encountered. At its closest point, the site is approximately 1,400 feet northeast of the Salinas River. Therefore, it should be anticipated that there will be variability in the depth to groundwater depending upon the season and the river level. The groundwater conditions described in this report reflect the conditions encountered during our drilling investigation in November of 2019 at the specific locations drilled. It must be anticipated that the perched and regional groundwater tables may vary with location and could fluctuate with variations in rainfall, runoff, irrigation and other changes to the conditions existing at the time our measurements were made.

2005 Investigation

A geotechnical investigation for a proposed grit separator and pond expansion project was completed by PCEI at the subject site in 2005. The investigation included the advancement of 11 borings ranging in depth from 15 feet to 45 feet below ground surface. Figure No. 2B, located within Appendix A of this report, depicts the boring locations drilled for this study in December of 2004. Please refer to the Logs of Test Borings in Appendix C for the soil profiles and classifications, laboratory test results and groundwater conditions encountered at each boring location.

B-1(04) and B-6(04), advanced in the vicinity of the proposed headworks and flow EQ basins for the new IWRF, were advanced to a depth of 45 and 31½ feet, respectively. Subsurface soils consisted of interbedded lean clay, silt, sandy silt, silty sand and sand consistent with alluvial deposits. Lean to high plasticity clay lenses were encountered from 9 to 25 feet below ground surface. Expansive clay was encountered within B-6(04) at a depth of 10 feet below ground surface. Finer grained soils had sand contents ranging from 3% to 33% and consistencies described as firm to stiff. Coarser grained soils were generally very fine grained with densities ranging from loose to medium dense. Fines content within the sandy strata ranged from 4% to 25%.

The remaining 10 borings were advanced at various locations within the proposed footprint of the new process and rapid infiltration ponds. The borings ranged in depth from 15 to 31½ feet below ground surface. Soils encountered within these borings generally consisted of poorly to well graded sands with discontinuous beds of sandy silts and expansive clay. Clay lenses were encountered at various depths within B-5(04), and B-10(04). Fine grained soil strata exhibited firm to very stiff consistency. Densities of sandy strata were described as medium dense. Inorganic silt and organic clay and silt of medium to high plasticity was encountered within B-1 at a depth of 20 feet below ground surface.

Groundwater was encountered within 5 of the 11 borings at the locations and depths listed below:

TABLE No. 2 – Groundwater Summary (2005 Study)

Location	Depth to Groundwater
B-1	23 feet
B-2	17 feet
B-4	17 feet
B-5	13 feet
B-6	22 feet

SOIL CORROSIVITY

Corrosion is an electrochemical process involving oxidation and reduction reactions. To help determine the corrosive potential of the earth materials along the pipeline alignment, three samples of the earth materials underlying the proposed alignment were collected and analyzed. The samples were tested for concentrations of chloride (Cl) and sulfate (SO_4), and for pH values and resistivity. The laboratory corrosivity test results are included in Figure No. 10 in Appendix A of this report. The analytical results are summarized below.

TABLE No. 3 - Corrosivity Test Summary

Sample	Approximate Sample Depth (ft)	Soil Resistivity	Chloride	Sulfate (water soluble)	pH
		Ohm-cm	mg/kg	mg/kg	
1-3	5	2242	5	81	8.6
3-3	5	777	85	286	8.9
4-3	5	1101	75	150	8.6

CalTrans defines soil corrosivity in terms of resistivity, pH and soluble salt content (chloride and sulfate concentrations). Refer to the CalTrans Corrosion Guidelines, Version 3.0 (March, 2018) for additional information. According to the Cal Trans Corrosion Guidelines, a corrosive area is defined as an area where the soil and/or water meets one or more of the following conditions:

- The soil resistivity is less than 1,100 ohm-cm
- Chloride concentration is greater than or equal to 500 mg/Kg (ppm)
- Sulfate concentration is greater than or equal to 1500 mg/Kg (ppm)
- The soil pH is 5.5 or less

In comparing the test results to the threshold values, we have determined that soils within B-3 and B-4 may be corrosive due to low resistivity values. The remaining samples did not meet the CalTrans threshold values for corrosivity. The corrosion potential for any imported select fill or bedding sand should also be tested for corrosivity.

The project civil and structural engineer and/or corrosion specialist should review the aforementioned test results and apply mitigating measures for achieving the design service life of the structure, as they deem necessary.

FAULTING AND SEISMICITY

Faulting

Mapped faults which have the potential to generate earthquakes that could significantly affect the subject site are listed in Table No. 4. The fault distances are approximate distances based on the U.S.

Geological Survey and California Geological Survey, Quaternary fault and fold database, accessed in July of 2018 from the USGS website (http//earthquake.usgs.gov/hazards/qfaults/), and overlaid onto Google Earth.

TABLE No. 4 - Distance to Significant Faults

Fault Name	Distance (miles)	Direction
Reliz	1½	Southwest
Monterey Bay – Tularcitos	8½	Southwest
San Andreas	17	Northeast
Pinerock	17½	Northeast
San Benito	18	Northeast
Bradford	21½	Northeast

Seismic Shaking and CBC Design Parameters

Due to the proximity of the site to active and potentially active faults, it is reasonable to assume the site will experience high intensity ground shaking during the lifetime of the project. Structures founded on thick soft soil deposits are more likely to experience more destructive shaking, with higher amplitude and lower frequency, than structures founded on bedrock. Generally, shaking will be more intense closer to earthquake epicenters. Thick soft soil deposits large distances from earthquake epicenters, however, may result in seismic accelerations significantly greater than expected in bedrock.

Selection of seismic design parameters should be determined by the project structural designer. The site coefficients and seismic ground motion values shown in the table below were developed based on CBC 2019 incorporating the ASCE 7-16 standard, the project site location, and the specific assumptions as outlined in Notes 2 through 4 below.

TABLE No. 5 - 2019 CBC Seismic Design Parameters [1, 2, 3]

Seismic Design Parameter	ASCE 7-16 Value
Site Class	E $^{\text{Note 4}}$
Spectral Acceleration for Short Periods	Ss = 1.525g
Spectral Acceleration for 1-second Period	S_1 = 0.537g
Short Period Site Coefficient	Fa = 1.2 $^{\text{Note 2}}$
1-Second Period Site Coefficient	Fv = 2.0 $^{\text{Note 3}}$
MCE Spectral Response Acceleration for Short Period	S_{MS} = 1.830 $^{\text{Note 2}}$
MCE Spectral Response Acceleration for 1-Second Period	S_{M1} = 1.074g $^{\text{Note 3}}$
Design Spectral Response Acceleration for Short Period	S_{DS} = 1.220g $^{\text{Note 2}}$
Design Spectral Response Acceleration for 1-Second Period	S_{D1} = 0.716g $^{\text{Note 3}}$

Note 1: S_S and S_1 values have been obtained by using the ASCE Hazard Tool at https://asce7hazardtool.online

Note 2: Per Section 11.4.8 of ASCE 7-16, a ground motion hazard analysis is required for Site Class E sites with S_S greater than or equal to 1.0. The values provided above for F_a, S_{Ms} and S_{DS} assume that this is not a seismically isolated structure or structure with damping systems, and Exception 1 of Section 11.4.8 is therefore applicable. **This should be verified by the structural engineer, and Pacific Crest Engineering, Inc. should be contacted for revised Table 2 parameters if Exception 1 is not applicable to the project.**

Note 3: Per Section 11.4.8 of ASCE 7-16, a ground motion hazard analysis is required for Site Class E sites with S_1 greater than or equal to 0.2. The values provided for F_v, S_{M1} and S_{D1} assume that: (1) this is not a seismically isolated structure or a structure with damping systems, (2) F_v can be obtained from Table 1613.2.3(2) of the 2019 CBC, and (3) Exception 3 of Section 11.4.8 is applicable (i.e, the fundamental period of the structure T is less than or equal to Ts as defined in Section 11.4.6.4 of ASCE 7-16 and equivalent static force procedure is used for design). **This should be verified by the project structural engineer and Pacific Crest Engineering, Inc. should be contacted for revised Table 2 parameters if these assumptions are not applicable to the project**.

Note 4: The site would normally be Site Class F because it is underlain by potentially liquefiable soils. If the fundamental period of vibration of the structure is less than 0.5 seconds, the site class can be determined by assuming there is no liquefaction (ASCE 7-16 Section 20.3.1). Therefore, Site Class E was selected for the project site. **The project structural engineer should verify the structure period and Pacific Crest Engineering should be contacted for revised Table 2 parameters if it exceeds 0.5 seconds**.

The recommendations of this report are intended to reduce the potential for structural damage to an acceptable risk level, however strong seismic shaking could result in the need for post-earthquake repairs.

GEOTECHNICAL HAZARDS

Geotechnical hazards which may affect project sites in the Gonzales area include ground shaking, ground surface rupture, liquefaction and lateral spreading, landsliding and expansive soils.

Ground Surface Fault Rupture

Pacific Crest Engineering Inc. has not performed a specific investigation for the presence of active faults at the project site. Based upon our review of the Monterey County GIS Hazard Maps, the project site is not mapped within a fault hazard zone.

Ground surface fault rupture typically occurs along the surficial traces of active faults during significant seismic events. Since the nearest known active, or potentially active fault trace is mapped approximately 1½ miles from the site, it is our opinion that the potential for ground surface fault rupture to occur at the site should be considered low.

Liquefaction and Lateral Spreading

Liquefaction is a phenomenon that can occur in saturated soil that has restricted drainage and is subject to seismic shaking. Liquefaction occurs when the soil grains are cyclically accelerated such that they begin to loose contact, allowing pressurized pore water to flow between soil particles. The soil, which derives its strength from point-to-point contact between grains, can become fluidized, resulting in significantly lower shear strengths. When the cyclic accelerations cease, the water pressure dissipates and the soil grains settle, regaining contact. Settlement can be differential due to the presence of non-homogeneous earth materials and due to differential densification and dewatering processes.

Liquefaction can result in bearing failure and differential ground settlement, which can be highly damaging to structures, pavements and utilities.

Substantial advances in liquefaction engineering have occurred over the past 15 years. Liquefaction science has expanded to examine strength loss of low plasticity silts and clays during cyclic earthquake shaking. We have the following understanding of the current state of the liquefaction science:

Classic cyclic liquefaction, as described above, can occur in undrained soil with low cohesion (Plasticity Index less than about 7 to 12). Liquefaction of “sand-like” soils occurs at the “onset of high excess water pressures and large shear strains during undrained cyclic loading” (Boulanger, 2004). Undrained soils with relatively high cohesion (Plasticity Index greater than about 12 to 20) may be subject to “cyclic failure”, which may result in similar surface manifestations as liquefaction. The transition between “cyclic liquefaction” of sand-like soils and “cyclic failure” of clay-like soil is thought to be gradual depending on the fines content, the water content, and the plasticity of the soil.

The potential for liquefaction was evaluated quantitatively for this project, based upon the data obtained from our CPT soundings. Our analysis considered a magnitude 6.6 earthquake and an estimated peak ground acceleration (PGA_M) value of 0.664g. A design groundwater depth of 15 feet below ground surface was incorporated into our analysis.

Liquefaction potential was evaluated with the assistance of Geologismiki software CLIQ version 2.3.1.15, which is based upon recent advances in soil liquefaction engineering as presented by Idriss & Boulanger (2014).

Based on the results of our analysis it is our opinion that there is a very high probability of liquefaction to occur at the project site during strong seismic shaking. Please refer to Appendix D for the model parameters and the results we obtained.

Estimated settlements due to liquefaction-induced settlement were also calculated using CLIQ, based upon the work of Idriss & Boulanger (2008) and Zhang, Robertson et. al (2002). On the basis of our analysis, we estimate the magnitude of possible seismically-induced ground surface settlement to be on the order of 8 to 12 inches. We estimate the differential settlement would be about half of the total settlement.

It must be cautioned that liquefaction analysis is an inexact science and the mathematical models of the liquefaction and liquefiable soils contain many simplifying assumptions, not the least of which are isotropy and homogeneity. Liquefaction analyses and the generated factors of safety should be used as indicating trend lines. A soil deposit with a safety factor less than one will not necessarily fail, but the probability of settlement will be greater than a soil deposit with a higher safety factor. Conversely, a soil deposit with a safety factor greater than one may fail, but the probability of stability is higher than a soil deposit with a lower safety factor.

Lateral spreading can occur when a liquefied soil oscillates back and forth breaking the non-liquefied soil crust into segments that progressively move toward a free slope face during the cyclic earthquake loading. Lateral spreading is characterized by small to moderate displacements that are distributed across the site. Lateral spreading can occur on sites that are underlain by liquefied soil strata characterized by standard penetration test “N-values” of 15 and less, such those as encountered at the project site. Due to the proximity of the facility to the banks of the Salinas River, in conjunction with a high potential for liquefaction across the site, it is our opinion that site facilities could be impacted by lateral spreading following a strong seismic event.

Landsliding

The subject site and immediate vicinity are relatively flat. It is our opinion that the potential for shallow landsliding to occur and adversely affect the proposed development may be considered negligible.

Expansive Soils

The subject site is underlain by discontinuous lenses of expansive clay and high plasticity silts at various locations and depths. Expansive soils tend to heave during the rainy season and contract during the summer and this shrink/swell action extends down to the depth of seasonal moisture change. When this cyclical volume change occurs on sloping ground it results in “soil creep” due to the downward vector of the shrink/swell action. Seasonal moisture fluctuation and subsequent expansion and contraction of these types of soils typically occurs more near the ground surface where the seasonal moisture fluctuation is the greatest and decreases with depth below ground surface.

IV. DISCUSSION AND CONCLUSIONS

GENERAL

1. The results of our investigation indicate that the proposed IWRF and associated pipeline are feasible from a geotechnical engineering standpoint, provided our recommendations are included in the design and construction of the project.

2. Grading and foundation plans should be reviewed by Pacific Crest Engineering Inc. during their preparation and prior to contract bidding.

3. Pacific Crest Engineering Inc. should be notified at least four (4) working days prior to any site clearing and grading operations on the property in order to observe the stripping and disposal of unsuitable materials, and to coordinate this work with the grading contractor. During this period, a pre-construction conference should be held on the site, with at least the client or their representative, the grading contractor, a City representative and one of our engineers present. At this meeting, the project specifications and the testing and inspection responsibilities will be outlined and discussed.

4. The validity of the findings, conclusions and recommendations contained in this report are dependent upon an adequate testing and observation program during the construction phase. Field observation and testing must therefore be provided by a representative of Pacific Crest Engineering

Inc., to enable us to form an opinion as to whether the extent of work related to earthwork or foundation excavation complies with the project plans, specifications and our geotechnical recommendations. It is the responsibility of the owner, or their representative, to ensure that the information and recommendations provided by Pacific Crest Engineering, Inc. are called to the attention of the contractor and subcontractors and that the necessary steps are taken to ensure that such recommendations are carried out in the field. Pacific Crest Engineering assumes no responsibility for the future performance of work related to grading or foundation excavation that is performed without the full knowledge and direct observation of Pacific Crest Engineering Inc.

PRIMARY GEOTECHNICAL CONSIDERATIONS

5. The following section provides geotechnical considerations for the design and construction of the pipeline and are intended for use in design of the project and preparation of the project plans and specifications. It is neither the intent nor within the scope of this investigation to recommend construction procedures or methods used by the contractor. It is the responsibility of the contractor to use sound construction procedures and methods of the industry in accordance with local, state and federal safety standards.

6. Variations in soil conditions due to agricultural processing, local grading, or seismic activity can occur and should be expected. Therefore, subsurface conditions may differ from those observed or inferred from this investigation.

7. Based upon the results of our investigation, it is our opinion that the primary geotechnical issues associated with the design and construction of the proposed project are the following:

a. *Seismically-Induced Settlement*: The primary geotechnical hazard affecting the proposed project is the potential for liquefaction of the subsurface soils during a strong seismic event. Structural improvements should be founded on a reinforced concrete structural mat foundation bearing upon zone of engineered fill that has been placed and compacted in accordance with the recommendations of this report. The mat foundation should be designed to span areas of potential settlement (either due to static building loads or strong seismic shaking). Portions of the pipeline may require repair following a strong seismic event.

b. *Compressible Soils and Divergent Bearing Conditions*: Variable and compressible native soils underlie the proposed IWRF site. Foundations, concrete slabs-on-grade, and pavements underlain by compressible material may be subject to settlement and distress. In order to reduce potential settlement and distress we recommend that soils underlying proposed structure foundations be subexcavated and recompacted with engineered fill. Pond liners should be placed on firm and stable ground in accordance with the recommendations of this report.

c. *Shallow Groundwater:* Groundwater has been noted as high as 11 feet below existing grades at the IWRF site. Shallow groundwater or saturated soil conditions could affect excavation conditions, compaction requirements, backfill specifications and bearing capacity. It should be anticipated that groundwater will be encountered during construction of below grade structures. Below grade structures may be subject to uplift from buoyancy forces.

Based on a design depth of 25 feet for the proposed process ponds, it is likely that the groundwater levels could rise above the bottom of pond elevation. Should a rise in groundwater above the bottom of the process ponds (and/or flow EQ basins) coincide with the ponds being empty, there is a potential for the impermeable liner to become detached from the base of the pond excavation and float. Furthermore, dewatering of the pond excavations may be necessary during construction in order to facilitate the necessary grading activities. To reduce the hazard of high groundwater conditions, we recommend that the ponds not be allowed to completely empty during periods of high groundwater, and/or be designed with a base elevation that does not exceed ten feet below existing grades.

d. *Expansive Soils:* High plasticity, potentially expansive soils have been identified throughout the project area. These materials should not be used as backfill beneath or around structures or as trench backfill.

e. *Excavation Conditions:* We anticipate excavations should be possible with conventional excavation equipment, however variations in soils conditions are likely and should be expected during construction. The silt and/or sand layers below the groundwater table may be particularly susceptible to caving and it should be anticipated that caving soils will be encountered during construction.

Where very moist or saturated sands and soft clays are encountered, side wall instability is likely to necessitate shoring of excavation or trench walls. Any temporary sloping or shoring of trenches and excavations (including temporary dewatering, if required) will be the responsibility of the contractor.

f. *Strong Seismic Shaking:* The project site is located within a seismically active area and strong seismic shaking is expected to occur within the design lifetime of the project. Improvements should be designed and constructed in accordance with the most current CBC Standards and the recommendations of this report to minimize reaction to seismic shaking. Improvements designed and constructed in accordance with applicable codes have an increased potential for experiencing relatively minor damage which should be repairable, however strong seismic shaking could result in the need for post-earthquake repairs.

V. RECOMMENDATIONS

EARTHWORK

Clearing and Stripping

1. The initial preparation of the site will consist of the removal of deleterious material, including any vegetation as required, abandoned improvements, and any associated debris. Buried tanks and/or piping, if found, must be completely removed. Tree removal should include the entire stump and root

ball. The extent of this soil removal will be designated by a representative of Pacific Crest Engineering Inc. in the field. This material must be removed from the site.

2. Any voids created by the removal of old structures and their foundations, tree and root balls, septic tanks, and leach lines must be backfilled with properly compacted native soils that are free of organic and other deleterious materials or with approved engineered fill. Backfill material, whether it consist of native soils or engineered fill, must be compacted in accordance with the recommendations provided in this report.

3. Any wells encountered shall be capped in accordance with the requirements and approval of the County Health Department. The strength of the cap shall be equal to the adjacent soil and shall not be located within 5 feet of a structural footing.

4. Surface vegetation, tree roots and organically contaminated topsoil should then be removed ("stripped") from the area to be graded. In addition, any remaining debris or large rocks must also be removed (this includes asphalt or rocks greater than 2 inches in greatest dimension). This material may be stockpiled for future landscaping.

5. It is anticipated that the depth of stripping may be as much as 12 inches in agricultural areas. Final required depth of stripping must be based upon visual observations by a representative of Pacific Crest Engineering Inc., in the field. The required depth of stripping will vary based upon the type and density of vegetation across the project site and with the time of year.

Subgrade Preparation

6. It is possible that there are areas of man-made fill at the site that our field investigation did not detect. Areas of man-made fill, if encountered within planned structural improvement areas, will need to be completely excavated to undisturbed native material. The excavation process should be observed and the extent designated by a representative of Pacific Crest Engineering Inc., in the field. Any voids created by fill removal must be backfilled with properly compacted engineered fill.

Process and Flow EQ Basins

7. After clearing and stripping and backfilling of voids, the exposed soils in the area of the proposed process treatment ponds and flow EQ basins should be subexcavated to design grades. The base of the excavation should be scarified a minimum of 12 inches, moisture conditioned and compacted in accordance with the recommendations of this report.

Structural Improvements

8. Following the clearing, stripping and backfilling of voids, areas to receive structural improvements should be subexcavated to a depth of 3 feet below mat subgrade elevation. The exposed soils at the bottom of the excavation should then be scarified to a minimum depth of 8 inches, moisture conditioned, and compacted as an engineered fill except for any contaminated material noted by a representative of Pacific Crest Engineering Inc. in the field.

9. Following subexcavation and bottom processing, a layer of Mirafi 500X geotextile stabilization fabric (or equivalent) should be placed at the base of the excavation. The geotextile fabric should be overlapped at least 30 inches, and lapped up against the sidewalls of the excavation. The excavation should then be brought back to the subgrade elevation by the placement of imported Class 2 aggregate baserock as engineered fill. The aggregate base should be moisture conditioned and compacted in maximum 8 inch lifts.

10. Recompacted sections should extend 5 feet beyond the building area, unless site constraints preclude such horizontal limits.

Equipment Pads, Pavements and Hardscape Areas

11. Following the clearing, stripping and backfilling of voids areas to receive exterior equipment pads, pavements and/or other hardscape areas should be subexcavated as follows:

Exterior concrete flatwork/slabs: 24 inches below bottom of slab
Interior slab-on-grade: 24 inches below capillary break
Roadways and pavements: 12 inches below subgrade

12. Subexcavations should extend at least 5 feet horizontally beyond foundations and at least 2 feet horizontally beyond pavements and flatwork.

13. Final depth of subexcavation should be determined by a representative of Pacific Crest Engineering Inc., in the field.

14. Following clearing, stripping and any necessary subexcavations, the exposed subgrade soil that is to support concrete slabs-on-grade, foundations or pavements should then be scarified 8 inches, and the soil moisture conditioned and compacted as outlined below.

15. If wet or unstable subgrades are encountered, they may need to be further subexcavated and replaced with stabilization fabric, crushed rock or other materials to create a stable working surface. The depth of over-excavations and method used should be determined in the field at the time of construction. All subexcavations should be observed by a representative of Pacific Crest Engineering Inc. and modified as necessary to establish a stable subgrade below planned structures.

Material for Engineered Fill

16. All structural foundation elements should be underlain by Class 2 aggregate baserock as discussed above. In general, we anticipate that non-expansive native soils can be used as engineered fill for the remaining areas of the project. Moderate to highly expansive materials, if encountered, are not suitable as engineered fill below foundations or concrete slab-on-grade, or as trench backfill. If these materials are encountered during earthwork operations, it should be anticipated that additional processing will be required as recommended by a representative of Pacific Crest Engineering, Inc. Highly expansive clay soils, if encountered, will need to be removed replaced with non-expansive engineered fill.

17. Native and imported soil proposed for use as engineered fill should meet the following requirements:

   a. free of organics, debris, and other deleterious materials,
   b. free of "recycled" materials such as asphaltic concrete, concrete, brick, etc.,
   c. granular in nature, well graded, and contain sufficient binder to allow utility trenches to stand open,
   d. free of rocks in excess of 2 inches in size.

18. In addition to the above requirements, import fill should have a Plasticity Index between 4 and 12, and a minimum Resistance "R" Value of 30, and be non-expansive.

19. Samples of any proposed imported fill planned for use on this project should be submitted to Pacific Crest Engineering Inc. for appropriate testing and approval not less than ten (10) working days before the anticipated jobsite delivery. This includes proposed import trench sand, drain rock and for aggregate base materials. Imported fill material delivered to the project site without prior submittal of samples for appropriate testing and approval must be removed from the project site.

Engineered Fill Placement and Compaction

20. Following sub-excavation and any required subgrade preparation, excavations should be backfilled to finish grade with engineered fill that is moisture conditioned and compacted according to the recommendations of this report.

21. Engineered fill should be placed in maximum 8-inch lifts, before compaction, at a water content which is within 2 to 4 percent over the laboratory optimum value.

22. The maximum dry density will be obtained from a laboratory compaction curve run in accordance with ASTM Procedure #D1557. This test will also establish the optimum moisture content of the material. Field density testing will be performed in accordance with ASTM Test #D6938 (nuclear method).

23. Engineered fill should be placed in maximum 8-inch lifts, before compaction, at a water content which is within 2 to 4 percent of the laboratory optimum value. Clayey subgrade soils should be moisture conditioned to between 3 to 5 percent above the laboratory optimum.

24. All engineered fill should be compacted to a minimum of 95% of its maximum dry density.

25. The maximum dry density will be obtained from a laboratory compaction curve run in accordance with ASTM Procedure #D1557. This test will also establish the optimum moisture content of the material. Field density testing will be performed in accordance with ASTM Test #D6938 (nuclear method).

26. We recommend field density testing be performed in maximum 1-foot elevation differences. In general terms, we recommend at least one compaction test per 500 linear feet of utility trench or retaining wall backfill, and at least one compaction test per 2,000 square feet of embankment or structure area. These are subjective values and may be changed by the geotechnical engineer based on a review of the final project layout and exposed field conditions.

Soil Moisture and Weather Conditions

27. If earthwork activities are done during or soon after the rainy season, the on-site soils and other materials may be too wet in their existing condition to be used as engineered fill. These materials may require a diligent and active drying and/or mixing operation to reduce the moisture content to the levels required to obtain adequate compaction as an engineered fill. If the on-site soils or other materials are too dry, water may need to be added. In some cases the time and effort to dry the on-site soil may be considered excessive, and the import of aggregate base may be required.

CUT AND FILL SLOPES FOR POND CONSTRUCTION

28. We request the opportunity to review final pond related plans during the design phase in order to provide additional recommendations, if required. In the meantime, we offer the following general recommendations.

29. Based on a design depth of 25 feet for the proposed process ponds, it is likely that the groundwater levels could rise above the bottom of pond elevation. Depending on the time of year that construction ensues, dewatering of the pond excavations may be necessary during construction in order to facilitate the necessary grading activities. It is the contractor’s responsibility to design an adequate de-watering system for the project site, and to submit a detailed de-watering plan to the project civil and geotechnical engineer for review at least three weeks prior to the start of construction.

30. It is our understanding that the process and flow EQ ponds will be lined with a synthetic liner. The liner must meet any applicable requirements of the State Water Resources Control Board, and be installed in accordance with the recommendations of the product manufacturer. The liner system should contain any required leak detection provisions, including installation of a pan lysimeter monitoring device under the lowest point of the pond.

31. Should a rise in groundwater above the bottom of the process ponds (and/or flow EQ basins) coincide with the ponds being empty, there is a potential for the impermeable liner to become detached from the base of the pond excavation and float. To reduce the hazard of high groundwater conditions, we recommend that the ponds not be allowed to completely empty during periods of high groundwater, and/or be designed with a base elevation that does not exceed ten feet below existing grades.

32. All fill slopes and/or lined containment berms should be constructed with engineered fill meeting the minimum density requirements of this report and have a gradient no steeper than 3:1 (horizontal to vertical). A maximum slope gradient of 2:1 may be considered for fill slopes on the outboard side of the ponds. Unlined berms should be constructed with gradients no steeper than 3:1 horizontal to vertical and a maximum vertical height of 8 feet.

33. A base keyway should be provided along the outboard toe of all fill berms. The base keyway should be a minimum of 10 feet wide. The bottom of the keyway should be sloped inward on a negative gradient of at least 5%. The depth of the keyways will vary, depending on the materials encountered. It is anticipated that the depth of the keyways may be two (2) to three (3) feet, but at all locations shall be at least two (2) feet into firm material. Refer to Figure 13 in Appendix A for a typical fill berm detail.

34. A bench keyway should be provided at the cut/fill transition on the inboard side of the berm. The bench should be a minimum of 10 feet wide and sloped inward on a negative gradient of at least 5%.

35. Cut slopes in native soils, including the interior banks of ponds, shall not exceed a 3:1 (horizontal to vertical) gradient and a 15-foot vertical height unless specifically reviewed by a representative of Pacific Crest Engineering Inc.

36. Slopes for pond embankments should be laterally over-built at least one foot, and the slope face trimmed back to firm/compacted material.

37. The above slope gradients are based on the strength characteristics of the materials under conditions of normal moisture content that would result from rainfall falling directly on the slope, and do not take into account the additional activating forces applied by seepage through the pond berms. Therefore, in order to maintain stable slopes at the recommended gradients, it is important that synthetic liner be completely impermeable.

38. The above recommended gradients do not preclude periodic maintenance of the slopes, as minor sloughing and erosion may take place.

PIPELINE CONSTRUCTION AND UTILITIES

General

39. To prevent damage to existing utilities it is essential to identify their existence and location, including depth, prior to commencing with open cut or trenchless pipeline installation. General surface utility location methods, keyhole type vacuum excavations or other applicable methods should be used to locate utilities within the zone of influence and to verify their clearance from the pipe to installed.

40. Where pipe is required to be installed under railroad embankments, highways, streets, or other facilities by jacking, boring or tunneling methods, it is the contractor’s responsibility to ensure construction shall be made in such a manner that will not interfere with the operation of the railroad, street, highway, or other facility, and shall not weaken or damage any embankment or structure.

41. The pits or trenches excavated to facilitate jacking, boring or tunneling operations shall be backfilled immediately after the installation of the pipe has been completed.

42. Trenchless undercrossing operations, if required, will be the responsibility of the contractor as to methods and job site safety and shall be performed by a contractor with sufficient experience in

trenchless pipeline installation. The contractor shall furnish for the City's approval, a plan showing the proposed construction methods, including as applicable, boring methods, location of pits, design for the jacking head, jacking support or back stop, arrangement and position of augers, jacks, pipe guides, etc. The plan should include provisions for maintaining the boring alignment within construction specifications.

43. Trenchless pipeline installation should include a program of measure and monitoring to mitigate potential heave. The monitoring program should include a preconstruction survey of all nearby structures, culverts, manholes and pavement. Nearby structures and utilities should be actively and continuously monitored throughout the trenchless pipeline operation. The monitoring program should be submitted for review and approval by the City Engineer and should be in-place prior to commencing trenchless pipeline operations.

Modulus of Subgrade Reaction

44. Vertical loading on a flexible pipe can cause the pipe to deform. The diameter of the pipe tends to decrease in the vertical direction and increase in the horizontal direction. The composite modulus of subgrade reaction (E'_c) is used in the design of buried flexible pipes to estimate the passive resistance developed by the soil when the pipe is vertically loaded. E'_c is a function of depth of cover, trench width, the diameter of the pipe, the modulus (E'_b) of the pipe zone material (the soil and bedding material directly surrounding the pipe), and the modulus (E'_n) of the native material adjacent to the trench walls.

45. The native soils encountered within the proposed pipeline alignment generally consisted of loose to medium dense silty to clayey sand (SM, SC) and stiff clay, (CL, CI, & CH).

46. The following table provides preliminary values for the Modulus of Subgrade Reaction (E'_n) for open-cut pipe embedment.

Table No. 6 – Modulus of Subgrade Reaction

Type of Soil	Modulus of Subgrade Reaction (E'_b, E'_n)(1) for open-cut trench installation
Expansive Clays and Silts (CH, MH, Liquid Limit	Do not use as backfill
Clays and Silts (CL, CI, ML)	700 psi(2)
Sand (SM, SC)	900 psi(2)

(1) Jey Jeyapalan P. E., "Modulus of Soil Reaction (E') Values for Pipeline Design"

(2) The above values apply when the soil cover is between 0 and 5 feet. These values may be increased by 25 psi for every foot of soil cover above the pipe greater than 5 feet.

47. To determine E'_c for the buried pipe E'_n for the native soil and E'_b for the backfill material must be determined then combined using the following formula:

$$E'_c = S_c E'_b$$

48. The value of S_c is a function of E'_n/E'_b and B_d/D where B_d is the width of the trench at the pipeline and D is the diameter of the pipe.

Table No. 7 – S_c Values

E'_n/E'_b	S_c for B_d/D*					
	1.5	2.0	2.5	3.0	4.0	5.0
0.1	0.15	0.30	0.60	0.80	0.90	1.00
0.2	0.30	0.45	0.70	0.85	0.92	1.00
0.4	0.50	0.60	0.80	0.90	0.95	1.00
0.6	0.70	0.80	0.90	0.95	1.00	1.00
0.8	0.85	0.90	0.95	0.98	1.00	1.00
1.0	1.00	1.00	1.00	1.00	1.00	1.00
1.5	1.30	1.15	1.10	1.05	1.00	1.00
2.0	1.50	1.30	1.15	1.10	1.05	1.00
3.0	1.75	1.45	1.30	1.20	1.08	1.00
>=5.0	2.00	1.60	1.40	1.25	1.10	1.00

*Jey Jeyapalan P. E., “Modulus of Soil Reaction (E’) Values for Pipeline Design”

Utility Trench Backfill

49. Utility trenches that are parallel to the sides of structures should be placed so that they do not extend below a line sloping down and away at a 2:1 (horizontal to vertical) slope from the bottom outside edge of all footings.

50. Utility pipes should be designed and constructed so that the top of pipe is a minimum of 24 inches below the finish subgrade elevation of any road or pavement areas. Any pipes within the top 24 inches of finish subgrade should be concrete encased, per design by the project civil engineer.

51. For the purpose of this section of the report, backfill is defined as material placed in a trench starting one foot above the pipe, and bedding is all material placed in a trench below the backfill.

52. Unless concrete bedding is required around utility pipes, free-draining clean sand should be used as bedding. Sand bedding should be compacted to at least 95 percent relative compaction. Clean sand is defined as 100 percent passing the #4 sieve, and less than 5 percent passing the #200 sieve.

53. Approved imported clean sand or native soil should be used as utility trench backfill. Backfill in trenches located under and adjacent to structural fill, foundations, concrete slabs and pavements should be placed in horizontal layers no more than 8 inches thick. This includes areas such as sidewalks, patios, and other hardscape areas. Each layer of trench backfill should be water conditioned and compacted to at least 95 percent relative compaction

54. All utility trenches beneath perimeter footing or grade beams should be backfilled with controlled density fill (such as 2-sack sand\cement slurry) to help minimize potential moisture intrusion below

interior floors. The length of the plug should be at least three times the width of the footing or grade beam at the building perimeter, but not less than 36 inches. A representative from Pacific Crest Engineering Inc. should be contacted to observe the placement of slurry plugs. In addition, all utility pipes which penetrate through the footings, stemwalls or grade beams (below the exterior soil grade) should also be sealed water-tight, as determined by the project civil engineer or architect.

55. Utility trenches which carry "nested" conduits (stacked vertically) should be backfilled with a control density fill (such as 2-sack sand\cement slurry) to an elevation one foot above the nested conduit stack. The use of pea gravel or clean sand as backfill within a zone of nested conduits is not recommended.

56. A representative from our firm should be present to observe the bottom of all trench excavations, prior to placement of utility pipes and conduits. In addition, we should observe the condition of the trench prior to placement of sand bedding, and to observe compaction of the sand bedding, in addition to any backfill planned above the bedding zone.

57. Jetting of the trench backfill is not recommended as it may result in an unsatisfactory degree of compaction.

58. Trenches must be shored as required by the local agency and the State of California Division of Industrial Safety construction safety orders.

59. Controlled low strength material (CLSM) is a flowable, self-compacting, cementitious material used in lieu of compacted soil. CLSM is a mixture of cement, pozzolan, coarse and fine aggregate and water mixed in accordance with ASTM C94. Controlled low strength material may be used as backfill provided it is in accordance with the following:

a. The CLSM should have a consistency such that the material flows easily into all openings. A stiffer mixture may be required on sloping ground. If a stiffer mixture is required, vibration should be performed to ensure that the CLSM fills all spaces and openings.

b. When fully cured the CLSM should be hand excavatable and have a minimum 28-day compressive strength of 50 psi and a maximum 28-day compressive strength of 150 psi.

c. Placement of backfill, pavement sections or concrete over the CLSM should not take place until the CLSM passes the ball drop test per ASTM 6024.

d. If the backfill is not placed within 8 hours, a 6-inch cover of moist earth should be placed over the CLSM. If the air temperature is 50°F or less, the earth cover should be 18 inches thick.

e. CLSM shall not be placed when the air temperature is below 40°F unless the air temperature is 35°F or more and the temperature is rising.

60. Pipelines in trenches backfilled with CLSM have a tendency to float as the CLSM is placed. Pipe anchors and sequential backfilling can mitigate the potential for floating. If the sequential backfilling method is selected, the height to which the CLSM is placed is a function of the buoyant force and the amount of resistance provided by the anchoring system. Sequential backfilling requires the trench to remain open for a longer period of time.

TRENCHING, OPEN-CUT EXCAVATIONS AND SHORING

61. It is our opinion that open-cut excavation is feasible for the installation of the proposed pipeline and IWRF improvements. Based on our subsurface investigation, groundwater should be anticipated during construction, particularly if the construction is performed during or soon after the rainy season, The possibility of caving soils and a relatively shallow groundwater table will need to be addressed, especially if excavations will extend below a depth of about ten feet below existing grades.

62. Based on the soils encountered in our borings and CPT, we anticipate that excavations for the planned improvements may generally be excavated using appropriately-sized, conventional excavation equipment. The contractor should anticipate interbedded lenses of loose to medium dense silty sand and sandy silt within planned excavations. It is the contractor’s responsibility to independently assess the excavatability of the soil along the pipeline alignment and at the IWRF site, and to choose suitable equipment, casing and/or excavation methods.

63. Pipeline and below grade construction should be performed in dry excavations. Temporary dewatering may be achieved by sloping the excavation to a system of sump pumps placed within the excavation, trenching from the base of excavations to discharge water by gravity flow, or other means. It is the contractor’s responsibility to design an adequate de-watering system for the project site, and to submit a detailed de-watering plan to the project civil and geotechnical engineer for review at least two weeks prior to the start of construction. The groundwater dewatering systems should be based on the actual groundwater conditions encountered at the time of construction.

64. It must be understood that on-site safety is the sole responsibility of the contractor, and that the contractor shall designate a competent person (as defined by CAL-OSHA) to monitor the slope excavation prior to the start of each work day, and throughout the work day as conditions change. The competent person designated by the contractor shall determine if flatter slope gradients are more appropriate, or if shoring should be installed or modified to protect workers in the vicinity of the slope excavation. Refer to Title 8, California Code of Regulations, Sections 1539-1543. All excavations must be evaluated for stability prior to entry. The contractor must act in accordance with the project specifications, Cal/OSHA and/or any other applicable government regulation concerning excavation safety and shoring.

65. All excavations must meet the requirements of 29 CFR 1926.651 and 1926.652 or comparable OSHA approved state plan requirements.

66. Groundwater has been noted as high as 11 feet below existing ground at the IWRF site. Groundwater should be expected at shallower depths during or soon after the rainy season. It is the contractor's responsibility to design an adequate de-watering system for the project site, and to submit a detailed de-watering plan to the geotechnical engineer for review at least two weeks prior to the start of construction.

67. Based on our field and laboratory investigations, we recommend that for sloping and benching purposes, the soils within the project site should be preliminarily classified as Type C soils (a submerged granular soil) in accordance with Cal/OSHA. The contractor's competent person must base their sloping and benching systems on the actual soil and groundwater conditions encountered in the field at the time of construction.

68. It should be anticipated that the non-cohesive sands and silts noted at the IWRF site may be susceptible to raveling, running or flowing and may have little to no stand-up time. Unsupported vertical cuts in raveling, running or flowing soils can result in vertical wall failure and the undermining of adjacent pavements, utilities and structures. If raveling, running or flowing soils are encountered during construction, continuous full-face shoring is recommended. It should be anticipated that the pump station excavation at the proposed headworks may require shoring.

69. The "top" of any temporary cut slope should be set-back at least ten feet (measured horizontally) from any nearby structure or property line. Any excavation that cannot meet these side slope gradients will need to have a shoring system designed to support steeper sidewall gradients.

70. Should temporary shoring be required, the shoring wall system chosen by the designer should be designed using the geotechnical design criteria presented in the "Lateral Pressures" section of this report. The contractor should submit a detailed shoring plan to the City, and the project civil, structural and geotechnical engineers for review at least two weeks prior to the start of construction.

FOUNDATIONS – STRUCTURAL MAT

71. At the time we prepared tis report, the grading plans had not been completed and the structure locations and foundation details had not been finalized. We request an opportunity to review these items during the design stages to determine if supplemental recommendations will be required.

Buoyancy Forces

72. Groundwater was encountered at the IWRF site with approximate depths ranging from 11 to 23 feet. Below grade structures may be subject to uplift from buoyancy forces. For design purposes we recommend assuming a groundwater level of ten feet below existing grades and a skin friction value of 300 psf/foot of surface area.

Reinforced Structural Mat

73. Considering the soil characteristics and site preparation recommendations, it is our opinion that an appropriate foundation system to support structural improvements consist of a reinforced structural mat designed to move as a unit, resist differential settlement, and span seismically induced voids.

74. The mat foundation should bear upon a minimum of 36 inches of Class 2 aggregate baserock that has been placed and compacted in accordance with the recommendations of this report.

75. The structural mat should be designed to span voids, withstand differential settlement, and allow the structure to move as a single unit. The loading should be kept as even as possible in all areas of the structure.

76. The structural mat should be designed and constructed to span a 6-foot diameter void appearing anywhere beneath the structure.

77. The structural mat should be designed for an allowable bearing capacity of 1,200 psf (dead plus live load) which may be increased by one-third for wind or seismic loads. Provided the recommendations of this report are closely followed, the mat should experience total static settlement of 1½ inches or less, with the differential settlement being approximately ½ of the total settlement.

78. Seismically-induced settlements will be higher as discussed previously. We have estimated seismically-induced ground surface settlement on the order of 8 to 12 inches following a 6.6 magnitude earthquake, with differential settlement ranging from 4 to 6 inches across the least dimension of the mat.

79. Structural mats constructed at the ground surface should be designed with a thickened edge beam that extends a minimum of 12 inches below the lowest adjacent grade, not including sand or gravel sections.

80. The embedded portion of the mat may be assumed to have a lateral bearing pressure resistance value of 350 psf/ft for the section of mat embedded below the ground surface.

81. The mat may be assumed to have a resistance to lateral sliding of 0.35.

82. We recommend a unit modulus of subgrade reaction (K_1) of 65 tons per cubic foot. This value is a based on a 1 foot square bearing area; the subgrade modulus can be proportioned for the width of the relative footing reaction area by the expression:

$$K_o = K_1 \left[\frac{B+1}{2B}\right]^2$$

Where: B = The effective width of the footing reaction area in feet.
K_1 = Unit modulus of subgrade reaction.
K_o = Reduced or actual modulus of subgrade reaction to use in elastic design.

83. Typically, concrete mat foundations for similar applications range in thickness from approximately 18 to 24 inches. Slab thickness, reinforcement, and doweling should be determined by the project structural engineer in accordance with applicable CBC or ACI Standards.

84. Structural slabs placed above the ground water table should be underlain by a minimum 6-inch thick capillary break of ¾ inch clean crushed rock (no fines). It is recommended that neither Class II baserock nor sand be employed as the capillary break material.

85. Slab dimensions, including embedment depth of thickened edges must be verified by a representative of Pacific Crest Engineering Inc. before placement of formwork, steel and concrete to verify bedding into proper material.

86. The slab should contain steel reinforcement as determined by the project civil or structural engineer in accordance with applicable CBC or ACI Standards.

SLAB-ON-GRADE CONSTRUCTION

87. Interior and exterior concrete slabs should bear upon non-expansive engineered fill that has been prepared as described in the Earthwork section of this report.

88. All exterior slabs, walkways, etc., should be structurally independent of structural foundation system(s).

89. All interior concrete slabs-on-grade should be underlain by a minimum 6 inch thick capillary break of ¾ inch clean crushed rock (no fines). It is recommended that neither Class II baserock nor sand be employed as the capillary break material.

90. Where floor coverings are anticipated or vapor transmission may be a problem, a vapor retarder/membrane should be placed between the capillary break layer and the floor slab in order to reduce the potential for moisture condensation under floor coverings. We recommend a high quality vapor retarder at least 10 mil thick and puncture resistant (Stego Wrap or equivalent). The vapor retarder must meet the minimum specifications for ASTM E-1745, Standard Specification For Water Vapor Retarder. Please note that low density polyethylene film (such as Visqueen) may meet minimum current standards for permeability but not puncture resistance. Laps and seams should be overlapped at least six inches and properly sealed to provide a continuous layer beneath the entire slab that is free of holes, tears or gaps. Joints and penetrations should also be properly sealed.

91. Floor coverings should be installed on concrete slabs that have been constructed according to the guidelines outlined in ACI 302.2R and the recommendations of the flooring material manufacturer.

92. Currently, ACI 302-1R and Section 4.505.2 of the 2019 California Green Building Standards Code recommend that concrete slabs to receive moisture sensitive floor coverings be placed directly upon the vapor retarder, with **no sand cushion**. ACI states that vapor retarders are not effective in preventing residual moisture within the concrete slab from migrating to the surface. Including a low

water-to-cement ratio (less than 0.50) and/or admixtures into the mix design are generally necessary to minimize water content, reduce soluble alkali content, and provide workability to the concrete. As noted in CIP 29 (*Concrete in Practice by the National Ready Mixed Concrete Association*), placing concrete directly on the vapor retarder can also create potential problems. If environmental conditions do not permit rapid drying of bleed water from the slab surface then the excess bleeding can delay finishing operations (refer to CIP 13, 19 and 20). Most of these problems can be alleviated by using a concrete with a low water content, moderate cement factor, and well-graded aggregate with the largest possible size. **With the increased occurrence of moisture related floor covering failures, minor cracking of floors placed on a vapor retarder and other problems discussed here are considered a more acceptable risk than failure of floor coverings, and these potential risks should be clearly understood by the Client and Project Owner**.

93. If a sand layer is chosen as a cushion for slabs without floor coverings, it should consist of a clean sand. Clean sand is defined as 100 percent passing the #4 sieve, and less than 5 percent passing the #200 sieve.

94. Requirements for pre-wetting of the subgrade soils prior to the pouring of the slabs will depend on the specific soils and seasonal moisture conditions and will be determined by a representative of Pacific Crest Engineering Inc. at the time of construction. It is important that the subgrade soils be properly moisture conditioned at the time the concrete is poured. Subgrade moisture contents should not be allowed to exceed our moisture recommendations for effective compaction, and should be maintained until the slab is poured.

95. Recommendations given above for the reduction of moisture transmission through the slab are general in nature and present good construction practice. Moisture protection measures for concrete slabs-on-grade should meet applicable ACI and ASTM standards. Pacific Crest Engineering Inc. are not waterproofing experts. For a more complete and specific discussion of moisture protection within the structure, a qualified waterproofing expert should be consulted to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. The waterproofing consultant should provide recommendations for mitigation of potential adverse impacts of moisture vapor transmission on various components of the structure as deemed appropriate.

96. Slab thickness, reinforcement, and doweling should be determined by the project civil or structural engineer. The use of welded wire mesh is not recommended for slab reinforcement.

RETAINING WALLS

97. Based on the groundwater conditions encountered during our investigation we recommend anticipating undrained conditions to apply to below grade retaining structures. The design of retaining walls should include the following criteria:

TABLE No. 8, Active and At-Rest Earth Pressure Values

Maximum Backfill Slope (H:V)	Active Earth Pressure (psf/ft of depth)		At-Rest Earth Pressure (psf/ft of depth)	
	Drained	Undrained	Drained	Undrained
Level	45	35	80	47
2:1	60	50	90	57

a. Undrained earth pressure values must be used in conjunction with hydrostatic pressures when unbalanced hydrostatic conditions are present. The total horizontal pressure from the undrained condition is the sum of the undrained soil pressure provided in Table No. 8 plus hydrostatic pressure (62.4 psf).

b. Should the slope behind the retaining walls be other than shown in the above table, supplemental design criteria will be provided for the active earth or at rest pressures for the particular slope angle.

c. Active earth pressure values may be used when walls are free to yield an amount sufficient to develop the active earth pressure condition (about ½% of height). The effect of wall rotation should be considered for areas behind the planned retaining wall (pavements, foundations, slabs, etc.). When walls are restrained at the top or to design for minimal wall rotation, at-rest earth pressure values should be used.

d. For resisting passive earth pressure use 250 psf/ft of depth. Ignore passive pressures along the upper 12 inches of the footing.

e. To develop the resisting passive earth pressure, retaining wall footings should be embedded a minimum of 18 inches below the lowest adjacent grade. There should be a minimum of 5 feet of horizontal cover as measured from the outside edge of the footing.

f. If the structural designer wishes to include seismic forces in their design, the wall may be designed using the above active soil pressures plus a horizontal seismic force of $12H^2$ pounds per lineal foot (where H is the height of retained material). The resultant seismic force should be applied at a point 1/3rd above the base of the wall. This force has been estimated using the Mononobe-Okabe method of analysis as modified by Whitman (1990) and Lew and Sitar (2010). A reduced factor of safety for overturning and sliding may be used in seismic design as determined by the structural designer. The above seismic forces should not be used in combination with at rest lateral soil pressures.

g. Where short term earthquake or wind loads are included, the minimum safety factor for retaining wall sliding and overturning shall be 1.1 for earthquake loads and 1.2 for wind loads.

h. For surcharge pressures due to traffic loading or other live or dead loads which will transmit a force to the wall, please refer to the Surcharge Pressure Diagram, Figure No. 11 in Appendix A.

i. The backfill area behind retaining walls should be compacted with approved material to a minimum relative compaction of 90%.

Retaining Wall Drainage

98. For retaining walls designed for fully drained conditions we recommend that permeable material meeting the State of California Standard Specification Section 68-1.025, Class 1, Type A, be placed behind the wall, with a minimum width of 12 inches and extending for the full height of the wall to within 1 foot of the ground surface. The top of the permeable material should be covered with Mirafi 140N filter fabric or equivalent and then compacted native soil placed to the ground surface. A 4-inch diameter perforated rigid plastic drain pipe should be installed within 3 inches of the bottom of the permeable material and be discharged to a suitable, approved location. The perforations should be placed downward; oriented along the lower half of the pipe. Neither the pipe nor the permeable material should be wrapped in filter fabric. Refer to the Typical Retaining Wall Drain Detail, Figure No. 12 in Appendix A for details.

PAVEMENT DESIGN

99. The design of pavement sections was beyond our scope of services for this project. To have the selected pavement sections perform to their greatest efficiency, it is very important that the following items be considered:

a. Properly scarify and moisture condition the upper 8 inches of the subgrade soil and compact it to a minimum of 95% of its maximum dry density, at a moisture content of 1 to 3% over the optimum moisture content for the soil.

b. Provide sufficient gradient to prevent ponding of water.

c. Use only quality materials of the type and thickness (minimum) specified. All aggregate base and subbase must meet Caltrans Standard Specifications for Class 2 materials, and be angular in shape. All Class 2 aggregate base should be ¾ inch maximum in aggregate size.

d. Compact the base and subbase uniformly to a minimum of 95% of its maximum dry density.

e. Use ½ inch maximum, Type “A” medium graded asphaltic concrete. Place the asphaltic concrete only during periods of fair weather when the free air temperature is within prescribed limits by Cal Trans Specifications.

f. Porous pavement systems which consist of porous paving blocks, asphaltic concrete or concrete are generally not recommended due to the potential for saturation of the subgrade soils and resulting increased potential for a shorter pavement life. At a minimum, porous pavement systems should include a layer of Mirafi HP370 geotextile fabric placed on the subgrade soil beneath the porous paving section. These pavement systems should only be used with the understanding by the Owner of the increased potential for pavement cracking, rutting, potholes, etc.

g. Maintenance should be undertaken on a routine basis.

SURFACE DRAINAGE

100. Surface water drainage is the responsibility of the project civil engineer. The following should be considered by the civil engineer in design of the project.

101. Surface water must not be allowed to pond or be trapped adjacent to foundations, or on building pads and parking areas.

102. All roof eaves should be guttered, with the outlets from the downspouts provided with adequate capacity to carry the storm water away from structures to reduce the possibility of soil saturation and erosion. The connection should be in a closed conduit which discharges at an approved location away from structures and graded areas.

103. Slope failures can occur where surface drainage is allowed to concentrate on unprotected slopes. Appropriate landscaping and surface drainage control around the project area is imperative in order to minimize the potential for shallow slope failures and erosion. Stormwater discharge locations should not be located at the top or on the face of any slope.

104. Final grades should be provided with positive gradient away from all foundation elements. Soil grades should slope away from foundations at least 5 percent for the first 10 feet. Impervious surfaces should slope away from foundations at least 2 percent for the first 10 feet. Concentrations of surface runoff should be handled by providing structures, such as paved or lined ditches, catch basins, etc.

105. Irrigation activities at the site should be done in a controlled and reasonable manner.

106. Following completion of the project we recommend that storm drainage provisions and performance of permanent erosion control measures be closely observed through the first season of significant rainfall, to determine if these systems are performing adequately and, if necessary, resolve any unforeseen issues.

107. The building and surface drainage facilities must not be altered nor any filling or excavation work performed in the area without first consulting Pacific Crest Engineering Inc. Surface drainage improvements developed by the project civil engineer must be maintained by the property owner at all times, as improper drainage provisions can produce undesirable affects.

EROSION CONTROL

108. The surface soils are classified as having a moderate potential for erosion. Therefore, the finished ground surface should be planted with ground cover and continually maintained to minimize surface erosion. For specific and detailed recommendations regarding erosion control on and surrounding the project site, the project civil engineer or an erosion control specialist should be consulted.

PLAN REVIEW

109. We respectfully request an opportunity to review the project plans and specifications during preparation and before bidding to verify that the recommendations of this report have been included and to provide additional recommendations, if needed. These plan review services are also typically required by the reviewing agency. Misinterpretation of our recommendations or omission of our requirements from the project plans and specifications may result in changes to the project design during the construction phase, with the potential for additional costs and delays in order to bring the project into conformance with the requirements outlined within this report. Services performed for review of the project plans and specifications are considered "post-report" services and billed on a "time and materials" fee basis in accordance with our latest Standard Fee Schedule.

VI. LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. This Geotechnical Investigation was prepared specifically for DUDEK Consulting and for the specific project and location described in the body of this report. This report and the recommendations included herein should be utilized for this specific project and location exclusively. This Geotechnical Investigation should not be applied to nor utilized on any other project or project site. Please refer to the ASFE "Important Information about Your Geotechnical Engineering Report" attached with this report.

2. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed in the borings. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the time, our firm should be notified so that supplemental recommendations can be provided.

3. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are called to the attention of the Architects and Engineers for the project and incorporated into the plans, and that the necessary steps are taken to ensure that the contractors and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural process or the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards 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 of our control. This report should therefore be reviewed in light of future planned construction and then current applicable codes. This report should not be considered valid after a period of two (2) years without our review.

5. This report was prepared upon your request for our services in accordance with currently accepted standards of professional geotechnical engineering practice. No warranty as to the contents of this report is intended, and none shall be inferred from the statements or opinions expressed.

6. The scope of our services mutually agreed upon for this project did not include any environmental assessment or study for the presence of hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site.

Important Information About Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

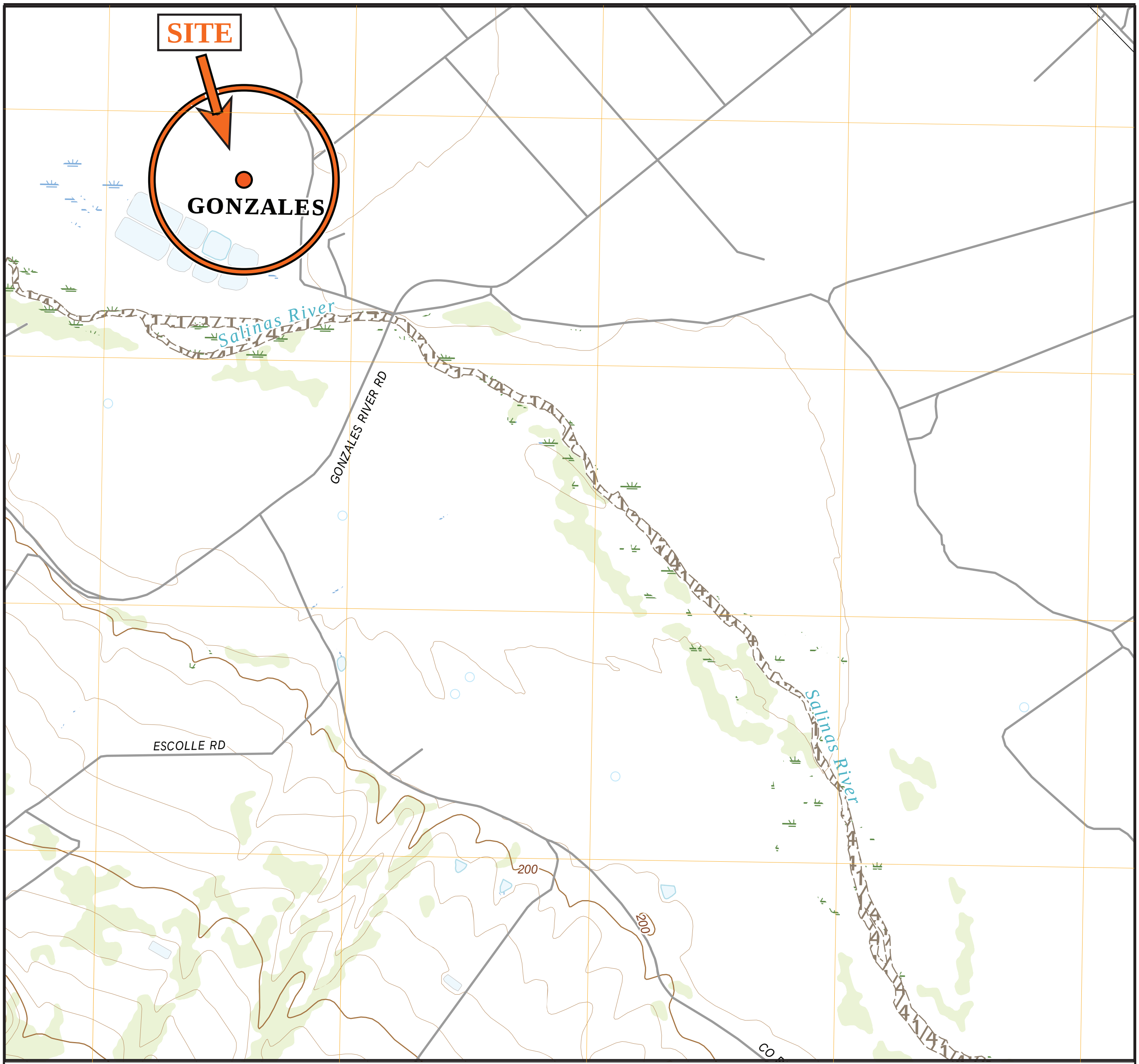
Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

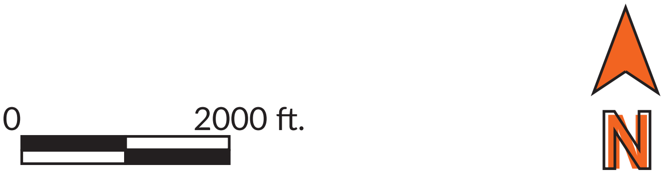
Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
The Best People on Earth

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

APPENDIX A





Base Map: United States Geological Survey
Palo Escrito Peak Quadrangle, California
Monterey County, 7.5 Minute Series, 2018

Pacific Crest
ENGINEERING INC

Regional Site Map
Gonzales IWRF
Gonzales, California

Figure No. 1
Project No. 19125
Date: 3/2/20

Scale: 1 inch = 800 feet

Base Map: Google Earth

LEGEND

B-4 Approximate location of test boring

Pacific Crest
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Site Map Showing Test Borings
Gonzales IWRF
Gonzales, California

Figure No. 2A
Project No. 19125
Date: 3/2/20

Pacific Crest
ENGINEERING INC

Site Map Showing Test Borings
Gonzales IWRF
Gonzales, California

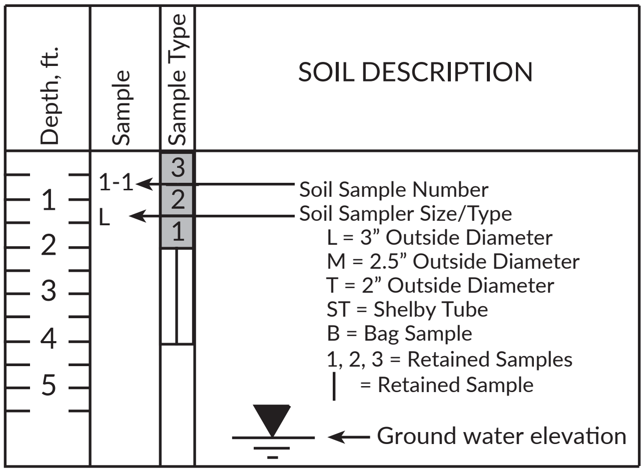
Figure No. 2B
Project No. 19125
Date: 3/2/20

KEY TO SOIL CLASSIFICATION - FINE GRAINED SOILS (FGS)
UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2487 (Modified)

MAJOR DIVISIONS		SYMBOL	FINES	COARSENESS	SAND/GRAVEL	GROUP NAME
SILT AND CLAY	*LL < 35% Low Plasticity	**CL** Lean Clay PI > 7 Plots Above A Line -OR- **ML** Silt PI > 4 Plots Below A Line	<30% plus No. 200	<15% plus No. 200		Lean Clay / Silt
				15-30% plus No. 200	% sand ≥ % gravel	Lean Clay with Sand / Silt with Sand
					% sand < % gravel	Lean Clay with Gravel / Silt with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Lean Clay / Sandy Silt
					≥ 15% gravel	Sandy Lean Clay with Gravel / Sandy Silt with Gravel
				% sand < % gravel	< 15% sand	Gravelly Lean Clay / Gravelly Silt
					≥ 15% sand	Gravelly Lean Clay with Sand / Gravelly Silt with Sand
		CL - ML 4 < PI < 7	<30% plus No. 200	<15% plus No. 200		Silty Clay
				15-30% plus No. 200	% sand ≥ % gravel	Silty Clay with Sand
					% sand < % gravel	Silty Clay with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Silty Clay
					≥15% gravel	Sandy Silty Clay with Gravel
				% sand < % gravel	< 15% sand	Gravelly Silty Clay
					≥15% sand	Gravelly Silty Clay with Sand
	35% ≤ *LL < 50% Intermediate Plasticity	**CI**	<30% plus No. 200	<15% plus No. 200		Clay
				15-30% plus No. 200	% sand ≥ % gravel	Clay with Sand
					% sand < % gravel	Clay with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Clay
					≥ 15% gravel	Sandy Clay with Gravel
				% sand < % gravel	< 15% sand	Gravelly Clay
					≥ 15% sand	Gravelly Clay with Sand
	*LL > 50% High Plasticity	**CH** Fat Clay Plots Above A Line -OR- **MH** Elastic Silt Plots Below A Line	<30% plus No. 200	<15% plus No. 200		Fat Clay or Elastic Silt
				15-30% plus No. 200	% sand ≥ % gravel	Fat Clay with Sand Elastic Silt with Sand
					% sand < % gravel	Fat Clay with Gravel / Elastic Silt with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Fat Clay / Sandy Elastic Silt
					≥ 15% gravel	Sandy Fat Clay with Gravel / Sandy Elastic Silt with Gravel
				% sand < % gravel	< 15% sand	Gravelly Fat Clay / Gravelly Elastic Silt
					≥ 15% sand	Gravelly Fat Clay with Sand / Gravelly Elastic Silt with Sand

* LL = Liquid Limit
* PI = Plasticity Index

BORING LOG EXPLANATION



MOISTURE

DESCRIPTION	CRITERIA
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp, but no visible water
WET	Visible free water, usually soil is below the water table

CONSISTENCY

DESCRIPTION	UNCONFINED SHEAR STRENGTH (KSF)	STANDARD PENETRATION (BLOWS/FOOT)
VERY SOFT	< 0.25	< 2
SOFT	0.25 - 0.5	2 - 4
FIRM	0.5 - 1.0	5 - 8
STIFF	1.0 - 2.0	9 - 15
VERY STIFF	2.0 - 4.0	16 - 30
HARD	> 4.0	> 30

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Boring Log Explanation - FGS
Gonzales IWRF
Gonzales, California

Figure No. 3
Project No. 19125
Date: 3/2/20

KEY TO SOIL CLASSIFICATION - COARSE GRAINED SOILS
UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2487 (Modified)

MAJOR DIVISIONS		FINES	GRADE/TYPE OF FINES	SYMBOL	GROUP NAME *
GRAVEL	More than 50% of coarse fraction is larger than No. 4 sieve size	<5%	Cu ≥ 4 and 1 ≤ Cc ≤ 3	**GW**	Well-Graded Gravel / Well-Graded Gravel with Sand
			Cu < 4 and/or 1 > Cc > 3	**GP**	Poorly Graded Gravel/Poorly Graded Gravel with Sand
		5-12%	ML or MH	**GW - GM**	Well-Graded Gravel with Silt / Well- Graded Gravel with Silt and Sand
				GP - GM	Poorly Graded Gravel with Silt / Poorly Graded Gravel with Silt and Sand
			CL, CI or CH	**GW - GC**	Well-Graded Gravel with Clay / Well-Graded Gravel with Clay and Sand
				GP - GC	Poorly Graded Gravel with Clay / Poorly Graded Gravel with Clay and Sand
		>12%	ML or MH	**GM**	Silty Gravel / Silty Gravel with Sand
			CL, CI or CH	**GC**	Clayey Gravel/ Clayey Gravel with Sand
			CL - ML	**GC - GM**	Silty, Clayey Gravel/ Silty, Clayey Gravel with Sand
SAND	50% or more of coarse fraction is smaller than No. 4 sieve size	<5%	Cu ≥ 6 and 1 ≤ Cc ≤ 3	**SW**	Well-Graded Sand / Well-Graded Sand with Gravel
			Cu < 6 and/or 1 > Cc > 3	**SP**	Poorly Graded Sand / Poorly Graded Sand with Gravel
		5-12%	ML or MH	**SW - SM**	Well-Graded Sand with Silt / Well- Graded Sand with Silt and Gravel
				SP - SM	Poorly Graded Sand with Silt / Poorly Graded Sand with Silt and Gravel
			CL, CI or CH	**SW - SC**	Well-Graded Sand with Clay / Well-Graded Sand with Clay and Gravel
				SP - SC	Poorly Graded Sand with Clay / Poorly Graded Sand with Clay and Gravel
		>12%	ML or MH	**SM**	Silty Sand / Silty Sand with Gravel
			CL, CI or CH	**SC**	Clayey Sand / Clayey Sand with Gravel
			CL - ML	**SC - SM**	Silty, Clayey Sand / Silty, Clayey Sand with Gravel

* The term “with sand” refers to materials containing 15% or greater sand particles within a gravel soil, while the term “with gravel” refers to materials containing 15% or greater gravel particles within a sand soil.

US STANDARD SIEVE SIZE:

3 inch ¾ inch No. 4 No. 10 No. 40 No. 200 0.002 μm

	COARSE	FINE	COARSE	MEDIUM	FINE		
COBBLES AND BOULDERS	GRAVEL		SAND			SILT	CLAY

RELATIVE DENSITY

DESCRIPTION	STANDARD PENETRATION (BLOWS/FOOT)
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	> 50

MOISTURE

DESCRIPTION	CRITERIA
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp, but no visible water
WET	Visible free water, usually soil is below the water table

Pacific Crest ENGINEERING INC	**Boring Log Explanation - CGS** Gonzales IWRF Gonzales, California	Figure No. 4 Project No. 19125 Date: 3/2/20

LOGGED BY CLA
DATE DRILLED 12/10/19
BORING DIAMETER 8" HS
BORING NO. 1

DRILL RIG EGI Mobile B-53R
HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
			5" Asphalt Concrete 7" Aggregate Base									
1	1-1 L		**SANDY CLAY:** Grayish brown (10YR 5/2), fine grained, poorly graded, micaceous, clay content decreases with depth, moist, very stiff	CI	11							
		2			15		3.0	17.7	103.3			
2		1			22	26	4.0	12.7	109.5	51.1	13	
	1-2 T				7							
3			Moist, medium dense		10							
4					7	17		15.4				
5	1-3 L		**SILTY SAND :** Light olive brown (2.5Y 5/4), fine grained, poorly graded, clean, micaceous, slightly moist, loose	SM	5							
		2			6							
6		1			7	7		11.8	92.3	37.4		
7												
8			**CLAY:** Olive brown (2.5Y 4/3), trace very fine to fine grained sand, moist, firm	CI								
	1-4 T				4							
9					3							
10					4	7		31.3		95.9	18	
11												
12												
13												
	1-5 L		Moist, very stiff		8							
14		2			15							
		1			21	26	3.0	33.5	85.3			Qu = 4065 psf
15			Boring terminated at 15 feet. No groundwater encountered.									
16												
17												
18												
19												
20												
21												
22												
23												

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Log of Test Borings
Gonzales IWRF
Gonzales, California

Figure No. 5
Project No. 19125
Date: 3/2/20

LOGGED BY CLA DATE DRILLED 12/10/19 BORING DIAMETER 8" HS BORING NO. 2

DRILL RIG EGI Mobile B-53R HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
			6" Asphalt Concrete 9" Aggregate Base									
1	2-1 L				10							
2		2	**CLAY WITH SAND:** Very dark grayish brown (10YR 3/2), very fine to fine grained quartz sand, slightly moist, hard	CH	22		4.0	24.9	95.0			Qu = 4764 psf
		1			34	37	4.5	24.9	89.6	83.8		EI = 104
3	2-2 T		**CLAYEY SAND:** Dark grayish brown (10YR 4/2), fine grained quartz sand, poorly graded, clay appears to be lean, slightly moist, loose	SC	6							
					4							
4					5	9		21.1				
5	2-3 L		**SILTY SAND :** Light olive brown (2.5Y 5/4), fine grained, poorly graded, clean, trace mica flakes, slightly moist, loose	SM	8							
6		2			9			14.2	90.4			
		1			9	9		12.2	90.0			
7												
8												
9	2-4 T		**SANDY CLAY:** Olive brown (2.5Y 4/4), very fine to fine grained quartz sand, trace mica flakes, slightly moist, firm	CI	6							
					4							
10					5	9		19.3		87.2	25	
			Boring terminated at 10 feet. No groundwater encountered.									
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest
ENGINEERING INC

Log of Test Borings
Gonzales IWRF
Gonzales, California

Figure No. 6
Project No. 19125
Date: 3/2/20

LOGGED BY CLA DATE DRILLED 12/10/19 BORING DIAMETER 8" HS BORING NO. 3

DRILL RIG EGI Mobile B-53R HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
			5” Asphalt Concrete 8” Aggregate Base									
1	3-1 L		**SILTY SAND WITH GRAVEL:** Dark yellowish brown (10YR 4/4), fine to medium grained, sub-angular to sub-rounded shaped, poorly graded, sub-angular shaped granite gravels up to ½ inch in diameter, slightly moist,very dense	SM	38							
2		1			50/6”	50/6”		5.4	118.7			
	3-2 T											
3					8							
			SANDY FAT CLAY: Black (10YR 2.5/1), very fine to fine grained quartz sand, slightly moist, hard	CH	11							
4					21	32		18.9		90.5	33	
5	3-3 L		**SANDY SILT:** Olive brown (2.5Y 4/4), very fine to fine grained quartz sand, trace plasticity, slightly moist, very stiff	ML	6							
6		2			11		4.5					
		1			12	18	4.0	19.7	99.7	85.3		
7												
8												
9	3-4 T		Slight increase in sand content, micaceous, moist, stiff		5							
					4							
10					6	10		25.0		69.1		
			Boring terminated at 10 feet. No groundwater encountered.									
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest
ENGINEERING INC

Log of Test Borings
Gonzales IWRF
Gonzales, California

Figure No. 7
Project No. 19125
Date: 3/2/20

LOGGED BY CLA DATE DRILLED 12/10/19 BORING DIAMETER 8" HS BORING NO. 4

DRILL RIG EGI Mobile B-53R HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
			CLAYEY SAND: Very dark grayish brown (10YR 3/2), very fine to fine grained quartz sand, clay exhibits low expansion potential, poorly graded, moist, stiff	SC								
1	4-1 L	▨			8							
		2			6			12.9	99.8			Qu = 3421 psf
2	4-2 T	1			5	9	4.5	12.9	103.2	47.7		EI = 24
3			**SILTY SAND:** Olive brown (2.5Y 4/4), very fine to fine grained, poorly graded, quartz rich, slightly moist, loose	SM	2							
					3							
4					5	8		11.8		36.7		
5			**SILTY SAND:** Light olive brown (2.5Y 5/4), very fine to fine grained, poorly graded, clean, quartz rich, slightly moist, medium dense	SM								
	4-3 L	▨			8							
6		2			11							
		1			14	13		11.2	95.4	35.8		
7												
8												
9	4-4 T		Slightly moist, loose		4							
					4							
10					5	9		13.7		26.4		
			Boring terminated at 10 feet. No groundwater encountered.									
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

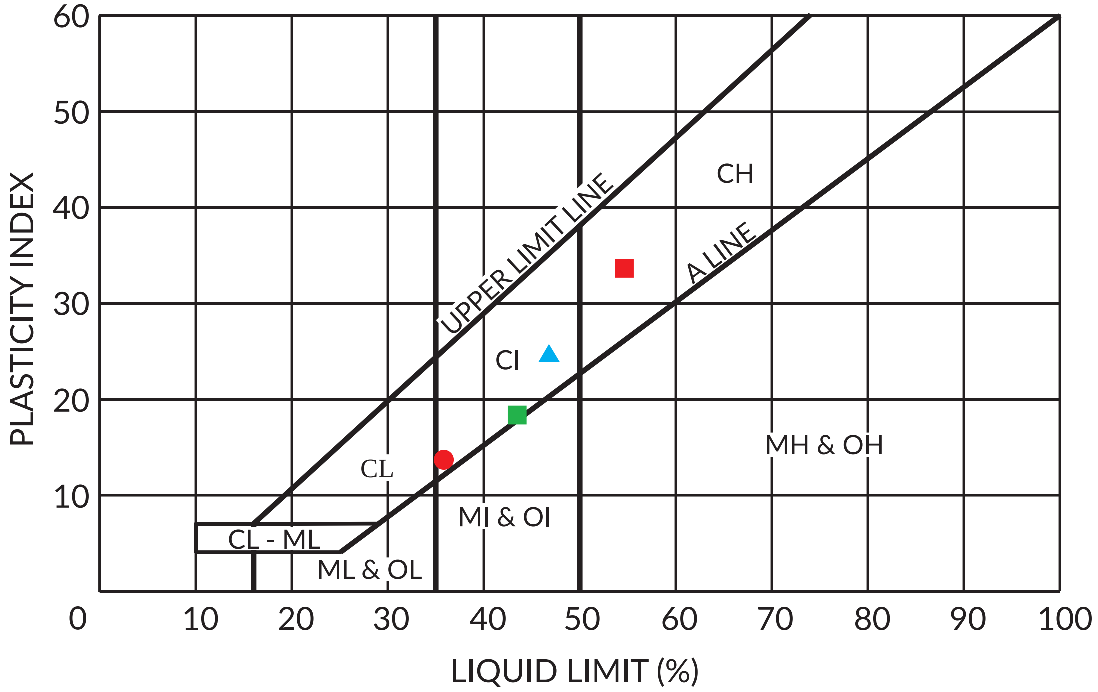
Pacific Crest
ENGINEERING INC

Log of Test Borings
Gonzales IWRF
Gonzales, California

Figure No. 8
Project No. 19125
Date: 3/2/20

ATTERBERG LIMITS - ASTM D4318

PLASTICITY CHART



*This chart has been modified to include the intermediate classifications CI, MI and OI for clays and silts with liquid limits between 35 and 50.

SYMBOL	SAMPLE #	LL (%)	PL (%)	PI
●	**1-1-1**	**31**	**18**	**13**
🟩	**1-4**	**43**	**25**	**18**
▲	**2-4**	**47**	**22**	**25**
🟥	**3-2**	**54**	**21**	**33**

EXPANSION INDEX - ASTM D4829

SAMPLE #	EI	EXPANSION POTENTIAL
2-1-1	**104**	**High**
4-1-1	**24**	**Low**

EXPANSION POTENTIAL	
0 - 20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

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Atterberg Limits/Expansion Index
Gonzales IWRF
Gonzales, California

Figure No. 9
Project No. 19125
Date: 3/2/20

COOPER TESTING LABORATORY

Corrosivity Test Summary

CTL # 416-605 **Date:** 2/13/2020 **Tested By:** PJ **Checked:** PJ
Client: Pacific Crest Engineering **Project:** Gonzales Waste Water Treatment Plant **Proj. No:** 19125
Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP	Moisture	Soil Visual Description
Boring	Sample, No.	Depth, ft.	As Rec.	Minimum	Saturated	mg/kg	mg/kg	%		(Redox)	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		mv	%	
			ASTM G57	Cal 643	ASTM G57	Cal 422-mod.	Cal 417-mod.	Cal 417-mod.	Cal 643	SM 2580B	ASTM D2216	
1-3	-	-	-	2242	-	5	81	0.0081	8.6	-	9.5	Olive Brown Silty SAND
3-3	-	-	-	777	-	85	286	0.0286	8.9	-	18.6	Olive Brown Silty SAND
4-3	-	-	-	1101	-	75	150	0.0150	8.6	-	14.0	Olive Brown Silty SAND

Resistivity	Ohm-cm
Very Corrosive	0-1000
Corrosive	1,000-2,000
Fairly Corrosive	2,000-5,000
Mildly Corrosive	5,000-10,000
Negligible	>10,000

Chloride Concentration	mg/kg
Severe	>1,500
Positive	300-1,500
Negligible	0-300

Sulfate Concentration	mg/kg
Severe	>5,000
Considerable	2,000-5,000
Positive	1,000-2,000
Negligible	0-1,000

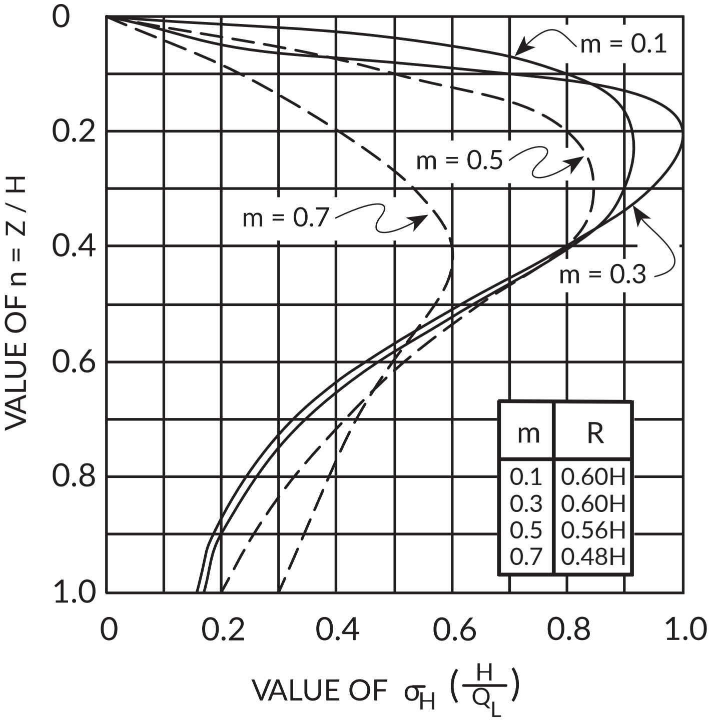
pH	
Potential for acid attack on concrete and steel	<5.5

Pacific Crest
ENGINEERING INC

Corrosivity Test Summary
Gonzales IWRF
Gonzales, California

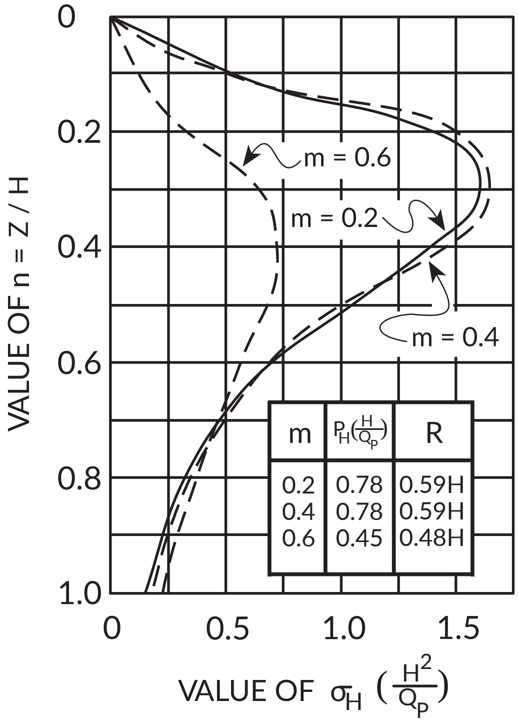
Figure No. 10
Project No. 19125
Date: 3/2/20

LINE LOAD

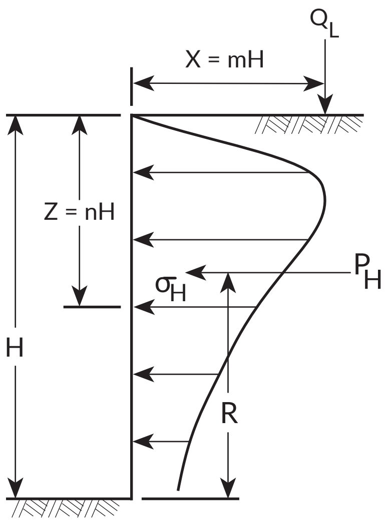


m	R
0.1	0.60H
0.3	0.60H
0.5	0.56H
0.7	0.48H

POINT LOAD



m	$P_H\left(\frac{H}{Q_P}\right)$	R
0.2	0.78	0.59H
0.4	0.78	0.59H
0.6	0.45	0.48H



FOR m ≦ 0.4:

$$\sigma_H\left(\frac{H}{Q_L}\right) = \frac{0.20\,n}{(0.16+n^2)^2}$$

$$P_H = 0.55Q_L$$

FOR m > 0.4:

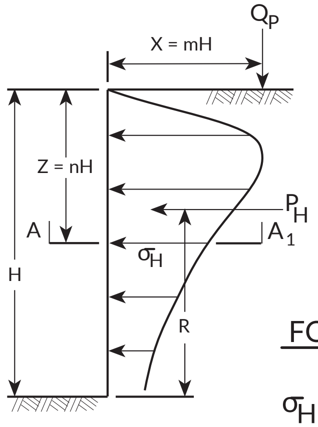
$$\sigma_H\left(\frac{H}{Q_L}\right) = \frac{1.28\,m^2 n}{(m^2+n^2)^2}$$

RESULTANT $P_H = \frac{0.64Q_L}{(m^2+1)}$

PRESSURES FROM LINE LOAD Q_L

(BOUSSINESQ EQUATION MODIFIED BY

REFERENCE: Design Manual
NAVFAC DM-7.02
Figure 11
Page 7.2-74



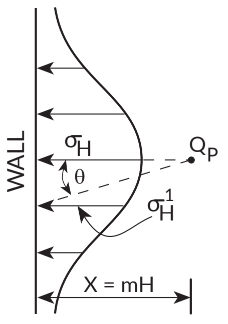
FOR m ≦ 0.4:

$$\sigma_H\left(\frac{H^2}{Q_P}\right) = \frac{0.28\,n^2}{(0.16+n^2)^3}$$

FOR m > 0.4:

$$\sigma_H\left(\frac{H^2}{Q_P}\right) = \frac{1.77\,m^2 n^2}{(m^2+n^2)^3}$$

$$\sigma_H^1 = \sigma_H \cos^2(1.1\,q)$$



SECTION A-A_1

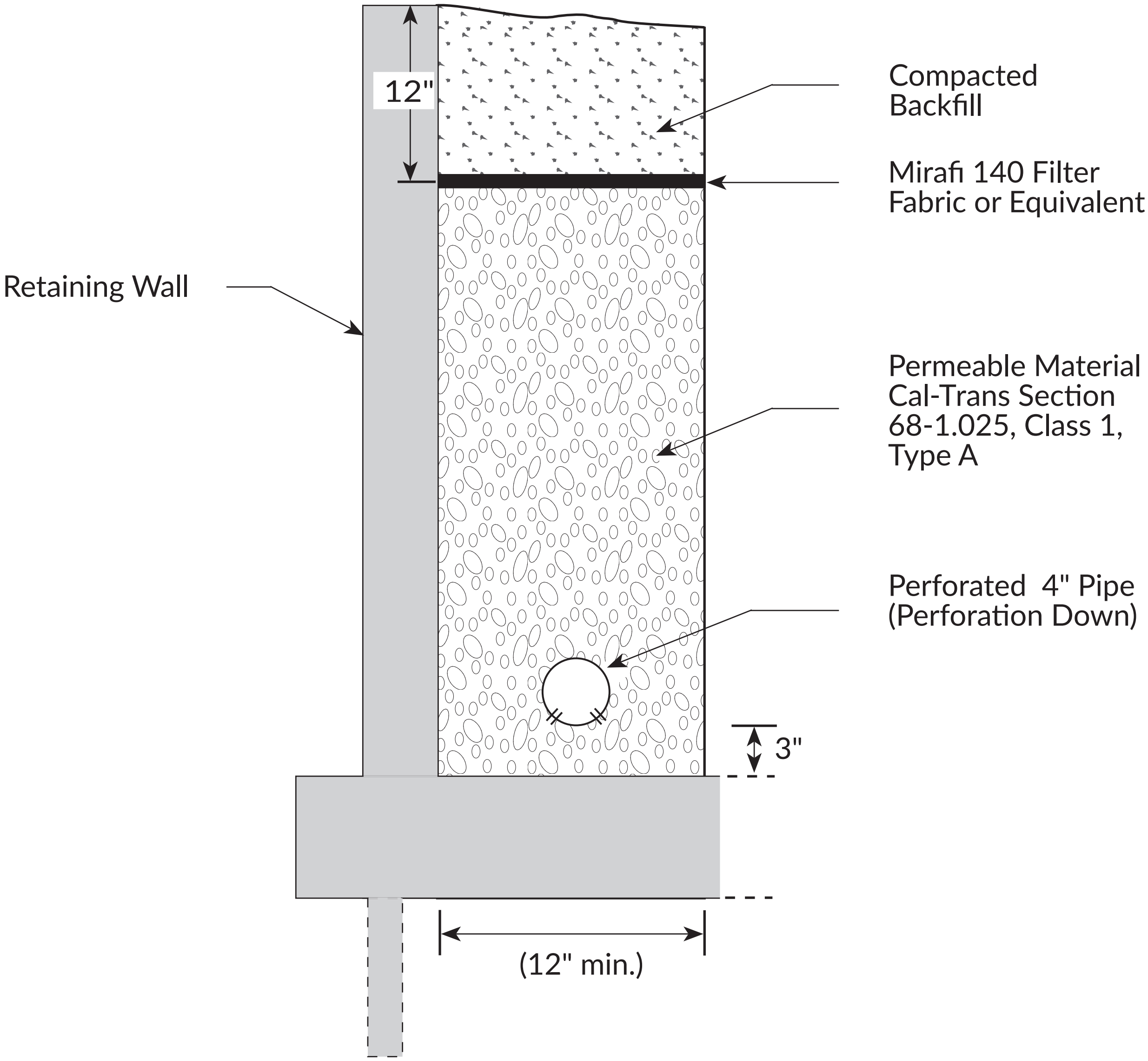
PRESSURES FROM POINT LOAD Q_P

(BOUSSINESQ EQUATION
MODIFIED

Pacific Crest
ENGINEERING INC

Surcharge Pressure Diagram
Gonzales IWRF
Gonzales, California

Figure No. 11
Project No. 19125
Date: 3/2/20

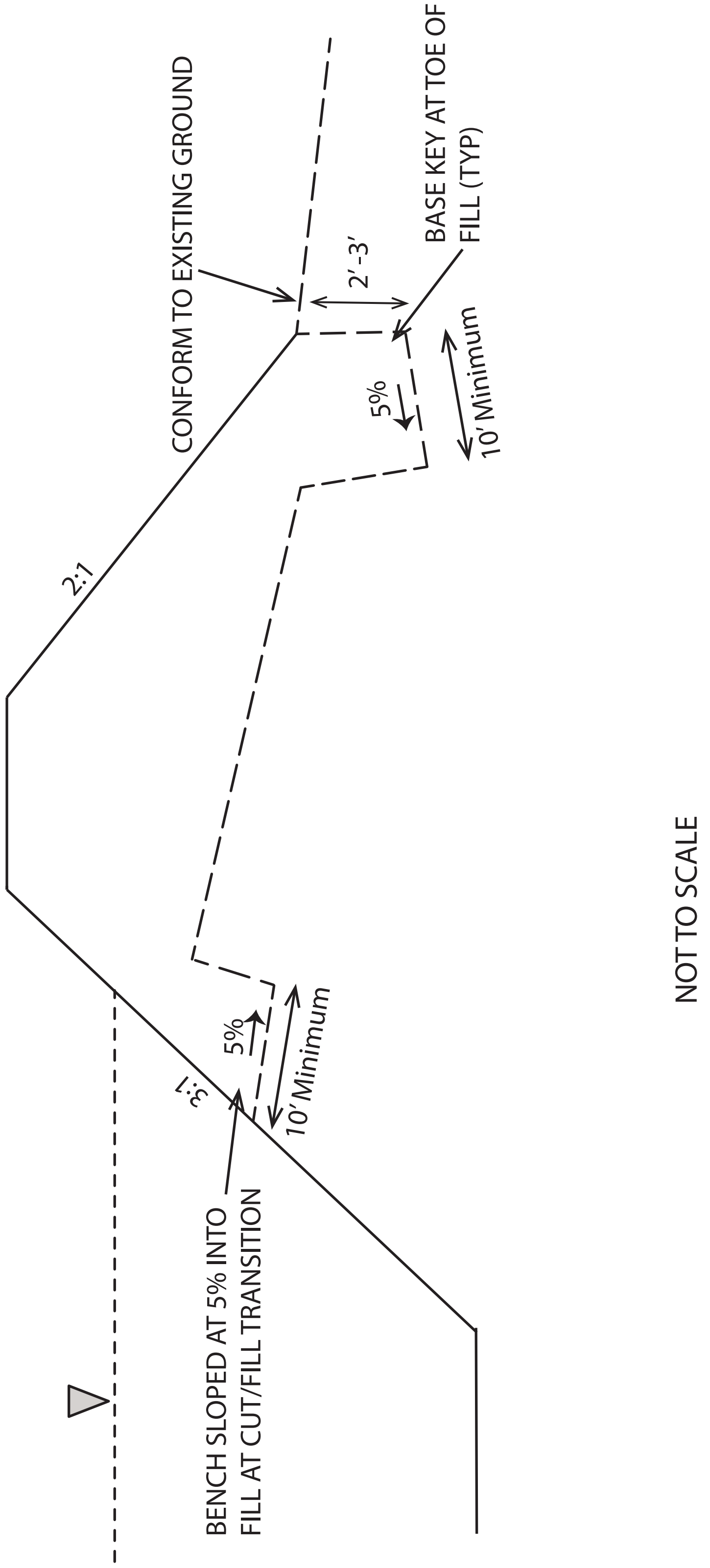


Not to Scale

Pacific Crest
ENGINEERING INC

Typical Retaining Wall Drain Detail
Gonzales IWRF
Gonzales, California

Figure No. 12
Project No. 19125
Date: 3/2/20



Pacific Crest
ENGINEERING INC

Typical Fill Berm Detail
Gonzales IWRF
Gonzales, California

Figure No. 13
Project No. 19125
Date: 3/2/20

APPENDIX B

CPT Results and Interpretive Plots

PRESENTATION OF SITE INVESTIGATION RESULTS

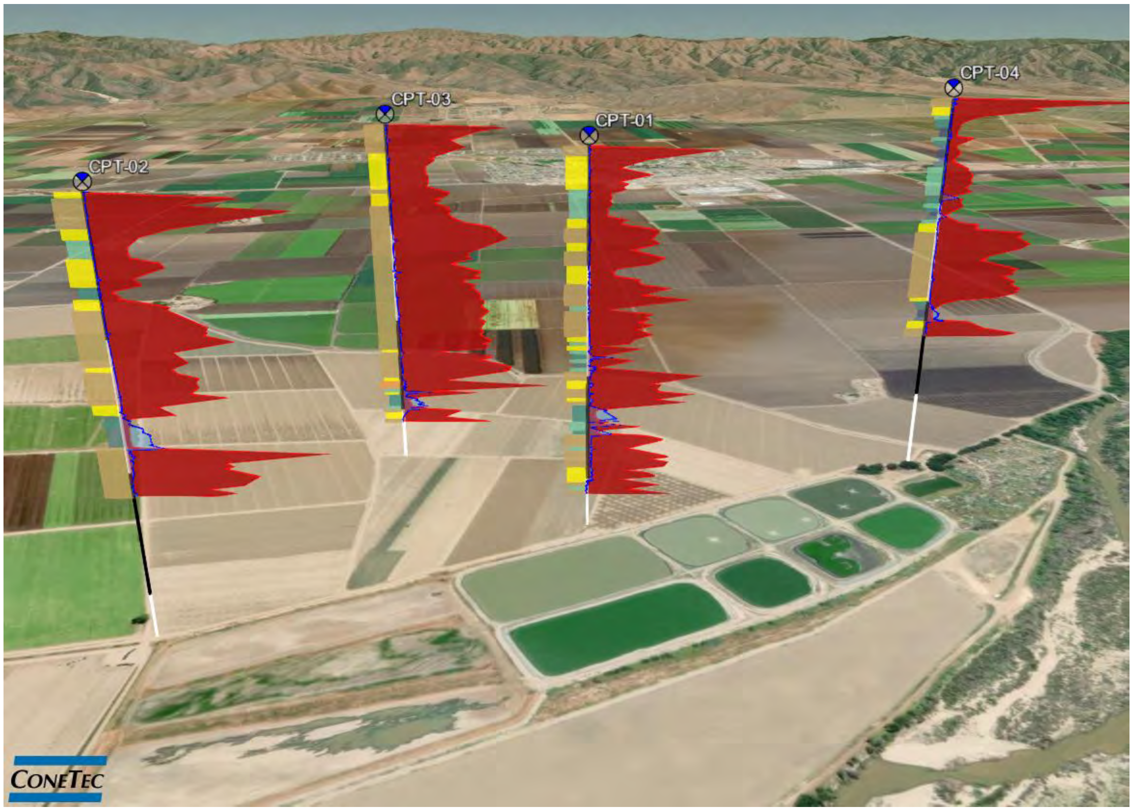
Gonzales Industrial WWTP

Prepared for:

Pacific Crest Engineering

ConeTec Job No: 19-56179

Project Start Date: 13-Nov-2019
Project End Date: 13-Nov-2019
Report Date: 19-Nov-2019



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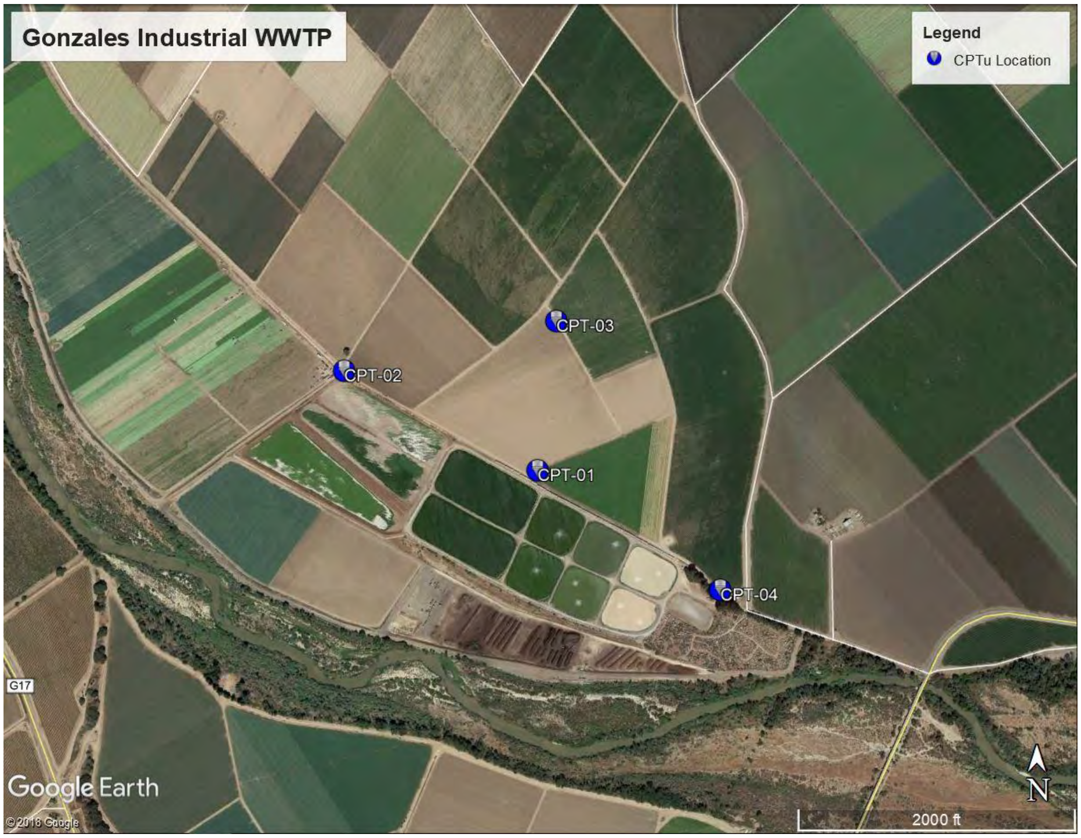
Introduction

The enclosed report presents the results of the site investigation program conducted by ConeTec Inc. for Pacific Crest Engineering of Watsonville, CA. The program consisted of cone penetration testing (CPTu) at four (4) locations.

Project Information

Project	
Client	Pacific Crest Engineering
Project	Gonzales Industrial WWTP
ConeTec Project #	19-56179

An aerial overview from Google Earth including the CPT test locations is presented below.



Rig Description	Deployment System	Test Type
CPT truck rig	30-ton truck mounted cylinder	CPTu

Coordinates		
Test Type	Collection Method	EPSG Number
CPTu	Consumer grade GPS	32610

Cone Penetrometers Used for this Project						
Cone Description	Cone Number	Cross Sectional Area (cm^2)	Sleeve Area (cm^2)	Tip Capacity (bar)	Sleeve Capacity (bar)	Pore Pressure Capacity (psi)
443:T1500F15U500	443	15	225	1500	15	500
Cone 443 was used in all soundings.						

Cone Penetration Test	
Depth reference	Depths are referenced to the existing ground surface at the time of test.
Tip and sleeve data offset	0.1 Meter This has been accounted for in the CPT data files.
Additional Comments	Advanced plots with Ic, Phi, Su(Nkt), and N1(60)Ic, as well as Soil Behavior Type (SBT) Scatter plots have been included in the data release package.

Calculated Geotechnical Parameter Tables	
Additional information	The Normalized Soil Behaviour Type Chart based on Q_{tn} (SBT Q_{tn}) (Robertson, 2009) was used to classify the soil for this project. A detailed set of calculated CPTu parameters have been generated and are provided in Excel format files in the release folder. The CPTu parameter calculations are based on values of corrected tip resistance (q_t) sleeve friction (f_s) and pore pressure (u_2). Effective stresses are calculated based on unit weights that have been assigned to the individual soil behaviour type zones and the assumed equilibrium pore pressure profile. Soils were classified as either drained or undrained based on the Q_{tn} Normalized Soil Behaviour Type Chart (Robertson, 2009). Calculations for both drained and undrained parameters were included for materials that classified as silt mixtures (zone 4).

Limitations

This report has been prepared for the exclusive use of Pacific Crest Engineering (Client) for the project titled “Gonzales Industrial WWTP”. The report’s contents may not be relied upon by any other party without the express written permission of ConeTec, Inc. (ConeTec). ConeTec has provided site investigation services, prepared the factual data reporting, and provided geotechnical parameter calculations consistent with current best practices. No other warranty, expressed or implied, is made.

The information presented in the report document and the accompanying data set pertain to the specific project, site conditions and objectives described to ConeTec by the Client. In order to properly understand the factual data, assumptions and calculations, reference must be made to the documents provided and their accompanying data sets, in their entirety.

Cone penetration tests (CPTu) are conducted using an integrated electronic piezocone penetrometer and data acquisition system manufactured by Adara Systems Ltd., a subsidiary of ConeTec.

ConeTec's piezocone penetrometers are compression type designs in which the tip and friction sleeve load cells are independent and have separate load capacities. The piezocones use strain gauged load cells for tip and sleeve friction and a strain gauged diaphragm type transducer for recording pore pressure. The piezocones also have a platinum resistive temperature device (RTD) for monitoring the temperature of the sensors, an accelerometer type dual axis inclinometer and a geophone sensor for recording seismic signals. All signals are amplified down hole within the cone body and the analog signals are sent to the surface through a shielded cable.

ConeTec penetrometers are manufactured with various tip, friction and pore pressure capacities in 5 cm^2, 10 cm^2 and 15 cm^2 tip base area configurations in order to maximize signal resolution for various soil conditions. The specific piezocone used for each test is described in the CPT summary table presented in the first appendix. The 15 cm^2 penetrometers do not require friction reducers as they have a diameter larger than the deployment rods. The 10 cm^2 piezocones use a friction reducer consisting of a rod adapter extension behind the main cone body with an enlarged cross-sectional area (typically forty-four millimeter diameter over a length of thirty-two millimeter with tapered leading and trailing edges) located at a distance of 585 millimeters above the cone tip.

The penetrometers are designed with equal end area friction sleeves, a net end area ratio of 0.8 and cone tips with a sixty-degree apex angle.

All ConeTec piezocones can record pore pressure at various locations. Unless otherwise noted, the pore pressure filter is located directly behind the cone tip in the "u_2" position (ASTM Type 2). The filter is six millimeters thick, made of porous plastic (polyethylene) having an average pore size of 125 microns (90-160 microns). The function of the filter is to allow rapid movements of extremely small volumes of water needed to activate the pressure transducer while preventing soil ingress or blockage.

The piezocone penetrometers are manufactured with dimensions, tolerances and sensor characteristics that are in general accordance with the current ASTM D5778 standard. ConeTec's calibration criteria also meets or exceeds those of the current ASTM D5778 standard. An illustration of the piezocone penetrometer is presented in Figure CPTu.

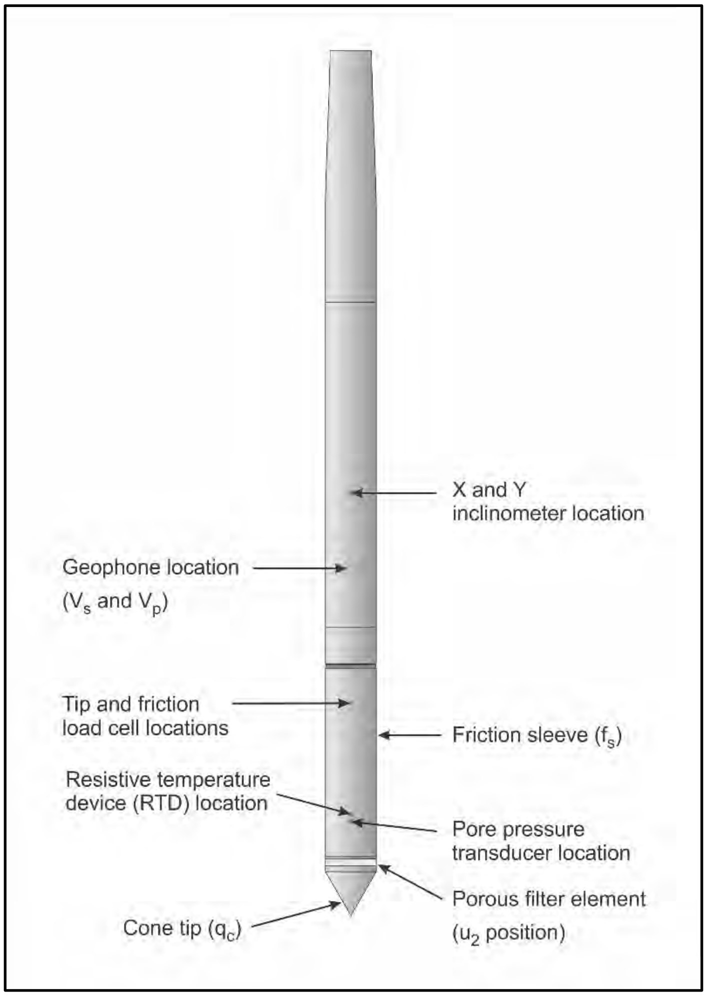


Figure CPTu. Piezocone Penetrometer (15 cm^2)

The ConeTec data acquisition systems consist of a Windows based computer and a signal conditioner and power supply interface box with a sixteen bit (or greater) analog to digital (A/D) converter. The data is recorded at fixed depth increments using a depth wheel attached to the push cylinders or by using a spring loaded rubber depth wheel that is held against the cone rods. The typical recording interval is 2.5 centimeters; custom recording intervals are possible. The system displays the CPTu data in real time and records the following parameters to a storage media during penetration:

- Depth
- Uncorrected tip resistance (q_c)
- Sleeve friction (f_s)
- Dynamic pore pressure (u)
- Additional sensors such as resistivity, passive gamma, ultra violet induced fluorescence, if applicable

All testing is performed in accordance to ConeTec's CPT operating procedures which are in general accordance with the current ASTM D5778 standard.

Prior to the start of a CPTu sounding a suitable cone is selected, the cone and data acquisition system are powered on, the pore pressure system is saturated with silicone oil and the baseline readings are recorded with the cone hanging freely in a vertical position.

The CPTu is conducted at a steady rate of two centimeters per second, within acceptable tolerances. Typically, one-meter length rods with an outer diameter of 38.1 millimeters are added to advance the cone to the sounding termination depth. After cone retraction final baselines are recorded.

Additional information pertaining to ConeTec's cone penetration testing procedures:

- Each filter is saturated in silicone oil under vacuum pressure prior to use
- Recorded baselines are checked with an independent multi-meter
- Baseline readings are compared to previous readings
- Soundings are terminated at the client's target depth or at a depth where an obstruction is encountered, excessive rod flex occurs, excessive inclination occurs, equipment damage is likely to take place, or a dangerous working environment arises
- Differences between initial and final baselines are calculated to ensure zero load offsets have not occurred and to ensure compliance with ASTM standards

The interpretation of piezocone data for this report is based on the corrected tip resistance (q_t), sleeve friction (f_s) and pore water pressure (u). The interpretation of soil type is based on the correlations developed by Robertson et al. (1986) and Robertson (1990, 2009). It should be noted that it is not always possible to accurately identify a soil behaviour type based on these parameters. In these situations, experience, judgment and an assessment of other parameters may be used to infer soil behaviour type.

The recorded tip resistance (q_c) is the total force acting on the piezocone tip divided by its base area. The tip resistance is corrected for pore pressure effects and termed corrected tip resistance (q_t) according to the following expression presented in Robertson et al. (1986):

$$q_t = q_c + (1-a) \bullet u_2$$

where: q_t is the corrected tip resistance
q_c is the recorded tip resistance
u_2 is the recorded dynamic pore pressure behind the tip (u_2 position)
a is the Net Area Ratio for the piezocone (0.8 for ConeTec probes)

The sleeve friction (f_s) is the frictional force on the sleeve divided by its surface area. As all ConeTec piezocones have equal end area friction sleeves, pore pressure corrections to the sleeve data are not required.

The dynamic pore pressure (u) is a measure of the pore pressures generated during cone penetration. To record equilibrium pore pressure, the penetration must be stopped to allow the dynamic pore pressures to stabilize. The rate at which this occurs is predominantly a function of the permeability of the soil and the diameter of the cone.

The friction ratio (Rf) is a calculated parameter. It is defined as the ratio of sleeve friction to the tip resistance expressed as a percentage. Generally, saturated cohesive soils have low tip resistance, high friction ratios and generate large excess pore water pressures. Cohesionless soils have higher tip resistances, lower friction ratios and do not generate significant excess pore water pressure.

A summary of the CPTu soundings along with test details and individual plots are provided in the appendices. A set of files with calculated geotechnical parameters were generated for each sounding based on published correlations and are provided in Excel format in the data release folder. Information regarding the methods used is also included in the data release folder.

For additional information on CPTu interpretations and calculated geotechnical parameters, refer to Robertson et al. (1986), Lunne et al. (1997), Robertson (2009), Mayne (2013, 2014) and Mayne and Peuchen (2012).

References

ASTM D5778-12, 2012, "Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils", ASTM International, West Conshohocken, PA. DOI: 10.1520/D5778-12.

Lunne, T., Robertson, P.K. and Powell, J. J. M., 1997, “Cone Penetration Testing in Geotechnical Practice”, Blackie Academic and Professional.

Mayne, P.W., 2013, “Evaluating yield stress of soils from laboratory consolidation and in-situ cone penetration tests”, Sound Geotechnical Research to Practice (Holtz Volume) GSP 230, ASCE, Reston/VA: 406-420. DOI: 10.1061/9780784412770.027.

Mayne, P.W. and Peuchen, J., 2012, “Unit weight trends with cone resistance in soft to firm clays”, Geotechnical and Geophysical Site Characterization *4,* Vol. 1 (Proc. ISC-4, Pernambuco), CRC Press, London: 903-910.

Mayne, P.W., 2014, “Interpretation of geotechnical parameters from seismic piezocone tests”, CPT’14 Keynote Address, Las Vegas, NV, May 2014.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, “Use of Piezometer Cone Data”, Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.

Robertson, P.K., 1990, “Soil Classification Using the Cone Penetration Test”, Canadian Geotechnical Journal, Volume 27: 151-158. DOI: 10.1139/T90-014.

Robertson, P.K., 2009, “Interpretation of cone penetration tests – a unified approach”, Canadian Geotechnical Journal, Volume 46: 1337-1355. DOI: 10.1139/T09-065.

The cone penetration test is halted at specific depths to carry out pore pressure dissipation (PPD) tests, shown in Figure PPD-1. For each dissipation test the cone and rods are decoupled from the rig and the data acquisition system measures and records the variation of the pore pressure (u) with time (t).

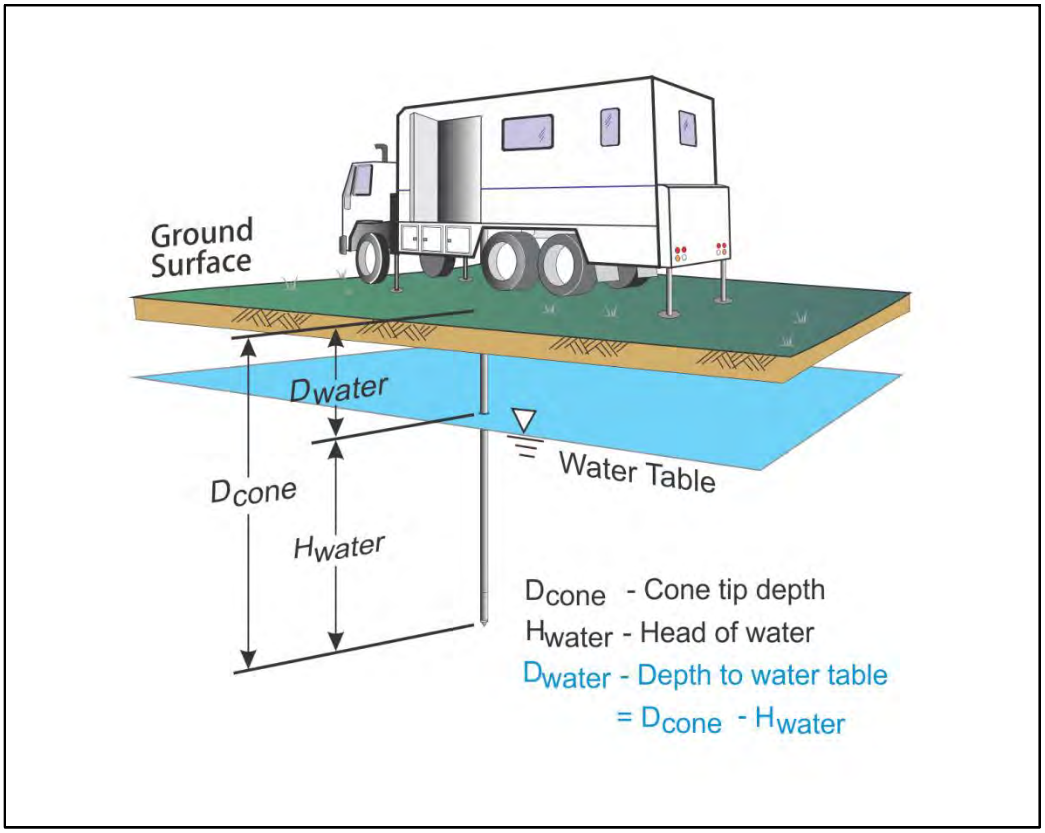


Figure PPD-1. Pore pressure dissipation test setup

Pore pressure dissipation data can be interpreted to provide estimates of ground water conditions, permeability, consolidation characteristics and soil behaviour.

The typical shapes of dissipation curves shown in Figure PPD-2 are very useful in assessing soil type, drainage, in situ pore pressure and soil properties. A flat curve that stabilizes quickly is typical of a freely draining sand. Undrained soils such as clays will typically show positive excess pore pressure and have long dissipation times. Dilative soils will often exhibit dynamic pore pressures below equilibrium that then rise over time. Overconsolidated fine-grained soils will often exhibit an initial dilatory response where there is an initial rise in pore pressure before reaching a peak and dissipating.

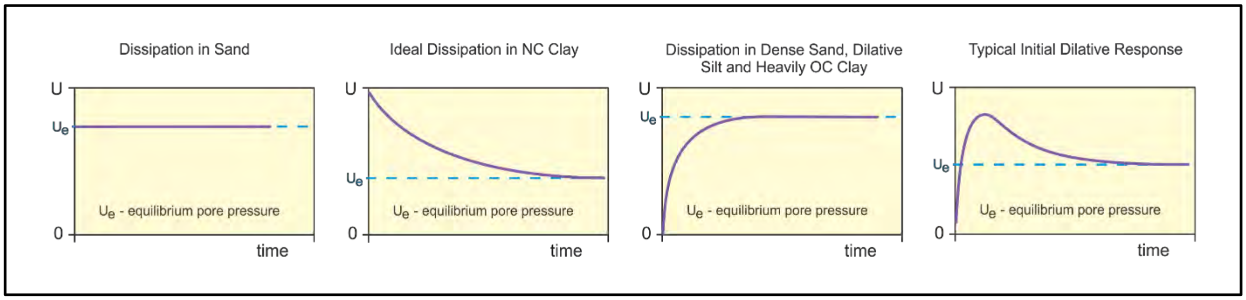


Figure PPD-2. Pore pressure dissipation curve examples

In order to interpret the equilibrium pore pressure (u_{eq}) and the apparent phreatic surface, the pore pressure should be monitored until such time as there is no variation in pore pressure with time as shown for each curve in Figure PPD-2.

In fine grained deposits the point at which 100% of the excess pore pressure has dissipated is known as t_{100}. In some cases this can take an excessive amount of time and it may be impractical to take the dissipation to t_{100}. A theoretical analysis of pore pressure dissipations by Teh and Houlsby (1991) showed that a single curve relating degree of dissipation versus theoretical time factor (T*) may be used to calculate the coefficient of consolidation (c_h) at various degrees of dissipation resulting in the expression for c_h shown below.

$$c_h = \frac{T^* \cdot a^2 \cdot \sqrt{I_r}}{t}$$

Where:

T* is the dimensionless time factor (Table Time Factor)
a is the radius of the cone
I_r is the rigidity index
t is the time at the degree of consolidation

Table Time Factor. T* versus degree of dissipation (Teh and Houlsby (1991))

Degree of Dissipation (%)	20	30	40	50	60	70	80
T* (u_2)	0.038	0.078	0.142	0.245	0.439	0.804	1.60

The coefficient of consolidation is typically analyzed using the time (t_{50}) corresponding to a degree of dissipation of 50% (u_{50}). In order to determine t_{50}, dissipation tests must be taken to a pressure less than u_{50}. The u_{50} value is half way between the initial maximum pore pressure and the equilibrium pore pressure value, known as u_{100}. To estimate u_{50}, both the initial maximum pore pressure and u_{100} must be known or estimated. Other degrees of dissipations may be considered, particularly for extremely long dissipations.

At any specific degree of dissipation the equilibrium pore pressure (u at t_{100}) must be estimated at the depth of interest. The equilibrium value may be determined from one or more sources such as measuring the value directly (u_{100}), estimating it from other dissipations in the same profile, estimating the phreatic surface and assuming hydrostatic conditions, from nearby soundings, from client provided information, from site observations and/or past experience, or from other site instrumentation.

For calculations of c_h (Teh and Houlsby (1991)), t_{50} values are estimated from the corresponding pore pressure dissipation curve and a rigidity index (I_r) is assumed. For curves having an initial dilatory response in which an initial rise in pore pressure occurs before reaching a peak, the relative time from the peak value is used in determining t_{50}. In cases where the time to peak is excessive, t_{50} values are not calculated.

Due to possible inherent uncertainties in estimating I_r, the equilibrium pore pressure and the effect of an initial dilatory response on calculating t_{50}, other methods should be applied to confirm the results for c_h.

Additional published methods for estimating the coefficient of consolidation from a piezocone test are described in Burns and Mayne (1998, 2002), Jones and Van Zyl (1981), Robertson et al. (1992) and Sully et al. (1999).

A summary of the pore pressure dissipation tests and dissipation plots are presented in the relevant appendix.

References

Burns, S.E. and Mayne, P.W., 1998, "Monotonic and dilatory pore pressure decay during piezocone tests", Canadian Geotechnical Journal 26 (4): 1063-1073. DOI: 1063-1073/T98-062.

Burns, S.E. and Mayne, P.W., 2002, "Analytical cavity expansion-critical state model cone dissipation in fine-grained soils", Soils & Foundations, Vol. 42(2): 131-137.

Jones, G.A. and Van Zyl, D.J.A., 1981, "The piezometer probe: a useful investigation tool", Proceedings, 10th International Conference on Soil Mechanics and Foundation Engineering, Vol. 3, Stockholm: 489-495.

Robertson, P.K., Sully, J.P., Woeller, D.J., Lunne, T., Powell, J.J.M. and Gillespie, D.G., 1992, "Estimating coefficient of consolidation from piezocone tests", Canadian Geotechnical Journal, 29(4): 539-550. DOI: 10.1139/T92-061.

Sully, J.P., Robertson, P.K., Campanella, R.G. and Woeller, D.J., 1999, "An approach to evaluation of field CPTU dissipation data in overconsolidated fine-grained soils", Canadian Geotechnical Journal, 36(2): 369-381. DOI: 10.1139/T98-105.

Teh, C.I., and Houlsby, G.T., 1991, "An analytical study of the cone penetration test in clay", Geotechnique, 41(1): 17-34. DOI: 10.1680/geot.1991.41.1.17.

The appendices listed below are included in the report:

- Cone Penetration Test Summary and Standard Cone Penetration Test Plots
- Advanced Cone Penetration Test Plots with Ic, Su(Nkt) and N1(60)Ic
- Soil Behavior Type (SBT) Scatter Plots
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Cone Penetration Test Summary and Standard Cone Penetration Test Plots

CONETEC

Job No: 19-56179
Client: Pacific Crest Engineering
Project: Gonzales Industrial WWTP
Start Date: 13-Nov-2019
End Date: 13-Nov-2019

CONE PENETRATION TEST SUMMARY

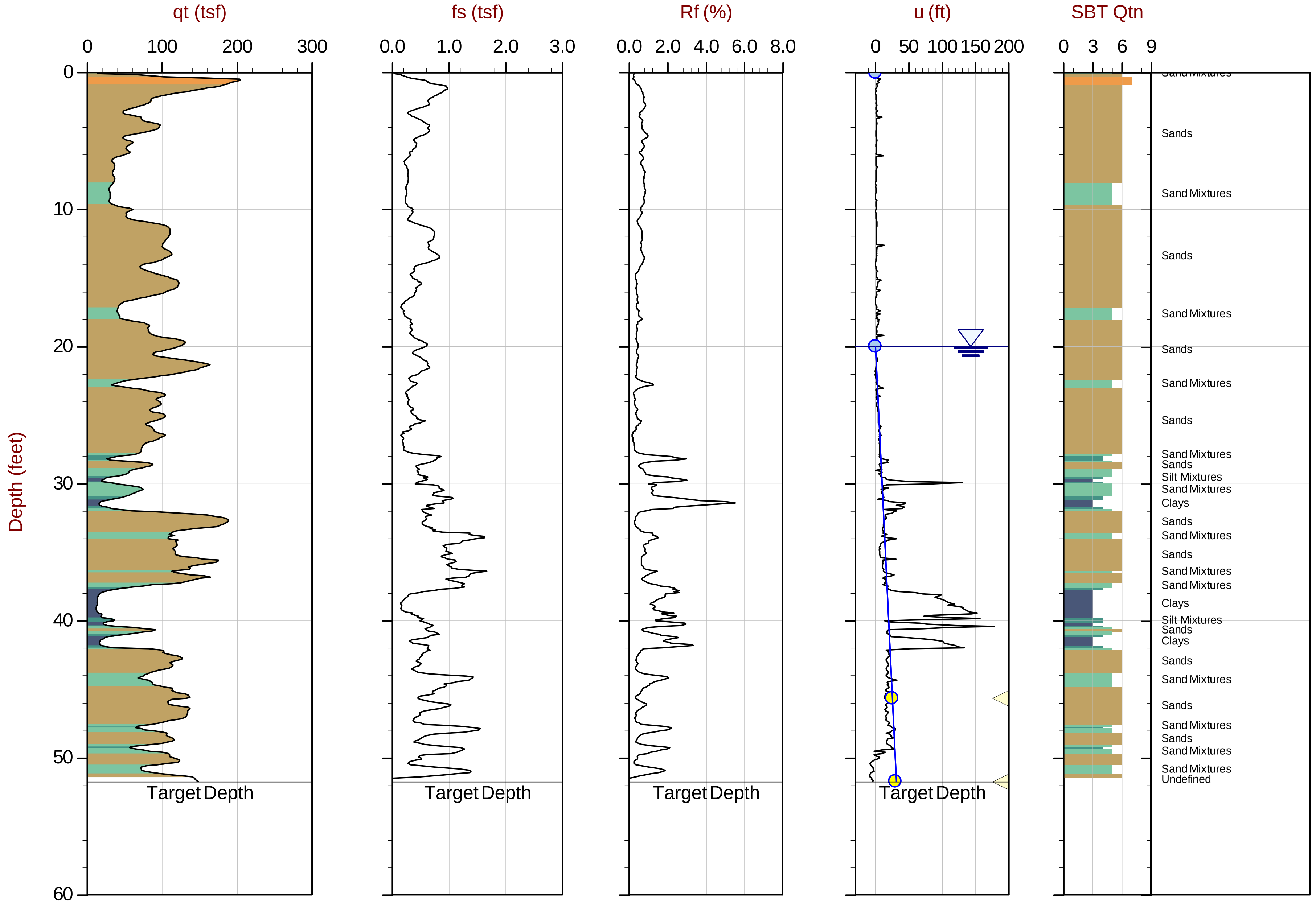
Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting[2] (m)	Elevation[3] (ft)	Refer to Notation Number
CPT-01	19-56179_CP01	13-Nov-2019	443:T1500F15U500	20.0	51.76	4039630	636309	109	
CPT-02	19-56179_CP02	13-Nov-2019	443:T1500F15U500	11.4	35.68	4039841	635881	107	
CPT-03	19-56179_CP03	13-Nov-2019	443:T1500F15U500	23.1	51.51	4039957	636345	110	
CPT-04	19-56179_CP04	13-Nov-2019	443:T1500F15U500	22.8	38.71	4039375	636714	114	

1. The assumed phreatic surface was based on the results of the shallowest pore pressure dissipation test performed within the sounding. Hydrostatic conditions were assumed for the calculated parameters.
2. The coordinates were acquired using consumer grade GPS equipment, datum: WGS 1984 / UTM Zone 10 North.
3. Elevations are refrenced to the ground surface and are derived from Google Earth Elevation for the recorded coordinates.

Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 08:52
Site: Gonzales Industrial WWTP

Sounding: CPT-01
Cone: 443:T1500F15U500



Max Depth: 15.775 m / 51.75 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP01.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039630m E: 636309m

● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

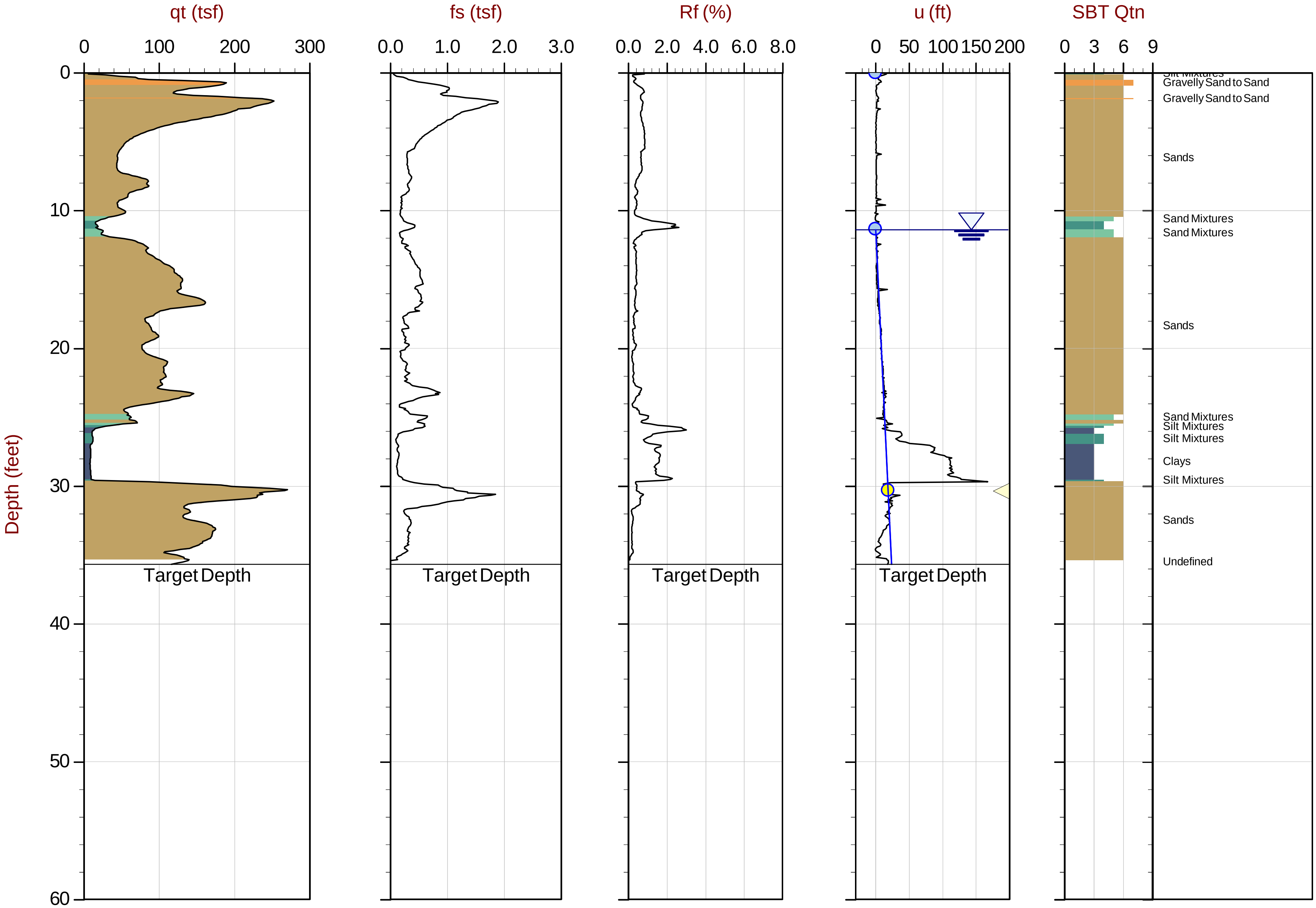
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 09:49
Site: Gonzales Industrial WWTP

Sounding: CPT-02
Cone: 443:T1500F15U500



Max Depth: 10.875 m / 35.68 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP02.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039841m E: 635881m

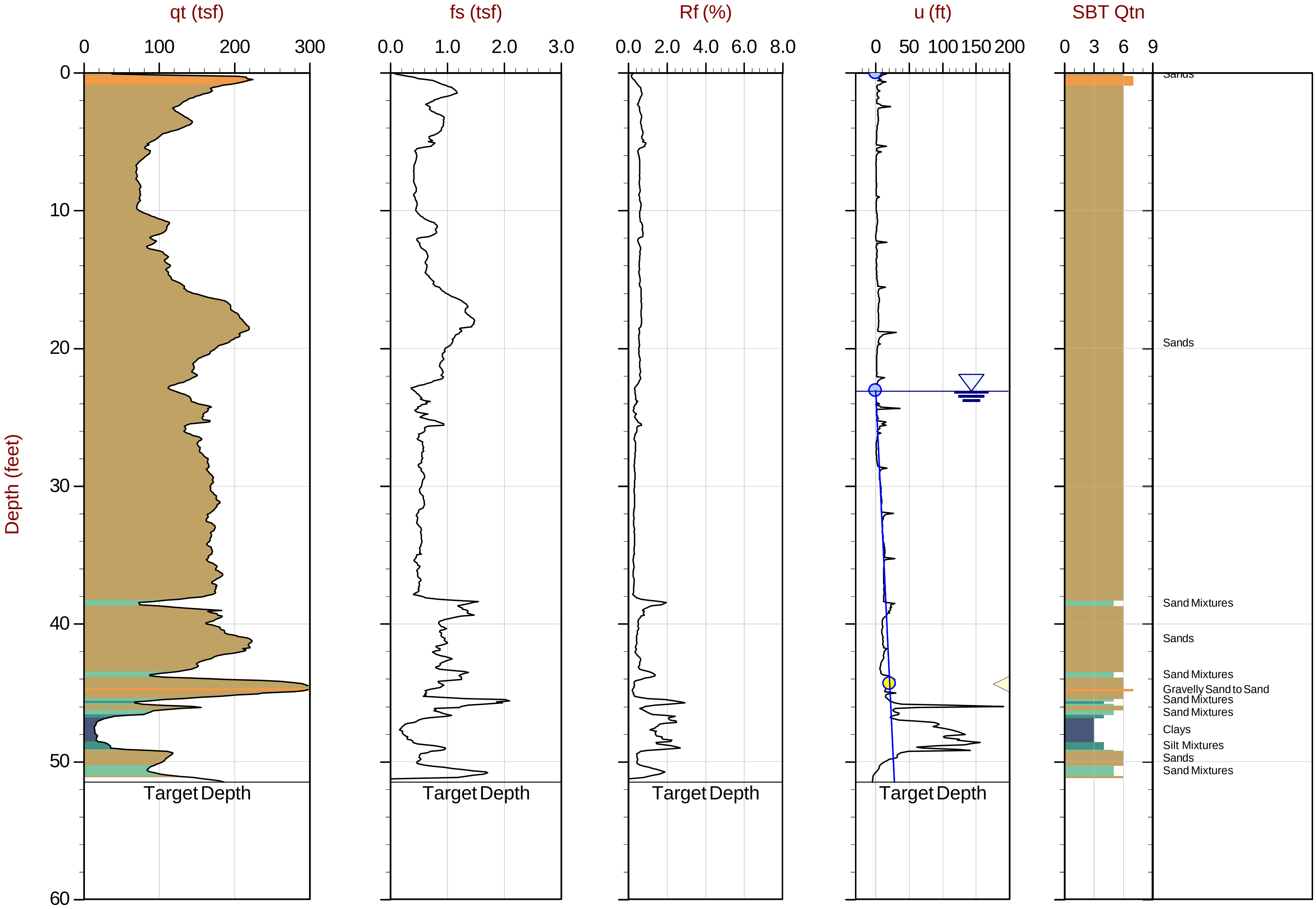
● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 10:35
Site: Gonzales Industrial WWTP

Sounding: CPT-03
Cone: 443:T1500F15U500



Max Depth: 15.700 m / 51.51 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP03.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039957m E: 636345m

● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

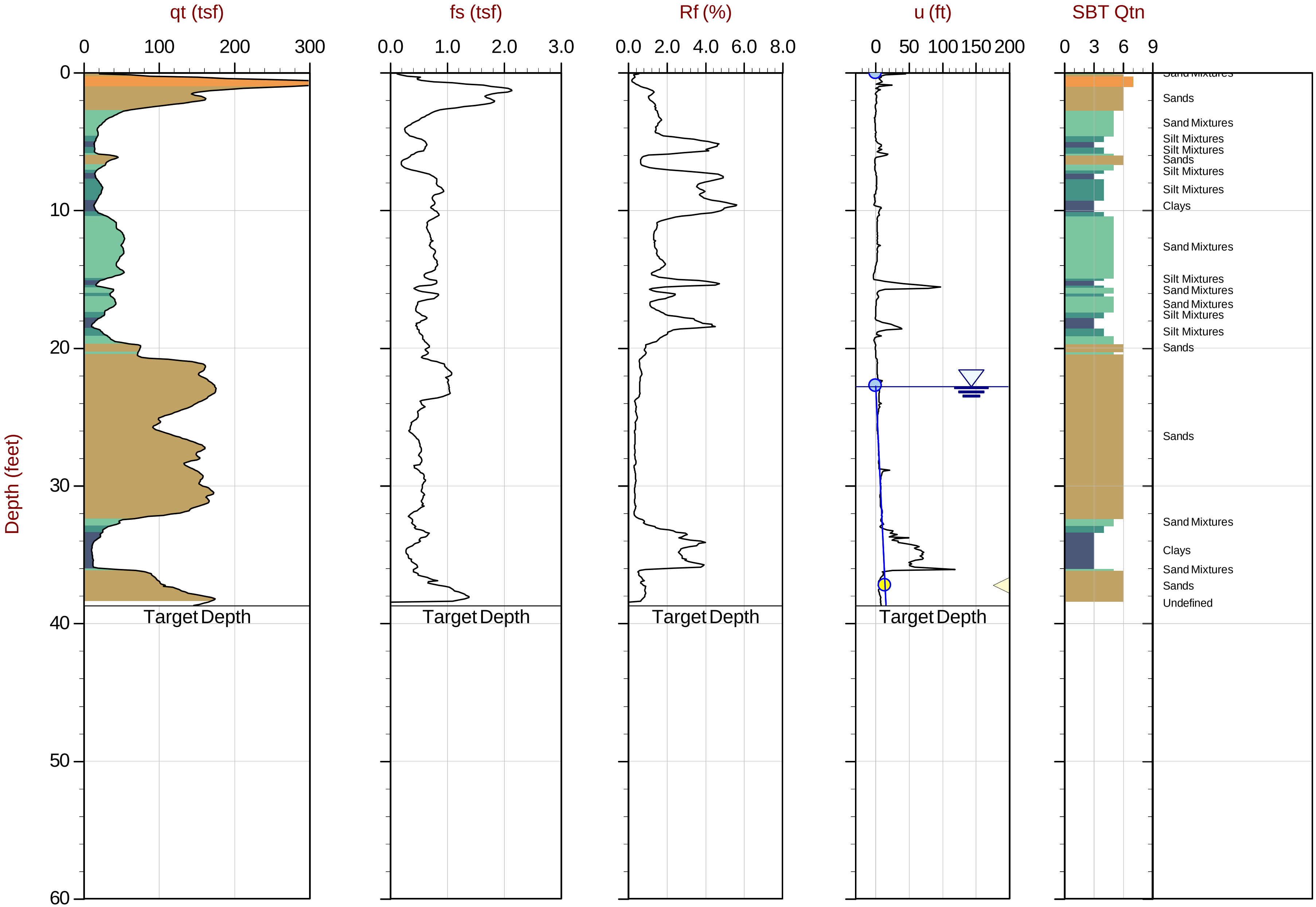
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 11:29
Site: Gonzales Industrial WWTP

Sounding: CPT-04
Cone: 443:T1500F15U500



Max Depth: 11.800 m / 38.71 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP04.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039375m E: 636714m

● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

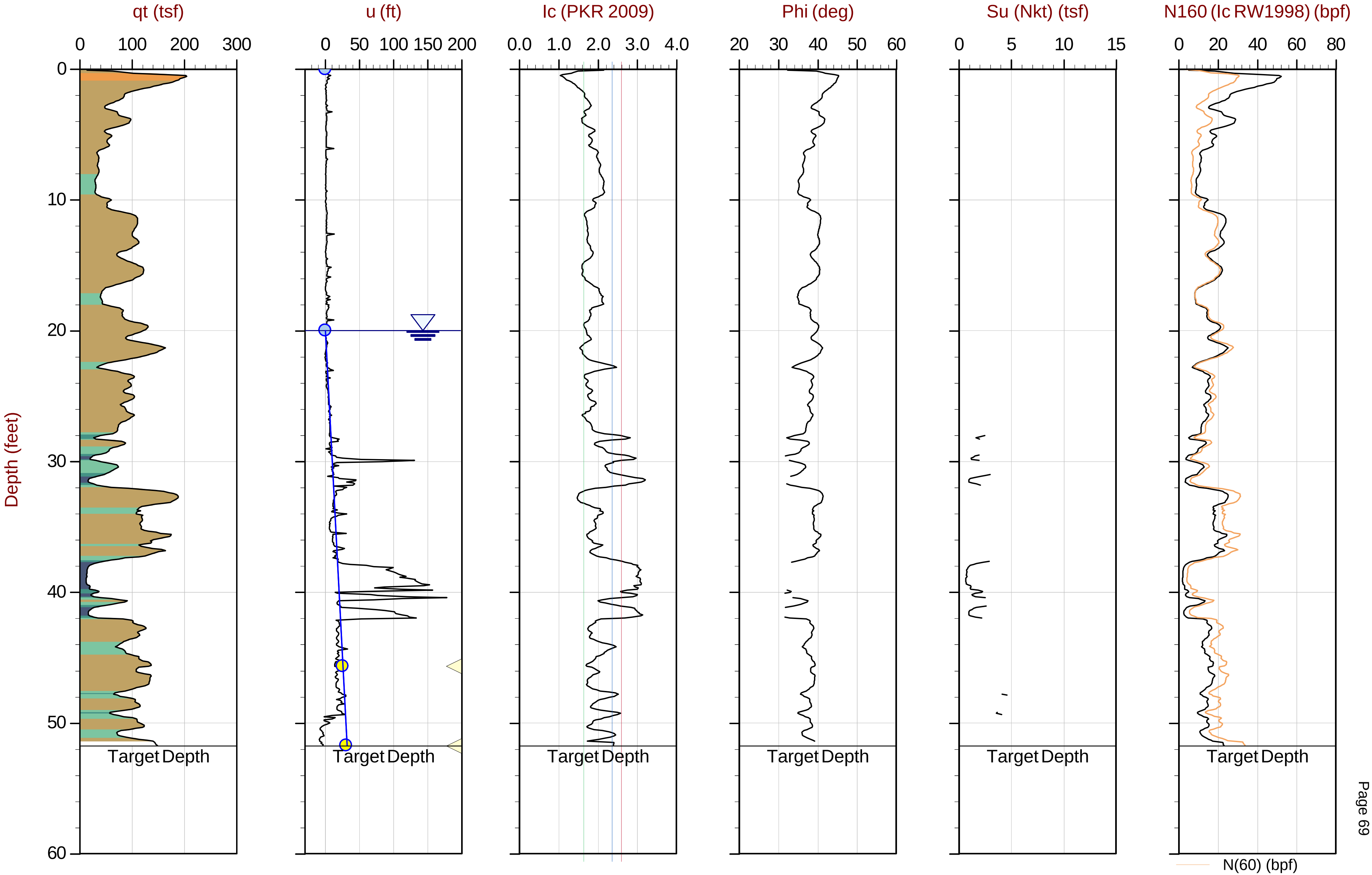
Advanced Cone Penetration Test Plots with Ic, Phi, Su(Nkt), and N1(60)Ic

CONETEC

Pacific Crest Engineering

Job No: 19-56177
Date: 2019-11-13 08:52
Site: Gonzales Industrial WWTP

Sounding: CPT-01
Cone: 443:T1500F15U500



Max Depth: 15.775 m / 51.75 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP01.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039630m E: 636309m

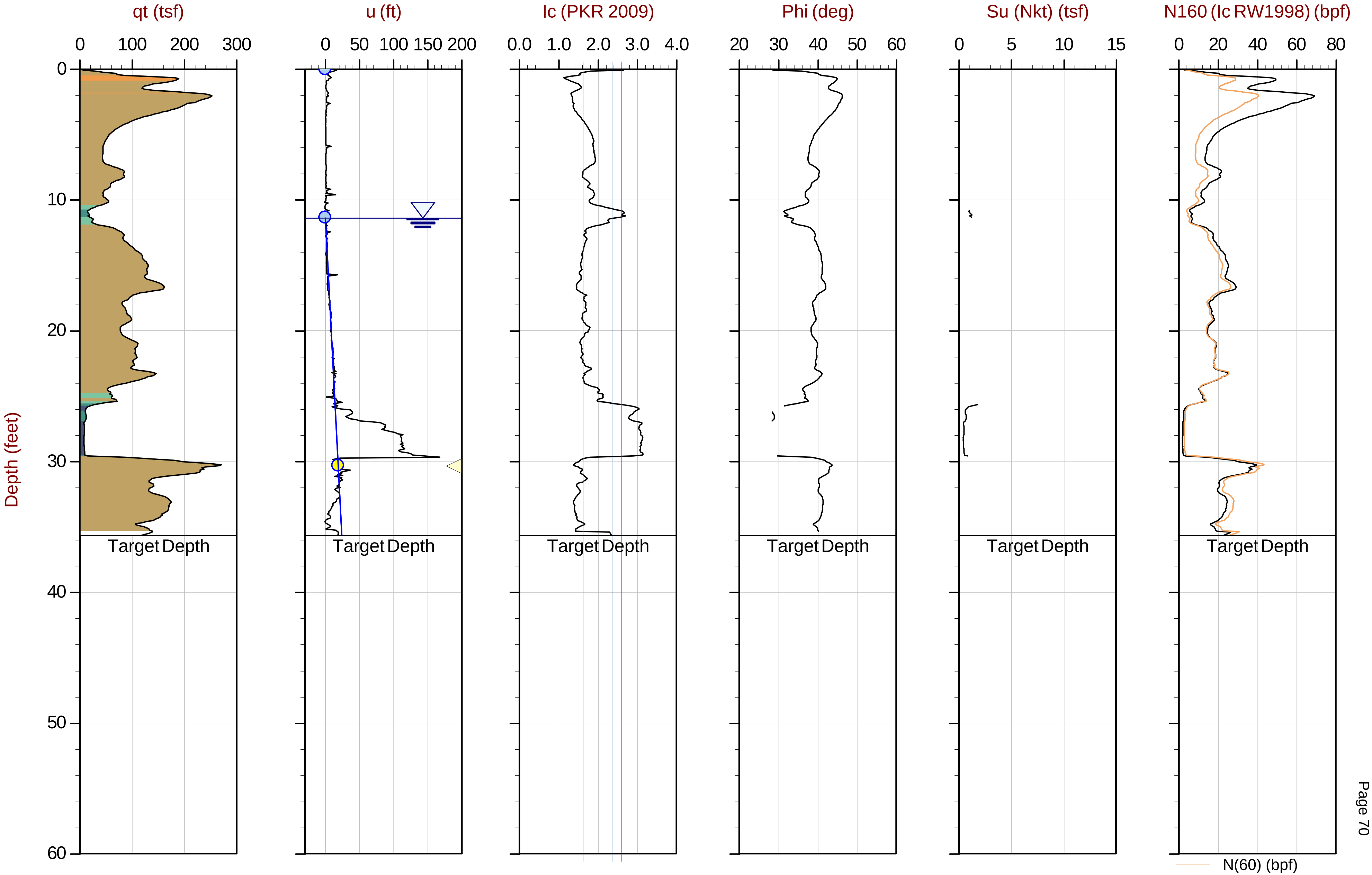
● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Pacific Crest Engineering

Job No: 19-56177
Date: 2019-11-13 09:49
Site: Gonzales Industrial WWTP

Sounding: CPT-02
Cone: 443:T1500F15U500



Max Depth: 10.875 m / 35.68 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP02.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039841m E: 635881m

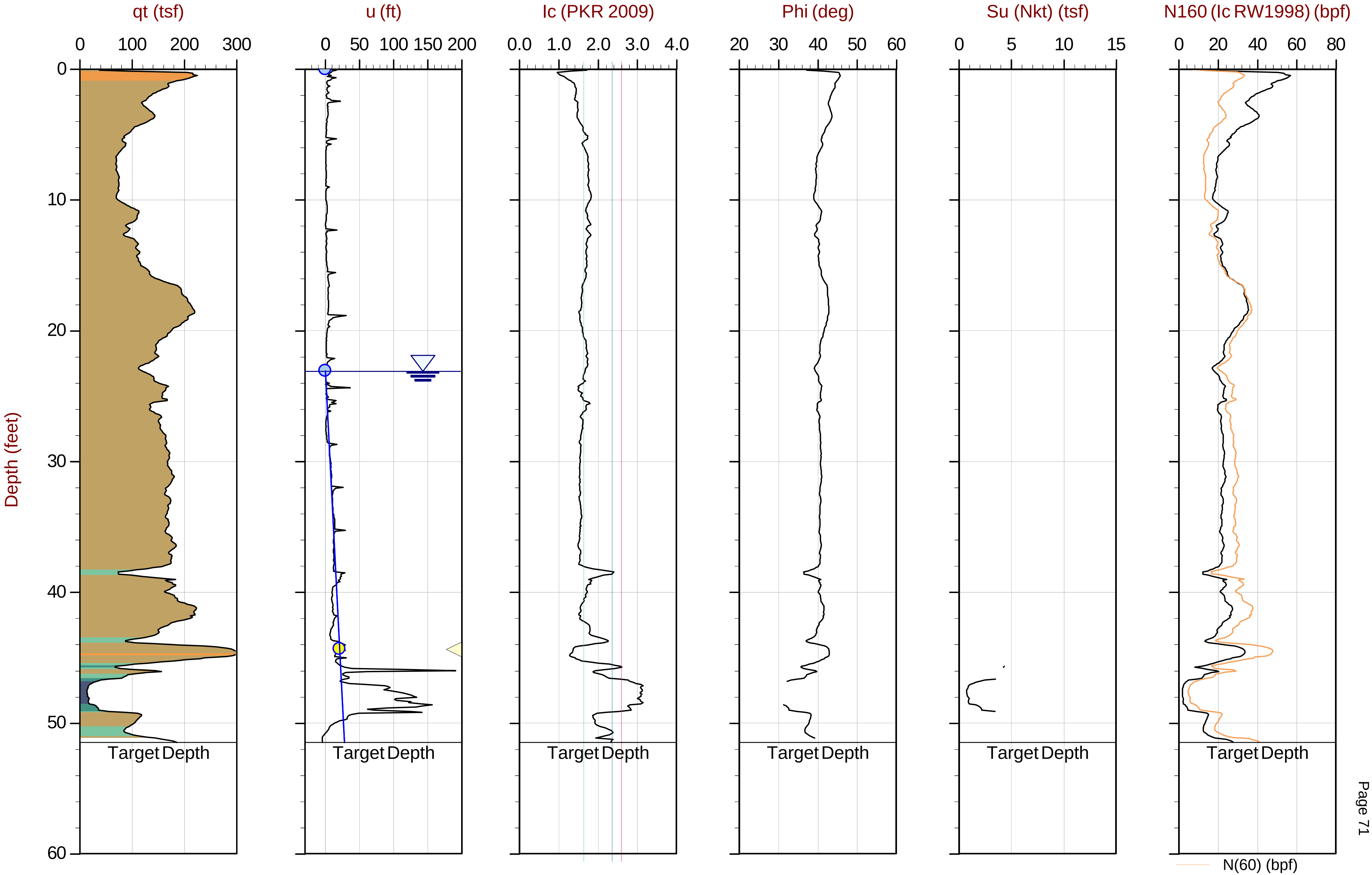
● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Pacific Crest Engineering

Job No: 19-56177
Date: 2019-11-13 10:35
Site: Gonzales Industrial WWTP

Sounding: CPT-03
Cone: 443:T1500F15U500



Max Depth: 15.700 m / 51.51 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP03.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039957m E: 636345m

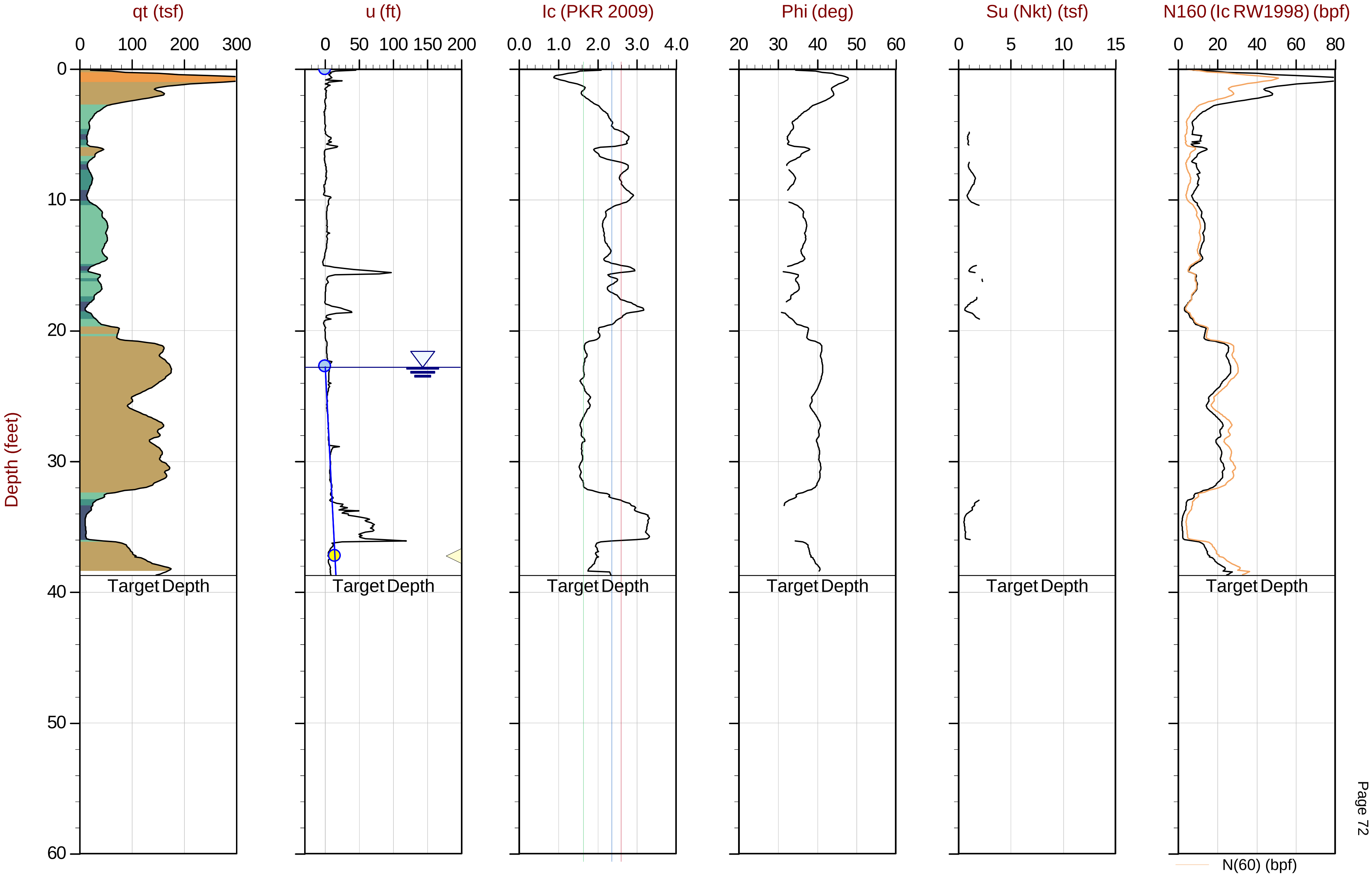
● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Pacific Crest Engineering

Job No: 19-56177
Date: 2019-11-13 11:29
Site: Gonzales Industrial WWTP

Sounding: CPT-04
Cone: 443:T1500F15U500



Max Depth: 11.800 m / 38.71 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP04.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039375m E: 636714m

● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

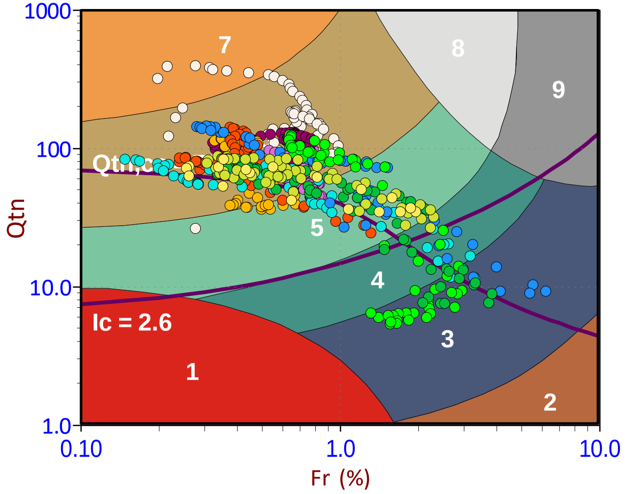
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

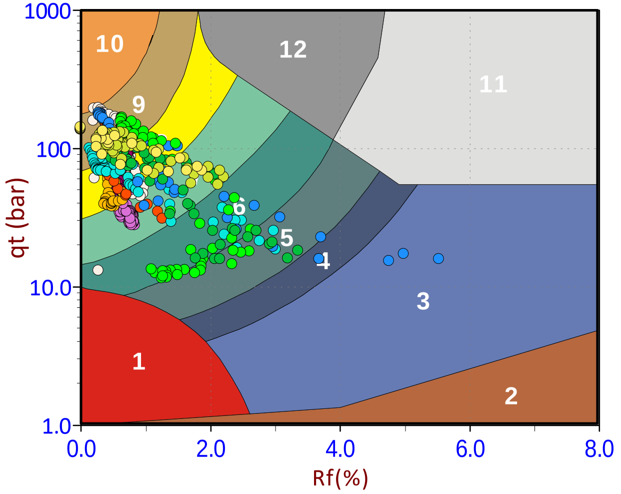
Soil Behavior Type (SBT) Scatter Plots

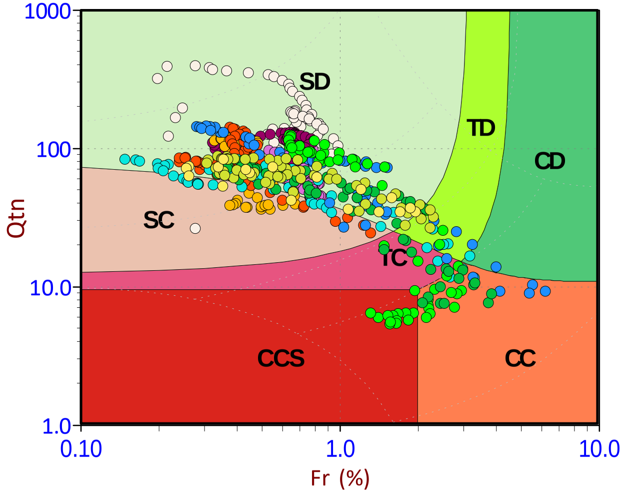
Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 08:52
Site: Gonzales Industrial WWTP

Sounding: CPT-01
Cone: 443:T1500F15U500


Qtn Chart (PKR 2009)


Standard SBT Chart (UBC 1986)


Modified SBTn (PKR 2016)

Depth Ranges
- ○ >0.0 to 5.0 ft
- ● >5.0 to 10.0 ft
- ● >10.0 to 15.0 ft
- ● >15.0 to 20.0 ft
- ● >20.0 to 25.0 ft
- ● >25.0 to 30.0 ft
- ● >30.0 to 35.0 ft
- ● >35.0 to 40.0 ft
- ● >40.0 to 45.0 ft
- ● >45.0 to 50.0 ft
- ● >50.0 ft

Legend
- 🟥 Sensitive, Fine Grained
- 🟫 Organic Soils
- 🟦 Clays
- 🟩 Silt Mixtures
- 🟩 Sand Mixtures
- 🟫 Sands
- 🟧 Gravelly Sand to Sand
- ⬜ Stiff Sand to Clayey Sand
- ⬛ Very Stiff Fine Grained

Legend
- 🟥 Sensitive Fines
- 🟫 Organic Soil
- 🟦 Clay
- 🟦 Silty Clay
- ⬛ Clayey Silt
- 🟩 Silt
- 🟩 Sandy Silt
- 🟨 Silty Sand/Sand
- 🟫 Sand
- 🟧 Gravelly Sand
- ⬜ Stiff Fine Grained
- ⬛ Cemented Sand

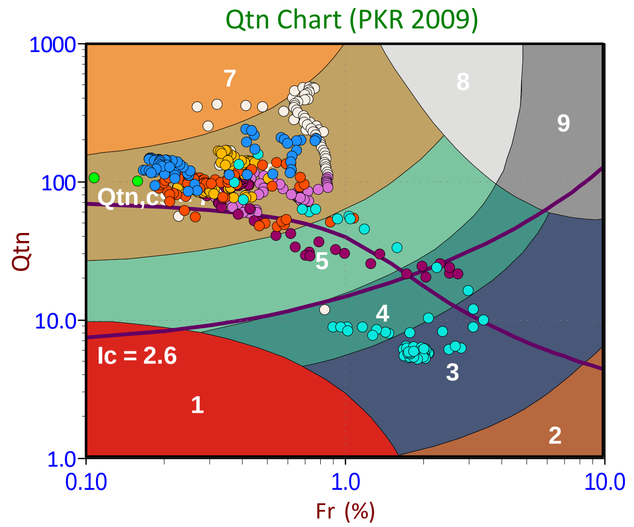
Legend
- 🟥 CCS (Cont. sensitive clay like)
- 🟧 CC (Cont. clay like)
- 🟥 TC (Cont. transitional)
- 🟫 SC (Cont. sand like)
- 🟩 CD (Dil. clay like)
- 🟩 TD (Dil. transitional)
- ⬜ SD (Dil. sand like)

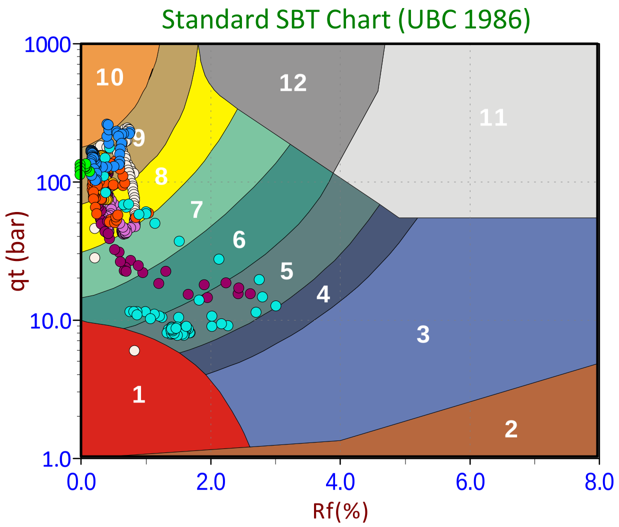
CONETEC

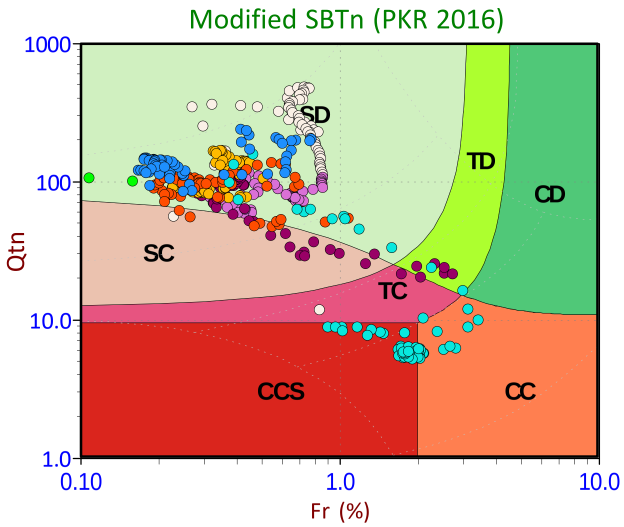
Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 09:49
Site: Gonzales Industrial WWTP

Sounding: CPT-02
Cone: 443:T1500F15U500


Qtn Chart (PKR 2009)


Standard SBT Chart (UBC 1986)


Modified SBTn (PKR 2016)

Depth Ranges
- ○ >0.0 to 5.0 ft
- ● >5.0 to 10.0 ft
- ● >10.0 to 15.0 ft
- ● >15.0 to 20.0 ft
- ● >20.0 to 25.0 ft
- ● >25.0 to 30.0 ft
- ● >30.0 to 35.0 ft
- ● >35.0 to 40.0 ft
- ● >40.0 to 45.0 ft
- ● >45.0 to 50.0 ft
- ● >50.0 ft

Legend
- 🟥 Sensitive, Fine Grained
- 🟫 Organic Soils
- ■ Clays
- ■ Silt Mixtures
- 🟩 Sand Mixtures
- ■ Sands
- 🟧 Gravelly Sand to Sand
- ■ Stiff Sand to Clayey Sand
- ■ Very Stiff Fine Grained

Legend
- 🟥 Sensitive Fines
- 🟫 Organic Soil
- 🟦 Clay
- ■ Silty Clay
- ■ Clayey Silt
- ■ Silt
- 🟩 Sandy Silt
- 🟨 Silty Sand/Sand
- ■ Sand
- 🟧 Gravelly Sand
- ■ Stiff Fine Grained
- ■ Cemented Sand

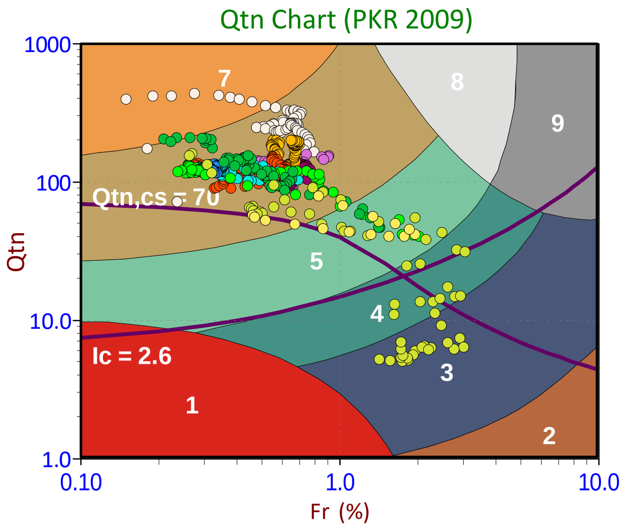
Legend
- 🟥 CCS (Cont. sensitive clay like)
- 🟧 CC (Cont. clay like)
- ■ TC (Cont. transitional)
- ■ SC (Cont. sand like)
- 🟩 CD (Dil. clay like)
- 🟩 TD (Dil. transitional)
- ■ SD (Dil. sand like)

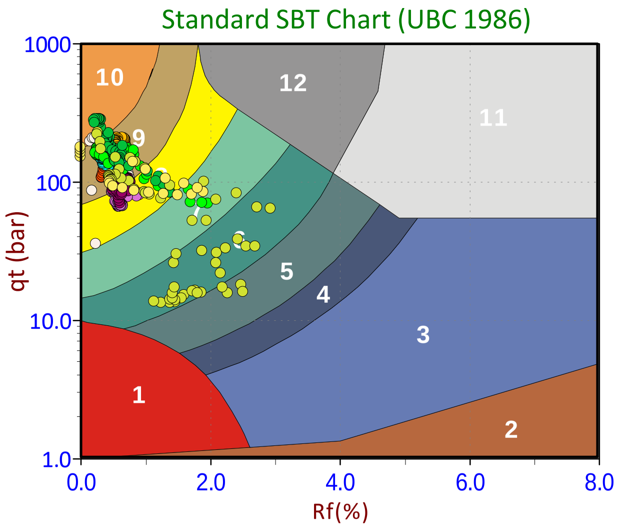
CONETEC

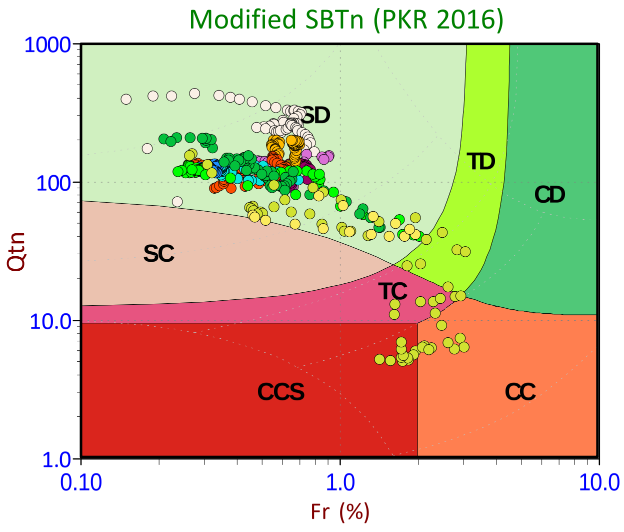
Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 10:35
Site: Gonzales Industrial WWTP

Sounding: CPT-03
Cone: 443:T1500F15U500







Depth Ranges

- ○ >0.0 to 5.0 ft
- ● >5.0 to 10.0 ft
- ● >10.0 to 15.0 ft
- ● >15.0 to 20.0 ft
- ● >20.0 to 25.0 ft
- ● >25.0 to 30.0 ft
- ● >30.0 to 35.0 ft
- ● >35.0 to 40.0 ft
- ● >40.0 to 45.0 ft
- ● >45.0 to 50.0 ft
- ● >50.0 ft

Legend

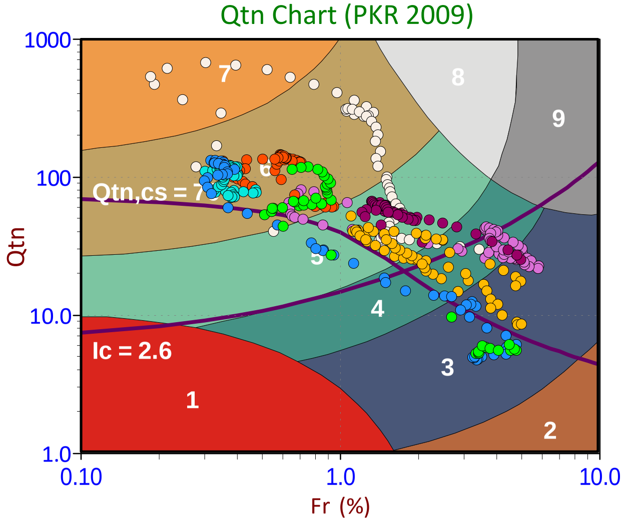
- 🟥 Sensitive, Fine Grained
- 🟫 Organic Soils
- ■ Clays
- ■ Silt Mixtures
- 🟩 Sand Mixtures
- ■ Sands
- 🟧 Gravelly Sand to Sand
- □ Stiff Sand to Clayey Sand
- ■ Very Stiff Fine Grained

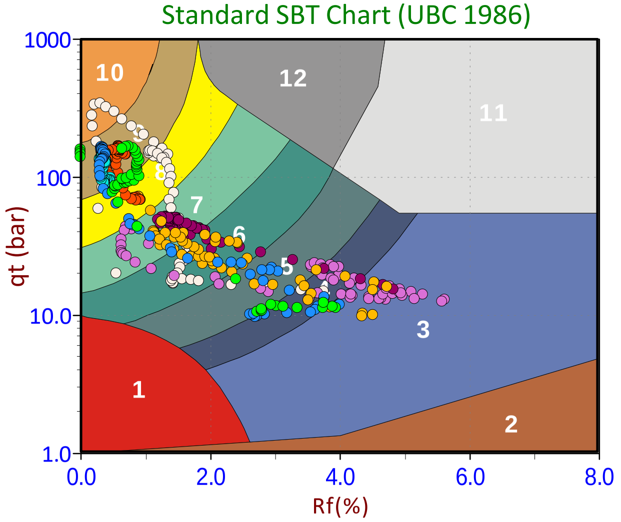
Legend

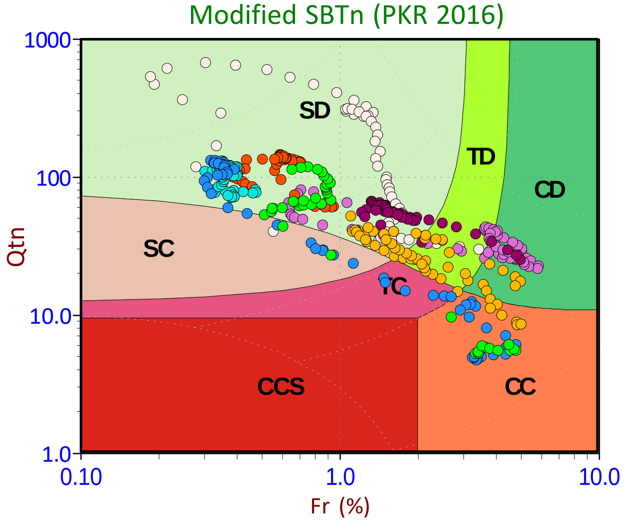
- 🟥 Sensitive Fines
- 🟫 Organic Soil
- 🟦 Clay
- ■ Silty Clay
- ■ Clayey Silt
- ■ Silt
- 🟩 Sandy Silt
- 🟨 Silty Sand/Sand
- ■ Sand
- 🟧 Gravelly Sand
- □ Stiff Fine Grained
- ■ Cemented Sand

Legend

- 🟥 CCS (Cont. sensitive clay like)
- 🟧 CC (Cont. clay like)
- ■ TC (Cont. transitional)
- ■ SC (Cont. sand like)
- 🟩 CD (Dil. clay like)
- 🟩 TD (Dil. transitional)
- □ SD (Dil. sand like)


Qtn Chart (PKR 2009)


Standard SBT Chart (UBC 1986)


Modified SBTn (PKR 2016)

Depth Ranges

- ○ >0.0 to 5.0 ft
- ● >5.0 to 10.0 ft
- ● >10.0 to 15.0 ft
- ● >15.0 to 20.0 ft
- ● >20.0 to 25.0 ft
- ● >25.0 to 30.0 ft
- ● >30.0 to 35.0 ft
- ● >35.0 to 40.0 ft
- ● >40.0 to 45.0 ft
- ● >45.0 to 50.0 ft
- ● >50.0 ft

Legend

- ■ Sensitive, Fine Grained
- ■ Organic Soils
- ■ Clays
- ■ Silt Mixtures
- ■ Sand Mixtures
- ■ Sands
- ■ Gravelly Sand to Sand
- ■ Stiff Sand to Clayey Sand
- ■ Very Stiff Fine Grained

Legend

- ■ Sensitive Fines
- ■ Organic Soil
- ■ Clay
- ■ Silty Clay
- ■ Clayey Silt
- ■ Silt
- ■ Sandy Silt
- ■ Silty Sand/Sand
- ■ Sand
- ■ Gravelly Sand
- ■ Stiff Fine Grained
- ■ Cemented Sand

Legend

- ■ CCS (Cont. sensitive clay like)
- ■ CC (Cont. clay like)
- ■ TC (Cont. transitional)
- ■ SC (Cont. sand like)
- ■ CD (Dil. clay like)
- ■ TD (Dil. transitional)
- ■ SD (Dil. sand like)

Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Job No: 19-56179
Client: Pacific Crest Engineering
Project: Gonzales Industrial WWTP
Start Date: 13-Nov-2019
End Date: 13-Nov-2019

CPTu PORE PRESSURE DISSIPATION SUMMARY

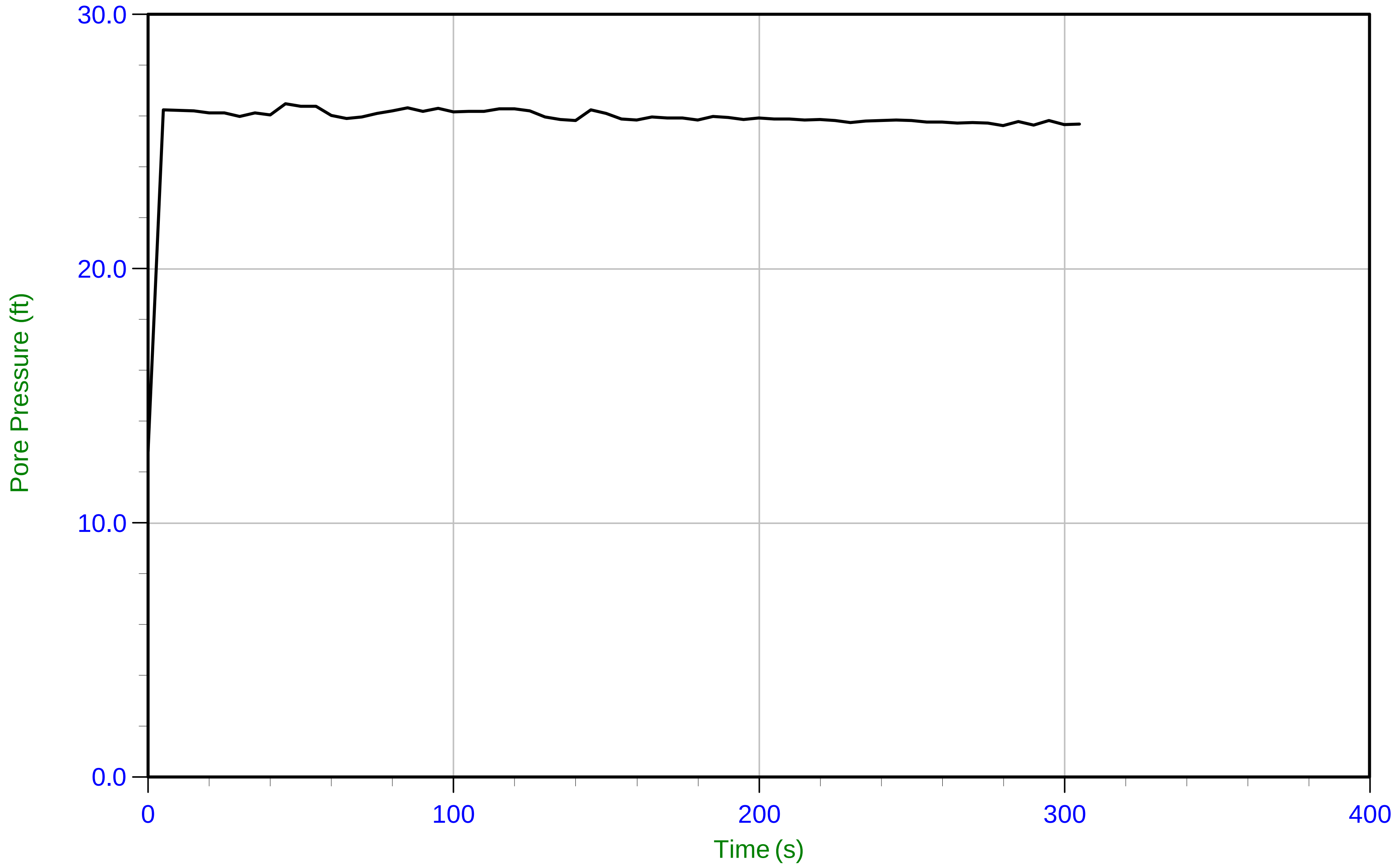
Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (ft)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)
CPT-01	19-56179_CP01	15	305	45.69	25.7	20.0
CPT-01	19-56179_CP01	15	295	51.75	30.5	21.3
CPT-02	19-56179_CP02	15	405	30.35	19.0	11.4
CPT-03	19-56179_CP03	15	440	44.37	21.3	23.1
CPT-04	19-56179_CP04	15	435	37.24	14.5	22.8

CONETEC

Pacific Crest Engineering

Job No: 19-56179
Date: 11/13/2019 08:52
Site: Gonzales Industrial WWTP

Sounding: CPT-01
Cone: 443:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 19-56179_CP01.PPF
Depth: 13.925 m / 45.685 ft
Duration: 305.0 s

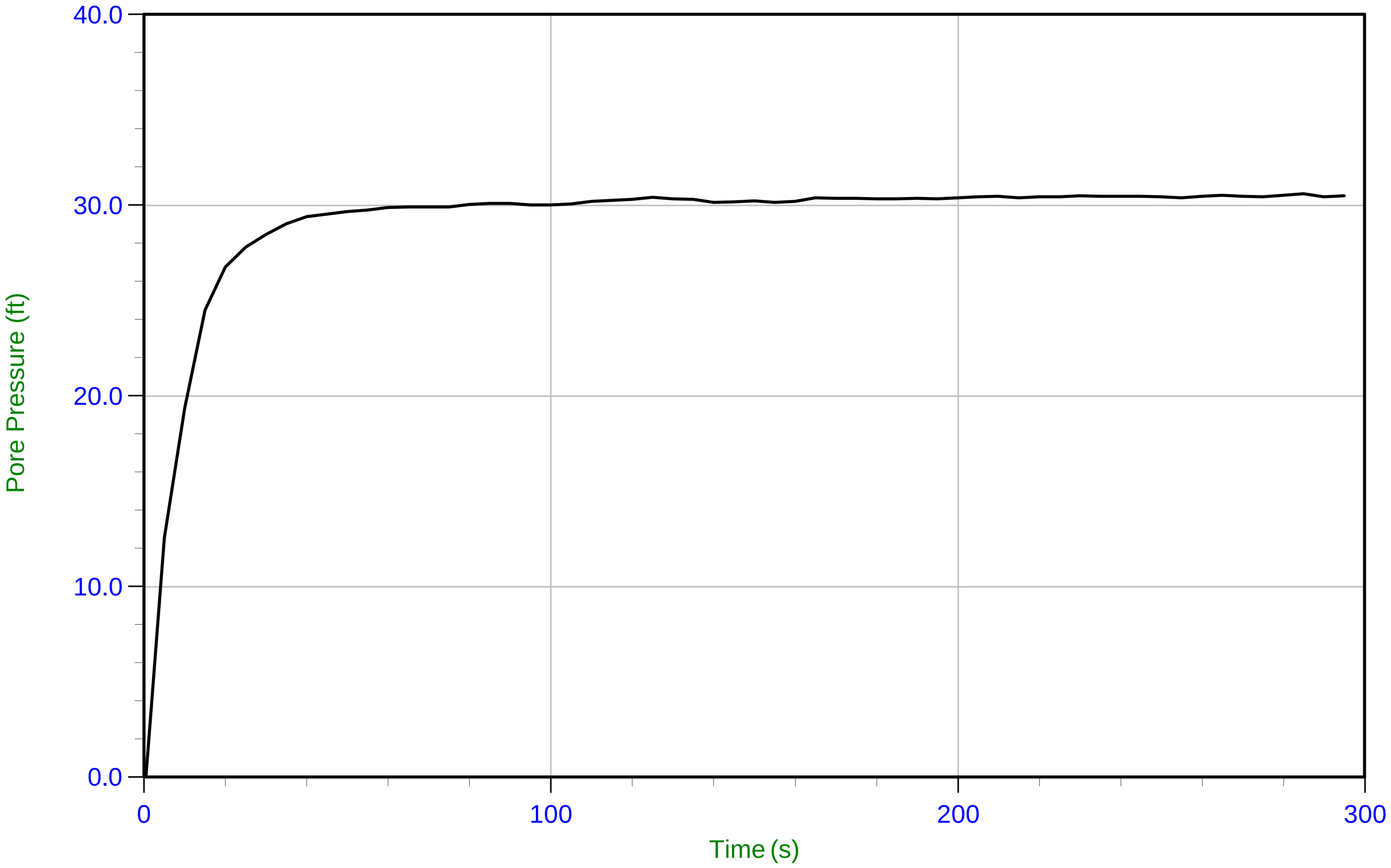
u Min: 12.8 ft
u Max: 26.5 ft
u Final: 25.7 ft

WT: 6.101 m / 20.017 ft
Ueq: 25.7 ft

Pacific Crest Engineering

Job No: 19-56179
Date: 11/13/2019 08:52
Site: Gonzales Industrial WWTP

Sounding: CPT-01
Cone: 443:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 19-56179_CP01.PPF
Depth: 15.775 m / 51.755 ft
Duration: 295.0 s

u Min: -1.3 ft
u Max: 30.6 ft
u Final: 30.5 ft

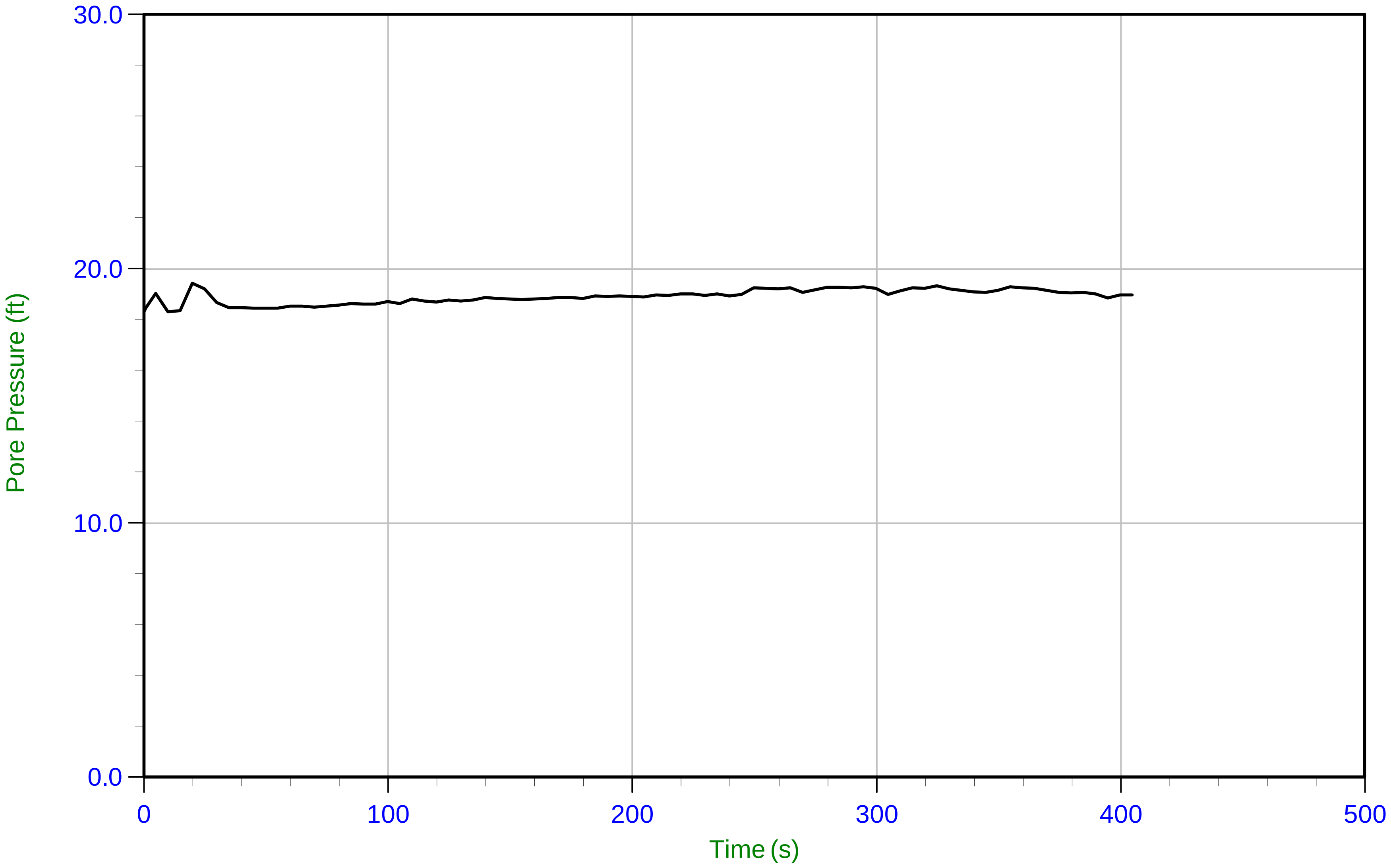
WT: 6.482 m / 21.267 ft
Ueq: 30.5 ft

CONETEC

Pacific Crest Engineering

Job No: 19-56179
Date: 11/13/2019 09:49
Site: Gonzales Industrial WWTP

Sounding: CPT-02
Cone: 443:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 19-56179_CP02.PPF
Depth: 9.250 m / 30.347 ft
Duration: 405.0 s

u Min: -15.3 ft
u Max: 19.4 ft
u Final: 19.0 ft

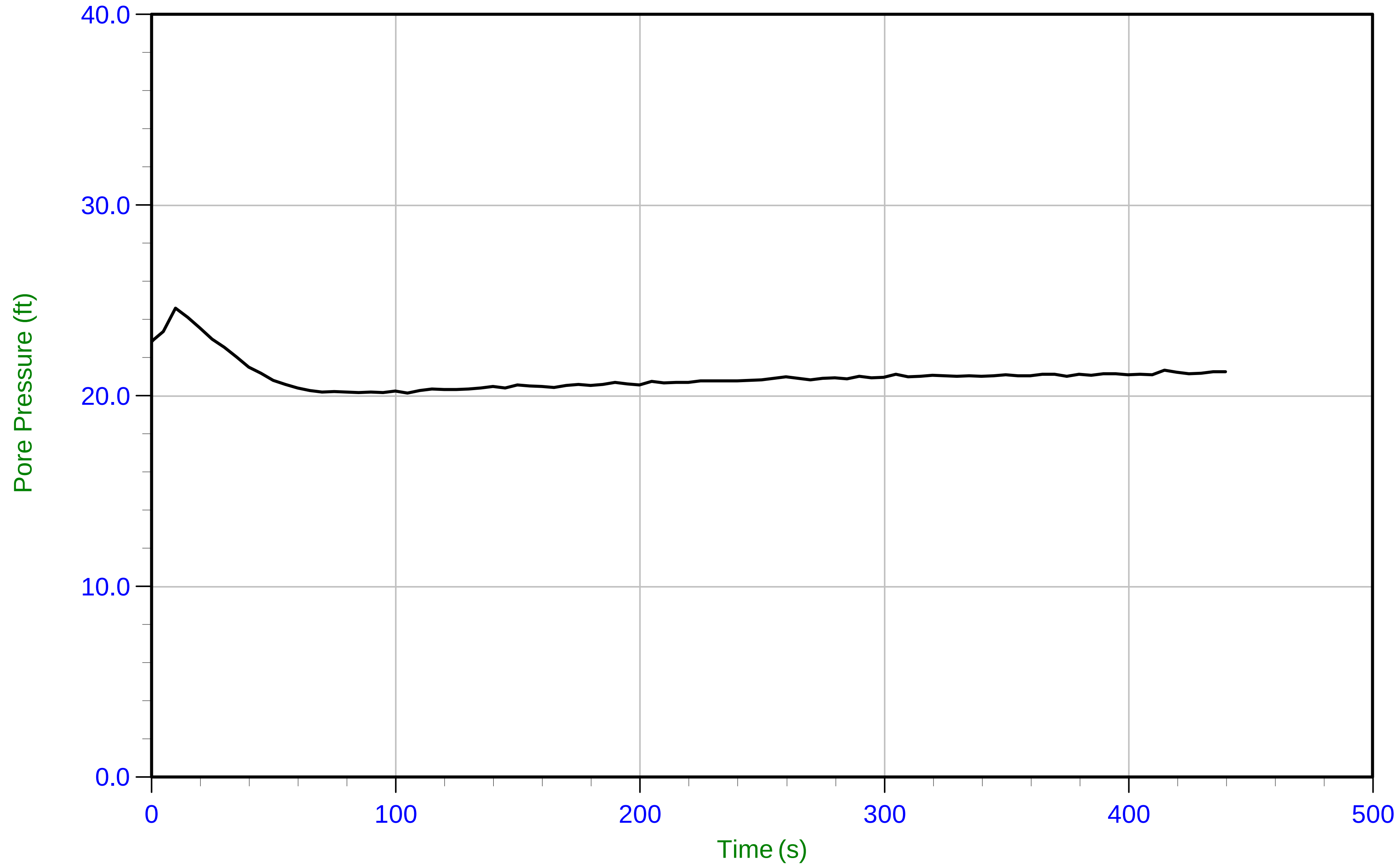
WT: 3.465 m / 11.367 ft
Ueq: 19.0 ft

CONETEC

Pacific Crest Engineering

Job No: 19-56179
Date: 11/13/2019 10:35
Site: Gonzales Industrial WWTP

Sounding: CPT-03
Cone: 443:T1500F15U500 Area=15 cm²

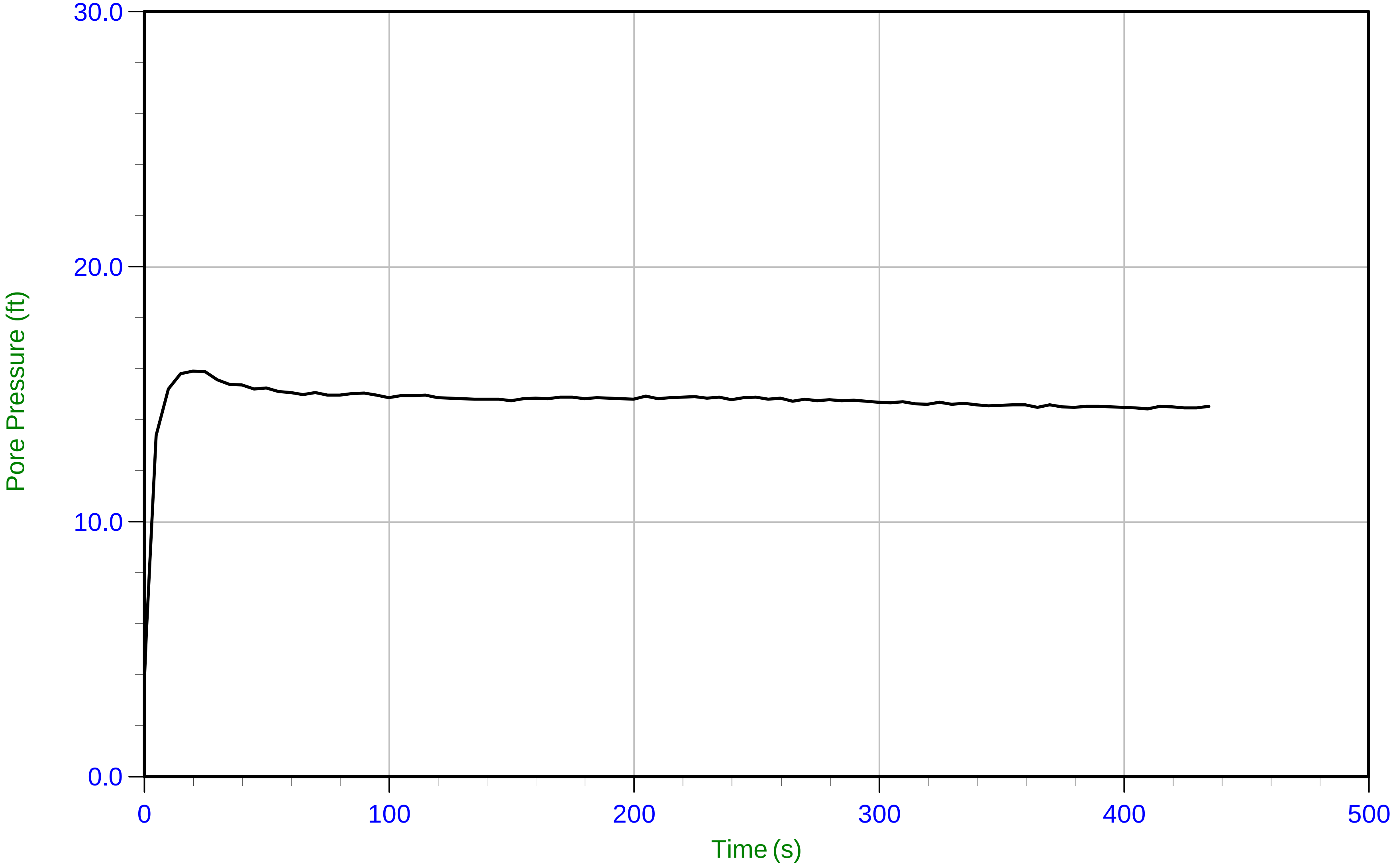


Trace Summary:	Filename: 19-56179_CP03.PPF	u Min: 20.2 ft	WT:	7.041 m / 23.099 ft
	Depth: 13.525 m / 44.373 ft	u Max: 24.6 ft	Ueq:	21.3 ft
	Duration: 440.0 s	u Final: 21.3 ft		

Pacific Crest Engineering

Job No: 19-56179
Date: 11/13/2019 11:29
Site: Gonzales Industrial WWTP

Sounding: CPT-04
Cone: 443:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 19-56179_CP04.PPF
Depth: 11.350 m / 37.237 ft
Duration: 435.0 s

u Min: 3.8 ft
u Max: 15.9 ft
u Final: 14.5 ft

WT: 6.937 m / 22.757 ft
Ueq: 14.5 ft

APPENDIX C

Logs of Test Borings – 2005 Study

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 1(04)

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	1-1 M		Yellowish brown Sandy SILT, sand is very fine grained, damp, firm	ML	7	NP	91.5	6.1	25% Passing #200 Sieve
5	1-2 M		Yellowish to olive brown Sandy SILT, sand is very fine grained, micaceous, damp, stiff		9		90.6	25.2	C= 1310 psf Ø= 17°
10	1-3 M		Olive brown Clayey Sandy SILT, sand is medium to very fine grained, moist, stiff	ML	9		92.7	25.6	90% Passing #200 Sieve Qu=2450 psf
15	1-4 M		Grey mottled with brown Sandy SILT, sand is very fine grained, micaceous, damp, stiff	ML	14		93.2	23.9	67% Passing #200 Sieve
20	1-5 M		Grey CLAY with very fine grained micaceous sand, moist, stiff	CL	12	24	76.3	38.8	97% Passing #200 Sieve
23			▼						

Depth scale: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Pacific Crest Engineering Inc.
444 Airport Blvd., Suite 106
Watsonville, CA 95076

Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 4
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 1(04)

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25	1-6 M		Grey SILT with very fine grained micacoues Sand and random gravels to 1", moist, stiff	MH	14		84.8	33.1	74% Passing #200 Sieve
26									
27									
28									
29									
30	1-7 M		Grey SILT with sand, sand is very fine grained, moist, stiff						
31			Olive brown Silty SAND, sand is medium to very fine grained, sub-angular, moist, medium dense	SM	11		95.4	27.8	25% Passing #200 Sieve
32									
33			Auger pushing through soils from 31 1/2 to 38 feet.						
34									
35									
36									
37									
38									
39									
40	1-8 M		Grey Silty SAND, Sand is well graded, sub angular, saturated, medium dense	SW	19		114.2	17.1	4% Passing #200 Sieve
41									
42									
43									
44									
45			Boring Terminated at 45'						
46									
47									
48									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** New Grit Separator and Pond Expansion Gonzales, California	Figure No. 5 Project No. 04108 Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 2(04)

Depth (feet)	Sample No . and Type	Sym bol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				SW					
1	2-1 M		Light yellowish brown SAND, Sand is medium to very fine grained, sub-angular, damp, medium dense		13		92.7	4.6	3.7% passing #200 sieve
5	2-2 M		Light yellowish brown SAND, Sand is medium to very fine grained, sub-angular, damp, loose		7		90.6	4.5	
10	2-3 M		Light yellowish brown SAND, Sand is medium to very fine grained, sub-angular, damp, loose		10		97.1	6.2	
15	2-4 M		Light yellowish brown SAND, Sand is medium to very fine grained, sub-angular, damp, medium dense		27		111.3	5.0	
17			▼						
20	2-5 M		Greyish brown SAND with some gravel, Sand is medium to very fine grained, sub-angular, saturated, medium dense		11		101.0	22.2	
22			Boring Terminated at 21 1/2’						

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Watsonville, CA 95076

Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 6
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 3

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				ML					
1									
2	3-1 M		Brown Clayey Sandy SILT, Sand is fine grained, moist, very stiff		23	NP	97.7	7.6	
3									
4				SW					
5	3-2 M		Light yellowish brown SAND, Sand is medium to very fine grained, damp, medium dense		13		95.0	3.8	
6									
7									
8									
9									
10	3-3 M		Light yellowish brown SAND with gravel, Sand is well graded, sub-angular, gravels are to 1/2", sub-angular, moist and loose		10		91.4	7.2	
11									
12				SM					
13									
14									
15	3-4 M		Grey Silty SAND, Sand is medium dense to fine grained, sub-angular, moist, medium dense		23		92.0	25.1	
16									
17									
18									
19									
20	3-5 M		Grey Silty SAND with gravel, Sand is well graded, sub-angular, gravels are to 1/2", saturated, dense		32		107.7	18.1	
21									
22									
23									
24									

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Watsonville, CA 95076

Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 7
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 3

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				SM					
25									
26									
27									
28									
29	3-6 B		Grey Silty SAND with gravel, gravels are to 1", Sands are well graded, sub-angular, saturated						
30			Boring Terminated at 30'						
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									

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Watsonville, CA 95076

Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 8
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 4

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	4-1 M		Yellowish brown Sandy SILT, Sand is very fine grained, micaceous, damp, stiff	MC	9		90.5	21.6	
5	4-2 M		Light yellowish brown SAND, Sand is medium to fine grained, sub-angular, damp, loose	SW	10		94.0	17.7	
10	4-3 M		Light yellowish brown SAND, Sand is medium to fine grained, sub-angular, damp, medium dense		13		91.1	7.7	
20	4-4 M		Light yellowish brown SAND, Sand is medium to fine grained, sub-angular, damp, medium dense		27		105.3	18.3	
22			Boring Terminated at 21 1/2'						

Pacific Crest Engineering Inc.
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Watsonville, CA 95076

Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 9
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 5

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				ML					
1	5-1 M		Brown Sandy SILT, sand is fine to very fine grained, damp, stiff		12			15.9	58.6% passing #200 sieve
2									
3				SW					
4									
5	5-1 M		Light yellowish brown SAND, sand is medium to very fine grained, damp, medium dense		13		97.3	7.2	
6									
7									
8									
9									
10	5-3 M		Light yellowish brown SAND, sand is medium to very fine grained, damp, loose		8		84.4	7.8	
11									
12									
13			▼						
14				SP					
15	5-4 M		Brownish grey SAND with some Clay, sand is well graded, sub-angular, moist, loose		6		80.5	21.4	
16									
17									
18									
19									
20									
21									
22									
23									
24			Greyish Brown Silty SAND						

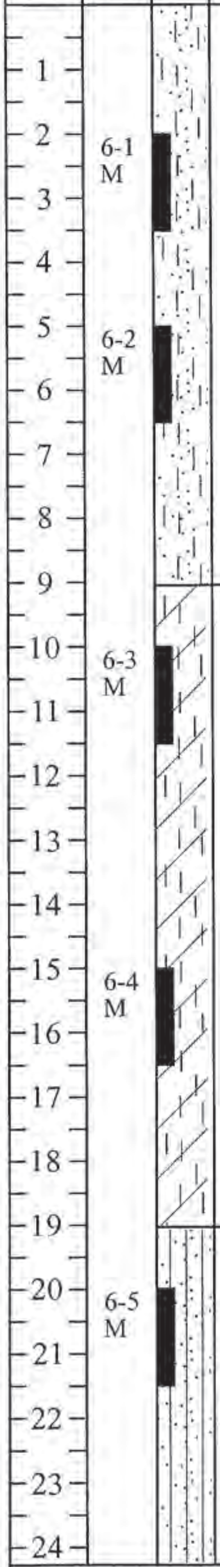
Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** New Grit Separator and Pond Expansion Gonzales, California	Figure No. 10 Project No. 04108 Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 5

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25	5-6 T		Greyish brown Silty SAND with grey clay lenses, sand is well graded, sub-angular, moist, loose	SM	7			22.7	
26									
27			Boring Terminated at 26 1/2'						
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** New Grit Separator and Pond Expansion Gonzales, California	Figure No. 11 Project No. 04108 Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6” BORING NO. 6



Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
	6-1 M		Brown Sandy SILT, sand is very fine grained, micaceous, moist, stiff	ML	9		94.8	23.1	
	6-2 M		Brown Sandy SILT with clay lenses, sand is very fine grained, micaceous, moist, firm		7		88.0	28.8	
	6-3 M		Brown mottled with grey Silty CLAY, moist, stiff	CH	11	26	83.0	36.7	Qu=2750 psf
	6-4 M		Brown mottled with grey Silty CLAY, moist, firm		7		73.0	45.1	
	6-5 M		Brown Sandy SILT, sand is fine to very fine grained, saturated, stiff ▼	ML	9		89.5	29.6	

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 12
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 6

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			Brown Sandy SILT, moist, stiff,	ML					
25									
26									
27									
28									
29				CL					
30	6-6 T		Brownish Grey Silty CLAY, very moist, firm		8			38.6	
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 13
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 7

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	7-1 M		Brown Silty SAND, sand is medium to fine grained, sub-angular, moist, medium dense	SM	29		110.8	9.1	32.5% Passing #200 Sieve
5	7-1 M		Light yellowish brown SAND, sand is medium to fine grained, sub-angular, damp, medium dense	SW	15		96.1	9.1	
10	7-1 M		Light yellowish brown SAND, sand is well graded, sub-angular, damp, medium dense		16		92.8	4.1	
15			Boring Terminated at 15'						

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 14
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 8

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				SW					
1	8-1 M		Light Yellowish brown SAND, sand is medium to fine grained, sub-angular, moist, medium dense		18		92.1	10.4	
2									
3									
4									
5	8-2 T		Light Yellowish brown SAND, sand is medium to fine grained, sub-angular, moist, loose		8			6.1	
6									
7									
8									
9									
10	8-3 T		Light Yellowish brown SAND, sand is medium to fine grained, sub-angular, moist, medium dense		24			6.6	
11									
12									
13									
14									
15			Boring Termianted at 15'						
16									
17									
18									
19									
20									
21									
22									
23									
24									

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 15
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 9

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				SM					
1	9-1 T	■	Brown Silty SAND, sand is finegrained, moist, loose		7			12.7	39.8% passing #200 sieve
2									
3				SW					
4									
5	9-2 T	■	Yellowish brown sand, sand is medium to fine grained, sub-angular, damp, medium dense		11			4.6	
6									
7									
8									
9									
10	9-3 T	■	Yellowish brown SAND, Sand is medium to fine grained, damp, loose		10			7.7	
11									
12									
13									
14									
15			Boring Terminated at 15'						
16									
17									
18									
19									
20									
21									
22									
23									
24									

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 16
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 10

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
2	10-1 T		Brown SILT with Sand, sand is very fine grained, micaceous, moist, firm	ML	7			23.7	
5	10-2 T		Light brown SAND with grey clay lenses, sand is medium to fine grained, sub-angularm moist, loose	SC	7			14.6	
10	10-3 T		Light yellowish brown SAND, sand is medium to very fine grained, sub-angular, moist, loose	SW	10			4.1	
15			Boring Terminated at 15'						

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 17
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 11

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1 2 3	11-1 T		Light yellowish brown SAND, sand is medium to fine grained, moist, sub-angular, medium dense	SW	12			6.2	32.5% Passing #200 Sieve
4 5	11-1 T		Brown Sandy SILT, sand is very fine grained, micaceous, very moist, stiff	ML					
6 7 8			Light yellowish brown SAND with Silt, sand is well graded, sub-angular, moist, loose	SM	10			29.3	
9 10 11 12 13 14	11-1 T		Light yellowish brown SAND, sand is well graded, sub-angular, damp, loose	SW	8			3.5	
15 16 17 18 19 20 21 22 23 24			Boring Terminated at 15'						

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 18
Project No. 04108
Date: 02/11/05

APPENDIX D

Results of Quantitative Liquefaction Analysis

LIQUEFACTION ANALYSIS REPORT

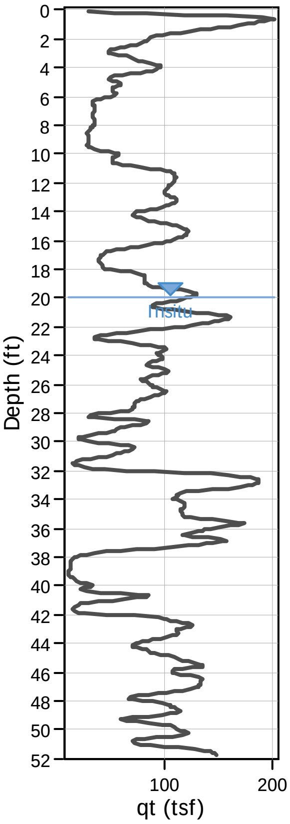
Project title : Gonzales IWW Treatment Plant **Location :**

CPT file : CPT 1

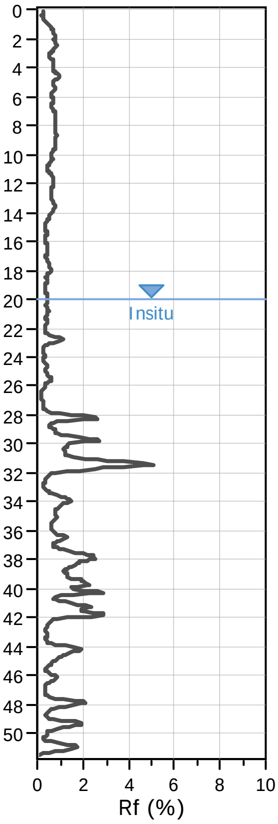
Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	20.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.64	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	No		

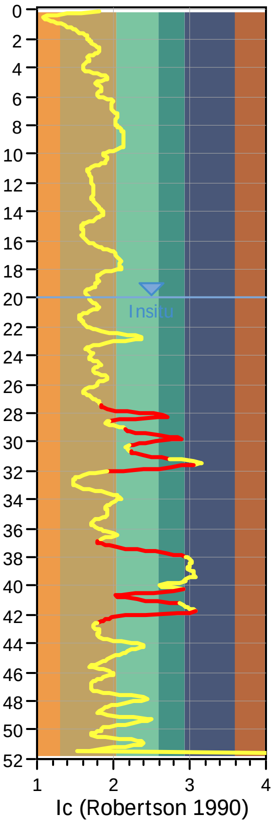
Cone resistance



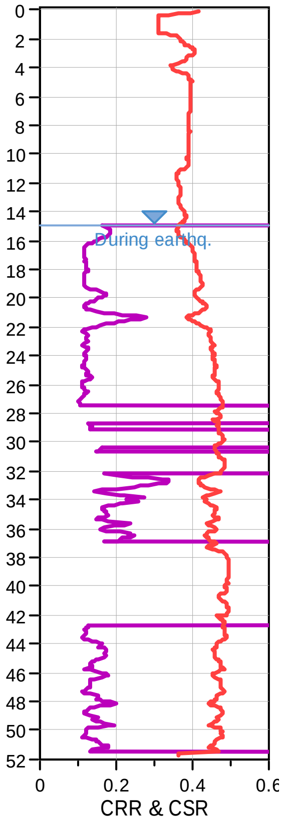
Friction Ratio



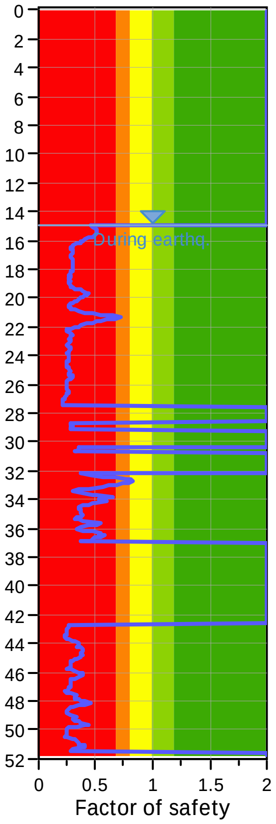
SBTn Plot



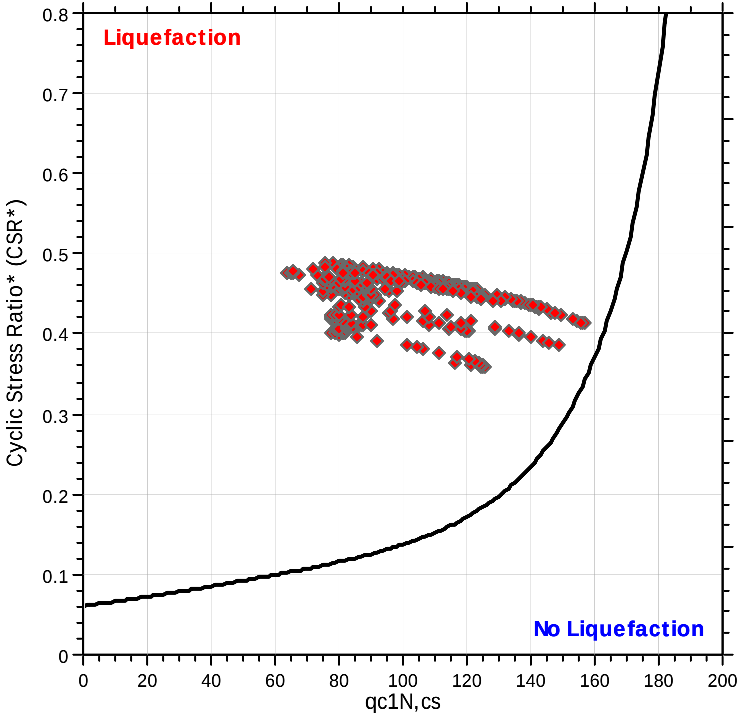
CRR plot



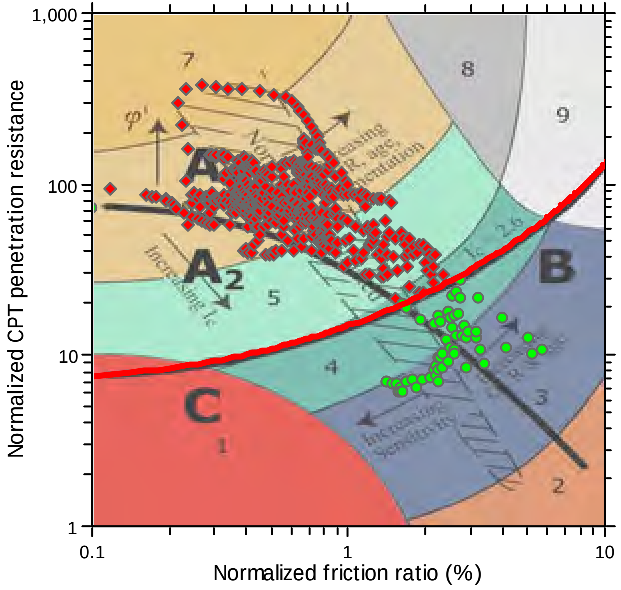
FS Plot



$M_w = 7^{1/2}$, sigma' = 1 atm base curve

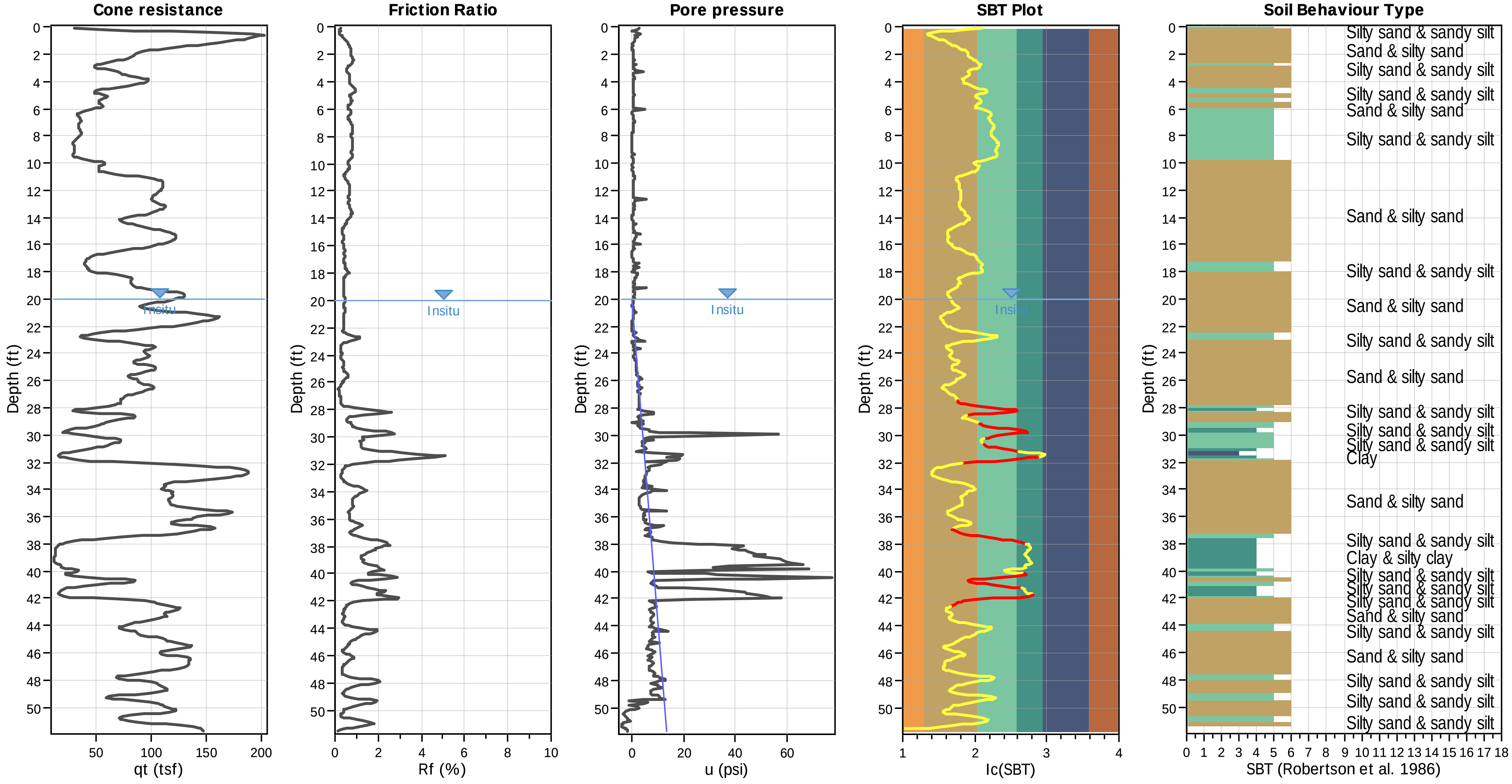


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



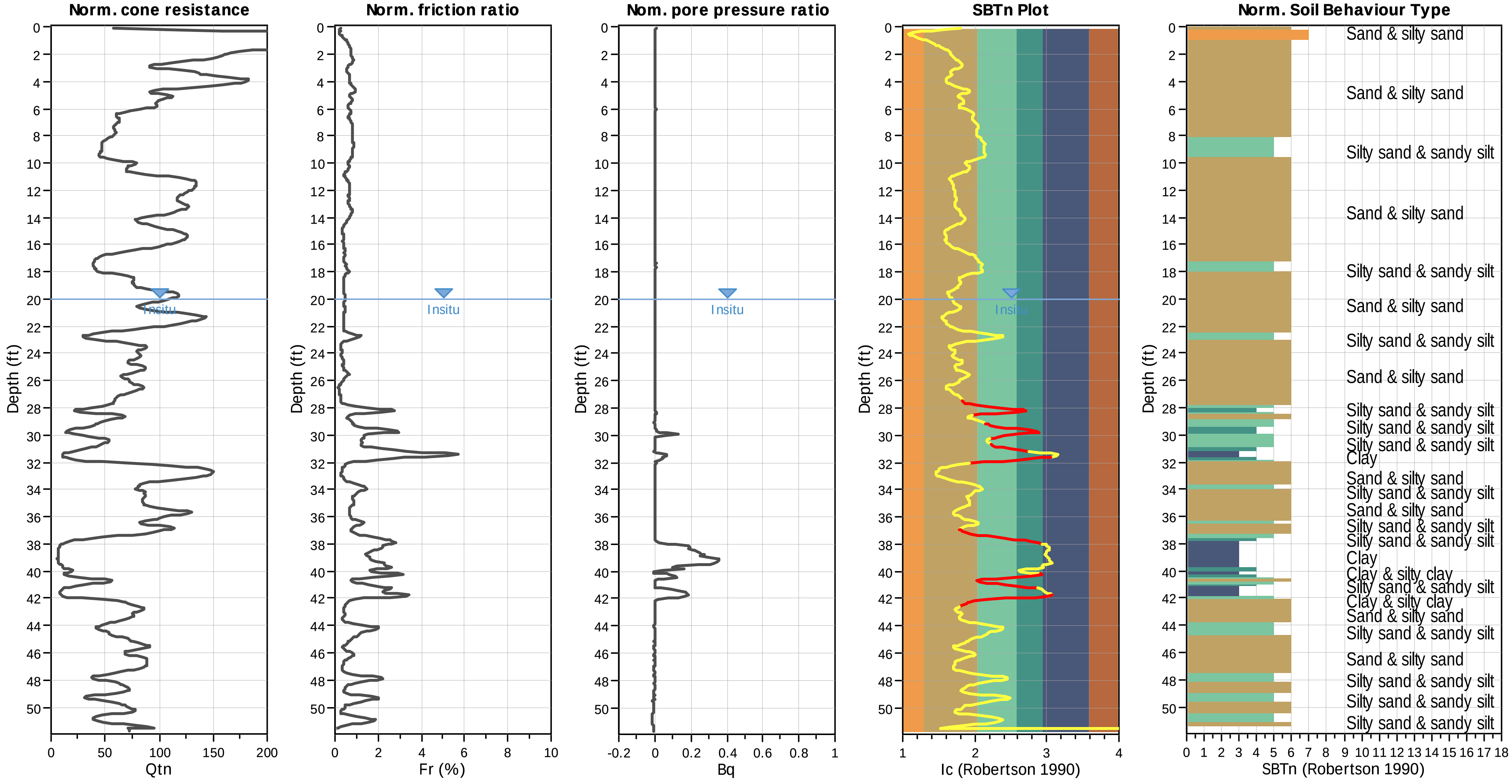
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty
- 🟩 5. Silty sand to sandy silt
- 🟫 6. Clean sand to silty sand
- 🟧 7. Gravely sand to sand
- ⬛ 8. Very stiff sand to
- ⬜ 9. Very stiff fine grained

CPT basic interpretation plots (normalized)



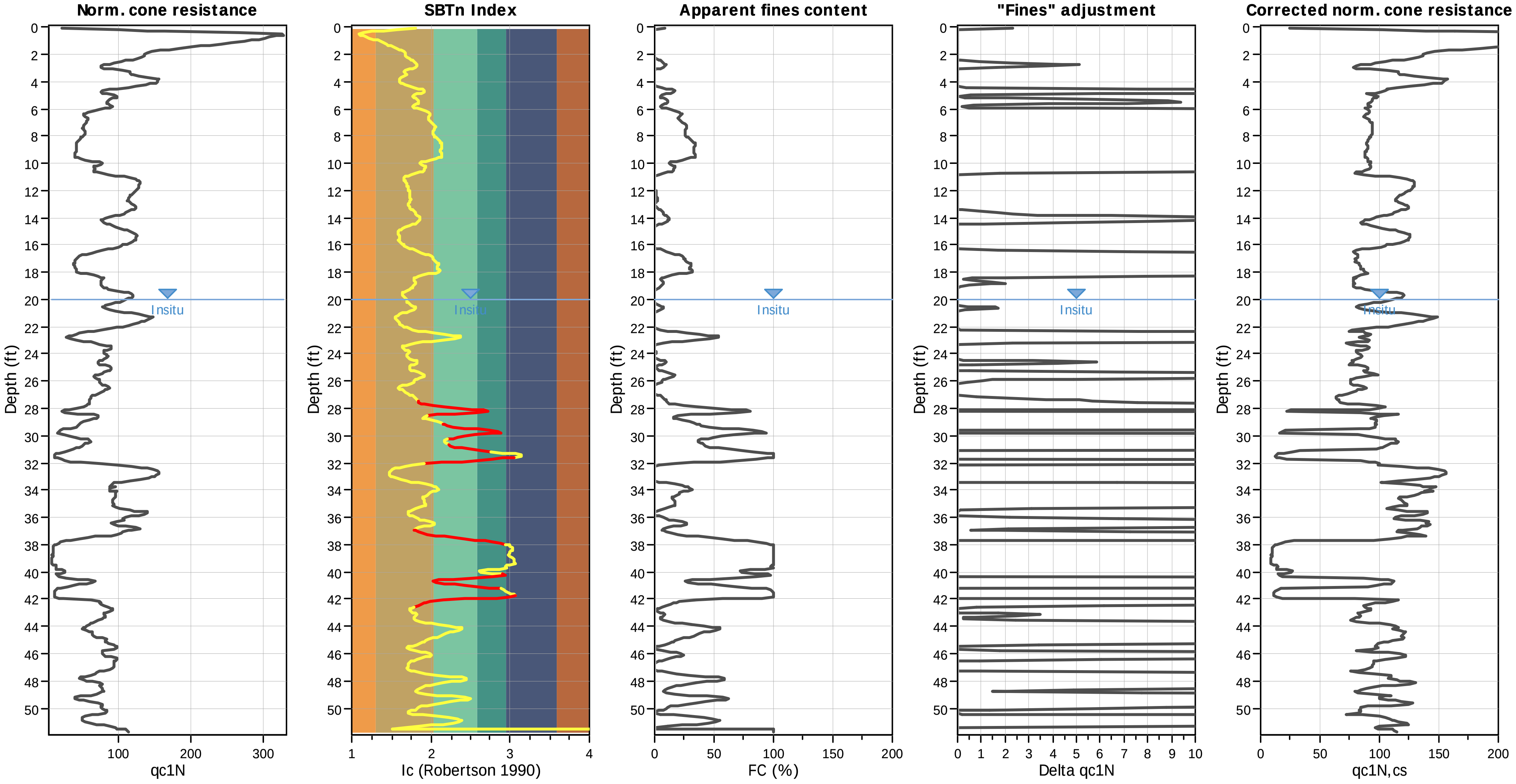
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬛ 8. Very stiff sand to
🟦 3. Clay to silty clay	🟫 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

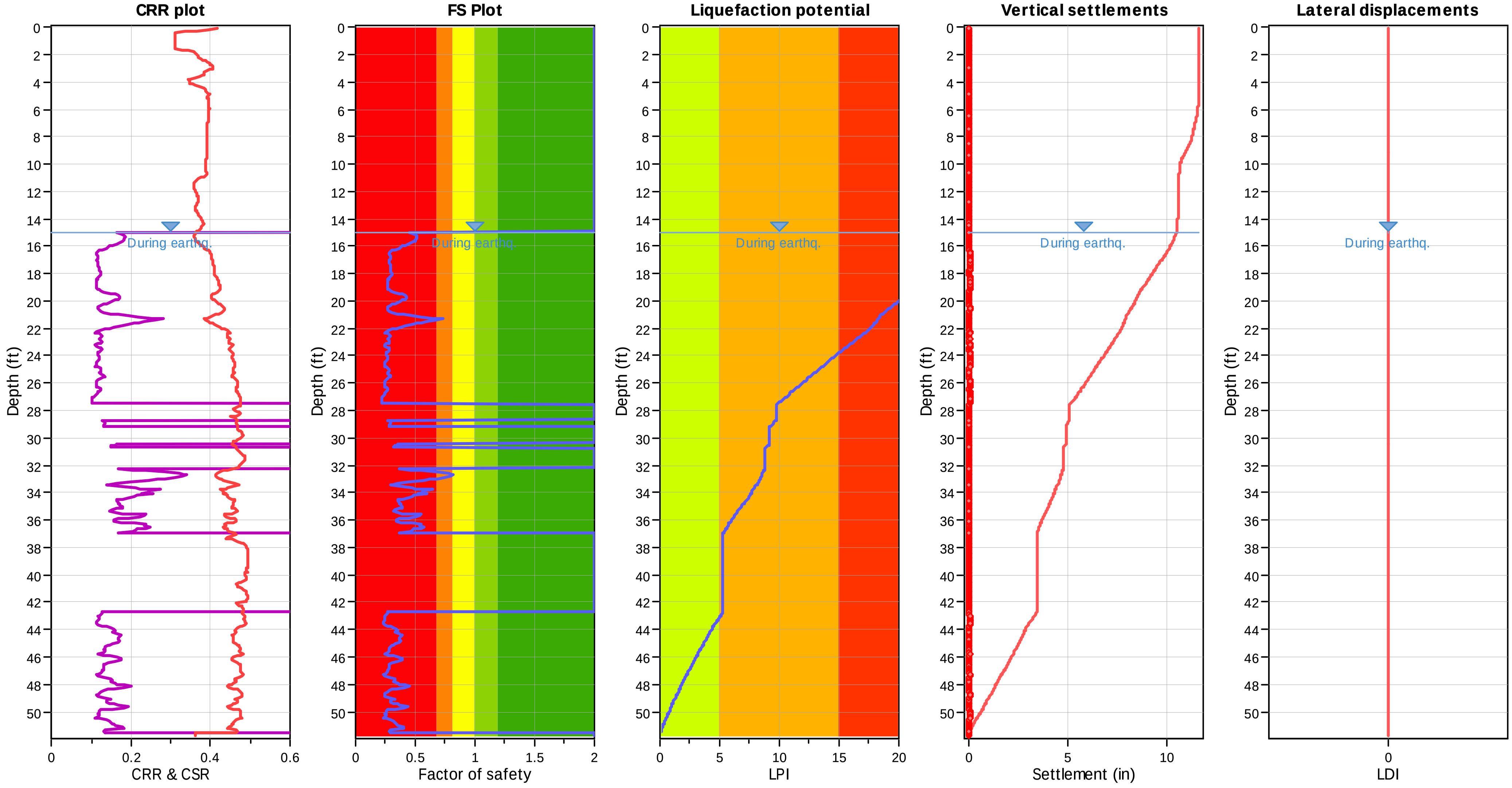
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)
Fines correction method:	B&I (2014)
Points to test:	Based on Ic value
Earthquake magnitude M_w:	6.64
Peak ground acceleration:	0.66
Depth to water table (insitu):	20.00 ft

Depth to GWT (erthq.):	15.00 ft
Average results interval:	3
Ic cut-off value:	2.60
Unit weight calculation:	Based on SBT
Use fill:	No
Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_σ applied:	No
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

F.S. color scheme

- 🟥 Almost certain it will liquefy
- 🟧 Very likely to liquefy
- 🟨 Liquefaction and no liq. are equally likely
- 🟩 Unlike to liquefy
- 🟩 Almost certain it will not liquefy

LPI color scheme

- 🟥 Very high risk
- 🟧 High risk
- 🟨 Low risk

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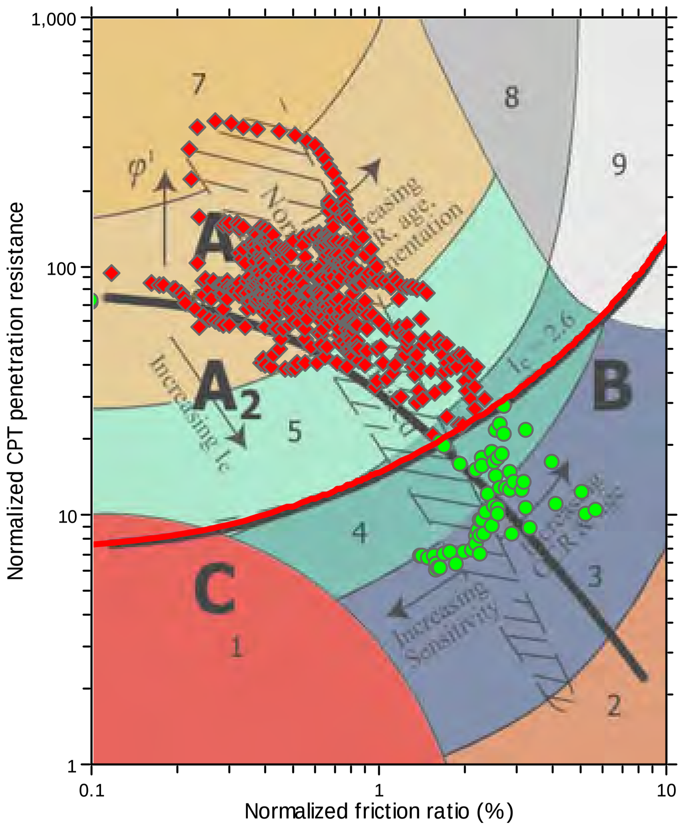
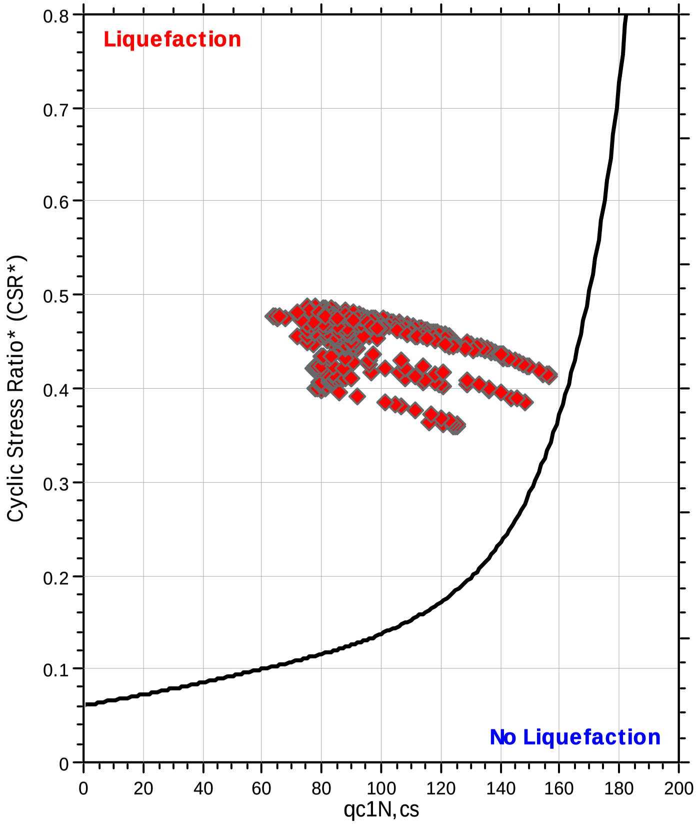
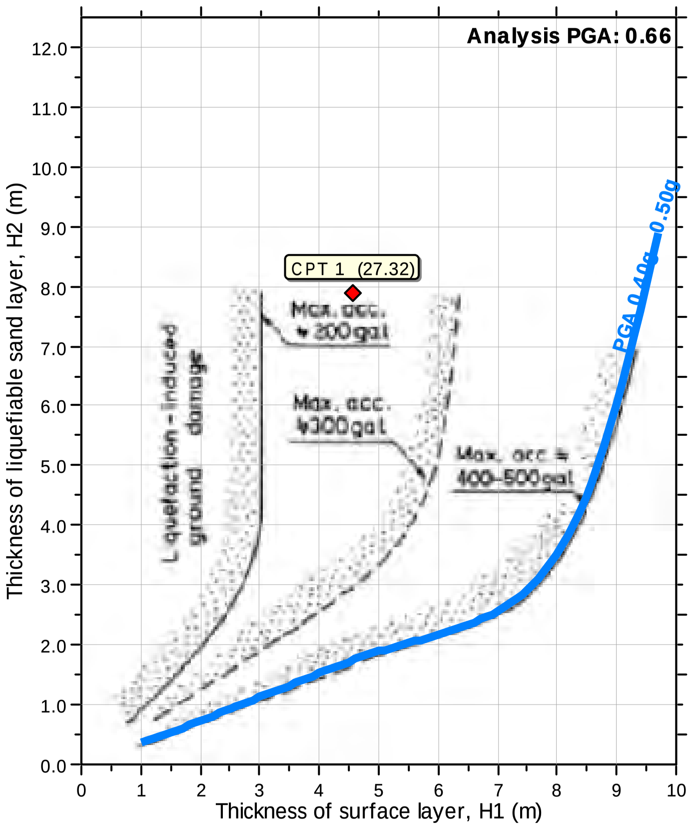
Liquefaction analysis summary plots



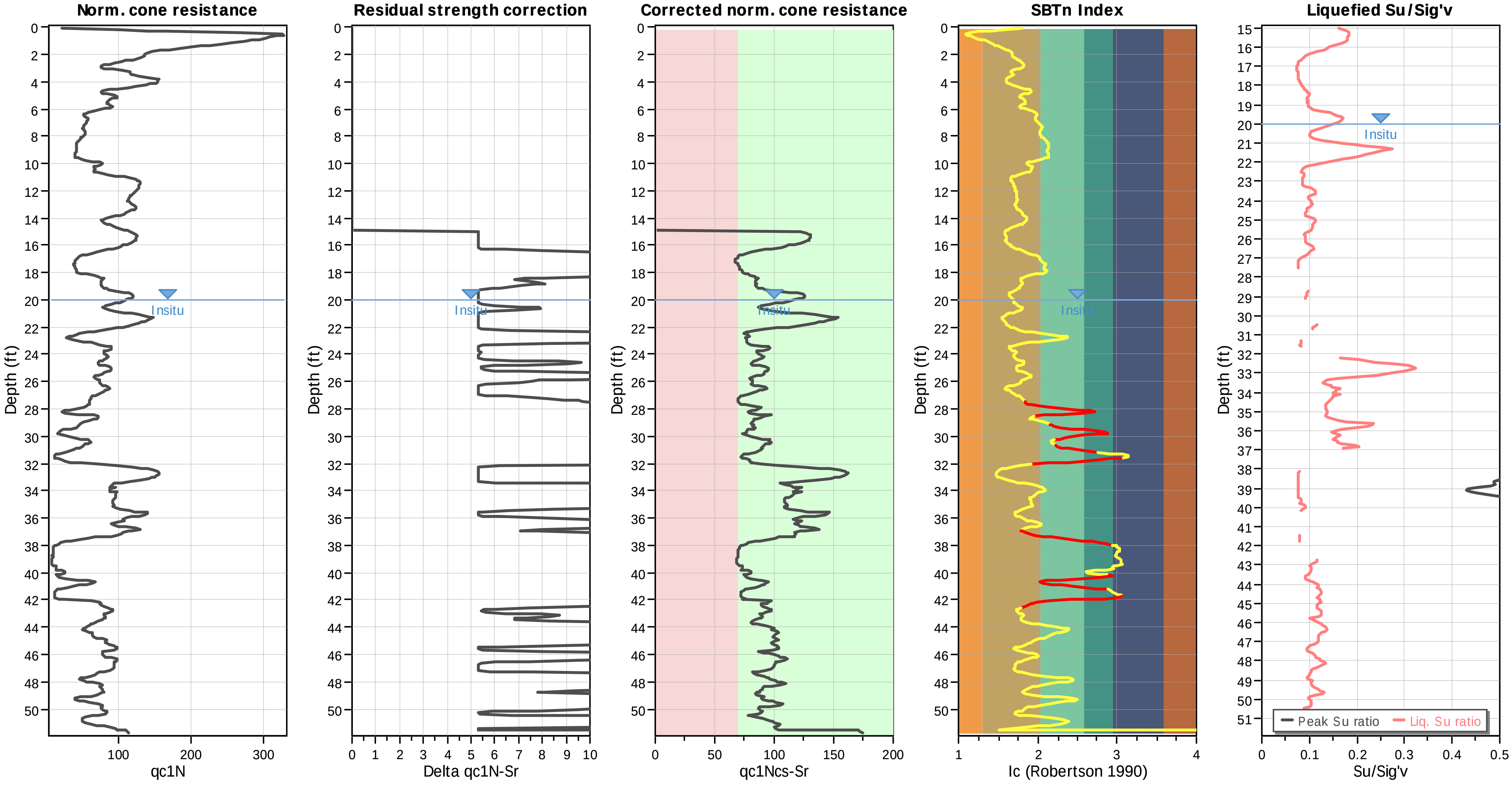




Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

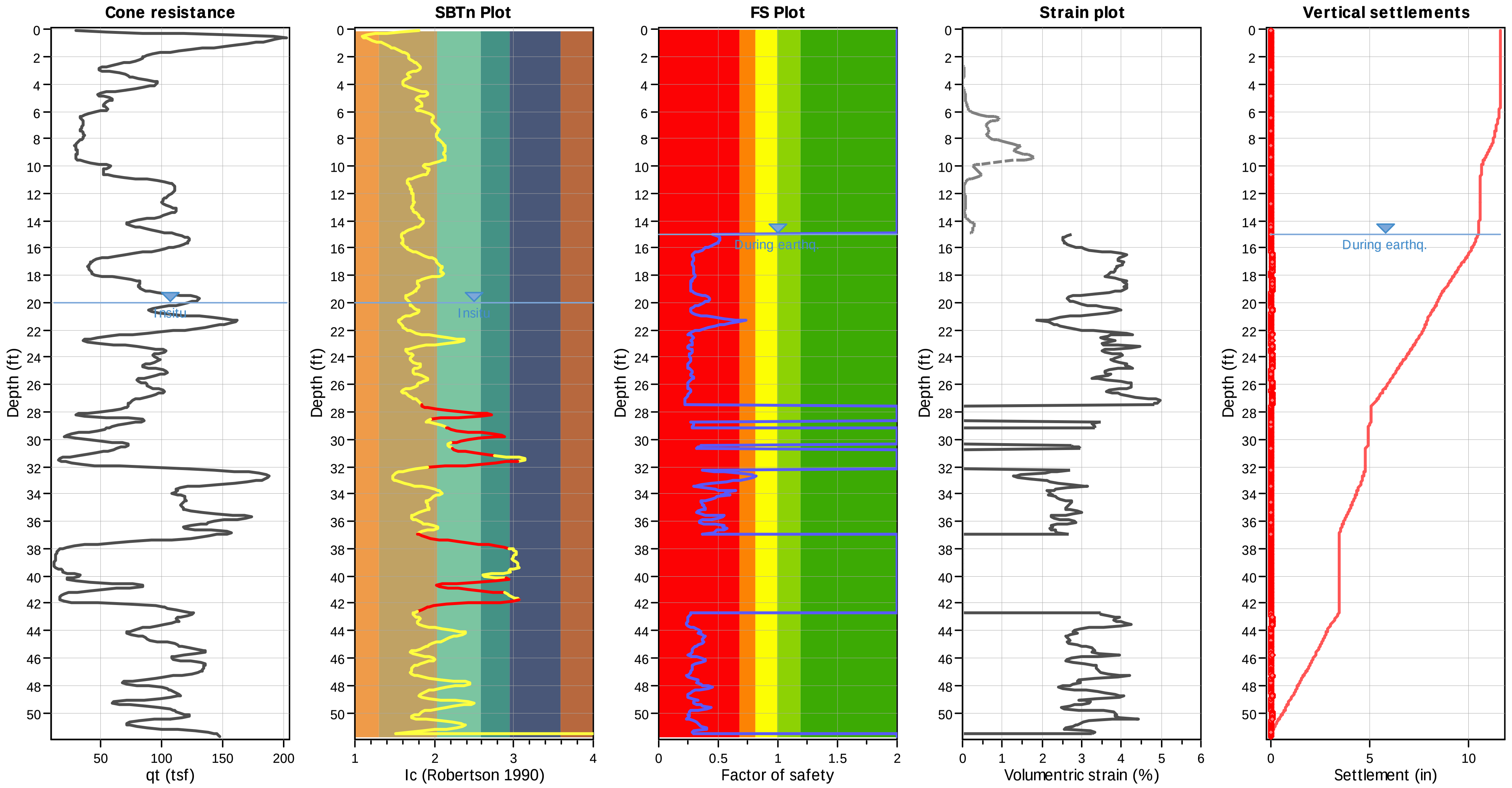
Check for strength loss plots (Idriss & Boulanger (2008))



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

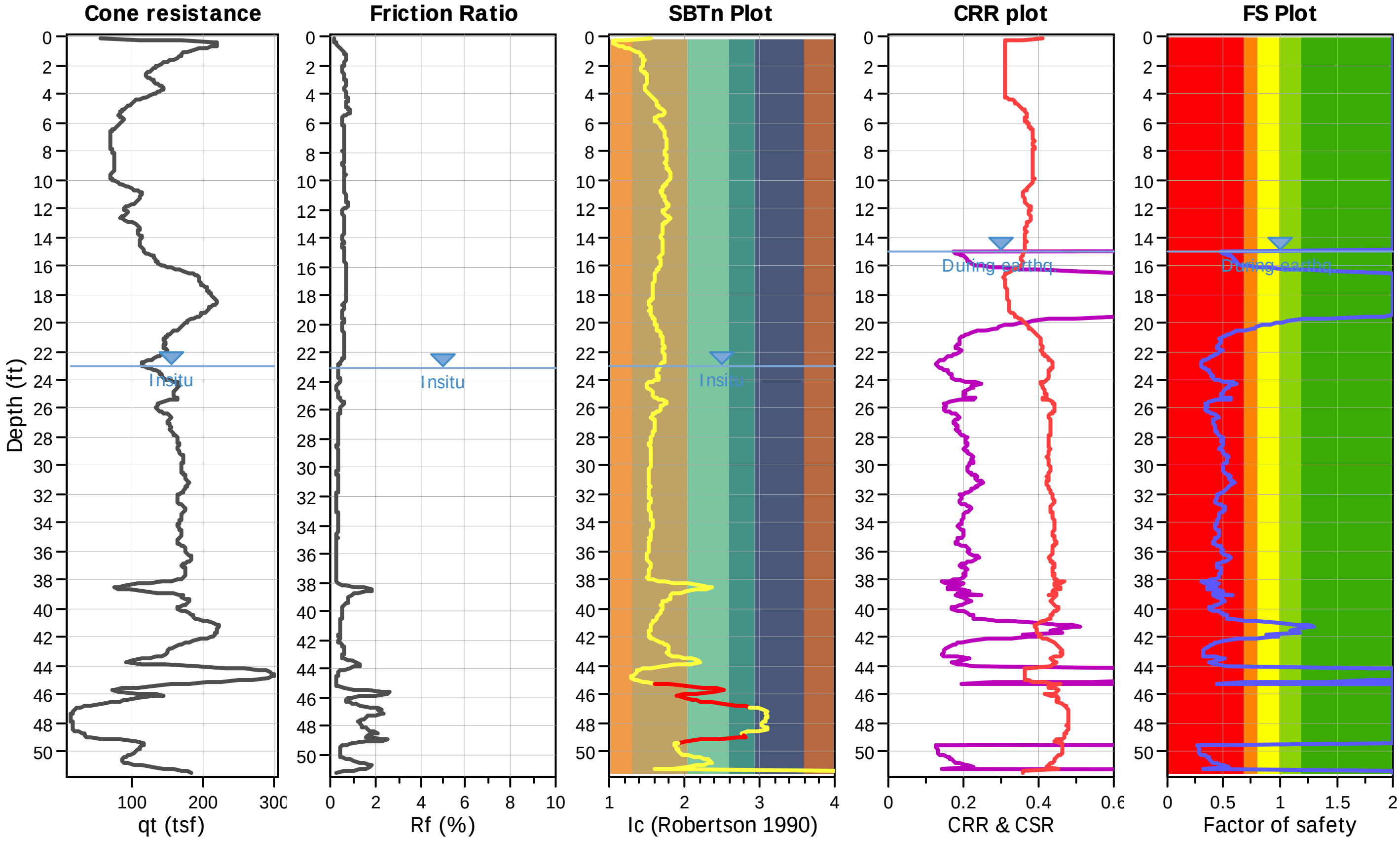
LIQUEFACTION ANALYSIS REPORT

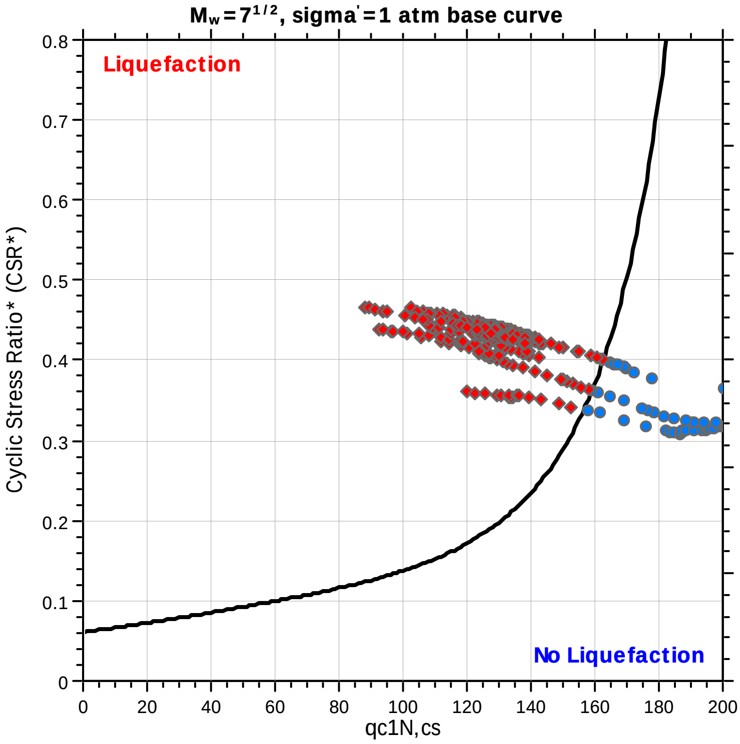
Project title : Gonzales IWW Treatment Plant **Location :**

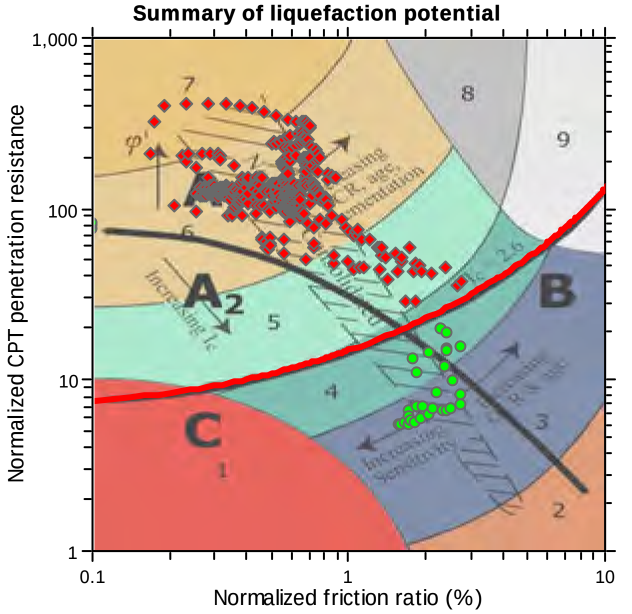
CPT file : CPT - 3

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	23.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.64	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	No		

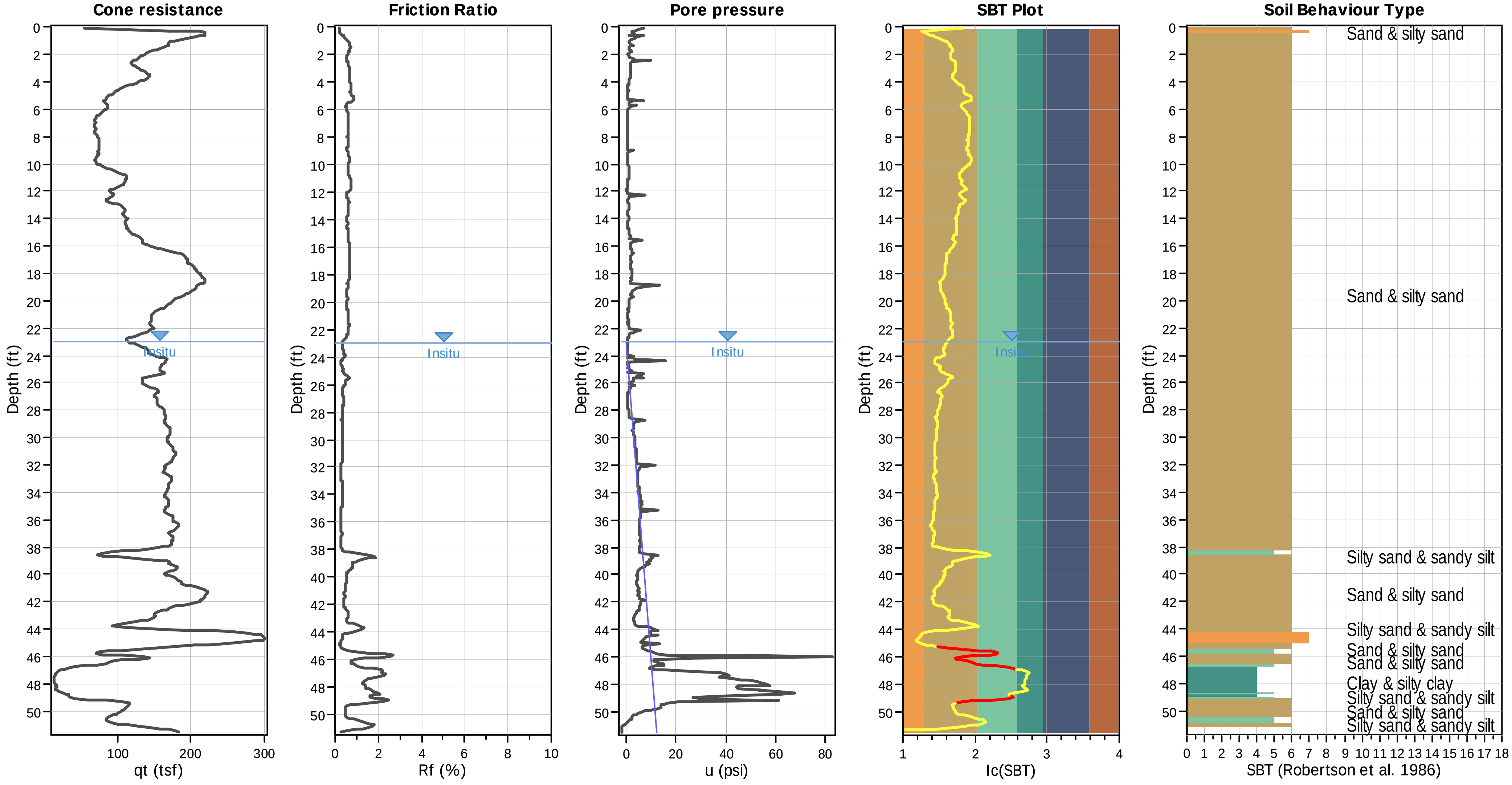






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



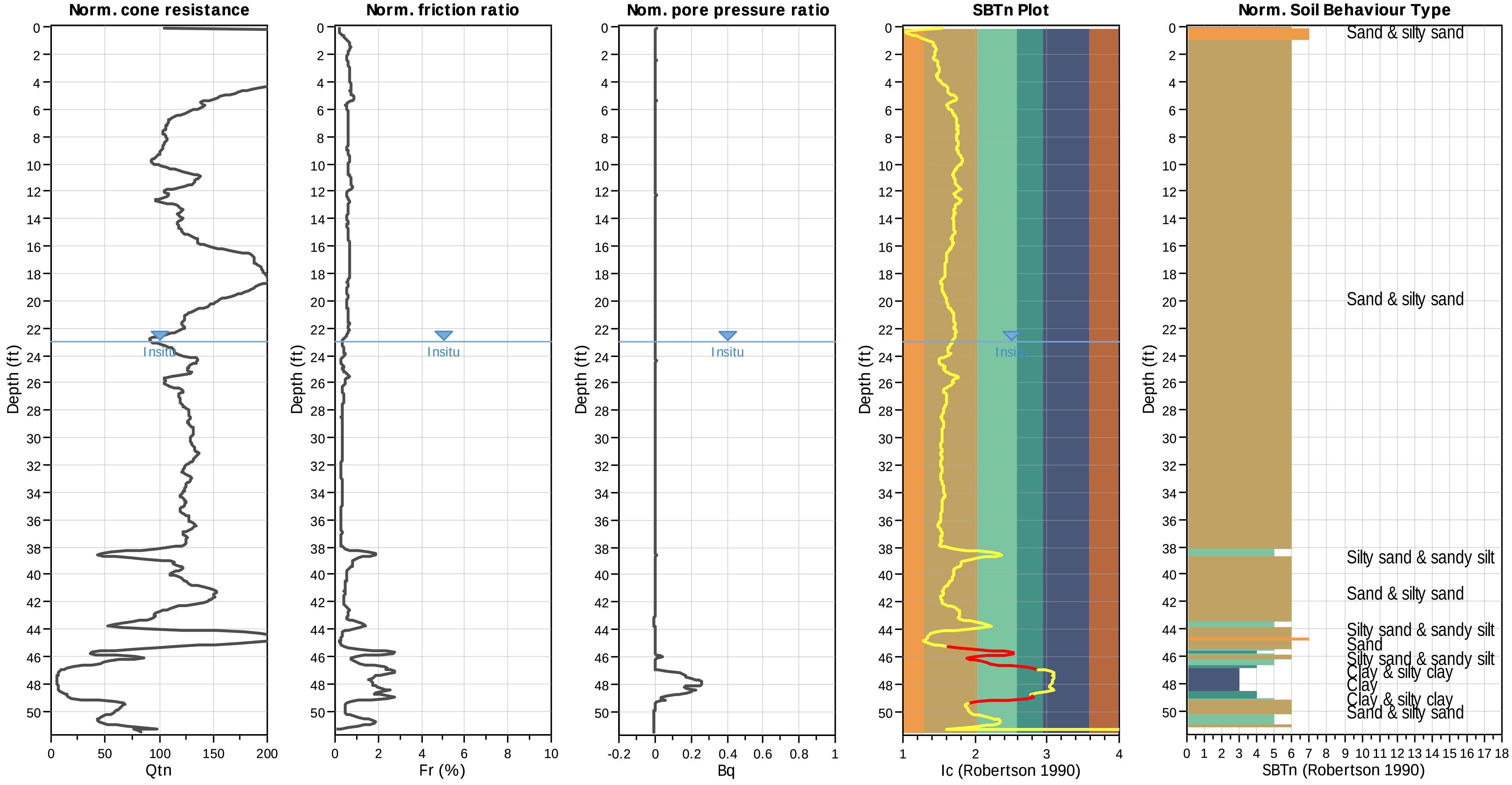
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty
- 🟩 5. Silty sand to sandy silt
- 🟫 6. Clean sand to silty sand
- 🟧 7. Gravely sand to sand
- ⬜ 8. Very stiff sand to
- ⬜ 9. Very stiff fine grained

CPT basic interpretation plots (normalized)



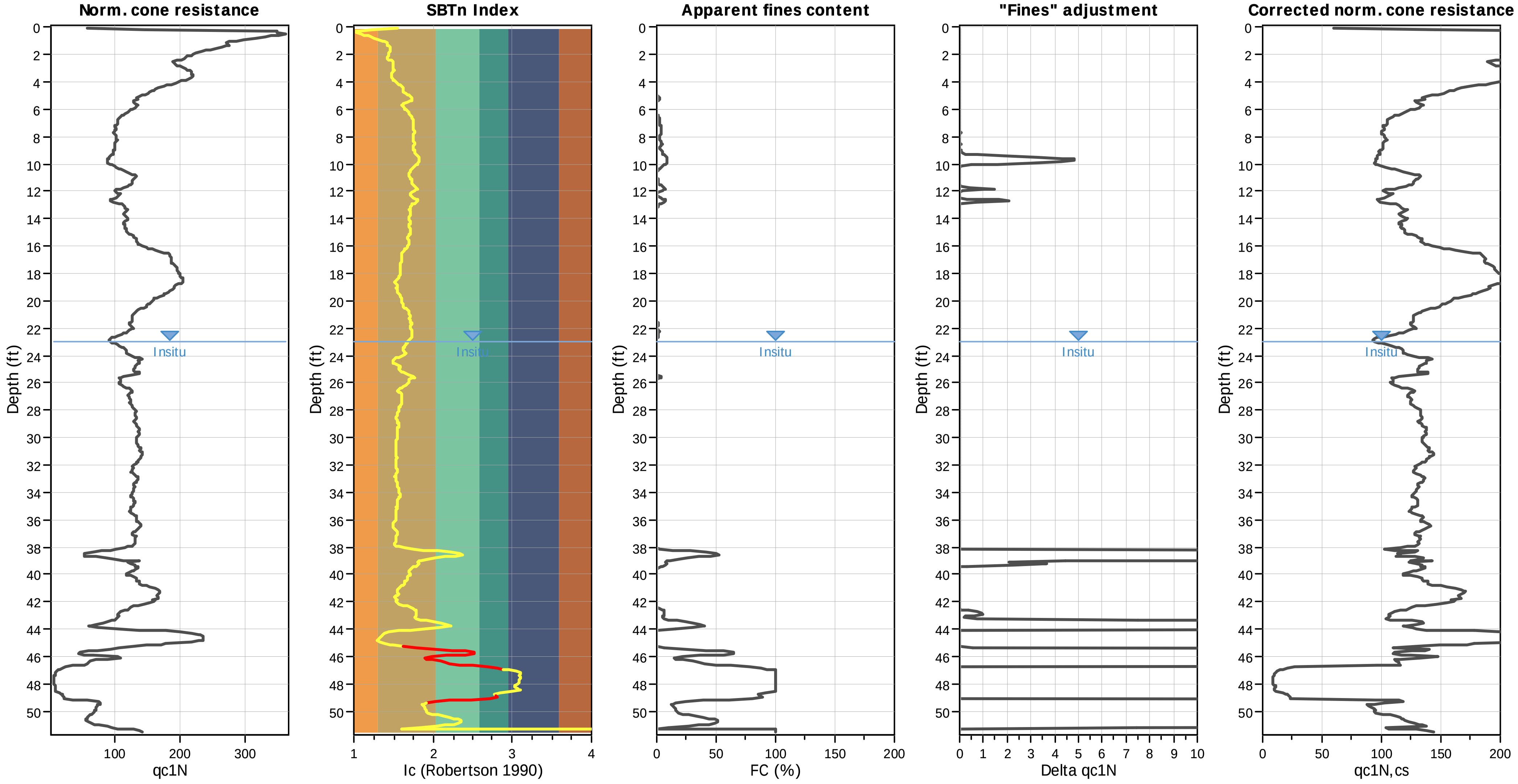
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬛ 8. Very stiff sand to
🟦 3. Clay to silty clay	🟫 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots (intermediate results)


Norm. cone resistance

SBTn Index

Apparent fines content

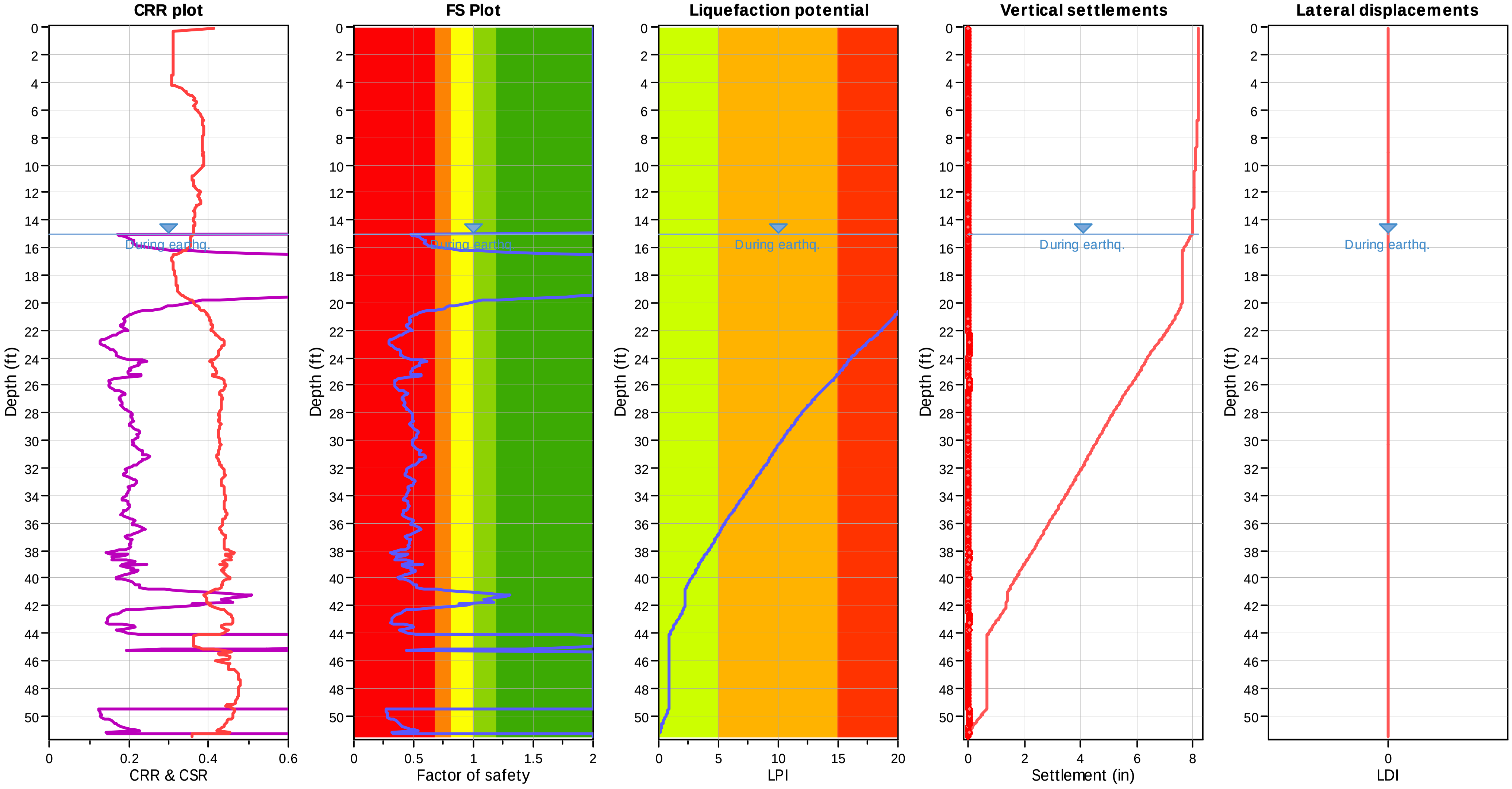
"Fines" adjustment

Corrected norm. cone resistance

Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method: B&I (2014)
Fines correction method: B&I (2014)
Points to test: Based on Ic value
Earthquake magnitude M_w: 6.64
Peak ground acceleration: 0.66
Depth to water table (insitu): 23.00 ft

Depth to GWT (erthq.): 15.00 ft
Average results interval: 3
Ic cut-off value: 2.60
Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

Fill weight: N/A
Transition detect. applied: Yes
K_σ applied: No
Clay like behavior applied: Sands only
Limit depth applied: No
Limit depth: N/A

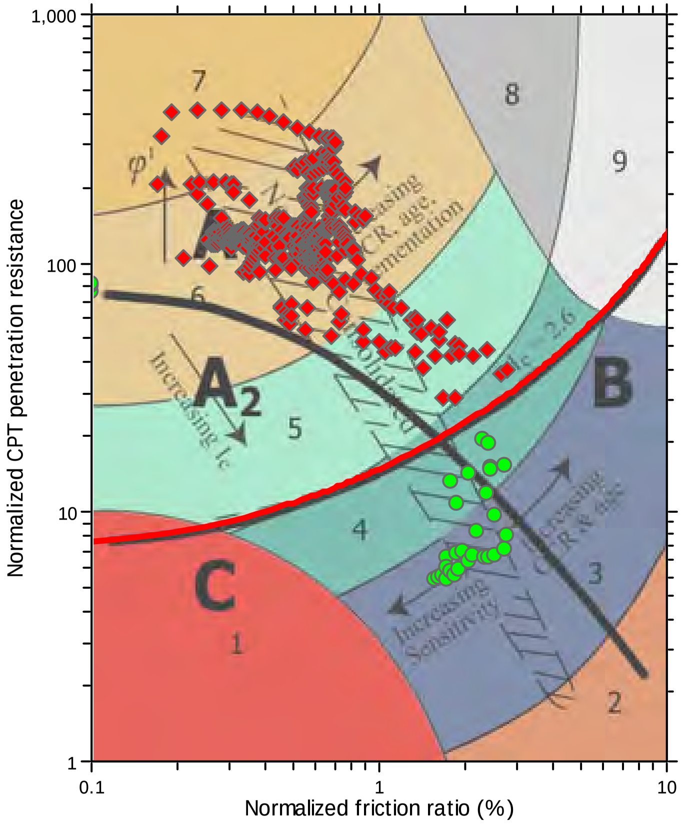
F.S. color scheme

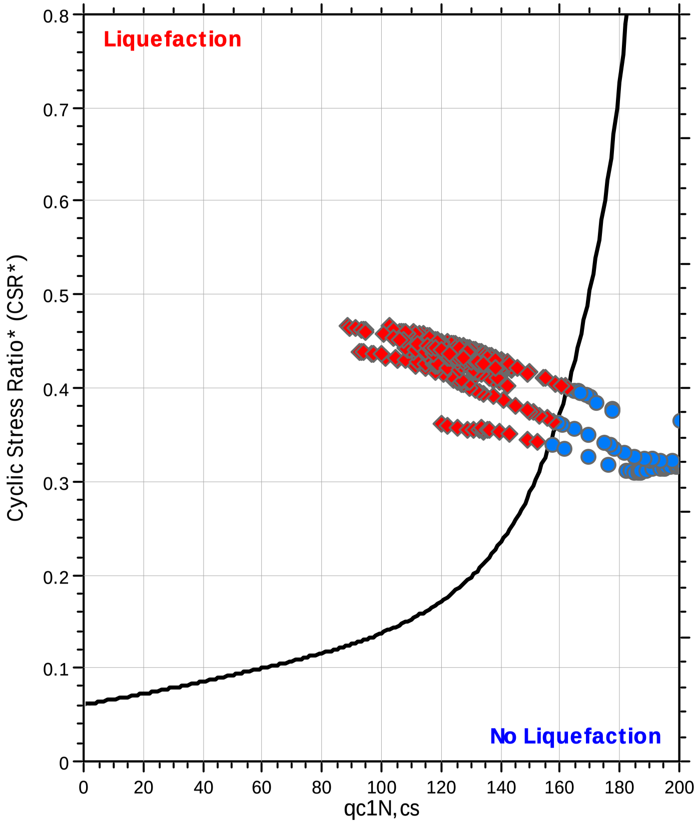
- 🟥 Almost certain it will liquefy
- 🟧 Very likely to liquefy
- 🟨 Liquefaction and no liq. are equally likely
- 🟩 Unlike to liquefy
- 🟩 Almost certain it will not liquefy

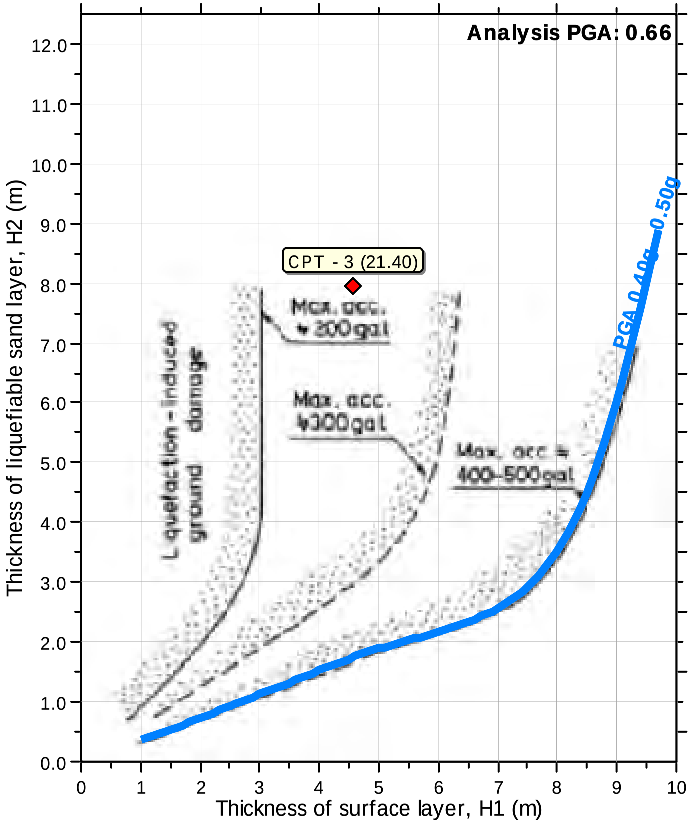
LPI color scheme

- 🟥 Very high risk
- 🟧 High risk
- 🟨 Low risk

Liquefaction analysis summary plots



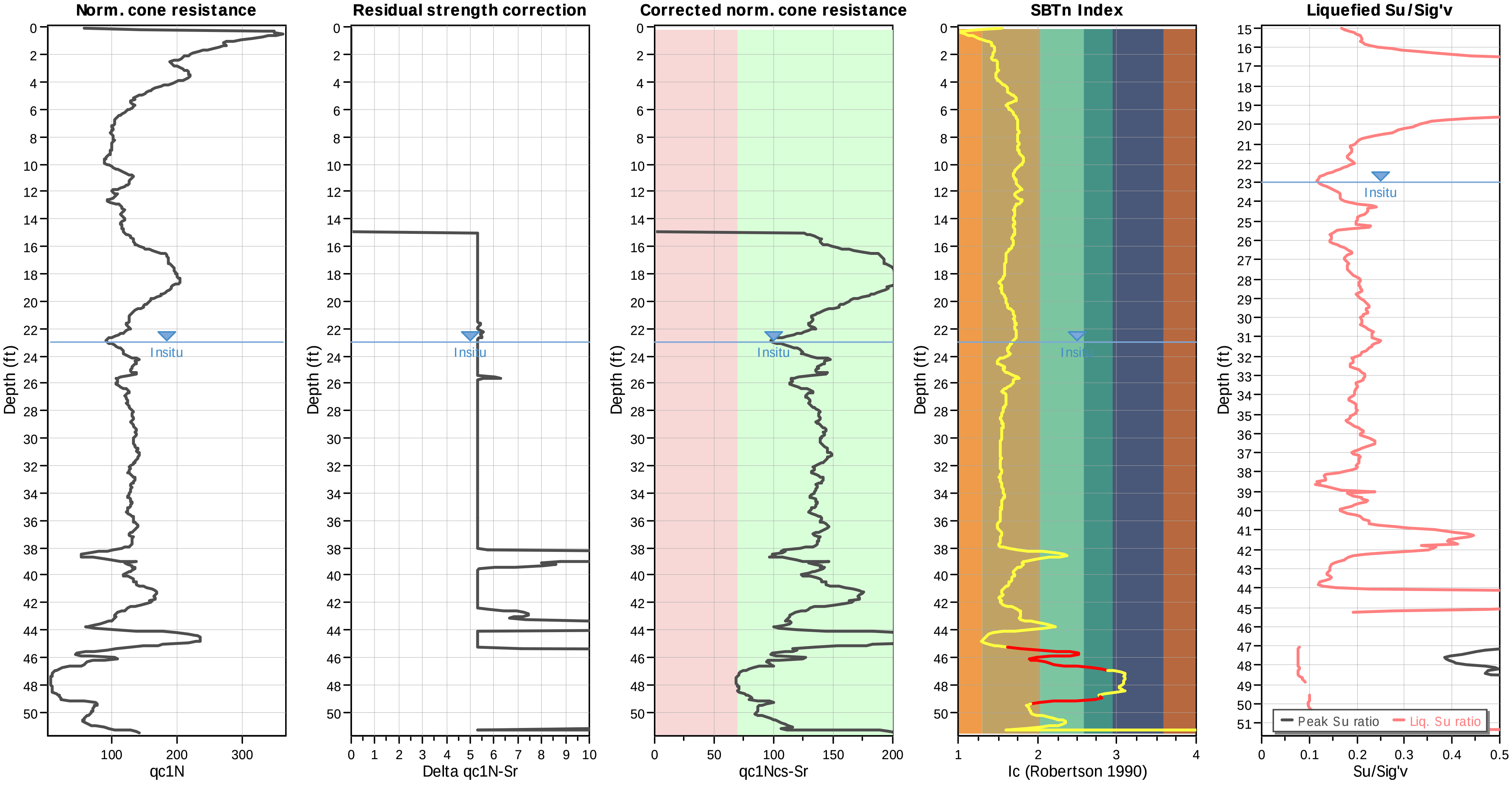




Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.00 ft	Fill height:	N/A	Limit depth:	N/A

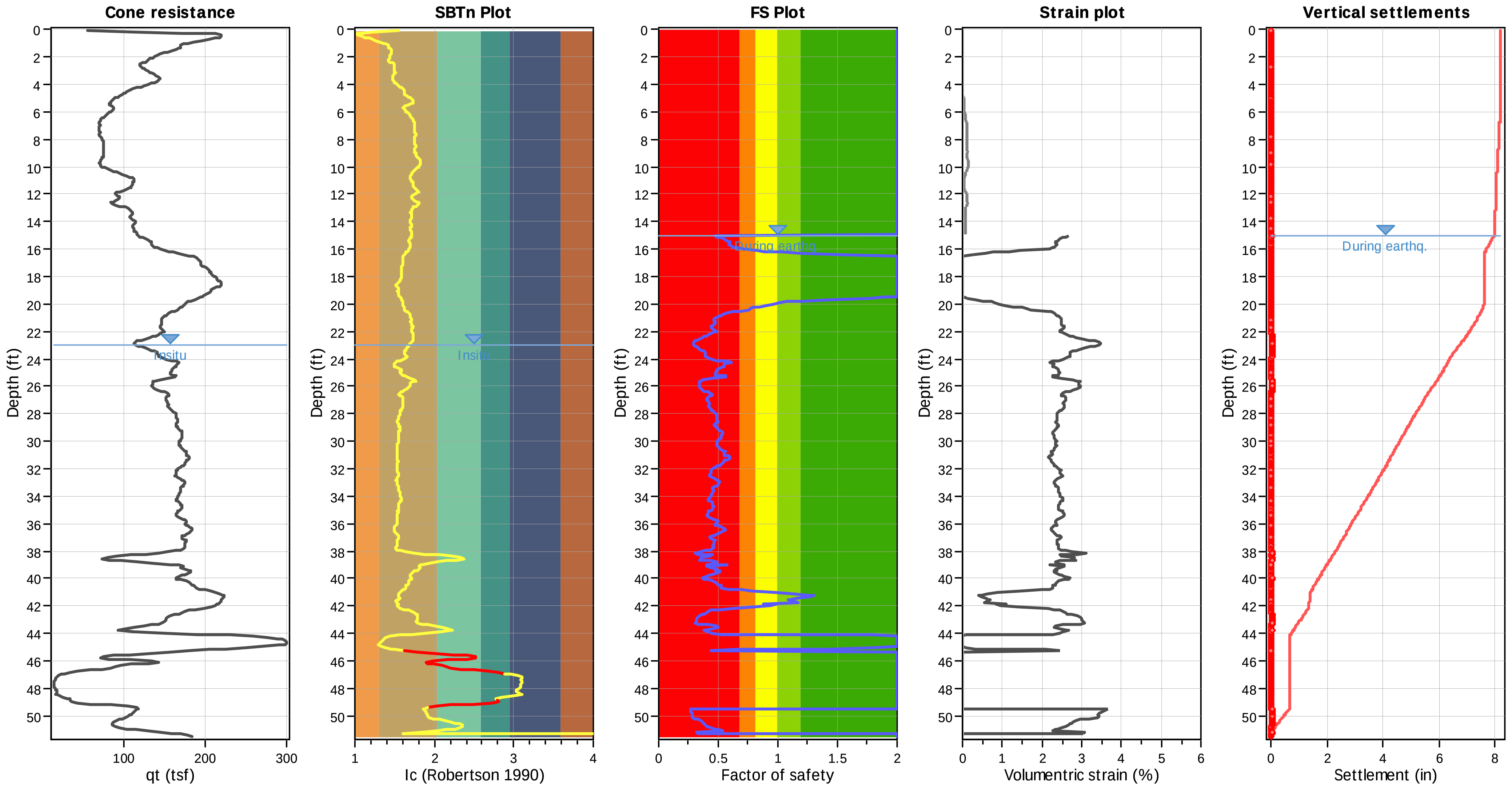
Check for strength loss plots (Idriss & Boulanger (2008))



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.00 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Appendix G

Hydrological Study

GEOTECHNICAL INVESTIGATION

GONZALES INDUSTRIAL WASTEWATER RECYCLING FACILITY
GONZALES, CALIFORNIA

FOR
DUDEK CONSULTING
ENCINITAS, CALIFORNIA

CONSULTING GEOTECHNICAL ENGINEERS

19125-M267-D41
MARCH 2020
www.4pacific-crest.com

Pacific Crest
ENGINEERING INC

GEOTECHNICAL | ENVIRONMENTAL | CHEMICAL | MATERIAL TESTING | SPECIAL INSPECTIONS

March 2, 2020 Project No. 19125-M267-D41

Phillip Giori, P.E.
DUDEK Consulting
750 Second Street
Encinitas, CA 92024

Subject: **Geotechnical Investigation – Design Phase**
Gonzales Industrial Wastewater Recycling Facility
APN 223-061-002, 223-061-014, 223-061-017, 223-061-019, 223-061-020
Short Road
Gonzales, California

Dear Mr. Giori,

In accordance with your authorization, we have performed a geotechnical investigation for the proposed industrial wastewater recycling facility (IWRF) located at the terminus of Short Road in Gonzales, California.

The accompanying report presents our conclusions and recommendations as well as the results of the geotechnical investigation on which they are based. The conclusions and recommendations presented in this report are contingent upon our review of the plans during the design phase of the project, and our observation and testing during the construction phase of the project.

Very truly yours,

PACIFIC CREST ENGINEERING INC.

ELIZABETH MAE MITCHELL
GE2718
Exp. 12/31/20

Elizabeth M. Mitchell, GE
President/Principal Geotechnical Engineer
GE 2718
Expires 12/31/20

Copies: 3 to Client

TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION REPORT
Gonzales Industrial Wastewater Recycling Facility
Gonzales, Santa Cruz

I. INTRODUCTION

PURPOSE AND SCOPE

This report describes the geotechnical investigation and presents our conclusions and recommendations for the proposed industrial wastewater recycling facility (IWRF) located at the terminus of Short Road in Gonzales, California. For purposes of this report, “site” refers to the proposed location of the IWRF and associated pipeline alignment as described in this report.

Our scope of services for this project has consisted of:

1. Site reconnaissance to observe the existing conditions and review of geologic and topographic maps, subsurface boring data from a 2005 geotechnical study performed for this site, and other available literature.

2. Review of the Draft Preliminary Engineering Report (DPER), prepared by Wallace Group dated February, 2020.

3. The advancement of four (4) cone penetration test (CPT) soundings.

4. The drilling and logging of four (4) test borings.

5. Laboratory analysis of retrieved soil samples.

6. Engineering analysis and review of data collected from our literature review and prior field exploration programs. This information was used to develop qualitative and quantitative geotechnical recommendations pertinent to the design and construction of the proposed project. Our analysis included quantitative evaluation of seismically-induced settlement, development of lateral earth pressures and foundation design criteria, development of general earthwork, materials and utility trench recommendations, and discussion of pertinent seismic and geotechnical hazards.

7. Preparation of this report documenting our investigation and presenting geotechnical recommendations for the design and construction of the project.

PROJECT LOCATION

The subject site is located immediately adjacent to the north side of the existing Gonzales Wastewater Treatment Plant (WWTP) facility located at the terminus of Short Road in the City of Gonzales. Please refer to the Regional Site Map, Figure No. 1, in Appendix A for the general vicinity of the project site, which is approximately located by the following coordinates:

Latitude = 36.493690 degrees
Longitude = -121.477531 degrees

PROPOSED IMPROVEMENTS

Based on discussions with DUDEK Consulting and review of February 2020 DPER, it is our understanding that the City of Gonzales intends to construct a new industrial wastewater recycling facility (IWRF) to be sited across five (5) parcels located immediately adjacent to the north side of the City's existing waste water treatment facility. The new facility will receive and treat industrial wastewater from the Gonzales Agricultural Business Industrial Park (GAIBP) located approximately 1.5 miles to the west. The proposed treatment system for the new IWFR will be a deep-aerated pond system along with associated infrastructure. The project is still in early stages of design, however it is our understanding that Phase 1 design and construction will include the following components:

Influent pump station situated approximately 14 feet below grade
Influent flow metering and screening structures
Two flow equalization (EQ) basins approximately 10 feet in depth (lined)
Three deep-aerated process treatment ponds approximately 25 feet in depth (lined)
32 acres of effluent rapid percolation beds approximately 3 feet in depth (unlined)

The industrial wastewater will be conveyed from the GAIBP to the new facility via a 21-inch trunk sewer line. The proposed pipeline alignment will traverse approximately 2.24 miles (11,800 linear feet) from Puente del Monte (near Catherine Street), along Gonzales River Road and Short Road, entering the headworks at the east end of the proposed facility.

If the proposed development differs significantly from that described above, our office should be contacted for additional recommendations.

II. INVESTIGATION METHODS

FIELD INVESTIGATION

Four (4), 8-inch diameter test borings were drilled along the proposed pipeline alignment on December 10, 2019. The approximate location of the test borings is shown on Figure No. 2A, in Appendix A. The drilling method used was hydraulically operated continuous flight augers on a truck mounted drill rig. A staff geologist from Pacific Crest Engineering Inc. was present during the drilling operations to log the soil encountered and to choose sampler type and locations.

Relatively undisturbed soil samples were obtained at various depths by driving a split spoon sampler 18 inches into the ground. This was achieved by dropping a 140-pound hammer a vertical height of 30 inches. The hammer was actuated with a wire winch. The number of blows required to drive the sampler each 6-inch increment and the total number of blows required to drive the last 12 inches was recorded by the field engineer. The outside diameter of the samplers used was 3-inch or 2-inch and is designated on the Boring Logs as "L" or "T", respectively.

The field blow counts in 6-inch increments are reported on the Boring Logs adjacent to each sample as well as the Standard Penetration Test data (SPT). All SPT data has been normalized to a 2-inch O.D. sampler and is reported on the Boring Logs as SPT "N" values. The normalization method used was derived from the second edition of the Foundation Engineering Handbook (H.Y. Fang, 1991). The method utilizes a Sampler Hammer Ratio which is dependent on the weight of the hammer, height of hammer drop, outside diameter of sampler, and inside diameter of sample.

The soils encountered in the borings were continuously logged in the field and visually described in accordance with the Unified Soil Classification System (ASTM D2488) as described in the Boring Log Explanation, Figures No. 3 and 4, in Appendix A. The soil classification was verified upon completion of laboratory testing in accordance with ASTM D2487.

Appendix A contains the site plan showing the locations of the test borings, our borings logs and an explanation of the soil classification system used. Stratification lines on the boring logs are approximate as the actual transition between soil types may be gradual.

CONE PENETROMETER TESTING

Four (4) cone penetrometer (CPT) soundings were advanced on November 13, 2019. The CPT soundings were located at accessible locations (compacted dirt farm roads) within the proposed footprint of the new IWRF facility. A staff geologist from Pacific Crest Engineering Inc. was present to supervise the field operations. The soundings were performed in accordance with the ASTM D5778 test method. The locations of the CPT soundings are shown on Figure No. 2B of Appendix A.

The CPT soundings were advanced using a 15 cm^2 piezocone penetrometer with a friction sleeve. A saturated piezo element is placed between the cone and the friction sleeve to obtain dynamic pore pressure parameters. Continuous measurements were made of the tip resistance, the friction sleeve resistance, and the dynamic pore pressure as the cone was pushed into the ground. Please refer to the CPT Report in Appendix B for a more comprehensive discussion of the Cone Penetration Test and associated references regarding CPT interpretations and calculated geotechnical parameters.

Real time data along with correlations between these measurements and soil properties were observed as the probe was advanced so that PCE could determine the depth of soundings required. CPT-1 (Elevation 109 feet), advanced along the southern perimeter of the site in the vicinity of the proposed process ponds. was terminated at a depth of 51.76 feet. CPT-2 (Elevation 107 feet) and CPT-3 (Elevation 110 feet) were located within the area of the proposed rapid infiltration ponds and were advanced to depths of 35.68 and 51.1 feet, respectively. CPT-4 (Elevation 114 feet) was located near the proposed headworks and advanced to a depth of 38.71 feet.

The results of the CPT site investigation, including plots with interpreted soil types, are presented in Appendix B.

LABORATORY TESTING

The laboratory testing program was developed to aid in evaluating the engineering properties of the materials encountered at the site. Laboratory tests performed include:

- Moisture Density relationships in accordance with ASTM D2937.
- Field penetrometer testing to approximate unconfined compressive strength.
- Gradation testing in accordance with ASTM D1140.
- Atterberg Limits testing in accordance with ASTM D4318.
- Expansion Index testing in accordance with ASTM D4829.
- Unconfined Compression testing in accordance with ASTM D2166.
- Corrosivity testing in accordance with California 643 (Minimum Resistivity), California 422 (Chlorides), California 417 (Sulfates) and California 643 (pH).

The results of the laboratory testing are presented on the boring logs opposite the sample tested and/or presented graphically in Appendix A.

III. FINDINGS AND ANALYSIS

GEOLOGIC SETTING

The surficial geology in the area of the project site is mapped as Alluvial Deposits (Dibblee Jr. 2006). The deposits locally are described as *"Alluvial gravel, sand and silt/clay of valley areas and stream channels."* The alluvium materials encountered during our field investigation are generally consistent with this description.

SURFACE CONDITIONS

The proposed IWRF site is currently occupied by agricultural fields. The agricultural fields are currently used by local farmers who grow and harvest a variety of crops. During our field investigation, approximately 30% to 40% of the land was planted with crop. The remaining land was disked in preparation for new crops. Most of the site was saturated due to recent storm activity; therefore the CPT soundings were located at accessible locations (compacted dirt farm roads) within the proposed footprint of the new IWRF facility. Areas that were planted, recently harvested or disked in preparation for planting were soft and therefore inaccessible to our drilling equipment.

The proposed pipeline alignment will traverse approximately 2.24 miles (11,800 linear feet) from Puente del Monte (near Catherine Street), along Gonzales River Road and Short Road. Puente del Monte and Gonzales River Road are developed, well-travelled roads, subject to moderate traffic volumes by cars, trucks, semi-trucks and trucks and equipment associated with the agriculture industry.

Short Road is an unpaved farm road composed primarily of well compacted soil but moderately rutted. Areas consisting of asphaltic concrete (AC) are generally relatively thin and very worn. This road is subject to light traffic volumes of large trucks and vehicles associated with nearby farming and composting operations off of Short Road. This road also provides vehicle access to the existing WWTP.

SUBSURFACE CONDITIONS

2020 Investigation

Our subsurface exploration consisted of four (4) shallow test borings drilled along the proposed pipeline alignment, and four (4) CPT soundings advanced within the proposed IWRF site. The borings advanced along the pipeline alignment were generally sited within the road shoulder.

The following briefly describes the general subsurface soil conditions encountered within the test borings and CPT soundings. The Logs of Test Borings in Appendix A and CPT plots in Appendix B provide, in more descriptive terms, the soil profiles and classifications, laboratory test results and groundwater conditions encountered at each boring location.

Subsurface conditions encountered along the proposed pipeline alignment consisted of interbedded sandy clay, sandy silt, and clayey to silty sand. The coarser grained sand material was generally described as poorly graded and very fine to fine grained with a trace amount of medium grains. The alluvial deposits are overlain by pavement sections ranging from five (5) to six (6) inches of asphaltic concrete (AC) and seven (7) to nine (9) inches of aggregate baserock. The exception was B-4 which was advanced in Short Road. Neither AC nor AB were encountered within this boring.

Subsurface conditions within the proposed IWRF footprint, as interpreted by the CPT, was consistent with alluvial materials. According to the “Presentation of Site Investigation Results” presented within Appendix B of this report, the subsurface soils within the proposed IWRF site consist of thick beds of sand with relatively thin, discontinuous lenses of sand mixtures, silt mixtures and clay.

Phreatic surfaces were noted within all four CPT soundings with initial depths ranging from 11.4 to 23.1 feet. Groundwater was not encountered within any of the four shallow test borings along the pipeline alignment. The below table lists the locations and corresponding depths in which the groundwater was encountered.

TABLE No. 1 – Groundwater[1] Summary

Location	Depth to Groundwater
CPT-1	20.0 feet
CPT-2	11.4 feet
CPT-3	23.1 feet
CPT-4	22.8 feet

NOTE 1: Groundwater, or the assumed phreatic surface was based on the results of the shallowest pore pressure dissipation test. The dissipation test was performed within each sounding and hydrostatic conditions were assumed.

It should be noted that actual groundwater levels level may be higher or lower than initially encountered. At its closest point, the site is approximately 1,400 feet northeast of the Salinas River. Therefore, it should be anticipated that there will be variability in the depth to groundwater depending upon the season and the river level. The groundwater conditions described in this report reflect the conditions encountered during our drilling investigation in November of 2019 at the specific locations drilled. It must be anticipated that the perched and regional groundwater tables may vary with location and could fluctuate with variations in rainfall, runoff, irrigation and other changes to the conditions existing at the time our measurements were made.

2005 Investigation

A geotechnical investigation for a proposed grit separator and pond expansion project was completed by PCEI at the subject site in 2005. The investigation included the advancement of 11 borings ranging in depth from 15 feet to 45 feet below ground surface. Figure No. 2B, located within Appendix A of this report, depicts the boring locations drilled for this study in December of 2004. Please refer to the Logs of Test Borings in Appendix C for the soil profiles and classifications, laboratory test results and groundwater conditions encountered at each boring location.

B-1(04) and B-6(04), advanced in the vicinity of the proposed headworks and flow EQ basins for the new IWRF, were advanced to a depth of 45 and 31½ feet, respectively. Subsurface soils consisted of interbedded lean clay, silt, sandy silt, silty sand and sand consistent with alluvial deposits. Lean to high plasticity clay lenses were encountered from 9 to 25 feet below ground surface. Expansive clay was encountered within B-6(04) at a depth of 10 feet below ground surface. Finer grained soils had sand contents ranging from 3% to 33% and consistencies described as firm to stiff. Coarser grained soils were generally very fine grained with densities ranging from loose to medium dense. Fines content within the sandy strata ranged from 4% to 25%.

The remaining 10 borings were advanced at various locations within the proposed footprint of the new process and rapid infiltration ponds. The borings ranged in depth from 15 to 31½ feet below ground surface. Soils encountered within these borings generally consisted of poorly to well graded sands with discontinuous beds of sandy silts and expansive clay. Clay lenses were encountered at various depths within B-5(04), and B-10(04). Fine grained soil strata exhibited firm to very stiff consistency. Densities of sandy strata were described as medium dense. Inorganic silt and organic clay and silt of medium to high plasticity was encountered within B-1 at a depth of 20 feet below ground surface.

Groundwater was encountered within 5 of the 11 borings at the locations and depths listed below:

TABLE No. 2 – Groundwater Summary (2005 Study)

Location	Depth to Groundwater
B-1	23 feet
B-2	17 feet
B-4	17 feet
B-5	13 feet
B-6	22 feet

SOIL CORROSIVITY

Corrosion is an electrochemical process involving oxidation and reduction reactions. To help determine the corrosive potential of the earth materials along the pipeline alignment, three samples of the earth materials underlying the proposed alignment were collected and analyzed. The samples were tested for concentrations of chloride (Cl) and sulfate (SO_4), and for pH values and resistivity. The laboratory corrosivity test results are included in Figure No. 10 in Appendix A of this report. The analytical results are summarized below.

TABLE No. 3 - Corrosivity Test Summary

Sample	Approximate Sample Depth (ft)	Soil Resistivity	Chloride	Sulfate (water soluble)	pH
		Ohm-cm	mg/kg	mg/kg	
1-3	5	2242	5	81	8.6
3-3	5	777	85	286	8.9
4-3	5	1101	75	150	8.6

CalTrans defines soil corrosivity in terms of resistivity, pH and soluble salt content (chloride and sulfate concentrations). Refer to the CalTrans Corrosion Guidelines, Version 3.0 (March, 2018) for additional information. According to the Cal Trans Corrosion Guidelines, a corrosive area is defined as an area where the soil and/or water meets one or more of the following conditions:

- The soil resistivity is less than 1,100 ohm-cm
- Chloride concentration is greater than or equal to 500 mg/Kg (ppm)
- Sulfate concentration is greater than or equal to 1500 mg/Kg (ppm)
- The soil pH is 5.5 or less

In comparing the test results to the threshold values, we have determined that soils within B-3 and B-4 may be corrosive due to low resistivity values. The remaining samples did not meet the CalTrans threshold values for corrosivity. The corrosion potential for any imported select fill or bedding sand should also be tested for corrosivity.

The project civil and structural engineer and/or corrosion specialist should review the aforementioned test results and apply mitigating measures for achieving the design service life of the structure, as they deem necessary.

FAULTING AND SEISMICITY

Faulting

Mapped faults which have the potential to generate earthquakes that could significantly affect the subject site are listed in Table No. 4. The fault distances are approximate distances based on the U.S.

Geological Survey and California Geological Survey, Quaternary fault and fold database, accessed in July of 2018 from the USGS website (http//earthquake.usgs.gov/hazards/qfaults/), and overlaid onto Google Earth.

TABLE No. 4 - Distance to Significant Faults

Fault Name	Distance (miles)	Direction
Reliz	1½	Southwest
Monterey Bay – Tularcitos	8½	Southwest
San Andreas	17	Northeast
Pinerock	17½	Northeast
San Benito	18	Northeast
Bradford	21½	Northeast

Seismic Shaking and CBC Design Parameters

Due to the proximity of the site to active and potentially active faults, it is reasonable to assume the site will experience high intensity ground shaking during the lifetime of the project. Structures founded on thick soft soil deposits are more likely to experience more destructive shaking, with higher amplitude and lower frequency, than structures founded on bedrock. Generally, shaking will be more intense closer to earthquake epicenters. Thick soft soil deposits large distances from earthquake epicenters, however, may result in seismic accelerations significantly greater than expected in bedrock.

Selection of seismic design parameters should be determined by the project structural designer. The site coefficients and seismic ground motion values shown in the table below were developed based on CBC 2019 incorporating the ASCE 7-16 standard, the project site location, and the specific assumptions as outlined in Notes 2 through 4 below.

TABLE No. 5 - 2019 CBC Seismic Design Parameters [1, 2, 3]

Seismic Design Parameter	ASCE 7-16 Value
Site Class	E [Note 4]
Spectral Acceleration for Short Periods	Ss = 1.525g
Spectral Acceleration for 1-second Period	S_1 = 0.537g
Short Period Site Coefficient	Fa = 1.2 [Note 2]
1-Second Period Site Coefficient	Fv = 2.0 [Note 3]
MCE Spectral Response Acceleration for Short Period	S_{MS} = 1.830 [Note 2]
MCE Spectral Response Acceleration for 1-Second Period	S_{M1} = 1.074g [Note 3]
Design Spectral Response Acceleration for Short Period	S_{DS} = 1.220g [Note 2]
Design Spectral Response Acceleration for 1-Second Period	S_{D1} = 0.716g [Note 3]

Note 1: S_S and S_1 values have been obtained by using the ASCE Hazard Tool at https://asce7hazardtool.online

Note 2: Per Section 11.4.8 of ASCE 7-16, a ground motion hazard analysis is required for Site Class E sites with S_S greater than or equal to 1.0. The values provided above for F_a, S_{Ms} and S_{DS} assume that this is not a seismically isolated structure or structure with damping systems, and Exception 1 of Section 11.4.8 is therefore applicable. **This should be verified by the structural engineer, and Pacific Crest Engineering, Inc. should be contacted for revised Table 2 parameters if Exception 1 is not applicable to the project.**

Note 3: Per Section 11.4.8 of ASCE 7-16, a ground motion hazard analysis is required for Site Class E sites with S_1 greater than or equal to 0.2. The values provided for F_v, S_{M1} and S_{D1} assume that: (1) this is not a seismically isolated structure or a structure with damping systems, (2) F_v can be obtained from Table 1613.2.3(2) of the 2019 CBC, and (3) Exception 3 of Section 11.4.8 is applicable (i.e, the fundamental period of the structure T is less than or equal to Ts as defined in Section 11.4.6.4 of ASCE 7-16 and equivalent static force procedure is used for design). **This should be verified by the project structural engineer and Pacific Crest Engineering, Inc. should be contacted for revised Table 2 parameters if these assumptions are not applicable to the project**.

Note 4: The site would normally be Site Class F because it is underlain by potentially liquefiable soils. If the fundamental period of vibration of the structure is less than 0.5 seconds, the site class can be determined by assuming there is no liquefaction (ASCE 7-16 Section 20.3.1). Therefore, Site Class E was selected for the project site. **The project structural engineer should verify the structure period and Pacific Crest Engineering should be contacted for revised Table 2 parameters if it exceeds 0.5 seconds**.

The recommendations of this report are intended to reduce the potential for structural damage to an acceptable risk level, however strong seismic shaking could result in the need for post-earthquake repairs.

GEOTECHNICAL HAZARDS

Geotechnical hazards which may affect project sites in the Gonzales area include ground shaking, ground surface rupture, liquefaction and lateral spreading, landsliding and expansive soils.

Ground Surface Fault Rupture

Pacific Crest Engineering Inc. has not performed a specific investigation for the presence of active faults at the project site. Based upon our review of the Monterey County GIS Hazard Maps, the project site is not mapped within a fault hazard zone.

Ground surface fault rupture typically occurs along the surficial traces of active faults during significant seismic events. Since the nearest known active, or potentially active fault trace is mapped approximately 1½ miles from the site, it is our opinion that the potential for ground surface fault rupture to occur at the site should be considered low.

Liquefaction and Lateral Spreading

Liquefaction is a phenomenon that can occur in saturated soil that has restricted drainage and is subject to seismic shaking. Liquefaction occurs when the soil grains are cyclically accelerated such that they begin to loose contact, allowing pressurized pore water to flow between soil particles. The soil, which derives its strength from point-to-point contact between grains, can become fluidized, resulting in significantly lower shear strengths. When the cyclic accelerations cease, the water pressure dissipates and the soil grains settle, regaining contact. Settlement can be differential due to the presence of non-homogeneous earth materials and due to differential densification and dewatering processes.

Liquefaction can result in bearing failure and differential ground settlement, which can be highly damaging to structures, pavements and utilities.

Substantial advances in liquefaction engineering have occurred over the past 15 years. Liquefaction science has expanded to examine strength loss of low plasticity silts and clays during cyclic earthquake shaking. We have the following understanding of the current state of the liquefaction science:

Classic cyclic liquefaction, as described above, can occur in undrained soil with low cohesion (Plasticity Index less than about 7 to 12). Liquefaction of "sand-like" soils occurs at the "onset of high excess water pressures and large shear strains during undrained cyclic loading" (Boulanger, 2004). Undrained soils with relatively high cohesion (Plasticity Index greater than about 12 to 20) may be subject to "cyclic failure", which may result in similar surface manifestations as liquefaction. The transition between "cyclic liquefaction" of sand-like soils and "cyclic failure" of clay-like soil is thought to be gradual depending on the fines content, the water content, and the plasticity of the soil.

The potential for liquefaction was evaluated quantitatively for this project, based upon the data obtained from our CPT soundings. Our analysis considered a magnitude 6.6 earthquake and an estimated peak ground acceleration (PGA_M) value of 0.664g. A design groundwater depth of 15 feet below ground surface was incorporated into our analysis.

Liquefaction potential was evaluated with the assistance of Geologismiki software CLIQ version 2.3.1.15, which is based upon recent advances in soil liquefaction engineering as presented by Idriss & Boulanger (2014).

Based on the results of our analysis it is our opinion that there is a very high probability of liquefaction to occur at the project site during strong seismic shaking. Please refer to Appendix D for the model parameters and the results we obtained.

Estimated settlements due to liquefaction-induced settlement were also calculated using CLIQ, based upon the work of Idriss & Boulanger (2008) and Zhang, Robertson et. al (2002). On the basis of our analysis, we estimate the magnitude of possible seismically-induced ground surface settlement to be on the order of 8 to 12 inches. We estimate the differential settlement would be about half of the total settlement.

It must be cautioned that liquefaction analysis is an inexact science and the mathematical models of the liquefaction and liquefiable soils contain many simplifying assumptions, not the least of which are isotropy and homogeneity. Liquefaction analyses and the generated factors of safety should be used as indicating trend lines. A soil deposit with a safety factor less than one will not necessarily fail, but the probability of settlement will be greater than a soil deposit with a higher safety factor. Conversely, a soil deposit with a safety factor greater than one may fail, but the probability of stability is higher than a soil deposit with a lower safety factor.

Lateral spreading can occur when a liquefied soil oscillates back and forth breaking the non-liquefied soil crust into segments that progressively move toward a free slope face during the cyclic earthquake loading. Lateral spreading is characterized by small to moderate displacements that are distributed across the site. Lateral spreading can occur on sites that are underlain by liquefied soil strata characterized by standard penetration test "N-values" of 15 and less, such those as encountered at the project site. Due to the proximity of the facility to the banks of the Salinas River, in conjunction with a high potential for liquefaction across the site, it is our opinion that site facilities could be impacted by lateral spreading following a strong seismic event.

Landsliding

The subject site and immediate vicinity are relatively flat. It is our opinion that the potential for shallow landsliding to occur and adversely affect the proposed development may be considered negligible.

Expansive Soils

The subject site is underlain by discontinuous lenses of expansive clay and high plasticity silts at various locations and depths. Expansive soils tend to heave during the rainy season and contract during the summer and this shrink/swell action extends down to the depth of seasonal moisture change. When this cyclical volume change occurs on sloping ground it results in "soil creep" due to the downward vector of the shrink/swell action. Seasonal moisture fluctuation and subsequent expansion and contraction of these types of soils typically occurs more near the ground surface where the seasonal moisture fluctuation is the greatest and decreases with depth below ground surface.

IV. DISCUSSION AND CONCLUSIONS

GENERAL

1. The results of our investigation indicate that the proposed IWRF and associated pipeline are feasible from a geotechnical engineering standpoint, provided our recommendations are included in the design and construction of the project.

2. Grading and foundation plans should be reviewed by Pacific Crest Engineering Inc. during their preparation and prior to contract bidding.

3. Pacific Crest Engineering Inc. should be notified at least four (4) working days prior to any site clearing and grading operations on the property in order to observe the stripping and disposal of unsuitable materials, and to coordinate this work with the grading contractor. During this period, a pre-construction conference should be held on the site, with at least the client or their representative, the grading contractor, a City representative and one of our engineers present. At this meeting, the project specifications and the testing and inspection responsibilities will be outlined and discussed.

4. The validity of the findings, conclusions and recommendations contained in this report are dependent upon an adequate testing and observation program during the construction phase. Field observation and testing must therefore be provided by a representative of Pacific Crest Engineering

Inc., to enable us to form an opinion as to whether the extent of work related to earthwork or foundation excavation complies with the project plans, specifications and our geotechnical recommendations. It is the responsibility of the owner, or their representative, to ensure that the information and recommendations provided by Pacific Crest Engineering, Inc. are called to the attention of the contractor and subcontractors and that the necessary steps are taken to ensure that such recommendations are carried out in the field. Pacific Crest Engineering assumes no responsibility for the future performance of work related to grading or foundation excavation that is performed without the full knowledge and direct observation of Pacific Crest Engineering Inc.

PRIMARY GEOTECHNICAL CONSIDERATIONS

5. The following section provides geotechnical considerations for the design and construction of the pipeline and are intended for use in design of the project and preparation of the project plans and specifications. It is neither the intent nor within the scope of this investigation to recommend construction procedures or methods used by the contractor. It is the responsibility of the contractor to use sound construction procedures and methods of the industry in accordance with local, state and federal safety standards.

6. Variations in soil conditions due to agricultural processing, local grading, or seismic activity can occur and should be expected. Therefore, subsurface conditions may differ from those observed or inferred from this investigation.

7. Based upon the results of our investigation, it is our opinion that the primary geotechnical issues associated with the design and construction of the proposed project are the following:

a. *Seismically-Induced Settlement*: The primary geotechnical hazard affecting the proposed project is the potential for liquefaction of the subsurface soils during a strong seismic event. Structural improvements should be founded on a reinforced concrete structural mat foundation bearing upon zone of engineered fill that has been placed and compacted in accordance with the recommendations of this report. The mat foundation should be designed to span areas of potential settlement (either due to static building loads or strong seismic shaking). Portions of the pipeline may require repair following a strong seismic event.

b. *Compressible Soils and Divergent Bearing Conditions*: Variable and compressible native soils underlie the proposed IWRF site. Foundations, concrete slabs-on-grade, and pavements underlain by compressible material may be subject to settlement and distress. In order to reduce potential settlement and distress we recommend that soils underlying proposed structure foundations be subexcavated and recompacted with engineered fill. Pond liners should be placed on firm and stable ground in accordance with the recommendations of this report.

c. *Shallow Groundwater:* Groundwater has been noted as high as 11 feet below existing grades at the IWRF site. Shallow groundwater or saturated soil conditions could affect excavation conditions, compaction requirements, backfill specifications and bearing capacity. It should be anticipated that groundwater will be encountered during construction of below grade structures. Below grade structures may be subject to uplift from buoyancy forces.

Based on a design depth of 25 feet for the proposed process ponds, it is likely that the groundwater levels could rise above the bottom of pond elevation. Should a rise in groundwater above the bottom of the process ponds (and/or flow EQ basins) coincide with the ponds being empty, there is a potential for the impermeable liner to become detached from the base of the pond excavation and float. Furthermore, dewatering of the pond excavations may be necessary during construction in order to facilitate the necessary grading activities. To reduce the hazard of high groundwater conditions, we recommend that the ponds not be allowed to completely empty during periods of high groundwater, and/or be designed with a base elevation that does not exceed ten feet below existing grades.

d. *Expansive Soils:* High plasticity, potentially expansive soils have been identified throughout the project area. These materials should not be used as backfill beneath or around structures or as trench backfill.

e. *Excavation Conditions:* We anticipate excavations should be possible with conventional excavation equipment, however variations in soils conditions are likely and should be expected during construction. The silt and/or sand layers below the groundwater table may be particularly susceptible to caving and it should be anticipated that caving soils will be encountered during construction.

Where very moist or saturated sands and soft clays are encountered, side wall instability is likely to necessitate shoring of excavation or trench walls. Any temporary sloping or shoring of trenches and excavations (including temporary dewatering, if required) will be the responsibility of the contractor.

f. *Strong Seismic Shaking:* The project site is located within a seismically active area and strong seismic shaking is expected to occur within the design lifetime of the project. Improvements should be designed and constructed in accordance with the most current CBC Standards and the recommendations of this report to minimize reaction to seismic shaking. Improvements designed and constructed in accordance with applicable codes have an increased potential for experiencing relatively minor damage which should be repairable, however strong seismic shaking could result in the need for post-earthquake repairs.

V. RECOMMENDATIONS

EARTHWORK

Clearing and Stripping

1. The initial preparation of the site will consist of the removal of deleterious material, including any vegetation as required, abandoned improvements, and any associated debris. Buried tanks and/or piping, if found, must be completely removed. Tree removal should include the entire stump and root

ball. The extent of this soil removal will be designated by a representative of Pacific Crest Engineering Inc. in the field. This material must be removed from the site.

2. Any voids created by the removal of old structures and their foundations, tree and root balls, septic tanks, and leach lines must be backfilled with properly compacted native soils that are free of organic and other deleterious materials or with approved engineered fill. Backfill material, whether it consist of native soils or engineered fill, must be compacted in accordance with the recommendations provided in this report.

3. Any wells encountered shall be capped in accordance with the requirements and approval of the County Health Department. The strength of the cap shall be equal to the adjacent soil and shall not be located within 5 feet of a structural footing.

4. Surface vegetation, tree roots and organically contaminated topsoil should then be removed ("stripped") from the area to be graded. In addition, any remaining debris or large rocks must also be removed (this includes asphalt or rocks greater than 2 inches in greatest dimension). This material may be stockpiled for future landscaping.

5. It is anticipated that the depth of stripping may be as much as 12 inches in agricultural areas. Final required depth of stripping must be based upon visual observations by a representative of Pacific Crest Engineering Inc., in the field. The required depth of stripping will vary based upon the type and density of vegetation across the project site and with the time of year.

Subgrade Preparation

6. It is possible that there are areas of man-made fill at the site that our field investigation did not detect. Areas of man-made fill, if encountered within planned structural improvement areas, will need to be completely excavated to undisturbed native material. The excavation process should be observed and the extent designated by a representative of Pacific Crest Engineering Inc., in the field. Any voids created by fill removal must be backfilled with properly compacted engineered fill.

Process and Flow EQ Basins

7. After clearing and stripping and backfilling of voids, the exposed soils in the area of the proposed process treatment ponds and flow EQ basins should be subexcavated to design grades. The base of the excavation should be scarified a minimum of 12 inches, moisture conditioned and compacted in accordance with the recommendations of this report.

Structural Improvements

8. Following the clearing, stripping and backfilling of voids, areas to receive structural improvements should be subexcavated to a depth of 3 feet below mat subgrade elevation. The exposed soils at the bottom of the excavation should then be scarified to a minimum depth of 8 inches, moisture conditioned, and compacted as an engineered fill except for any contaminated material noted by a representative of Pacific Crest Engineering Inc. in the field.

9. Following subexcavation and bottom processing, a layer of Mirafi 500X geotextile stabilization fabric (or equivalent) should be placed at the base of the excavation. The geotextile fabric should be overlapped at least 30 inches, and lapped up against the sidewalls of the excavation. The excavation should then be brought back to the subgrade elevation by the placement of imported Class 2 aggregate baserock as engineered fill. The aggregate base should be moisture conditioned and compacted in maximum 8 inch lifts.

10. Recompacted sections should extend 5 feet beyond the building area, unless site constraints preclude such horizontal limits.

Equipment Pads, Pavements and Hardscape Areas

11. Following the clearing, stripping and backfilling of voids areas to receive exterior equipment pads, pavements and/or other hardscape areas should be subexcavated as follows:

Exterior concrete flatwork/slabs: 24 inches below bottom of slab
Interior slab-on-grade: 24 inches below capillary break
Roadways and pavements: 12 inches below subgrade

12. Subexcavations should extend at least 5 feet horizontally beyond foundations and at least 2 feet horizontally beyond pavements and flatwork.

13. Final depth of subexcavation should be determined by a representative of Pacific Crest Engineering Inc., in the field.

14. Following clearing, stripping and any necessary subexcavations, the exposed subgrade soil that is to support concrete slabs-on-grade, foundations or pavements should then be scarified 8 inches, and the soil moisture conditioned and compacted as outlined below.

15. If wet or unstable subgrades are encountered, they may need to be further subexcavated and replaced with stabilization fabric, crushed rock or other materials to create a stable working surface. The depth of over-excavations and method used should be determined in the field at the time of construction. All subexcavations should be observed by a representative of Pacific Crest Engineering Inc. and modified as necessary to establish a stable subgrade below planned structures.

Material for Engineered Fill

16. All structural foundation elements should be underlain by Class 2 aggregate baserock as discussed above. In general, we anticipate that non-expansive native soils can be used as engineered fill for the remaining areas of the project. Moderate to highly expansive materials, if encountered, are not suitable as engineered fill below foundations or concrete slab-on-grade, or as trench backfill. If these materials are encountered during earthwork operations, it should be anticipated that additional processing will be required as recommended by a representative of Pacific Crest Engineering, Inc. Highly expansive clay soils, if encountered, will need to be removed replaced with non-expansive engineered fill.

17. Native and imported soil proposed for use as engineered fill should meet the following requirements:

  a. free of organics, debris, and other deleterious materials,
  b. free of “recycled” materials such as asphaltic concrete, concrete, brick, etc.,
  c. granular in nature, well graded, and contain sufficient binder to allow utility trenches to stand open,
  d. free of rocks in excess of 2 inches in size.

18. In addition to the above requirements, import fill should have a Plasticity Index between 4 and 12, and a minimum Resistance “R” Value of 30, and be non-expansive.

19. Samples of any proposed imported fill planned for use on this project should be submitted to Pacific Crest Engineering Inc. for appropriate testing and approval not less than ten (10) working days before the anticipated jobsite delivery. This includes proposed import trench sand, drain rock and for aggregate base materials. Imported fill material delivered to the project site without prior submittal of samples for appropriate testing and approval must be removed from the project site.

Engineered Fill Placement and Compaction

20. Following sub-excavation and any required subgrade preparation, excavations should be backfilled to finish grade with engineered fill that is moisture conditioned and compacted according to the recommendations of this report.

21. Engineered fill should be placed in maximum 8-inch lifts, before compaction, at a water content which is within 2 to 4 percent over the laboratory optimum value.

22. The maximum dry density will be obtained from a laboratory compaction curve run in accordance with ASTM Procedure #D1557. This test will also establish the optimum moisture content of the material. Field density testing will be performed in accordance with ASTM Test #D6938 (nuclear method).

23. Engineered fill should be placed in maximum 8-inch lifts, before compaction, at a water content which is within 2 to 4 percent of the laboratory optimum value. Clayey subgrade soils should be moisture conditioned to between 3 to 5 percent above the laboratory optimum.

24. All engineered fill should be compacted to a minimum of 95% of its maximum dry density.

25. The maximum dry density will be obtained from a laboratory compaction curve run in accordance with ASTM Procedure #D1557. This test will also establish the optimum moisture content of the material. Field density testing will be performed in accordance with ASTM Test #D6938 (nuclear method).

26. We recommend field density testing be performed in maximum 1-foot elevation differences. In general terms, we recommend at least one compaction test per 500 linear feet of utility trench or retaining wall backfill, and at least one compaction test per 2,000 square feet of embankment or structure area. These are subjective values and may be changed by the geotechnical engineer based on a review of the final project layout and exposed field conditions.

Soil Moisture and Weather Conditions

27. If earthwork activities are done during or soon after the rainy season, the on-site soils and other materials may be too wet in their existing condition to be used as engineered fill. These materials may require a diligent and active drying and/or mixing operation to reduce the moisture content to the levels required to obtain adequate compaction as an engineered fill. If the on-site soils or other materials are too dry, water may need to be added. In some cases the time and effort to dry the on-site soil may be considered excessive, and the import of aggregate base may be required.

CUT AND FILL SLOPES FOR POND CONSTRUCTION

28. We request the opportunity to review final pond related plans during the design phase in order to provide additional recommendations, if required. In the meantime, we offer the following general recommendations.

29. Based on a design depth of 25 feet for the proposed process ponds, it is likely that the groundwater levels could rise above the bottom of pond elevation. Depending on the time of year that construction ensues, dewatering of the pond excavations may be necessary during construction in order to facilitate the necessary grading activities. It is the contractor's responsibility to design an adequate de-watering system for the project site, and to submit a detailed de-watering plan to the project civil and geotechnical engineer for review at least three weeks prior to the start of construction.

30. It is our understanding that the process and flow EQ ponds will be lined with a synthetic liner. The liner must meet any applicable requirements of the State Water Resources Control Board, and be installed in accordance with the recommendations of the product manufacturer. The liner system should contain any required leak detection provisions, including installation of a pan lysimeter monitoring device under the lowest point of the pond.

31. Should a rise in groundwater above the bottom of the process ponds (and/or flow EQ basins) coincide with the ponds being empty, there is a potential for the impermeable liner to become detached from the base of the pond excavation and float. To reduce the hazard of high groundwater conditions, we recommend that the ponds not be allowed to completely empty during periods of high groundwater, and/or be designed with a base elevation that does not exceed ten feet below existing grades.

32. All fill slopes and/or lined containment berms should be constructed with engineered fill meeting the minimum density requirements of this report and have a gradient no steeper than 3:1 (horizontal to vertical). A maximum slope gradient of 2:1 may be considered for fill slopes on the outboard side of the ponds. Unlined berms should be constructed with gradients no steeper than 3:1 horizontal to vertical and a maximum vertical height of 8 feet.

33. A base keyway should be provided along the outboard toe of all fill berms. The base keyway should be a minimum of 10 feet wide. The bottom of the keyway should be sloped inward on a negative gradient of at least 5%. The depth of the keyways will vary, depending on the materials encountered. It is anticipated that the depth of the keyways may be two (2) to three (3) feet, but at all locations shall be at least two (2) feet into firm material. Refer to Figure 13 in Appendix A for a typical fill berm detail.

34. A bench keyway should be provided at the cut/fill transition on the inboard side of the berm. The bench should be a minimum of 10 feet wide and sloped inward on a negative gradient of at least 5%.

35. Cut slopes in native soils, including the interior banks of ponds, shall not exceed a 3:1 (horizontal to vertical) gradient and a 15-foot vertical height unless specifically reviewed by a representative of Pacific Crest Engineering Inc.

36. Slopes for pond embankments should be laterally over-built at least one foot, and the slope face trimmed back to firm/compacted material.

37. The above slope gradients are based on the strength characteristics of the materials under conditions of normal moisture content that would result from rainfall falling directly on the slope, and do not take into account the additional activating forces applied by seepage through the pond berms. Therefore, in order to maintain stable slopes at the recommended gradients, it is important that synthetic liner be completely impermeable.

38. The above recommended gradients do not preclude periodic maintenance of the slopes, as minor sloughing and erosion may take place.

PIPELINE CONSTRUCTION AND UTILITIES

General

39. To prevent damage to existing utilities it is essential to identify their existence and location, including depth, prior to commencing with open cut or trenchless pipeline installation. General surface utility location methods, keyhole type vacuum excavations or other applicable methods should be used to locate utilities within the zone of influence and to verify their clearance from the pipe to installed.

40. Where pipe is required to be installed under railroad embankments, highways, streets, or other facilities by jacking, boring or tunneling methods, it is the contractor’s responsibility to ensure construction shall be made in such a manner that will not interfere with the operation of the railroad, street, highway, or other facility, and shall not weaken or damage any embankment or structure.

41. The pits or trenches excavated to facilitate jacking, boring or tunneling operations shall be backfilled immediately after the installation of the pipe has been completed.

42. Trenchless undercrossing operations, if required, will be the responsibility of the contractor as to methods and job site safety and shall be performed by a contractor with sufficient experience in

trenchless pipeline installation. The contractor shall furnish for the City's approval, a plan showing the proposed construction methods, including as applicable, boring methods, location of pits, design for the jacking head, jacking support or back stop, arrangement and position of augers, jacks, pipe guides, etc. The plan should include provisions for maintaining the boring alignment within construction specifications.

43. Trenchless pipeline installation should include a program of measure and monitoring to mitigate potential heave. The monitoring program should include a preconstruction survey of all nearby structures, culverts, manholes and pavement. Nearby structures and utilities should be actively and continuously monitored throughout the trenchless pipeline operation. The monitoring program should be submitted for review and approval by the City Engineer and should be in-place prior to commencing trenchless pipeline operations.

Modulus of Subgrade Reaction

44. Vertical loading on a flexible pipe can cause the pipe to deform. The diameter of the pipe tends to decrease in the vertical direction and increase in the horizontal direction. The composite modulus of subgrade reaction (E'_c) is used in the design of buried flexible pipes to estimate the passive resistance developed by the soil when the pipe is vertically loaded. E'_c is a function of depth of cover, trench width, the diameter of the pipe, the modulus (E'_b) of the pipe zone material (the soil and bedding material directly surrounding the pipe), and the modulus (E'_n) of the native material adjacent to the trench walls.

45. The native soils encountered within the proposed pipeline alignment generally consisted of loose to medium dense silty to clayey sand (SM, SC) and stiff clay, (CL, CI, & CH).

46. The following table provides preliminary values for the Modulus of Subgrade Reaction (E'_n) for open-cut pipe embedment.

Table No. 6 – Modulus of Subgrade Reaction

Type of Soil	Modulus of Subgrade Reaction (E'_b, E'_n)[(1)] for open-cut trench installation
Expansive Clays and Silts (CH, MH, Liquid Limit	Do not use as backfill
Clays and Silts (CL, CI, ML)	700 psi[(2)]
Sand (SM, SC)	900 psi[(2)]

(1) Jey Jeyapalan P. E., "Modulus of Soil Reaction (E') Values for Pipeline Design"

(2) The above values apply when the soil cover is between 0 and 5 feet. These values may be increased by 25 psi for every foot of soil cover above the pipe greater than 5 feet.

47. To determine E'_c for the buried pipe E'_n for the native soil and E'_b for the backfill material must be determined then combined using the following formula:

$$E'_c = S_c E'_b$$

48. The value of S_c is a function of E'_n/E'_b and B_d/D where B_d is the width of the trench at the pipeline and D is the diameter of the pipe.

Table No. 7 – S_c Values

E'_n/E'_b	S_c for B_d/D*					
	1.5	2.0	2.5	3.0	4.0	5.0
0.1	0.15	0.30	0.60	0.80	0.90	1.00
0.2	0.30	0.45	0.70	0.85	0.92	1.00
0.4	0.50	0.60	0.80	0.90	0.95	1.00
0.6	0.70	0.80	0.90	0.95	1.00	1.00
0.8	0.85	0.90	0.95	0.98	1.00	1.00
1.0	1.00	1.00	1.00	1.00	1.00	1.00
1.5	1.30	1.15	1.10	1.05	1.00	1.00
2.0	1.50	1.30	1.15	1.10	1.05	1.00
3.0	1.75	1.45	1.30	1.20	1.08	1.00
>=5.0	2.00	1.60	1.40	1.25	1.10	1.00

*Jey Jeyapalan P. E., "Modulus of Soil Reaction (E') Values for Pipeline Design"

Utility Trench Backfill

49. Utility trenches that are parallel to the sides of structures should be placed so that they do not extend below a line sloping down and away at a 2:1 (horizontal to vertical) slope from the bottom outside edge of all footings.

50. Utility pipes should be designed and constructed so that the top of pipe is a minimum of 24 inches below the finish subgrade elevation of any road or pavement areas. Any pipes within the top 24 inches of finish subgrade should be concrete encased, per design by the project civil engineer.

51. For the purpose of this section of the report, backfill is defined as material placed in a trench starting one foot above the pipe, and bedding is all material placed in a trench below the backfill.

52. Unless concrete bedding is required around utility pipes, free-draining clean sand should be used as bedding. Sand bedding should be compacted to at least 95 percent relative compaction. Clean sand is defined as 100 percent passing the #4 sieve, and less than 5 percent passing the #200 sieve.

53. Approved imported clean sand or native soil should be used as utility trench backfill. Backfill in trenches located under and adjacent to structural fill, foundations, concrete slabs and pavements should be placed in horizontal layers no more than 8 inches thick. This includes areas such as sidewalks, patios, and other hardscape areas. Each layer of trench backfill should be water conditioned and compacted to at least 95 percent relative compaction

54. All utility trenches beneath perimeter footing or grade beams should be backfilled with controlled density fill (such as 2-sack sand\cement slurry) to help minimize potential moisture intrusion below

interior floors. The length of the plug should be at least three times the width of the footing or grade beam at the building perimeter, but not less than 36 inches. A representative from Pacific Crest Engineering Inc. should be contacted to observe the placement of slurry plugs. In addition, all utility pipes which penetrate through the footings, stemwalls or grade beams (below the exterior soil grade) should also be sealed water-tight, as determined by the project civil engineer or architect.

55. Utility trenches which carry "nested" conduits (stacked vertically) should be backfilled with a control density fill (such as 2-sack sand\cement slurry) to an elevation one foot above the nested conduit stack. The use of pea gravel or clean sand as backfill within a zone of nested conduits is not recommended.

56. A representative from our firm should be present to observe the bottom of all trench excavations, prior to placement of utility pipes and conduits. In addition, we should observe the condition of the trench prior to placement of sand bedding, and to observe compaction of the sand bedding, in addition to any backfill planned above the bedding zone.

57. Jetting of the trench backfill is not recommended as it may result in an unsatisfactory degree of compaction.

58. Trenches must be shored as required by the local agency and the State of California Division of Industrial Safety construction safety orders.

59. Controlled low strength material (CLSM) is a flowable, self-compacting, cementitious material used in lieu of compacted soil. CLSM is a mixture of cement, pozzolan, coarse and fine aggregate and water mixed in accordance with ASTM C94. Controlled low strength material may be used as backfill provided it is in accordance with the following:

a. The CLSM should have a consistency such that the material flows easily into all openings. A stiffer mixture may be required on sloping ground. If a stiffer mixture is required, vibration should be performed to ensure that the CLSM fills all spaces and openings.

b. When fully cured the CLSM should be hand excavatable and have a minimum 28-day compressive strength of 50 psi and a maximum 28-day compressive strength of 150 psi.

c. Placement of backfill, pavement sections or concrete over the CLSM should not take place until the CLSM passes the ball drop test per ASTM 6024.

d. If the backfill is not placed within 8 hours, a 6-inch cover of moist earth should be placed over the CLSM. If the air temperature is 50°F or less, the earth cover should be 18 inches thick.

e. CLSM shall not be placed when the air temperature is below 40°F unless the air temperature is 35°F or more and the temperature is rising.

60. Pipelines in trenches backfilled with CLSM have a tendency to float as the CLSM is placed. Pipe anchors and sequential backfilling can mitigate the potential for floating. If the sequential backfilling method is selected, the height to which the CLSM is placed is a function of the buoyant force and the amount of resistance provided by the anchoring system. Sequential backfilling requires the trench to remain open for a longer period of time.

TRENCHING, OPEN-CUT EXCAVATIONS AND SHORING

61. It is our opinion that open-cut excavation is feasible for the installation of the proposed pipeline and IWRF improvements. Based on our subsurface investigation, groundwater should be anticipated during construction, particularly if the construction is performed during or soon after the rainy season, The possibility of caving soils and a relatively shallow groundwater table will need to be addressed, especially if excavations will extend below a depth of about ten feet below existing grades.

62. Based on the soils encountered in our borings and CPT, we anticipate that excavations for the planned improvements may generally be excavated using appropriately-sized, conventional excavation equipment. The contractor should anticipate interbedded lenses of loose to medium dense silty sand and sandy silt within planned excavations. It is the contractor's responsibility to independently assess the excavatability of the soil along the pipeline alignment and at the IWRF site, and to choose suitable equipment, casing and/or excavation methods.

63. Pipeline and below grade construction should be performed in dry excavations. Temporary dewatering may be achieved by sloping the excavation to a system of sump pumps placed within the excavation, trenching from the base of excavations to discharge water by gravity flow, or other means. It is the contractor's responsibility to design an adequate de-watering system for the project site, and to submit a detailed de-watering plan to the project civil and geotechnical engineer for review at least two weeks prior to the start of construction. The groundwater dewatering systems should be based on the actual groundwater conditions encountered at the time of construction.

64. It must be understood that on-site safety is the sole responsibility of the contractor, and that the contractor shall designate a competent person (as defined by CAL-OSHA) to monitor the slope excavation prior to the start of each work day, and throughout the work day as conditions change. The competent person designated by the contractor shall determine if flatter slope gradients are more appropriate, or if shoring should be installed or modified to protect workers in the vicinity of the slope excavation. Refer to Title 8, California Code of Regulations, Sections 1539-1543. All excavations must be evaluated for stability prior to entry. The contractor must act in accordance with the project specifications, Cal/OSHA and/or any other applicable government regulation concerning excavation safety and shoring.

65. All excavations must meet the requirements of 29 CFR 1926.651 and 1926.652 or comparable OSHA approved state plan requirements.

66. Groundwater has been noted as high as 11 feet below existing ground at the IWRF site. Groundwater should be expected at shallower depths during or soon after the rainy season. It is the contractor's responsibility to design an adequate de-watering system for the project site, and to submit a detailed de-watering plan to the geotechnical engineer for review at least two weeks prior to the start of construction.

67. Based on our field and laboratory investigations, we recommend that for sloping and benching purposes, the soils within the project site should be preliminarily classified as Type C soils (a submerged granular soil) in accordance with Cal/OSHA. The contractor's competent person must base their sloping and benching systems on the actual soil and groundwater conditions encountered in the field at the time of construction.

68. It should be anticipated that the non-cohesive sands and silts noted at the IWRF site may be susceptible to raveling, running or flowing and may have little to no stand-up time. Unsupported vertical cuts in raveling, running or flowing soils can result in vertical wall failure and the undermining of adjacent pavements, utilities and structures. If raveling, running or flowing soils are encountered during construction, continuous full-face shoring is recommended. It should be anticipated that the pump station excavation at the proposed headworks may require shoring.

69. The "top" of any temporary cut slope should be set-back at least ten feet (measured horizontally) from any nearby structure or property line. Any excavation that cannot meet these side slope gradients will need to have a shoring system designed to support steeper sidewall gradients.

70. Should temporary shoring be required, the shoring wall system chosen by the designer should be designed using the geotechnical design criteria presented in the "Lateral Pressures" section of this report. The contractor should submit a detailed shoring plan to the City, and the project civil, structural and geotechnical engineers for review at least two weeks prior to the start of construction.

FOUNDATIONS – STRUCTURAL MAT

71. At the time we prepared tis report, the grading plans had not been completed and the structure locations and foundation details had not been finalized. We request an opportunity to review these items during the design stages to determine if supplemental recommendations will be required.

Buoyancy Forces

72. Groundwater was encountered at the IWRF site with approximate depths ranging from 11 to 23 feet. Below grade structures may be subject to uplift from buoyancy forces. For design purposes we recommend assuming a groundwater level of ten feet below existing grades and a skin friction value of 300 psf/foot of surface area.

Reinforced Structural Mat

73. Considering the soil characteristics and site preparation recommendations, it is our opinion that an appropriate foundation system to support structural improvements consist of a reinforced structural mat designed to move as a unit, resist differential settlement, and span seismically induced voids.

74. The mat foundation should bear upon a minimum of 36 inches of Class 2 aggregate baserock that has been placed and compacted in accordance with the recommendations of this report.

75. The structural mat should be designed to span voids, withstand differential settlement, and allow the structure to move as a single unit. The loading should be kept as even as possible in all areas of the structure.

76. The structural mat should be designed and constructed to span a 6-foot diameter void appearing anywhere beneath the structure.

77. The structural mat should be designed for an allowable bearing capacity of 1,200 psf (dead plus live load) which may be increased by one-third for wind or seismic loads. Provided the recommendations of this report are closely followed, the mat should experience total static settlement of 1½ inches or less, with the differential settlement being approximately ½ of the total settlement.

78. Seismically-induced settlements will be higher as discussed previously. We have estimated seismically-induced ground surface settlement on the order of 8 to 12 inches following a 6.6 magnitude earthquake, with differential settlement ranging from 4 to 6 inches across the least dimension of the mat.

79. Structural mats constructed at the ground surface should be designed with a thickened edge beam that extends a minimum of 12 inches below the lowest adjacent grade, not including sand or gravel sections.

80. The embedded portion of the mat may be assumed to have a lateral bearing pressure resistance value of 350 psf/ft for the section of mat embedded below the ground surface.

81. The mat may be assumed to have a resistance to lateral sliding of 0.35.

82. We recommend a unit modulus of subgrade reaction (K_1) of 65 tons per cubic foot. This value is a based on a 1 foot square bearing area; the subgrade modulus can be proportioned for the width of the relative footing reaction area by the expression:

$$K_o = K_1 \left[\frac{B+1}{2B}\right]^2$$

Where: B = The effective width of the footing reaction area in feet.
K_1 = Unit modulus of subgrade reaction.
K_o = Reduced or actual modulus of subgrade reaction to use in elastic design.

83. Typically, concrete mat foundations for similar applications range in thickness from approximately 18 to 24 inches. Slab thickness, reinforcement, and doweling should be determined by the project structural engineer in accordance with applicable CBC or ACI Standards.

84. Structural slabs placed above the ground water table should be underlain by a minimum 6-inch thick capillary break of ¾ inch clean crushed rock (no fines). It is recommended that neither Class II baserock nor sand be employed as the capillary break material.

85. Slab dimensions, including embedment depth of thickened edges must be verified by a representative of Pacific Crest Engineering Inc. before placement of formwork, steel and concrete to verify bedding into proper material.

86. The slab should contain steel reinforcement as determined by the project civil or structural engineer in accordance with applicable CBC or ACI Standards.

SLAB-ON-GRADE CONSTRUCTION

87. Interior and exterior concrete slabs should bear upon non-expansive engineered fill that has been prepared as described in the Earthwork section of this report.

88. All exterior slabs, walkways, etc., should be structurally independent of structural foundation system(s).

89. All interior concrete slabs-on-grade should be underlain by a minimum 6 inch thick capillary break of ¾ inch clean crushed rock (no fines). It is recommended that neither Class II baserock nor sand be employed as the capillary break material.

90. Where floor coverings are anticipated or vapor transmission may be a problem, a vapor retarder/membrane should be placed between the capillary break layer and the floor slab in order to reduce the potential for moisture condensation under floor coverings. We recommend a high quality vapor retarder at least 10 mil thick and puncture resistant (Stego Wrap or equivalent). The vapor retarder must meet the minimum specifications for ASTM E-1745, Standard Specification For Water Vapor Retarder. Please note that low density polyethylene film (such as Visqueen) may meet minimum current standards for permeability but not puncture resistance. Laps and seams should be overlapped at least six inches and properly sealed to provide a continuous layer beneath the entire slab that is free of holes, tears or gaps. Joints and penetrations should also be properly sealed.

91. Floor coverings should be installed on concrete slabs that have been constructed according to the guidelines outlined in ACI 302.2R and the recommendations of the flooring material manufacturer.

92. Currently, ACI 302-1R and Section 4.505.2 of the 2019 California Green Building Standards Code recommend that concrete slabs to receive moisture sensitive floor coverings be placed directly upon the vapor retarder, with **no sand cushion**. ACI states that vapor retarders are not effective in preventing residual moisture within the concrete slab from migrating to the surface. Including a low

water-to-cement ratio (less than 0.50) and/or admixtures into the mix design are generally necessary to minimize water content, reduce soluble alkali content, and provide workability to the concrete. As noted in CIP 29 (*Concrete in Practice by the National Ready Mixed Concrete Association*), placing concrete directly on the vapor retarder can also create potential problems. If environmental conditions do not permit rapid drying of bleed water from the slab surface then the excess bleeding can delay finishing operations (refer to CIP 13, 19 and 20). Most of these problems can be alleviated by using a concrete with a low water content, moderate cement factor, and well-graded aggregate with the largest possible size. **With the increased occurrence of moisture related floor covering failures, minor cracking of floors placed on a vapor retarder and other problems discussed here are considered a more acceptable risk than failure of floor coverings, and these potential risks should be clearly understood by the Client and Project Owner**.

93. If a sand layer is chosen as a cushion for slabs without floor coverings, it should consist of a clean sand. Clean sand is defined as 100 percent passing the #4 sieve, and less than 5 percent passing the #200 sieve.

94. Requirements for pre-wetting of the subgrade soils prior to the pouring of the slabs will depend on the specific soils and seasonal moisture conditions and will be determined by a representative of Pacific Crest Engineering Inc. at the time of construction. It is important that the subgrade soils be properly moisture conditioned at the time the concrete is poured. Subgrade moisture contents should not be allowed to exceed our moisture recommendations for effective compaction, and should be maintained until the slab is poured.

95. Recommendations given above for the reduction of moisture transmission through the slab are general in nature and present good construction practice. Moisture protection measures for concrete slabs-on-grade should meet applicable ACI and ASTM standards. Pacific Crest Engineering Inc. are not waterproofing experts. For a more complete and specific discussion of moisture protection within the structure, a qualified waterproofing expert should be consulted to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. The waterproofing consultant should provide recommendations for mitigation of potential adverse impacts of moisture vapor transmission on various components of the structure as deemed appropriate.

96. Slab thickness, reinforcement, and doweling should be determined by the project civil or structural engineer. The use of welded wire mesh is not recommended for slab reinforcement.

RETAINING WALLS

97. Based on the groundwater conditions encountered during our investigation we recommend anticipating undrained conditions to apply to below grade retaining structures. The design of retaining walls should include the following criteria:

TABLE No. 8, Active and At-Rest Earth Pressure Values

Maximum Backfill Slope (H:V)	Active Earth Pressure (psf/ft of depth)		At-Rest Earth Pressure (psf/ft of depth)	
	Drained	Undrained	Drained	Undrained
Level	45	35	80	47
2:1	60	50	90	57

a. Undrained earth pressure values must be used in conjunction with hydrostatic pressures when unbalanced hydrostatic conditions are present. The total horizontal pressure from the undrained condition is the sum of the undrained soil pressure provided in Table No. 8 plus hydrostatic pressure (62.4 psf).

b. Should the slope behind the retaining walls be other than shown in the above table, supplemental design criteria will be provided for the active earth or at rest pressures for the particular slope angle.

c. Active earth pressure values may be used when walls are free to yield an amount sufficient to develop the active earth pressure condition (about ½% of height). The effect of wall rotation should be considered for areas behind the planned retaining wall (pavements, foundations, slabs, etc.). When walls are restrained at the top or to design for minimal wall rotation, at-rest earth pressure values should be used.

d. For resisting passive earth pressure use 250 psf/ft of depth. Ignore passive pressures along the upper 12 inches of the footing.

e. To develop the resisting passive earth pressure, retaining wall footings should be embedded a minimum of 18 inches below the lowest adjacent grade. There should be a minimum of 5 feet of horizontal cover as measured from the outside edge of the footing.

f. If the structural designer wishes to include seismic forces in their design, the wall may be designed using the above active soil pressures plus a horizontal seismic force of $12H^2$ pounds per lineal foot (where H is the height of retained material). The resultant seismic force should be applied at a point 1/3rd above the base of the wall. This force has been estimated using the Mononobe-Okabe method of analysis as modified by Whitman (1990) and Lew and Sitar (2010). A reduced factor of safety for overturning and sliding may be used in seismic design as determined by the structural designer. The above seismic forces should not be used in combination with at rest lateral soil pressures.

g. Where short term earthquake or wind loads are included, the minimum safety factor for retaining wall sliding and overturning shall be 1.1 for earthquake loads and 1.2 for wind loads.

h. For surcharge pressures due to traffic loading or other live or dead loads which will transmit a force to the wall, please refer to the Surcharge Pressure Diagram, Figure No. 11 in Appendix A.

i. The backfill area behind retaining walls should be compacted with approved material to a minimum relative compaction of 90%.

Retaining Wall Drainage

98. For retaining walls designed for fully drained conditions we recommend that permeable material meeting the State of California Standard Specification Section 68-1.025, Class 1, Type A, be placed behind the wall, with a minimum width of 12 inches and extending for the full height of the wall to within 1 foot of the ground surface. The top of the permeable material should be covered with Mirafi 140N filter fabric or equivalent and then compacted native soil placed to the ground surface. A 4-inch diameter perforated rigid plastic drain pipe should be installed within 3 inches of the bottom of the permeable material and be discharged to a suitable, approved location. The perforations should be placed downward; oriented along the lower half of the pipe. Neither the pipe nor the permeable material should be wrapped in filter fabric. Refer to the Typical Retaining Wall Drain Detail, Figure No. 12 in Appendix A for details.

PAVEMENT DESIGN

99. The design of pavement sections was beyond our scope of services for this project. To have the selected pavement sections perform to their greatest efficiency, it is very important that the following items be considered:

a. Properly scarify and moisture condition the upper 8 inches of the subgrade soil and compact it to a minimum of 95% of its maximum dry density, at a moisture content of 1 to 3% over the optimum moisture content for the soil.

b. Provide sufficient gradient to prevent ponding of water.

c. Use only quality materials of the type and thickness (minimum) specified. All aggregate base and subbase must meet Caltrans Standard Specifications for Class 2 materials, and be angular in shape. All Class 2 aggregate base should be ¾ inch maximum in aggregate size.

d. Compact the base and subbase uniformly to a minimum of 95% of its maximum dry density.

e. Use ½ inch maximum, Type "A" medium graded asphaltic concrete. Place the asphaltic concrete only during periods of fair weather when the free air temperature is within prescribed limits by Cal Trans Specifications.

f. Porous pavement systems which consist of porous paving blocks, asphaltic concrete or concrete are generally not recommended due to the potential for saturation of the subgrade soils and resulting increased potential for a shorter pavement life. At a minimum, porous pavement systems should include a layer of Mirafi HP370 geotextile fabric placed on the subgrade soil beneath the porous paving section. These pavement systems should only be used with the understanding by the Owner of the increased potential for pavement cracking, rutting, potholes, etc.

g. Maintenance should be undertaken on a routine basis.

SURFACE DRAINAGE

100. Surface water drainage is the responsibility of the project civil engineer. The following should be considered by the civil engineer in design of the project.

101. Surface water must not be allowed to pond or be trapped adjacent to foundations, or on building pads and parking areas.

102. All roof eaves should be guttered, with the outlets from the downspouts provided with adequate capacity to carry the storm water away from structures to reduce the possibility of soil saturation and erosion. The connection should be in a closed conduit which discharges at an approved location away from structures and graded areas.

103. Slope failures can occur where surface drainage is allowed to concentrate on unprotected slopes. Appropriate landscaping and surface drainage control around the project area is imperative in order to minimize the potential for shallow slope failures and erosion. Stormwater discharge locations should not be located at the top or on the face of any slope.

104. Final grades should be provided with positive gradient away from all foundation elements. Soil grades should slope away from foundations at least 5 percent for the first 10 feet. Impervious surfaces should slope away from foundations at least 2 percent for the first 10 feet. Concentrations of surface runoff should be handled by providing structures, such as paved or lined ditches, catch basins, etc.

105. Irrigation activities at the site should be done in a controlled and reasonable manner.

106. Following completion of the project we recommend that storm drainage provisions and performance of permanent erosion control measures be closely observed through the first season of significant rainfall, to determine if these systems are performing adequately and, if necessary, resolve any unforeseen issues.

107. The building and surface drainage facilities must not be altered nor any filling or excavation work performed in the area without first consulting Pacific Crest Engineering Inc. Surface drainage improvements developed by the project civil engineer must be maintained by the property owner at all times, as improper drainage provisions can produce undesirable affects.

EROSION CONTROL

108. The surface soils are classified as having a moderate potential for erosion. Therefore, the finished ground surface should be planted with ground cover and continually maintained to minimize surface erosion. For specific and detailed recommendations regarding erosion control on and surrounding the project site, the project civil engineer or an erosion control specialist should be consulted.

PLAN REVIEW

109. We respectfully request an opportunity to review the project plans and specifications during preparation and before bidding to verify that the recommendations of this report have been included and to provide additional recommendations, if needed. These plan review services are also typically required by the reviewing agency. Misinterpretation of our recommendations or omission of our requirements from the project plans and specifications may result in changes to the project design during the construction phase, with the potential for additional costs and delays in order to bring the project into conformance with the requirements outlined within this report. Services performed for review of the project plans and specifications are considered “post-report” services and billed on a “time and materials” fee basis in accordance with our latest Standard Fee Schedule.

VI. LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. This Geotechnical Investigation was prepared specifically for DUDEK Consulting and for the specific project and location described in the body of this report. This report and the recommendations included herein should be utilized for this specific project and location exclusively. This Geotechnical Investigation should not be applied to nor utilized on any other project or project site. Please refer to the ASFE “Important Information about Your Geotechnical Engineering Report” attached with this report.

2. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed in the borings. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the time, our firm should be notified so that supplemental recommendations can be provided.

3. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are called to the attention of the Architects and Engineers for the project and incorporated into the plans, and that the necessary steps are taken to ensure that the contractors and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural process or the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards 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 of our control. This report should therefore be reviewed in light of future planned construction and then current applicable codes. This report should not be considered valid after a period of two (2) years without our review.

5. This report was prepared upon your request for our services in accordance with currently accepted standards of professional geotechnical engineering practice. No warranty as to the contents of this report is intended, and none shall be inferred from the statements or opinions expressed.

6. The scope of our services mutually agreed upon for this project did not include any environmental assessment or study for the presence of hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site.

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
The Best People on Earth

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Telephone: 301/565-2733   Facsimile: 301/589-2017
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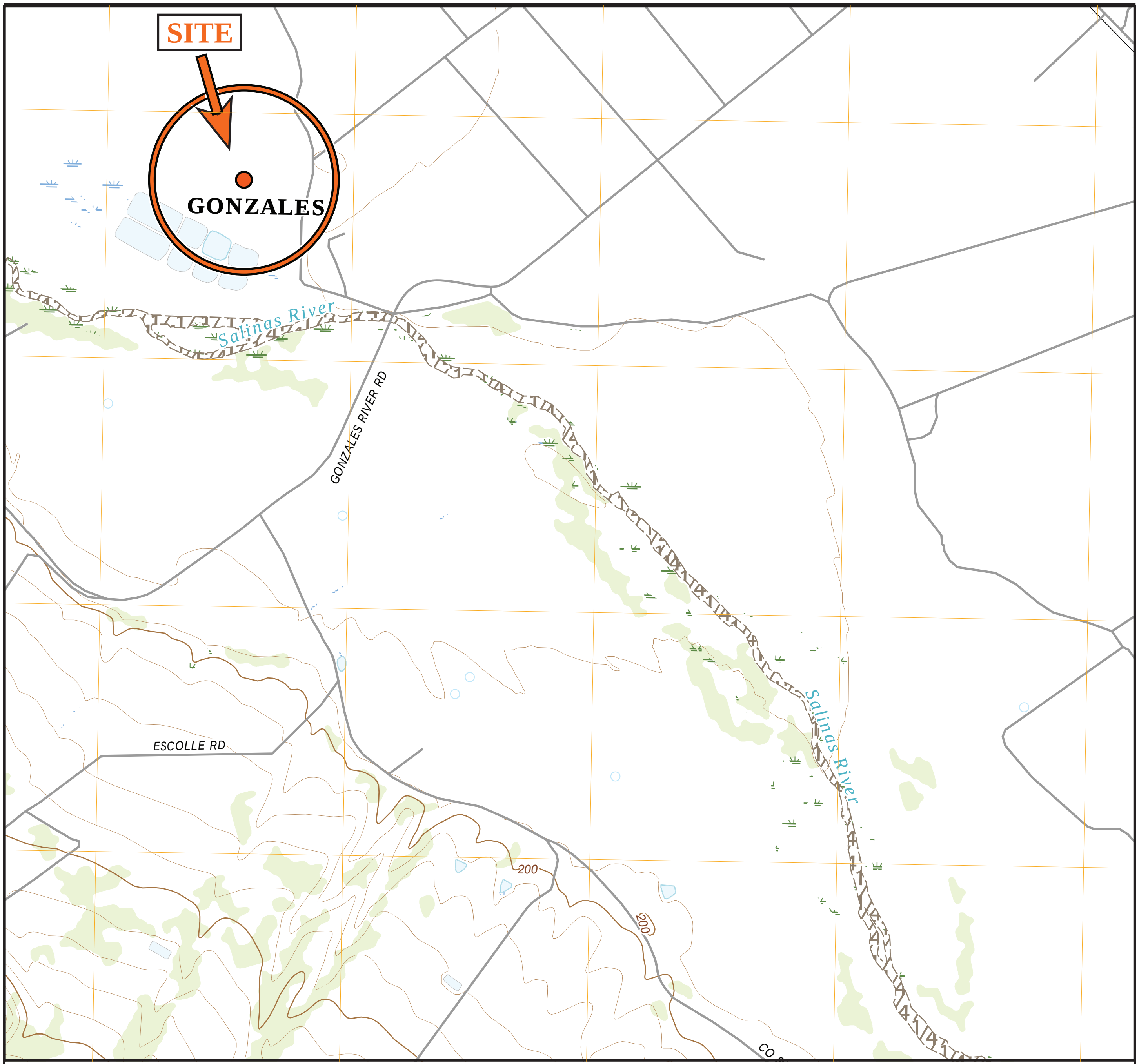
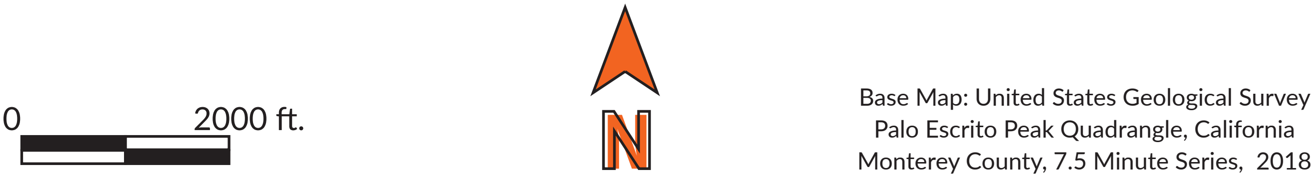
APPENDIX A





Base Map: United States Geological Survey
Palo Escrito Peak Quadrangle, California
Monterey County, 7.5 Minute Series, 2018

Pacific Crest ENGINEERING INC	**Regional Site Map** Gonzales IWRF Gonzales, California	Figure No. 1 Project No. 19125 Date: 3/2/20

Scale: 1 inch = 800 feet

Base Map: Google Earth

LEGEND

B-4 Approximate location of test boring

Pacific Crest ENGINEERING INC

Site Map Showing Test Borings
Gonzales IWRF
Gonzales, California

Figure No. 2A
Project No. 19125
Date: 3/2/20

Base Map: Google Earth

Pacific Crest
ENGINEERING INC

Site Map Showing Test Borings
Gonzales IWRF
Gonzales, California

Figure No. 2B
Project No. 19125
Date: 3/2/20

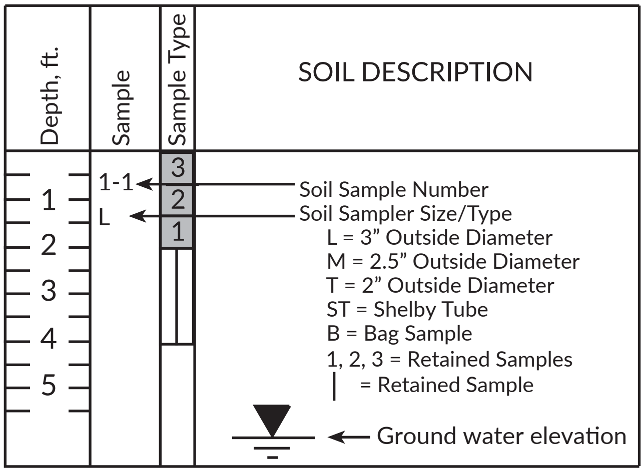
KEY TO SOIL CLASSIFICATION - FINE GRAINED SOILS (FGS)
UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2487 (Modified)

MAJOR DIVISIONS		SYMBOL	FINES	COARSENESS	SAND/GRAVEL	GROUP NAME
SILT AND CLAY	*LL < 35% Low Plasticity	**CL** Lean Clay PI > 7 Plots Above A Line -OR- **ML** Silt PI > 4 Plots Below A Line	<30% plus No. 200	<15% plus No. 200		Lean Clay / Silt
				15-30% plus No. 200	% sand ≥ % gravel	Lean Clay with Sand / Silt with Sand
					% sand < % gravel	Lean Clay with Gravel / Silt with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Lean Clay / Sandy Silt
					≥ 15% gravel	Sandy Lean Clay with Gravel / Sandy Silt with Gravel
				% sand < % gravel	< 15% sand	Gravelly Lean Clay / Gravelly Silt
					≥ 15% sand	Gravelly Lean Clay with Sand / Gravelly Silt with Sand
		CL - ML 4 < PI < 7	<30% plus No. 200	<15% plus No. 200		Silty Clay
				15-30% plus No. 200	% sand ≥ % gravel	Silty Clay with Sand
					% sand < % gravel	Silty Clay with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Silty Clay
					≥15% gravel	Sandy Silty Clay with Gravel
				% sand < % gravel	< 15% sand	Gravelly Silty Clay
					≥15% sand	Gravelly Silty Clay with Sand
	35% ≤ *LL < 50% Intermediate Plasticity	**CI**	<30% plus No. 200	<15% plus No. 200		Clay
				15-30% plus No. 200	% sand ≥ % gravel	Clay with Sand
					% sand < % gravel	Clay with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Clay
					≥ 15% gravel	Sandy Clay with Gravel
				% sand < % gravel	< 15% sand	Gravelly Clay
					≥ 15% sand	Gravelly Clay with Sand
	*LL > 50% High Plasticity	**CH** Fat Clay Plots Above A Line -OR- **MH** Elastic Silt Plots Below A Line	<30% plus No. 200	<15% plus No. 200		Fat Clay or Elastic Silt
				15-30% plus No. 200	% sand ≥ % gravel	Fat Clay with Sand Elastic Silt with Sand
					% sand < % gravel	Fat Clay with Gravel / Elastic Silt with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Fat Clay / Sandy Elastic Silt
					≥ 15% gravel	Sandy Fat Clay with Gravel / Sandy Elastic Silt with Gravel
				% sand < % gravel	< 15% sand	Gravelly Fat Clay / Gravelly Elastic Silt
					≥ 15% sand	Gravelly Fat Clay with Sand / Gravelly Elastic Silt with Sand

* LL = Liquid Limit

* PI = Plasticity Index

BORING LOG EXPLANATION



MOISTURE

DESCRIPTION	CRITERIA
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp, but no visible water
WET	Visible free water, usually soil is below the water table

CONSISTENCY

DESCRIPTION	UNCONFINED SHEAR STRENGTH (KSF)	STANDARD PENETRATION (BLOWS/FOOT)
VERY SOFT	< 0.25	< 2
SOFT	0.25 - 0.5	2 - 4
FIRM	0.5 - 1.0	5 - 8
STIFF	1.0 - 2.0	9 - 15
VERY STIFF	2.0 - 4.0	16 - 30
HARD	> 4.0	> 30

Pacific Crest ENGINEERING INC	**Boring Log Explanation - FGS** Gonzales IWRF Gonzales, California	Figure No. 3 Project No. 19125 Date: 3/2/20

KEY TO SOIL CLASSIFICATION - COARSE GRAINED SOILS

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2487 (Modified)

MAJOR DIVISIONS		FINES	GRADE/TYPE OF FINES	SYMBOL	GROUP NAME *
GRAVEL	More than 50% of coarse fraction is larger than No. 4 sieve size	<5%	Cu ≥ 4 and 1 ≤ Cc ≤ 3	**GW**	Well-Graded Gravel / Well-Graded Gravel with Sand
			Cu < 4 and/or 1 > Cc > 3	**GP**	Poorly Graded Gravel/Poorly Graded Gravel with Sand
		5-12%	ML or MH	**GW - GM**	Well-Graded Gravel with Silt / Well- Graded Gravel with Silt and Sand
				GP - GM	Poorly Graded Gravel with Silt / Poorly Graded Gravel with Silt and Sand
			CL, CI or CH	**GW - GC**	Well-Graded Gravel with Clay / Well-Graded Gravel with Clay and Sand
				GP - GC	Poorly Graded Gravel with Clay / Poorly Graded Gravel with Clay and Sand
		>12%	ML or MH	**GM**	Silty Gravel / Silty Gravel with Sand
			CL, CI or CH	**GC**	Clayey Gravel/ Clayey Gravel with Sand
			CL - ML	**GC - GM**	Silty, Clayey Gravel/ Silty, Clayey Gravel with Sand
SAND	50% or more of coarse fraction is smaller than No. 4 sieve size	<5%	Cu ≥ 6 and 1 ≤ Cc ≤ 3	**SW**	Well-Graded Sand / Well-Graded Sand with Gravel
			Cu < 6 and/or 1 > Cc > 3	**SP**	Poorly Graded Sand / Poorly Graded Sand with Gravel
		5-12%	ML or MH	**SW - SM**	Well-Graded Sand with Silt / Well- Graded Sand with Silt and Gravel
				SP - SM	Poorly Graded Sand with Silt / Poorly Graded Sand with Silt and Gravel
			CL, CI or CH	**SW - SC**	Well-Graded Sand with Clay / Well-Graded Sand with Clay and Gravel
				SP - SC	Poorly Graded Sand with Clay / Poorly Graded Sand with Clay and Gravel
		>12%	ML or MH	**SM**	Silty Sand / Silty Sand with Gravel
			CL, CI or CH	**SC**	Clayey Sand / Clayey Sand with Gravel
			CL - ML	**SC - SM**	Silty, Clayey Sand / Silty, Clayey Sand with Gravel

* The term "with sand" refers to materials containing 15% or greater sand particles within a gravel soil, while the term "with gravel" refers to materials containing 15% or greater gravel particles within a sand soil.

US STANDARD SIEVE SIZE:

3 inch | ¾ inch | No. 4 | No. 10 | No. 40 | No. 200 | 0.002 μm

	COARSE	FINE	COARSE	MEDIUM	FINE		
COBBLES AND BOULDERS	GRAVEL		SAND			SILT	CLAY

RELATIVE DENSITY

DESCRIPTION	STANDARD PENETRATION (BLOWS/FOOT)
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	> 50

MOISTURE

DESCRIPTION	CRITERIA
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp, but no visible water
WET	Visible free water, usually soil is below the water table

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Boring Log Explanation - CGS
Gonzales IWRF
Gonzales, California

Figure No. 4
Project No. 19125
Date: 3/2/20

LOGGED BY CLA DATE DRILLED 12/10/19 BORING DIAMETER 8" HS BORING NO. 1

DRILL RIG EGI Mobile B-53R HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
			5" Asphalt Concrete 7" Aggregate Base									
1	1-1 L		**SANDY CLAY:** Grayish brown (10YR 5/2), fine grained, poorly graded, micaceous, clay content decreases with depth, moist, very stiff	CI	11							
		2			15		3.0	17.7	103.3			
2		1			22	26	4.0	12.7	109.5	51.1	13	
	1-2 T		Moist, medium dense		7							
3					10							
4					7	17		15.4				
5	1-3 L		**SILTY SAND :** Light olive brown (2.5Y 5/4), fine grained, poorly graded, clean, micaceous, slightly moist, loose	SM	5							
		2			6							
6		1			7	7		11.8	92.3	37.4		
7												
8			**CLAY:** Olive brown (2.5Y 4/3), trace very fine to fine grained sand, moist, firm	CI								
	1-4 T				4							
9					3							
10					4	7		31.3		95.9	18	
11												
12												
13												
	1-5 L		Moist, very stiff		8							
14		2			15							
		1			21	26	3.0	33.5	85.3			Qu = 4065 psf
15			Boring terminated at 15 feet. No groundwater encountered.									
16												
17												
18												
19												
20												
21												
22												
23												

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Log of Test Borings
Gonzales IWRF
Gonzales, California

Figure No. 5
Project No. 19125
Date: 3/2/20

LOGGED BY CLA DATE DRILLED 12/10/19 BORING DIAMETER 8" HS BORING NO. 2

DRILL RIG EGI Mobile B-53R HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
			6" Asphalt Concrete 9" Aggregate Base									
1	2-1 L				10							
2		2	**CLAY WITH SAND:** Very dark grayish brown (10YR 3/2), very fine to fine grained quartz sand, slightly moist, hard	CH	22		4.0	24.9	95.0			Qu = 4764 psf
		1			34	37	4.5	24.9	89.6	83.8		EI = 104
3	2-2 T		**CLAYEY SAND:** Dark grayish brown (10YR 4/2), fine grained quartz sand, poorly graded, clay appears to be lean, slightly moist, loose	SC	6							
					4							
4					5	9		21.1				
5	2-3 L		**SILTY SAND :** Light olive brown (2.5Y 5/4), fine grained, poorly graded, clean, trace mica flakes, slightly moist, loose	SM	8							
6		2			9			14.2	90.4			
		1			9	9		12.2	90.0			
7												
8	2-4 T		**SANDY CLAY:** Olive brown (2.5Y 4/4), very fine to fine grained quartz sand, trace mica flakes, slightly moist, firm	CI	6							
9					4							
10					5	9		19.3		87.2	25	
11			Boring terminated at 10 feet. No groundwater encountered.									
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

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Log of Test Borings
Gonzales IWRF
Gonzales, California

Figure No. 6
Project No. 19125
Date: 3/2/20

LOGGED BY CLA DATE DRILLED 12/10/19 BORING DIAMETER 8" HS BORING NO. 3

DRILL RIG EGI Mobile B-53R HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
			5" Asphalt Concrete 8" Aggregate Base									
1 2 3	3-1 L 3-2 T	1	**SILTY SAND WITH GRAVEL:** Dark yellowish brown (10YR 4/4), fine to medium grained, sub-angular to sub-rounded shaped, poorly graded, sub-angular shaped granite gravels up to ½ inch in diameter, slightly moist,very dense	SM	38 50/6" 8	50/6"		5.4	118.7			
4			**SANDY FAT CLAY:** Black (10YR 2.5/1), very fine to fine grained quartz sand, slightly moist, hard	CH	11 21	32		18.9		90.5	33	
5 6 7 8	3-3 L	2 1	**SANDY SILT:** Olive brown (2.5Y 4/4), very fine to fine grained quartz sand, trace plasticity, slightly moist, very stiff	ML	6 11 12	18	4.5 4.0	19.7	99.7	85.3		
9 10	3-4 T		Slight increase in sand content, micaceous, moist, stiff		5 4 6	10		25.0		69.1		
11 12 13 14 15 16 17 18 19 20 21 22 23			Boring terminated at 10 feet. No groundwater encountered.									

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Log of Test Borings
Gonzales IWRF
Gonzales, California

Figure No. 7
Project No. 19125
Date: 3/2/20

LOGGED BY CLA DATE DRILLED 12/10/19 BORING DIAMETER 8" HS BORING NO. 4

DRILL RIG EGI Mobile B-53R HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
			CLAYEY SAND: Very dark grayish brown (10YR 3/2), very fine to fine grained quartz sand, clay exhibits low expansion potential, poorly graded, moist, stiff	SC								
1	4-1 L	▨			8							
		2			6			12.9	99.8			Qu = 3421 psf
2	4-2 T	1			5	9	4.5	12.9	103.2	47.7		EI = 24
3			**SILTY SAND:** Olive brown (2.5Y 4/4), very fine to fine grained, poorly graded, quartz rich, slightly moist, loose	SM	2							
					3							
4					5	8		11.8		36.7		
5			**SILTY SAND:** Light olive brown (2.5Y 5/4), very fine to fine grained, poorly graded, clean, quartz rich, slightly moist, medium dense	SM								
	4-3 L	▨			8							
6		2			11							
		1			14	13		11.2	95.4	35.8		
7												
8												
9	4-4 T		Slightly moist, loose		4							
					4							
10					5	9		13.7		26.4		
			Boring terminated at 10 feet. No groundwater encountered.									
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

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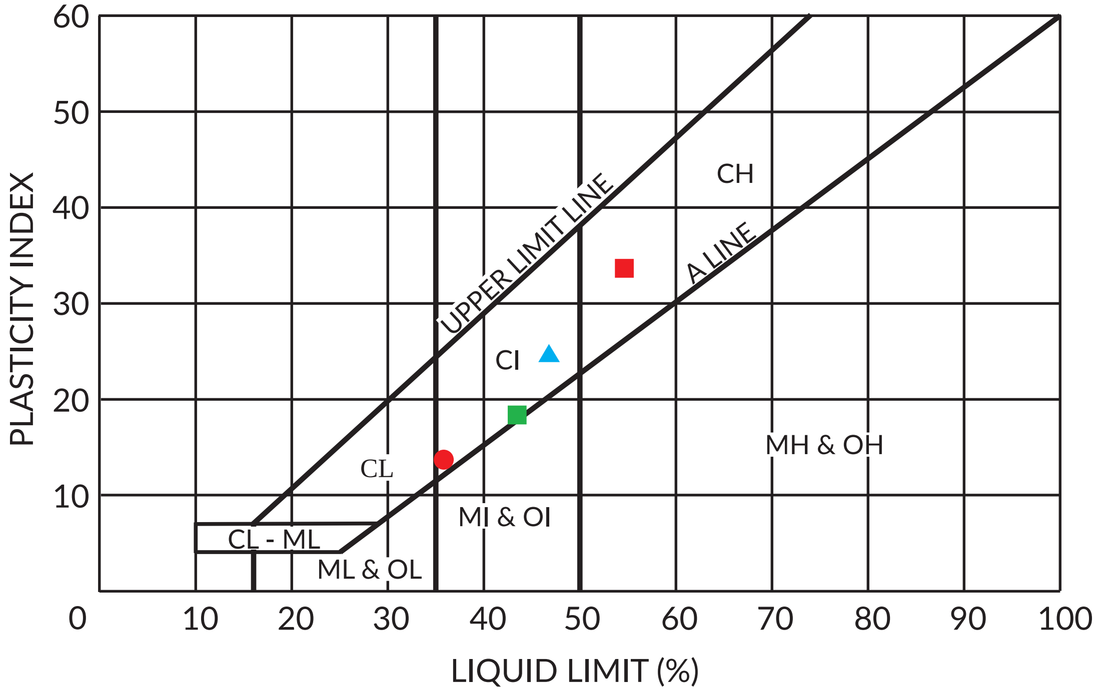
Log of Test Borings
Gonzales IWRF
Gonzales, California

Figure No. 8
Project No. 19125
Date: 3/2/20

ATTERBERG LIMITS - ASTM D4318

PLASTICITY CHART



*This chart has been modified to include the intermediate classifications CI, MI and OI for clays and silts with liquid limits between 35 and 50.

SYMBOL	SAMPLE #	LL (%)	PL (%)	PI
●	**1-1-1**	**31**	**18**	**13**
🟩	**1-4**	**43**	**25**	**18**
▲	**2-4**	**47**	**22**	**25**
🟥	**3-2**	**54**	**21**	**33**

EXPANSION INDEX - ASTM D4829

SAMPLE #	EI	EXPANSION POTENTIAL
2-1-1	**104**	**High**
4-1-1	**24**	**Low**

EXPANSION POTENTIAL	
0 - 20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

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Atterberg Limits/Expansion Index
Gonzales IWRF
Gonzales, California

Figure No. 9
Project No. 19125
Date: 3/2/20

COOPER TESTING LABORATORY

Corrosivity Test Summary

CTL # 416-605 **Date:** 2/13/2020 **Tested By:** PJ **Checked:** PJ

Client: Pacific Crest Engineering **Project:** Gonzales Waste Water Treatment Plant **Proj. No:** 19125

Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP	Moisture	Soil Visual Description
Boring	Sample, No.	Depth, ft.	As Rec.	Minimum	Saturated	mg/kg	mg/kg	%		(Redox)	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		mv	%	
			ASTM G57	Cal 643	ASTM G57	Cal 422-mod.	Cal 417-mod.	Cal 417-mod.	Cal 643	SM 2580B	ASTM D2216	
1-3	-	-	-	2242	-	5	81	0.0081	8.6	-	9.5	Olive Brown Silty SAND
3-3	-	-	-	777	-	85	286	0.0286	8.9	-	18.6	Olive Brown Silty SAND
4-3	-	-	-	1101	-	75	150	0.0150	8.6	-	14.0	Olive Brown Silty SAND

Resistivity	Ohm-cm
Very Corrosive	0-1000
Corrosive	1,000-2,000
Fairly Corrosive	2,000-5,000
Mildly Corrosive	5,000-10,000
Negligible	>10,000

Chloride Concentration	mg/kg
Severe	>1,500
Positive	300-1,500
Negligible	0-300

Sulfate Concentration	mg/kg
Severe	>5,000
Considerable	2,000-5,000
Positive	1,000-2,000
Negligible	0-1,000

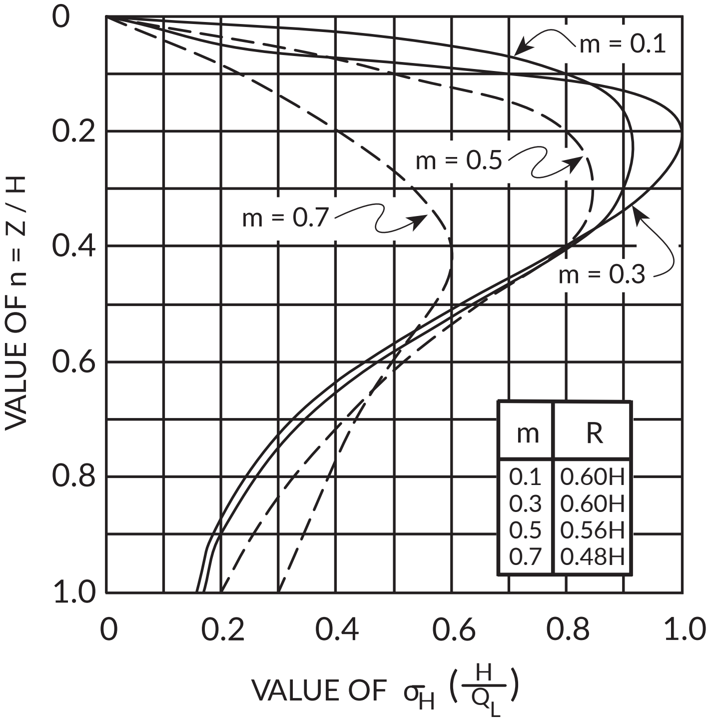
pH	
Potential for acid attack on concrete and steel	<5.5

Pacific Crest ENGINEERING INC

Corrosivity Test Summary
Gonzales IWRF
Gonzales, California

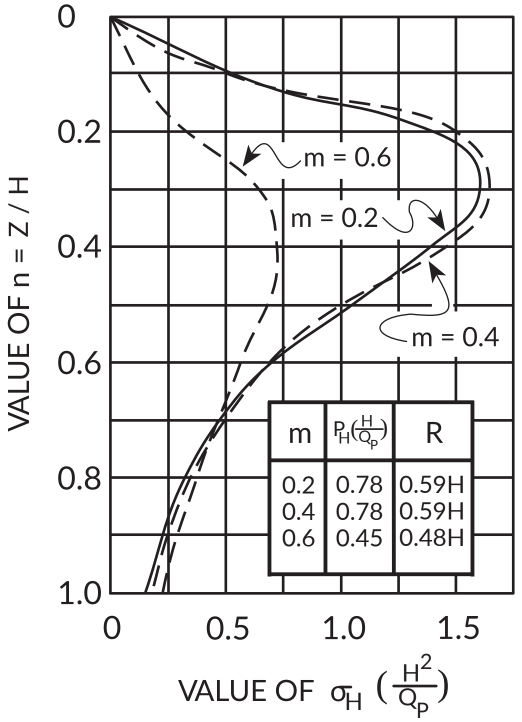
Figure No. 10
Project No. 19125
Date: 3/2/20

LINE LOAD

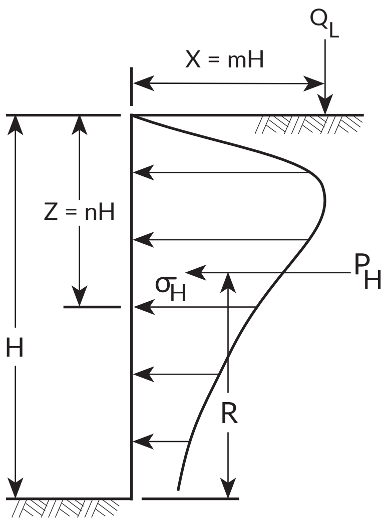


m	R
0.1	0.60H
0.3	0.60H
0.5	0.56H
0.7	0.48H

POINT LOAD



m	$P_H\left(\frac{H}{Q_P}\right)$	R
0.2	0.78	0.59H
0.4	0.78	0.59H
0.6	0.45	0.48H



FOR m ≦ 0.4:

$$\sigma_H\left(\frac{H}{Q_L}\right) = \frac{0.20\ n}{(0.16+n^2)^2}$$

$$P_H = 0.55Q_L$$

FOR m > 0.4:

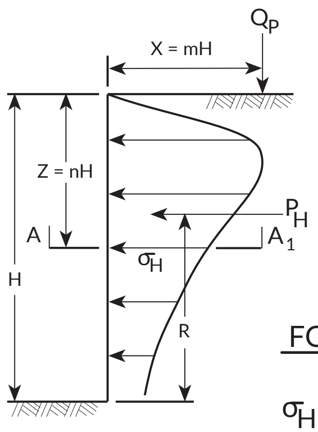
$$\sigma_H\left(\frac{H}{Q_L}\right) = \frac{1.28\ m^2\,n}{(m^2+n^2)^2}$$

RESULTANT $P_H = \frac{0.64Q_L}{(m^2+1)}$

PRESSURES FROM LINE LOAD Q_L

(BOUSSINESQ EQUATION MODIFIED BY

REFERENCE: Design Manual
NAVFAC DM-7.02
Figure 11
Page 7.2-74



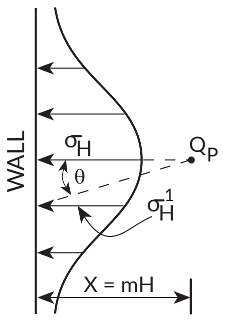
FOR m ≦ 0.4:

$$\sigma_H\left(\frac{H^2}{Q_P}\right) = \frac{0.28\ n^2}{(0.16+n^2)^3}$$

FOR m > 0.4:

$$\sigma_H\left(\frac{H^2}{Q_P}\right) = \frac{1.77\ m^2\,n^2}{(m^2+n^2)^3}$$

$$\sigma_H^1 = \sigma_H\cos^2(1.1\ q)$$



SECTION A-A_1

PRESSURES FROM POINT LOAD Q_P

(BOUSSINESQ EQUATION
MODIFIED

Pacific Crest
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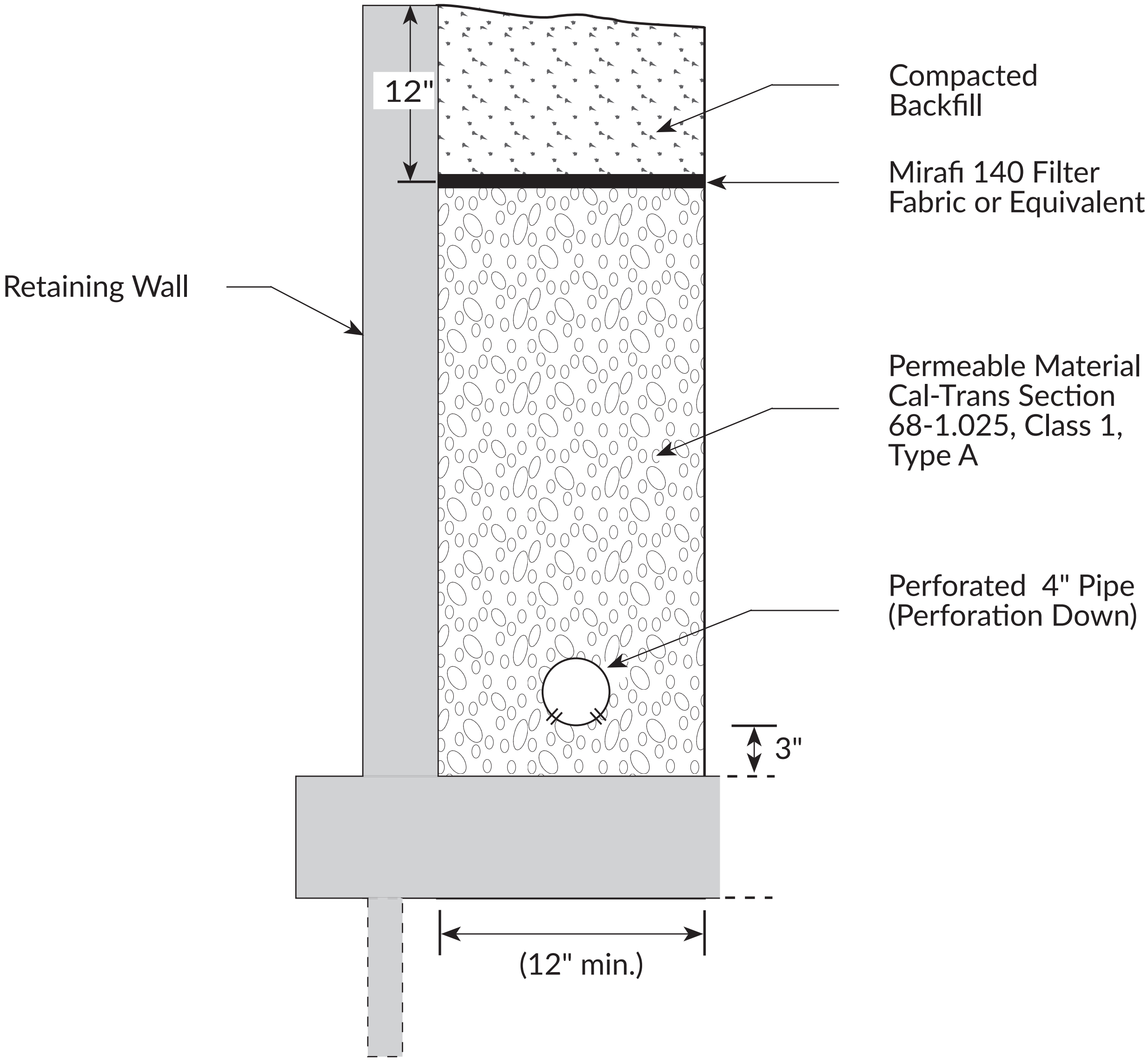
Surcharge Pressure Diagram
Gonzales IWRF
Gonzales, California

Figure No. 11
Project No. 19125
Date: 3/2/20



Not to Scale

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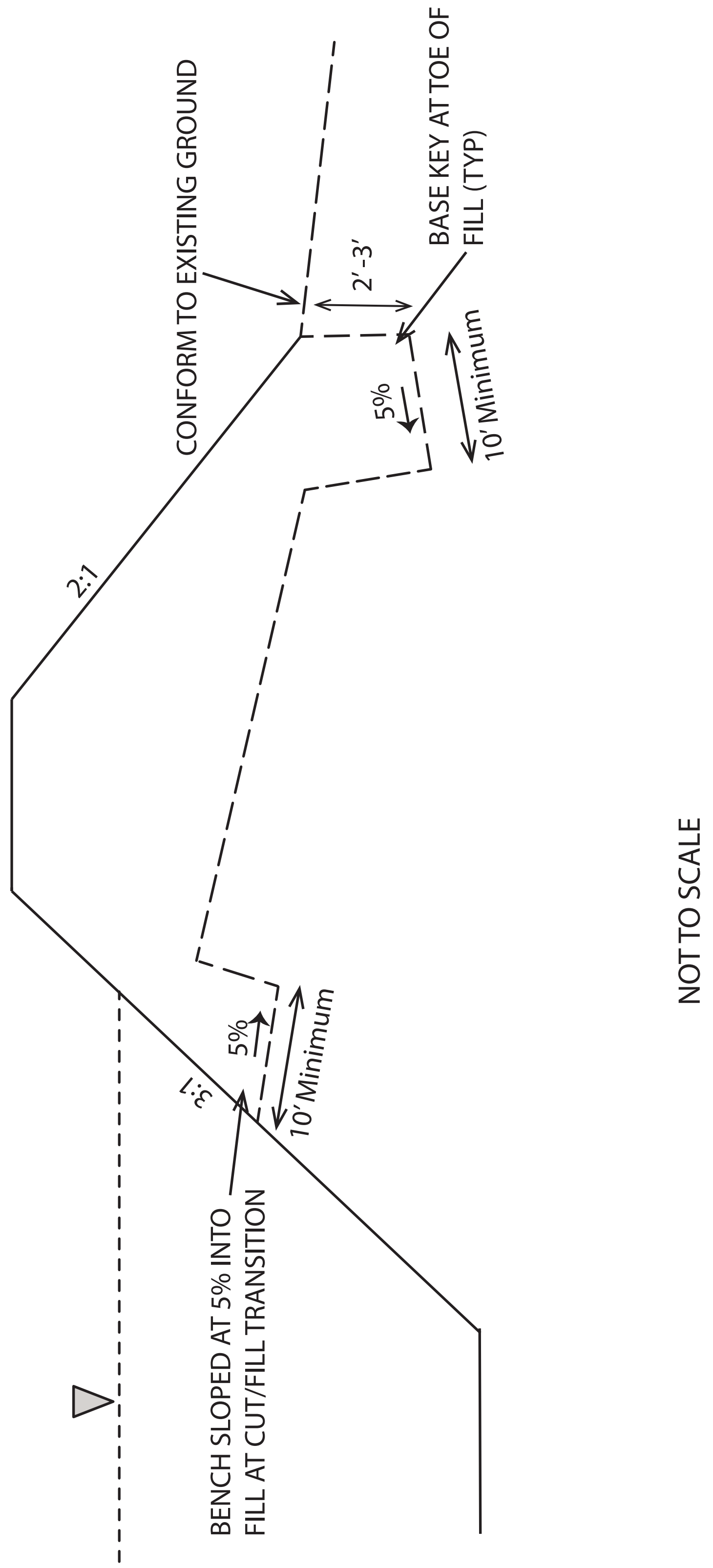
Typical Retaining Wall Drain Detail
Gonzales IWRF
Gonzales, California

Figure No. 12
Project No. 19125
Date: 3/2/20



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Typical Fill Berm Detail
Gonzales IWRF
Gonzales, California

Figure No. 13
Project No. 19125
Date: 3/2/20

APPENDIX B

CPT Results and Interpretive Plots

PRESENTATION OF SITE INVESTIGATION RESULTS

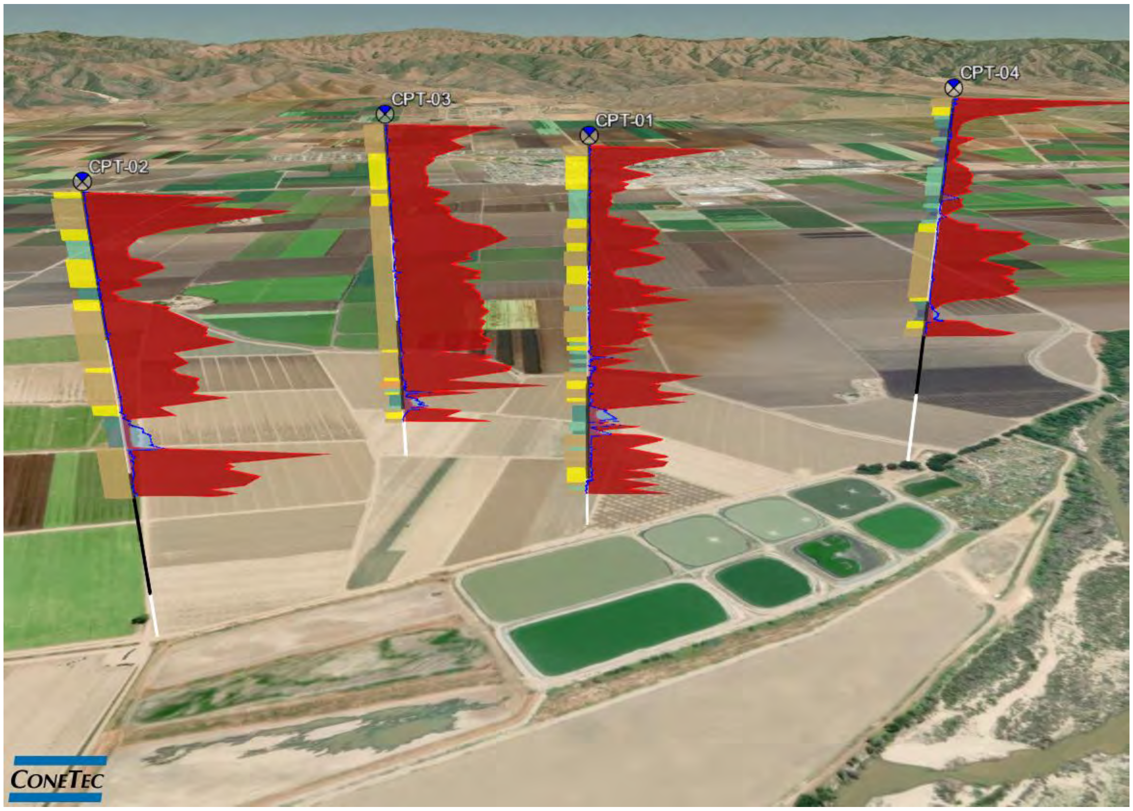
Gonzales Industrial WWTP

Prepared for:

Pacific Crest Engineering

ConeTec Job No: 19-56179

Project Start Date: 13-Nov-2019
Project End Date: 13-Nov-2019
Report Date: 19-Nov-2019



Prepared by:

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www.conetec.com
www.conetecdataservices.com

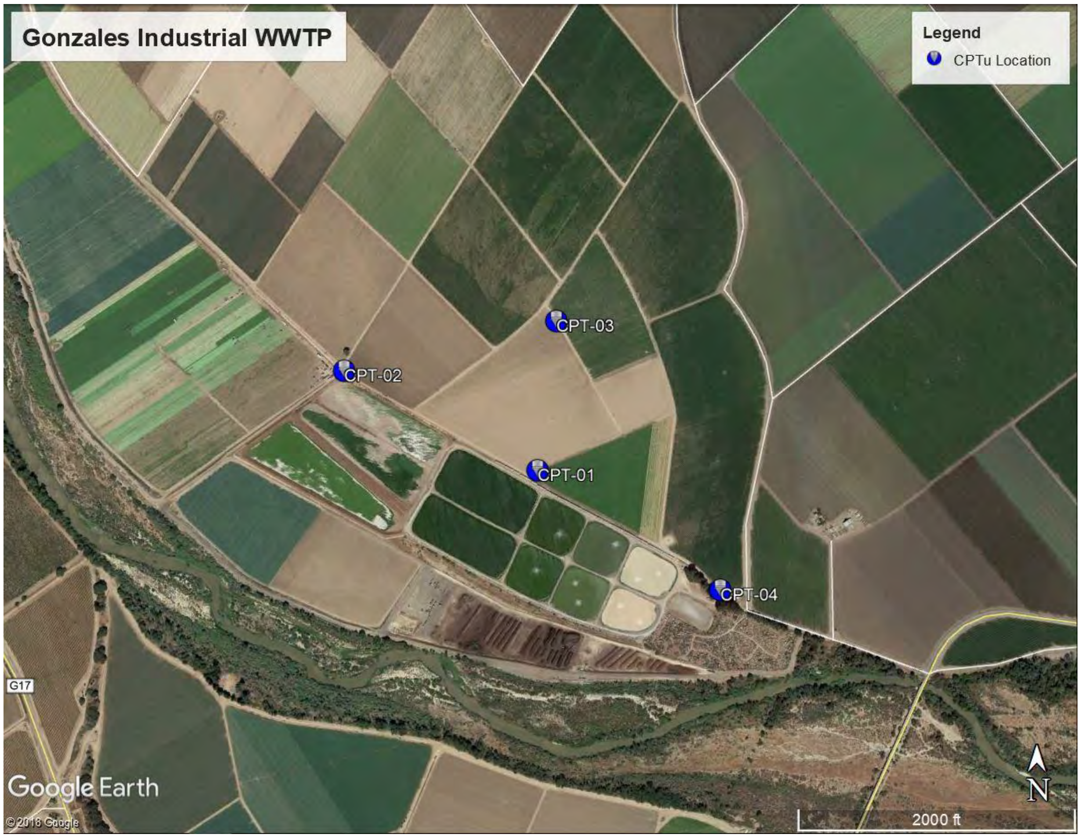
Introduction

The enclosed report presents the results of the site investigation program conducted by ConeTec Inc. for Pacific Crest Engineering of Watsonville, CA. The program consisted of cone penetration testing (CPTu) at four (4) locations.

Project Information

Project	
Client	Pacific Crest Engineering
Project	Gonzales Industrial WWTP
ConeTec Project #	19-56179

An aerial overview from Google Earth including the CPT test locations is presented below.



Rig Description	Deployment System	Test Type
CPT truck rig	30-ton truck mounted cylinder	CPTu

Coordinates		
Test Type	Collection Method	EPSG Number
CPTu	Consumer grade GPS	32610

Cone Penetrometers Used for this Project						
Cone Description	Cone Number	Cross Sectional Area (cm^2)	Sleeve Area (cm^2)	Tip Capacity (bar)	Sleeve Capacity (bar)	Pore Pressure Capacity (psi)
443:T1500F15U500	443	15	225	1500	15	500
Cone 443 was used in all soundings.						

Cone Penetration Test	
Depth reference	Depths are referenced to the existing ground surface at the time of test.
Tip and sleeve data offset	0.1 Meter This has been accounted for in the CPT data files.
Additional Comments	Advanced plots with Ic, Phi, Su(Nkt), and N1(60)Ic, as well as Soil Behavior Type (SBT) Scatter plots have been included in the data release package.

Calculated Geotechnical Parameter Tables	
Additional information	The Normalized Soil Behaviour Type Chart based on Q_{tn} (SBT Q_{tn}) (Robertson, 2009) was used to classify the soil for this project. A detailed set of calculated CPTu parameters have been generated and are provided in Excel format files in the release folder. The CPTu parameter calculations are based on values of corrected tip resistance (q_t) sleeve friction (f_s) and pore pressure (u_2). Effective stresses are calculated based on unit weights that have been assigned to the individual soil behaviour type zones and the assumed equilibrium pore pressure profile. Soils were classified as either drained or undrained based on the Q_{tn} Normalized Soil Behaviour Type Chart (Robertson, 2009). Calculations for both drained and undrained parameters were included for materials that classified as silt mixtures (zone 4).

Limitations

This report has been prepared for the exclusive use of Pacific Crest Engineering (Client) for the project titled “Gonzales Industrial WWTP”. The report’s contents may not be relied upon by any other party without the express written permission of ConeTec, Inc. (ConeTec). ConeTec has provided site investigation services, prepared the factual data reporting, and provided geotechnical parameter calculations consistent with current best practices. No other warranty, expressed or implied, is made.

The information presented in the report document and the accompanying data set pertain to the specific project, site conditions and objectives described to ConeTec by the Client. In order to properly understand the factual data, assumptions and calculations, reference must be made to the documents provided and their accompanying data sets, in their entirety.

Cone penetration tests (CPTu) are conducted using an integrated electronic piezocone penetrometer and data acquisition system manufactured by Adara Systems Ltd., a subsidiary of ConeTec.

ConeTec's piezocone penetrometers are compression type designs in which the tip and friction sleeve load cells are independent and have separate load capacities. The piezocones use strain gauged load cells for tip and sleeve friction and a strain gauged diaphragm type transducer for recording pore pressure. The piezocones also have a platinum resistive temperature device (RTD) for monitoring the temperature of the sensors, an accelerometer type dual axis inclinometer and a geophone sensor for recording seismic signals. All signals are amplified down hole within the cone body and the analog signals are sent to the surface through a shielded cable.

ConeTec penetrometers are manufactured with various tip, friction and pore pressure capacities in 5 cm^2, 10 cm^2 and 15 cm^2 tip base area configurations in order to maximize signal resolution for various soil conditions. The specific piezocone used for each test is described in the CPT summary table presented in the first appendix. The 15 cm^2 penetrometers do not require friction reducers as they have a diameter larger than the deployment rods. The 10 cm^2 piezocones use a friction reducer consisting of a rod adapter extension behind the main cone body with an enlarged cross-sectional area (typically forty-four millimeter diameter over a length of thirty-two millimeter with tapered leading and trailing edges) located at a distance of 585 millimeters above the cone tip.

The penetrometers are designed with equal end area friction sleeves, a net end area ratio of 0.8 and cone tips with a sixty-degree apex angle.

All ConeTec piezocones can record pore pressure at various locations. Unless otherwise noted, the pore pressure filter is located directly behind the cone tip in the "u_2" position (ASTM Type 2). The filter is six millimeters thick, made of porous plastic (polyethylene) having an average pore size of 125 microns (90-160 microns). The function of the filter is to allow rapid movements of extremely small volumes of water needed to activate the pressure transducer while preventing soil ingress or blockage.

The piezocone penetrometers are manufactured with dimensions, tolerances and sensor characteristics that are in general accordance with the current ASTM D5778 standard. ConeTec's calibration criteria also meets or exceeds those of the current ASTM D5778 standard. An illustration of the piezocone penetrometer is presented in Figure CPTu.

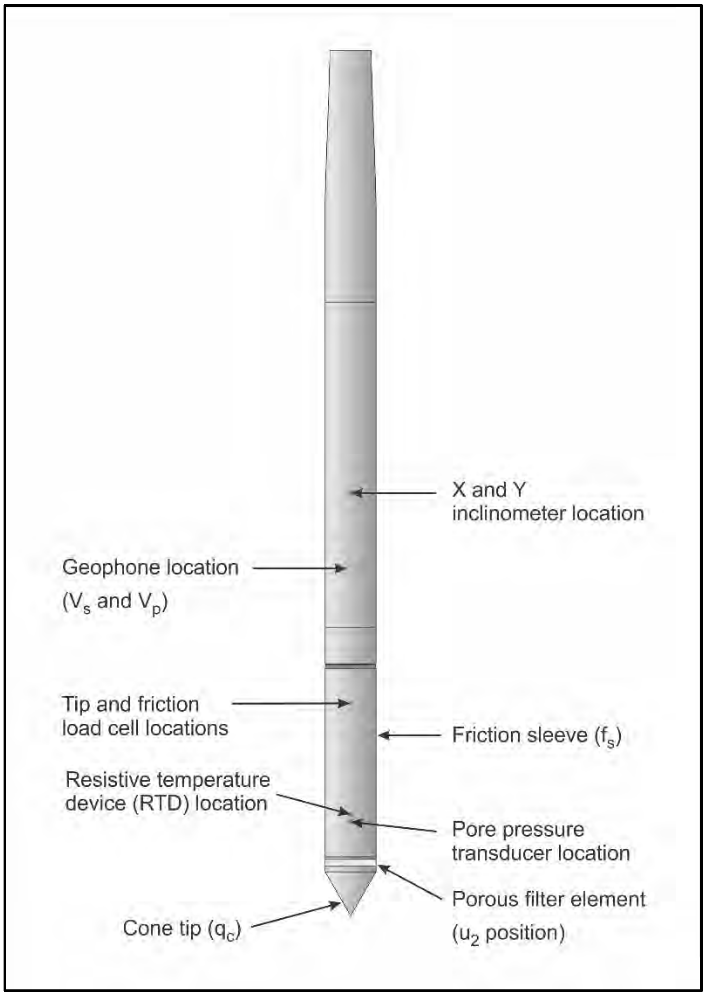


Figure CPTu. Piezocone Penetrometer (15 cm^2)

The ConeTec data acquisition systems consist of a Windows based computer and a signal conditioner and power supply interface box with a sixteen bit (or greater) analog to digital (A/D) converter. The data is recorded at fixed depth increments using a depth wheel attached to the push cylinders or by using a spring loaded rubber depth wheel that is held against the cone rods. The typical recording interval is 2.5 centimeters; custom recording intervals are possible. The system displays the CPTu data in real time and records the following parameters to a storage media during penetration:

- Depth
- Uncorrected tip resistance (q_c)
- Sleeve friction (f_s)
- Dynamic pore pressure (u)
- Additional sensors such as resistivity, passive gamma, ultra violet induced fluorescence, if applicable

All testing is performed in accordance to ConeTec's CPT operating procedures which are in general accordance with the current ASTM D5778 standard.

Prior to the start of a CPTu sounding a suitable cone is selected, the cone and data acquisition system are powered on, the pore pressure system is saturated with silicone oil and the baseline readings are recorded with the cone hanging freely in a vertical position.

The CPTu is conducted at a steady rate of two centimeters per second, within acceptable tolerances. Typically, one-meter length rods with an outer diameter of 38.1 millimeters are added to advance the cone to the sounding termination depth. After cone retraction final baselines are recorded.

Additional information pertaining to ConeTec's cone penetration testing procedures:

- Each filter is saturated in silicone oil under vacuum pressure prior to use
- Recorded baselines are checked with an independent multi-meter
- Baseline readings are compared to previous readings
- Soundings are terminated at the client's target depth or at a depth where an obstruction is encountered, excessive rod flex occurs, excessive inclination occurs, equipment damage is likely to take place, or a dangerous working environment arises
- Differences between initial and final baselines are calculated to ensure zero load offsets have not occurred and to ensure compliance with ASTM standards

The interpretation of piezocone data for this report is based on the corrected tip resistance (q_t), sleeve friction (f_s) and pore water pressure (u). The interpretation of soil type is based on the correlations developed by Robertson et al. (1986) and Robertson (1990, 2009). It should be noted that it is not always possible to accurately identify a soil behaviour type based on these parameters. In these situations, experience, judgment and an assessment of other parameters may be used to infer soil behaviour type.

The recorded tip resistance (q_c) is the total force acting on the piezocone tip divided by its base area. The tip resistance is corrected for pore pressure effects and termed corrected tip resistance (q_t) according to the following expression presented in Robertson et al. (1986):

$$q_t = q_c + (1\text{-}a) \bullet u_2$$

where: q_t is the corrected tip resistance
q_c is the recorded tip resistance
u_2 is the recorded dynamic pore pressure behind the tip (u_2 position)
a is the Net Area Ratio for the piezocone (0.8 for ConeTec probes)

The sleeve friction (f_s) is the frictional force on the sleeve divided by its surface area. As all ConeTec piezocones have equal end area friction sleeves, pore pressure corrections to the sleeve data are not required.

The dynamic pore pressure (u) is a measure of the pore pressures generated during cone penetration. To record equilibrium pore pressure, the penetration must be stopped to allow the dynamic pore pressures to stabilize. The rate at which this occurs is predominantly a function of the permeability of the soil and the diameter of the cone.

The friction ratio (Rf) is a calculated parameter. It is defined as the ratio of sleeve friction to the tip resistance expressed as a percentage. Generally, saturated cohesive soils have low tip resistance, high friction ratios and generate large excess pore water pressures. Cohesionless soils have higher tip resistances, lower friction ratios and do not generate significant excess pore water pressure.

A summary of the CPTu soundings along with test details and individual plots are provided in the appendices. A set of files with calculated geotechnical parameters were generated for each sounding based on published correlations and are provided in Excel format in the data release folder. Information regarding the methods used is also included in the data release folder.

For additional information on CPTu interpretations and calculated geotechnical parameters, refer to Robertson et al. (1986), Lunne et al. (1997), Robertson (2009), Mayne (2013, 2014) and Mayne and Peuchen (2012).

References

ASTM D5778-12, 2012, "Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils", ASTM International, West Conshohocken, PA. DOI: 10.1520/D5778-12.

Lunne, T., Robertson, P.K. and Powell, J. J. M., 1997, “Cone Penetration Testing in Geotechnical Practice”, Blackie Academic and Professional.

Mayne, P.W., 2013, “Evaluating yield stress of soils from laboratory consolidation and in-situ cone penetration tests”, Sound Geotechnical Research to Practice (Holtz Volume) GSP 230, ASCE, Reston/VA: 406-420. DOI: 10.1061/9780784412770.027.

Mayne, P.W. and Peuchen, J., 2012, “Unit weight trends with cone resistance in soft to firm clays”, Geotechnical and Geophysical Site Characterization *4,* Vol. 1 (Proc. ISC-4, Pernambuco), CRC Press, London: 903-910.

Mayne, P.W., 2014, “Interpretation of geotechnical parameters from seismic piezocone tests”, CPT’14 Keynote Address, Las Vegas, NV, May 2014.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, “Use of Piezometer Cone Data”, Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.

Robertson, P.K., 1990, “Soil Classification Using the Cone Penetration Test”, Canadian Geotechnical Journal, Volume 27: 151-158. DOI: 10.1139/T90-014.

Robertson, P.K., 2009, “Interpretation of cone penetration tests – a unified approach”, Canadian Geotechnical Journal, Volume 46: 1337-1355. DOI: 10.1139/T09-065.

The cone penetration test is halted at specific depths to carry out pore pressure dissipation (PPD) tests, shown in Figure PPD-1. For each dissipation test the cone and rods are decoupled from the rig and the data acquisition system measures and records the variation of the pore pressure (u) with time (t).

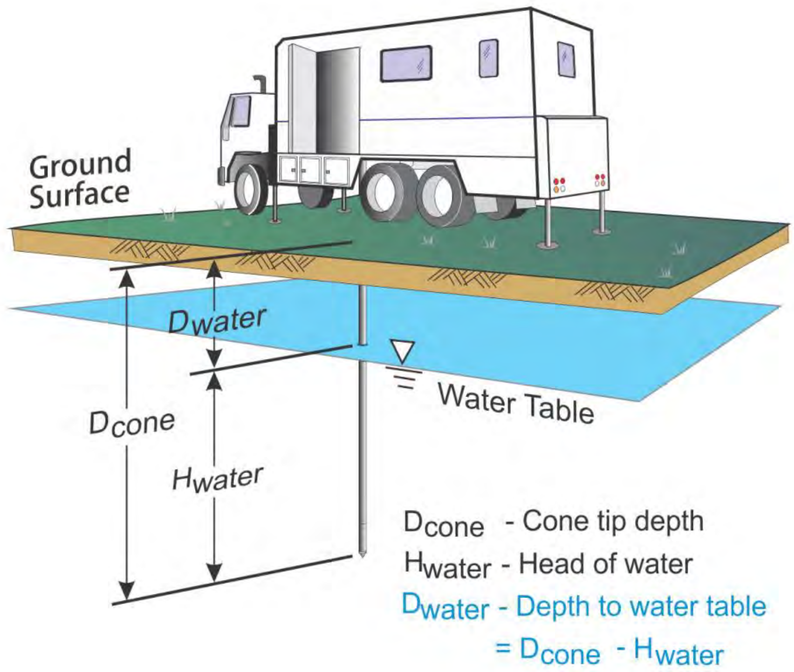


Figure PPD-1. Pore pressure dissipation test setup

Pore pressure dissipation data can be interpreted to provide estimates of ground water conditions, permeability, consolidation characteristics and soil behaviour.

The typical shapes of dissipation curves shown in Figure PPD-2 are very useful in assessing soil type, drainage, in situ pore pressure and soil properties. A flat curve that stabilizes quickly is typical of a freely draining sand. Undrained soils such as clays will typically show positive excess pore pressure and have long dissipation times. Dilative soils will often exhibit dynamic pore pressures below equilibrium that then rise over time. Overconsolidated fine-grained soils will often exhibit an initial dilatory response where there is an initial rise in pore pressure before reaching a peak and dissipating.

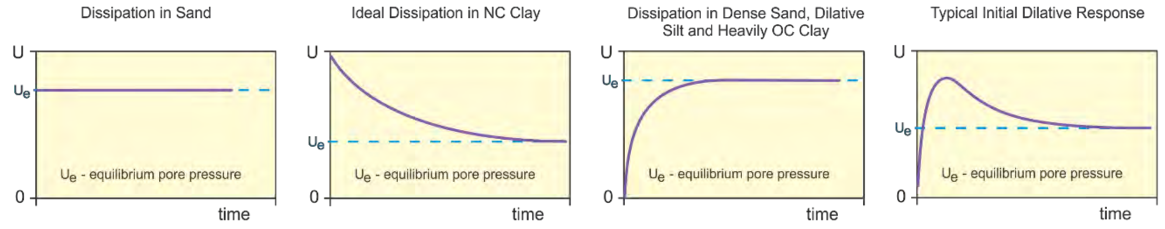


Figure PPD-2. Pore pressure dissipation curve examples

In order to interpret the equilibrium pore pressure (u_{eq}) and the apparent phreatic surface, the pore pressure should be monitored until such time as there is no variation in pore pressure with time as shown for each curve in Figure PPD-2.

In fine grained deposits the point at which 100% of the excess pore pressure has dissipated is known as t_{100}. In some cases this can take an excessive amount of time and it may be impractical to take the dissipation to t_{100}. A theoretical analysis of pore pressure dissipations by Teh and Houlsby (1991) showed that a single curve relating degree of dissipation versus theoretical time factor (T*) may be used to calculate the coefficient of consolidation (c_h) at various degrees of dissipation resulting in the expression for c_h shown below.

$$c_h = \frac{T^* \cdot a^2 \cdot \sqrt{I_r}}{t}$$

Where:

T^* is the dimensionless time factor (Table Time Factor)
a is the radius of the cone
I_r is the rigidity index
t is the time at the degree of consolidation

Table Time Factor. T* versus degree of dissipation (Teh and Houlsby (1991))

Degree of Dissipation (%)	20	30	40	50	60	70	80
T* (u_2)	0.038	0.078	0.142	0.245	0.439	0.804	1.60

The coefficient of consolidation is typically analyzed using the time (t_{50}) corresponding to a degree of dissipation of 50% (u_{50}). In order to determine t_{50}, dissipation tests must be taken to a pressure less than u_{50}. The u_{50} value is half way between the initial maximum pore pressure and the equilibrium pore pressure value, known as u_{100}. To estimate u_{50}, both the initial maximum pore pressure and u_{100} must be known or estimated. Other degrees of dissipations may be considered, particularly for extremely long dissipations.

At any specific degree of dissipation the equilibrium pore pressure (u at t_{100}) must be estimated at the depth of interest. The equilibrium value may be determined from one or more sources such as measuring the value directly (u_{100}), estimating it from other dissipations in the same profile, estimating the phreatic surface and assuming hydrostatic conditions, from nearby soundings, from client provided information, from site observations and/or past experience, or from other site instrumentation.

For calculations of c_h (Teh and Houlsby (1991)), t_{50} values are estimated from the corresponding pore pressure dissipation curve and a rigidity index (I_r) is assumed. For curves having an initial dilatory response in which an initial rise in pore pressure occurs before reaching a peak, the relative time from the peak value is used in determining t_{50}. In cases where the time to peak is excessive, t_{50} values are not calculated.

Due to possible inherent uncertainties in estimating I_r, the equilibrium pore pressure and the effect of an initial dilatory response on calculating t_{50}, other methods should be applied to confirm the results for c_h.

Additional published methods for estimating the coefficient of consolidation from a piezocone test are described in Burns and Mayne (1998, 2002), Jones and Van Zyl (1981), Robertson et al. (1992) and Sully et al. (1999).

A summary of the pore pressure dissipation tests and dissipation plots are presented in the relevant appendix.

References

Burns, S.E. and Mayne, P.W., 1998, “Monotonic and dilatory pore pressure decay during piezocone tests”, Canadian Geotechnical Journal 26 (4): 1063-1073. DOI: 1063-1073/T98-062.

Burns, S.E. and Mayne, P.W., 2002, “Analytical cavity expansion-critical state model cone dissipation in fine-grained soils”, Soils & Foundations, Vol. 42(2): 131-137.

Jones, G.A. and Van Zyl, D.J.A., 1981, “The piezometer probe: a useful investigation tool”, Proceedings, 10th International Conference on Soil Mechanics and Foundation Engineering, Vol. 3, Stockholm: 489-495.

Robertson, P.K., Sully, J.P., Woeller, D.J., Lunne, T., Powell, J.J.M. and Gillespie, D.G., 1992, “Estimating coefficient of consolidation from piezocone tests”, Canadian Geotechnical Journal, 29(4): 539-550. DOI: 10.1139/T92-061.

Sully, J.P., Robertson, P.K., Campanella, R.G. and Woeller, D.J., 1999, “An approach to evaluation of field CPTU dissipation data in overconsolidated fine-grained soils”, Canadian Geotechnical Journal, 36(2): 369-381. DOI: 10.1139/T98-105.

Teh, C.I., and Houlsby, G.T., 1991, “An analytical study of the cone penetration test in clay”, Geotechnique, 41(1): 17-34. DOI: 10.1680/geot.1991.41.1.17.

The appendices listed below are included in the report:

- Cone Penetration Test Summary and Standard Cone Penetration Test Plots
- Advanced Cone Penetration Test Plots with Ic, Su(Nkt) and N1(60)Ic
- Soil Behavior Type (SBT) Scatter Plots
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Cone Penetration Test Summary and Standard Cone Penetration Test Plots

CONETEC

Job No:	19-56179
Client:	Pacific Crest Engineering
Project:	Gonzales Industrial WWTP
Start Date:	13-Nov-2019
End Date:	13-Nov-2019

CONE PENETRATION TEST SUMMARY

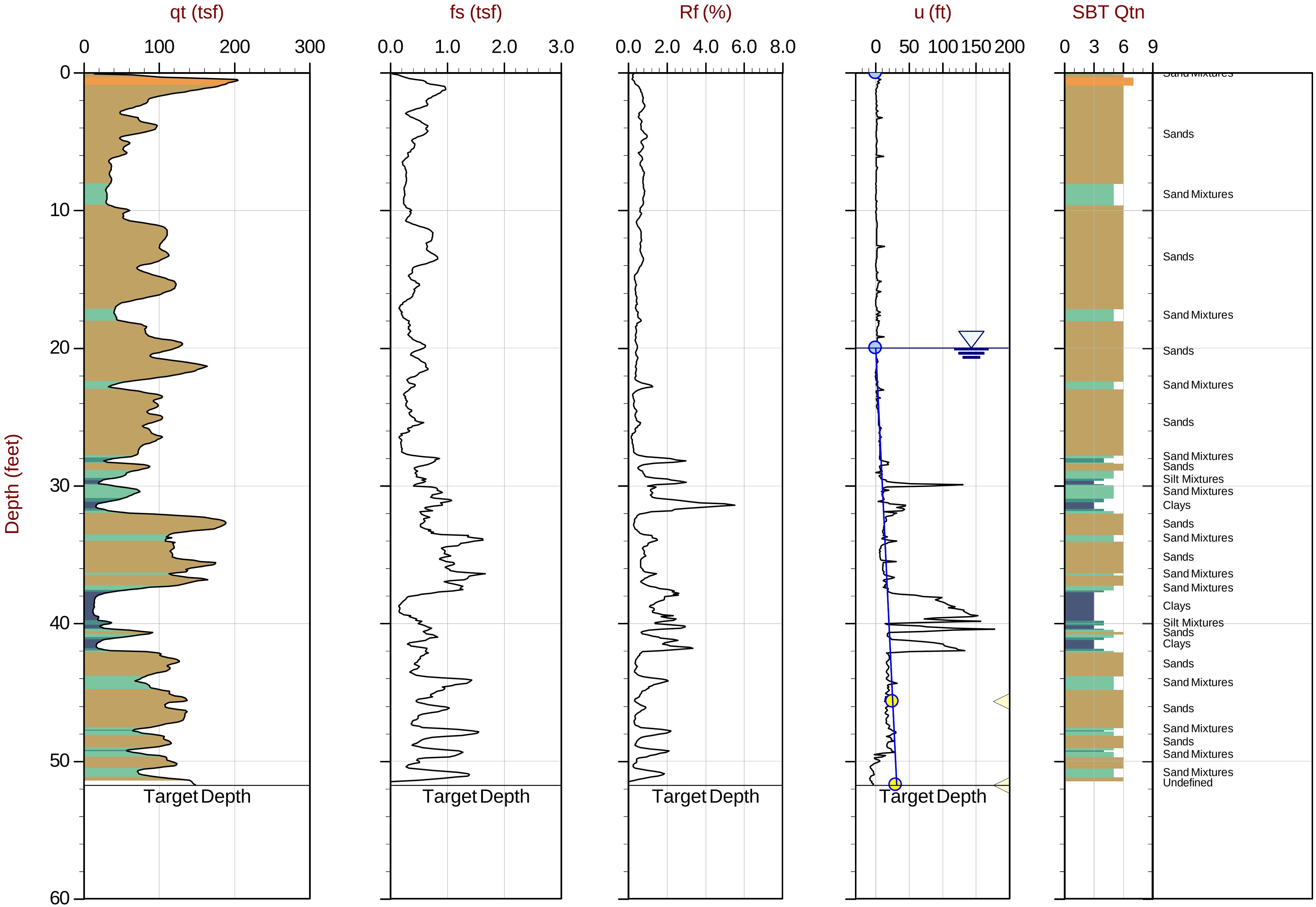
Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface^1 (ft)	Final Depth (ft)	Northing^2 (m)	Easting^2 (m)	Elevation^3 (ft)	Refer to Notation Number
CPT-01	19-56179_CP01	13-Nov-2019	443:T1500F15U500	20.0	51.76	4039630	636309	109	
CPT-02	19-56179_CP02	13-Nov-2019	443:T1500F15U500	11.4	35.68	4039841	635881	107	
CPT-03	19-56179_CP03	13-Nov-2019	443:T1500F15U500	23.1	51.51	4039957	636345	110	
CPT-04	19-56179_CP04	13-Nov-2019	443:T1500F15U500	22.8	38.71	4039375	636714	114	

1. The assumed phreatic surface was based on the results of the shallowest pore pressure dissipation test performed within the sounding. Hydrostatic conditions were assumed for the calculated parameters.
2. The coordinates were acquired using consumer grade GPS equipment, datum: WGS 1984 / UTM Zone 10 North.
3. Elevations are refrenced to the ground surface and are derived from Google Earth Elevation for the recorded coordinates.

Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 08:52
Site: Gonzales Industrial WWTP

Sounding: CPT-01
Cone: 443:T1500F15U500



Max Depth: 15.775 m / 51.75 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP01.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039630m E: 636309m

● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

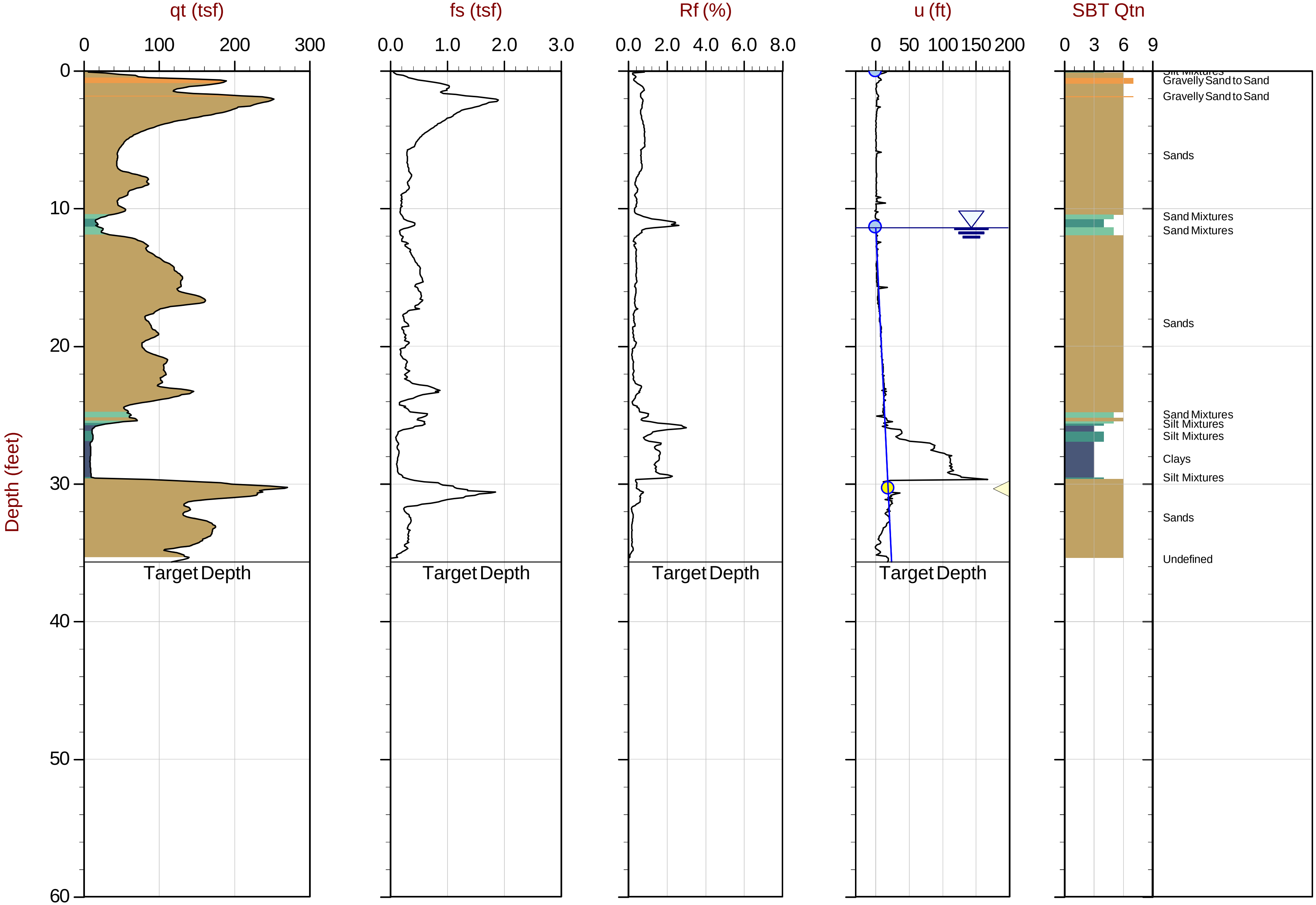
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 09:49
Site: Gonzales Industrial WWTP

Sounding: CPT-02
Cone: 443:T1500F15U500



Max Depth: 10.875 m / 35.68 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP02.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039841m E: 635881m

● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

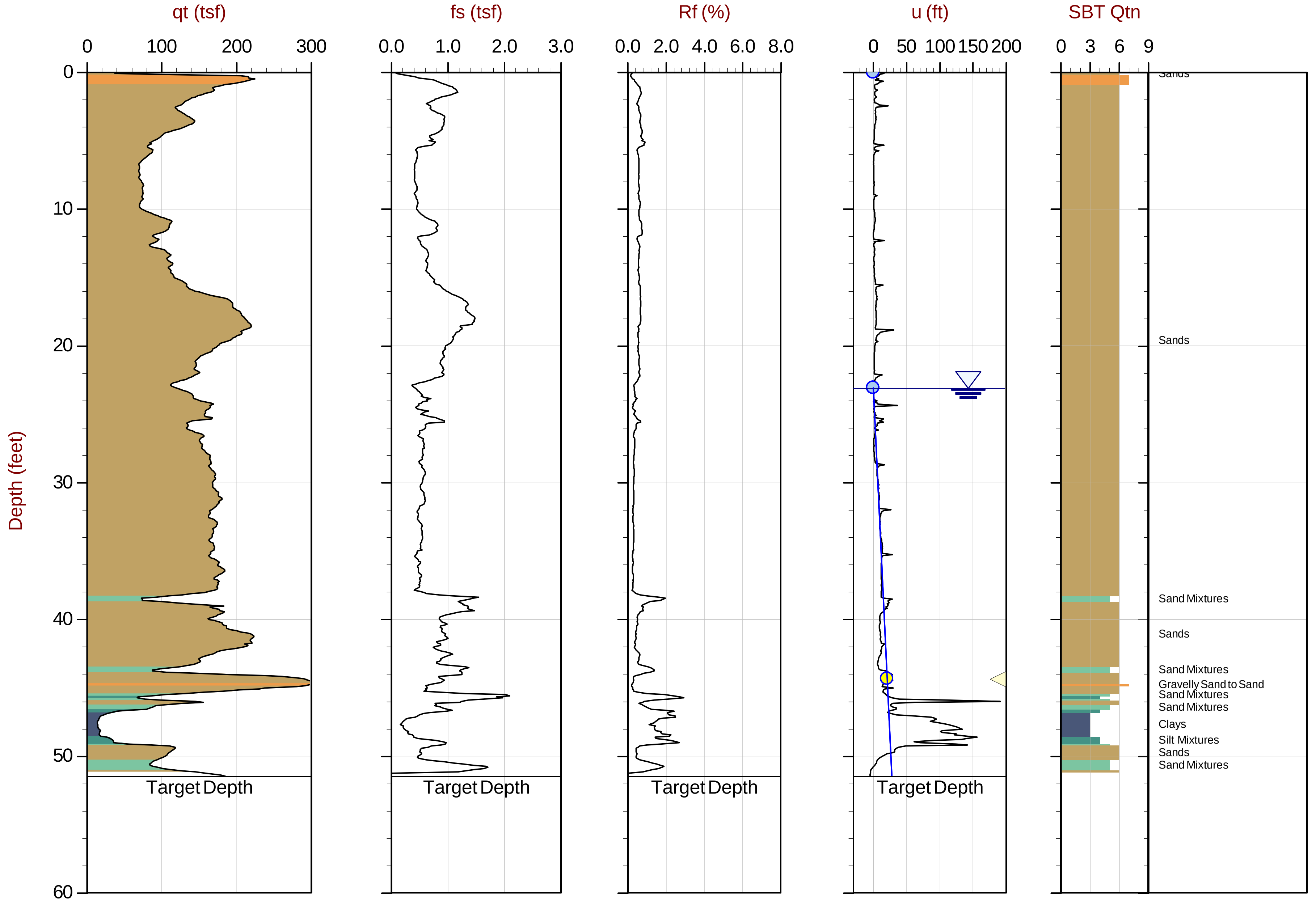
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 10:35
Site: Gonzales Industrial WWTP

Sounding: CPT-03
Cone: 443:T1500F15U500



Max Depth: 15.700 m / 51.51 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP03.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039957m E: 636345m

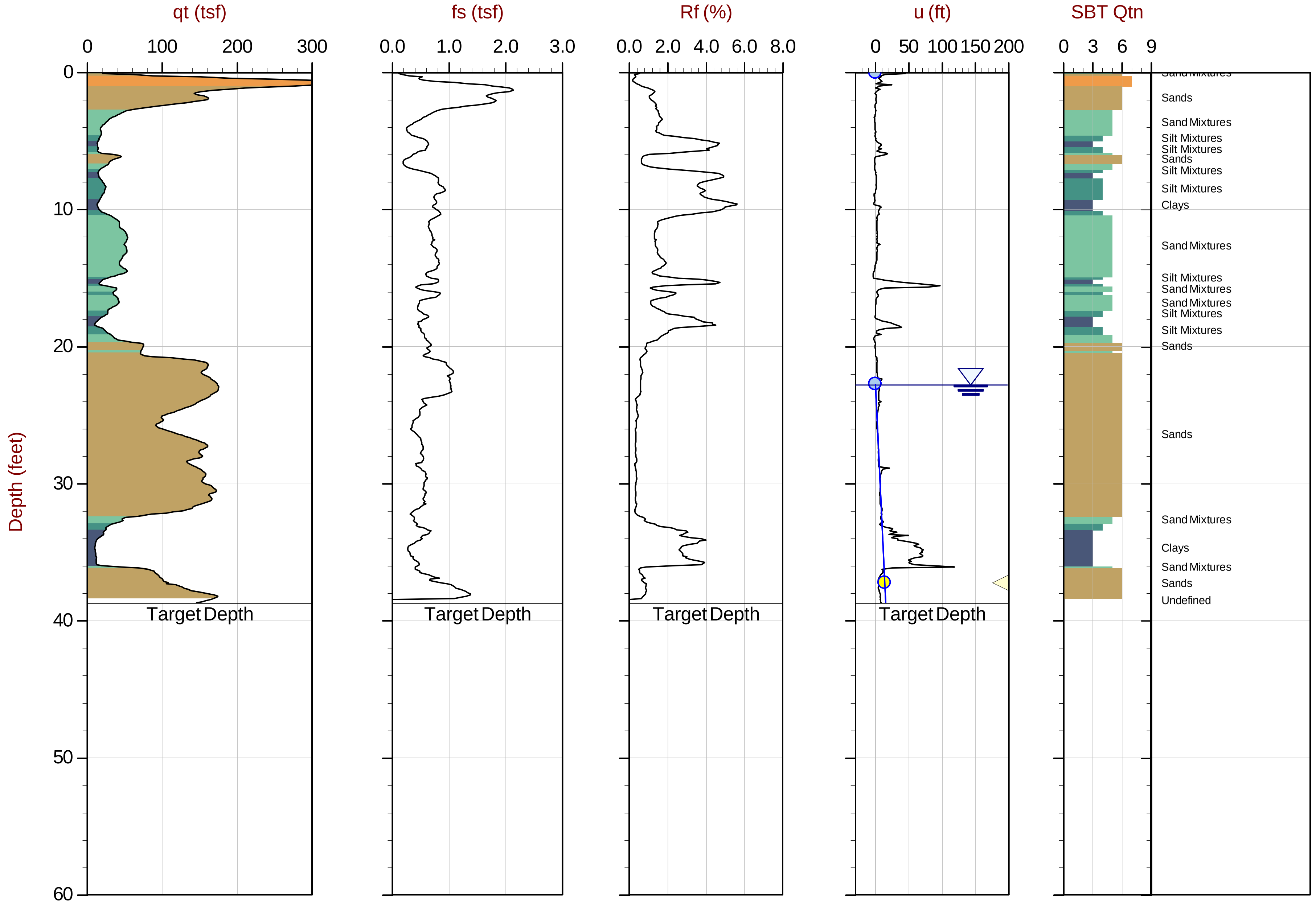
● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 11:29
Site: Gonzales Industrial WWTP

Sounding: CPT-04
Cone: 443:T1500F15U500



Max Depth: 11.800 m / 38.71 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP04.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039375m E: 636714m

● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

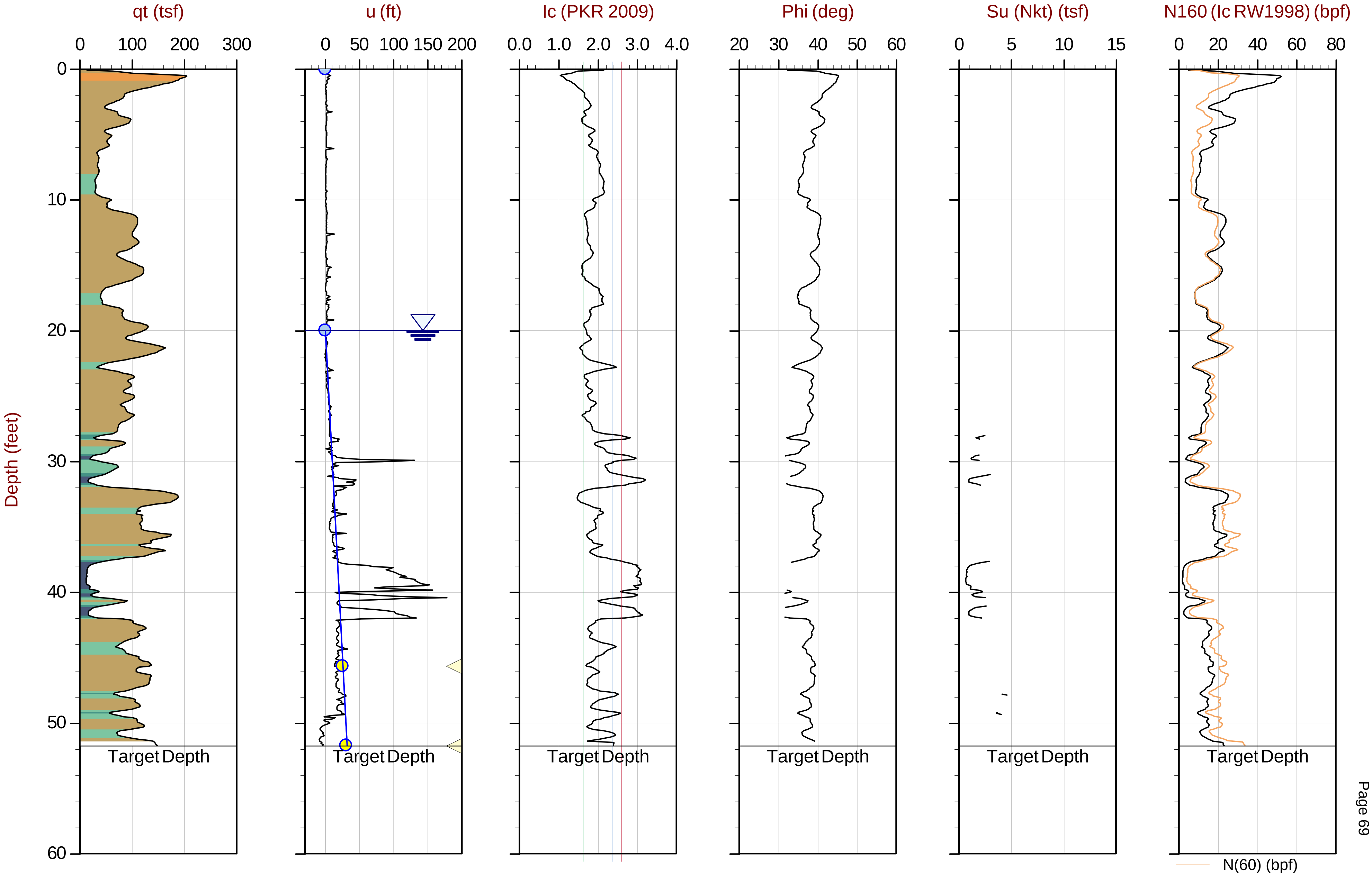
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Advanced Cone Penetration Test Plots with Ic, Phi, Su(Nkt), and N1(60)Ic

Pacific Crest Engineering

Job No: 19-56177
Date: 2019-11-13 08:52
Site: Gonzales Industrial WWTP

Sounding: CPT-01
Cone: 443:T1500F15U500



Max Depth: 15.775 m / 51.75 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP01.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039630m E: 636309m

● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

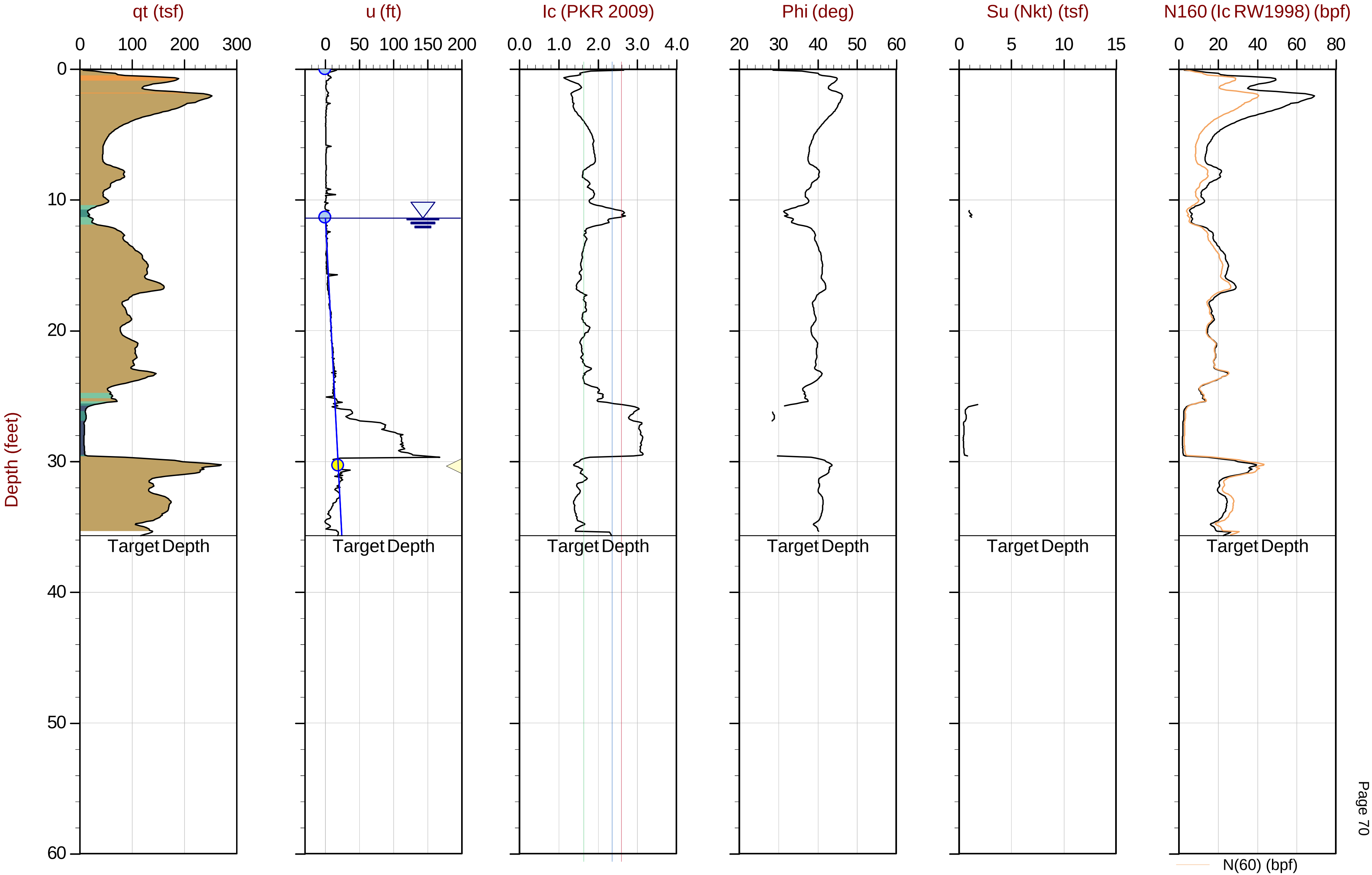
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Pacific Crest Engineering

Job No: 19-56177
Date: 2019-11-13 09:49
Site: Gonzales Industrial WWTP

Sounding: CPT-02
Cone: 443:T1500F15U500



Max Depth: 10.875 m / 35.68 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP02.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039841m E: 635881m

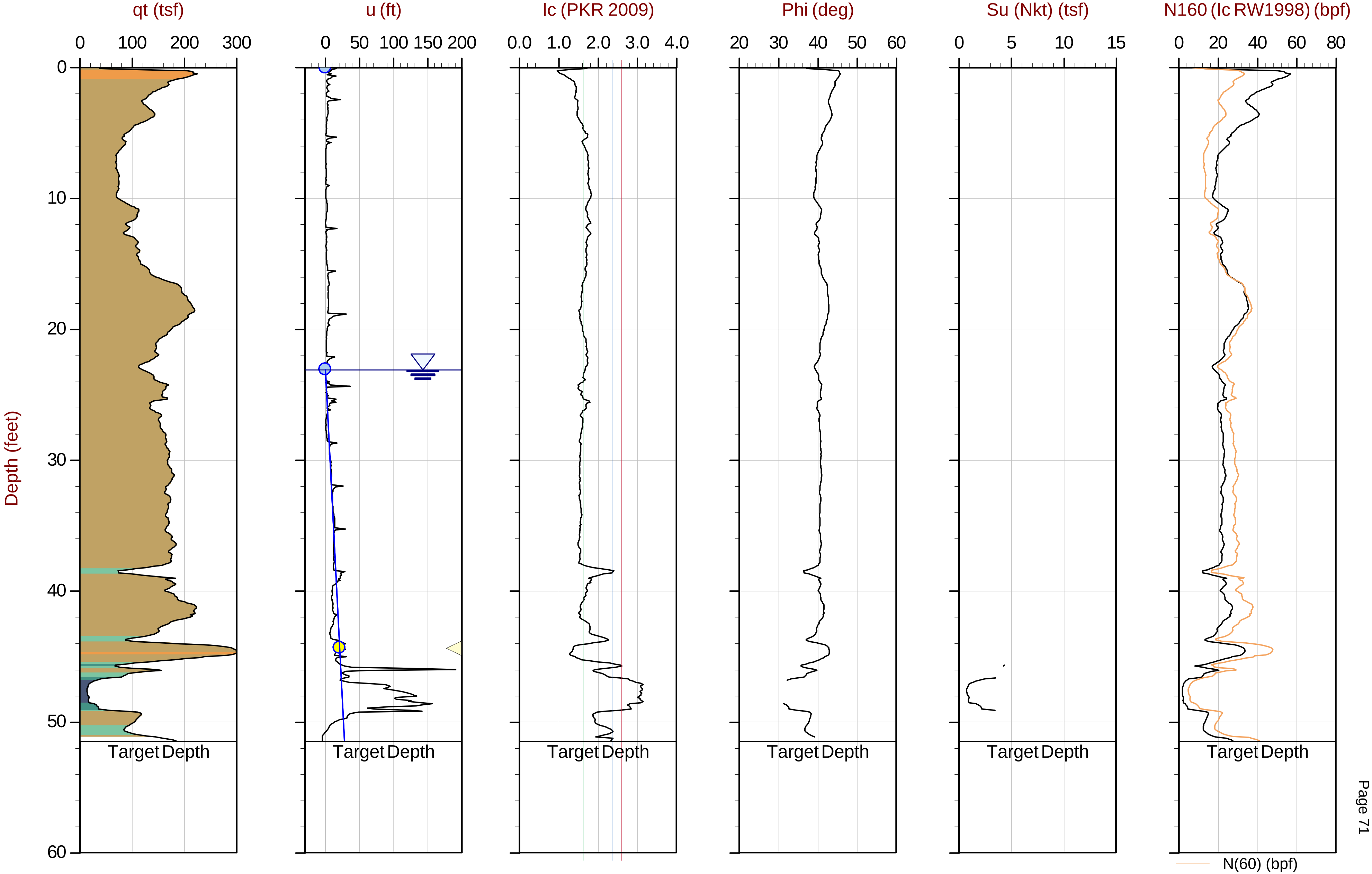
● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Pacific Crest Engineering

Job No: 19-56177
Date: 2019-11-13 10:35
Site: Gonzales Industrial WWTP

Sounding: CPT-03
Cone: 443:T1500F15U500



Max Depth: 15.700 m / 51.51 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP03.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039957m E: 636345m

● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

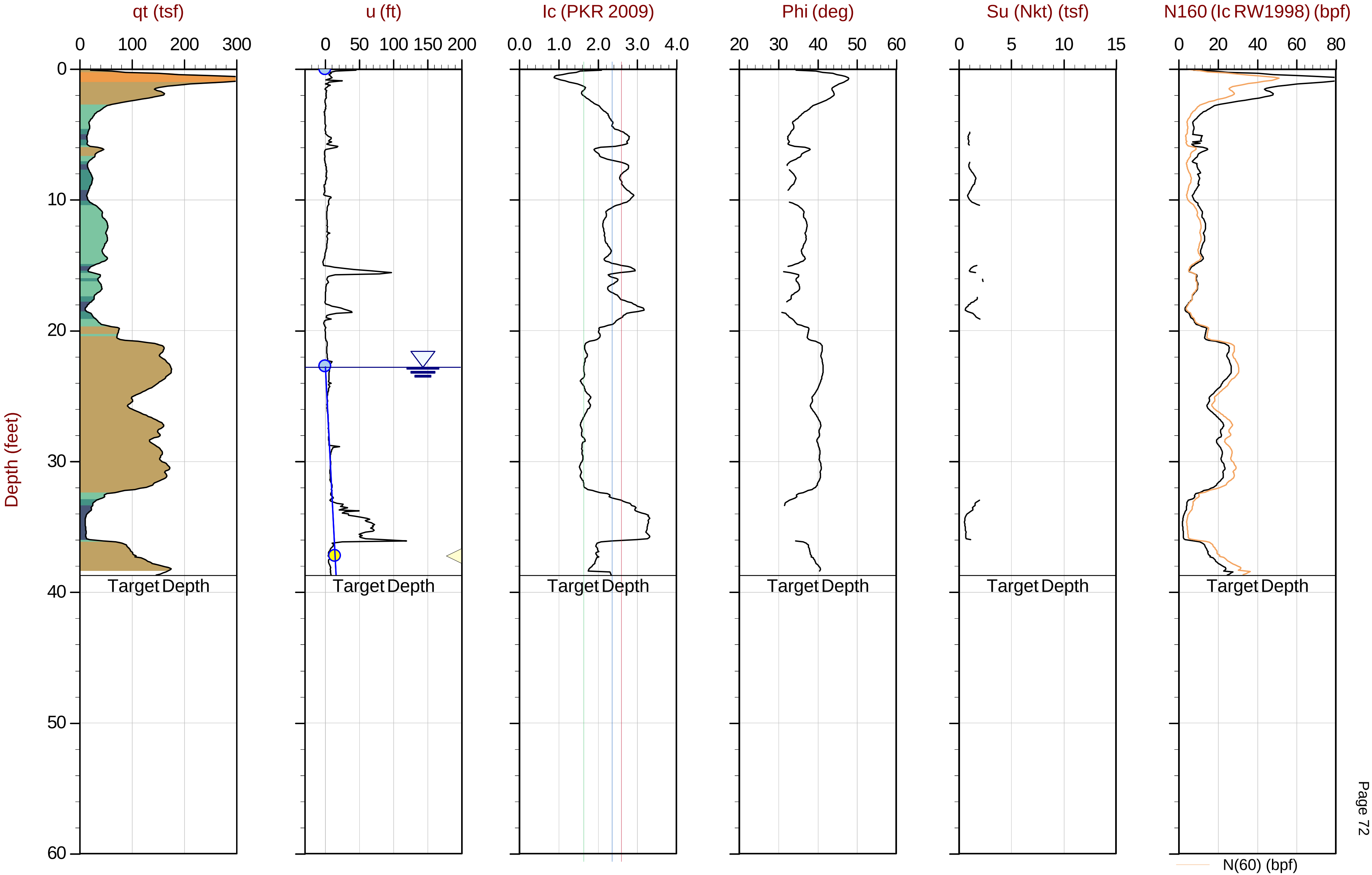
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Pacific Crest Engineering

Job No: 19-56177
Date: 2019-11-13 11:29
Site: Gonzales Industrial WWTP

Sounding: CPT-04
Cone: 443:T1500F15U500



Max Depth: 11.800 m / 38.71 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56179_CP04.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4039375m E: 636714m

● Equilibrium Pore Pressure (Ueq) ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved — Hydrostatic Line

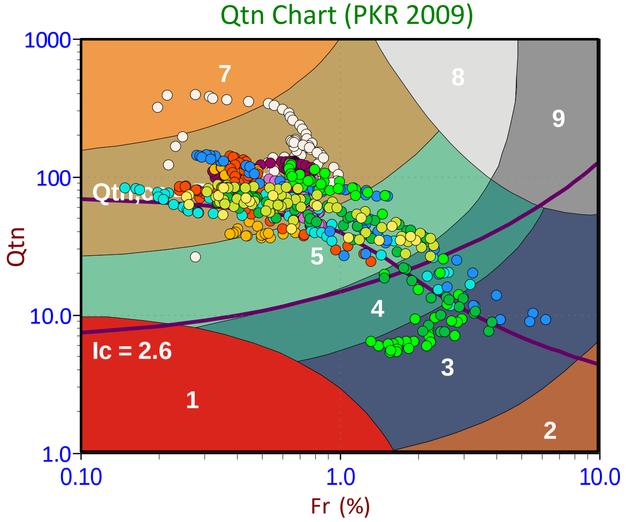
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

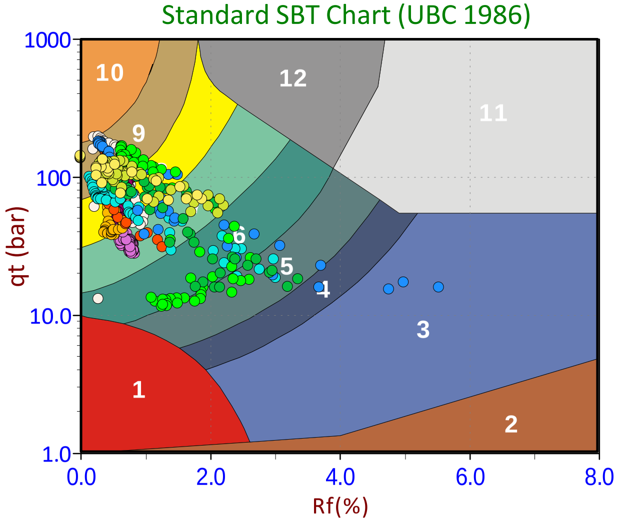
Soil Behavior Type (SBT) Scatter Plots

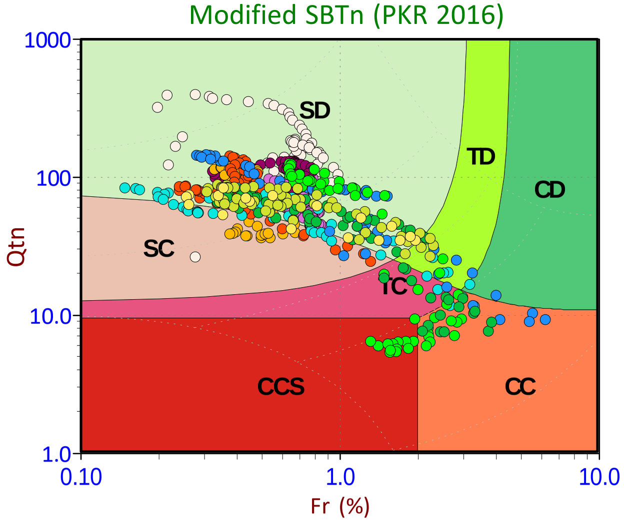
Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 08:52
Site: Gonzales Industrial WWTP

Sounding: CPT-01
Cone: 443:T1500F15U500


Qtn Chart (PKR 2009)


Standard SBT Chart (UBC 1986)


Modified SBTn (PKR 2016)

Depth Ranges
- ○ >0.0 to 5.0 ft
- ● >5.0 to 10.0 ft
- ● >10.0 to 15.0 ft
- ● >15.0 to 20.0 ft
- ● >20.0 to 25.0 ft
- ● >25.0 to 30.0 ft
- ● >30.0 to 35.0 ft
- ● >35.0 to 40.0 ft
- ● >40.0 to 45.0 ft
- ● >45.0 to 50.0 ft
- ● >50.0 ft

Legend
- 🟥 Sensitive, Fine Grained
- 🟫 Organic Soils
- ■ Clays
- ■ Silt Mixtures
- 🟩 Sand Mixtures
- ■ Sands
- 🟧 Gravelly Sand to Sand
- ⬜ Stiff Sand to Clayey Sand
- ■ Very Stiff Fine Grained

Legend
- 🟥 Sensitive Fines
- 🟫 Organic Soil
- 🟦 Clay
- ■ Silty Clay
- ■ Clayey Silt
- ■ Silt
- 🟩 Sandy Silt
- 🟨 Silty Sand/Sand
- ■ Sand
- 🟧 Gravelly Sand
- ⬜ Stiff Fine Grained
- ■ Cemented Sand

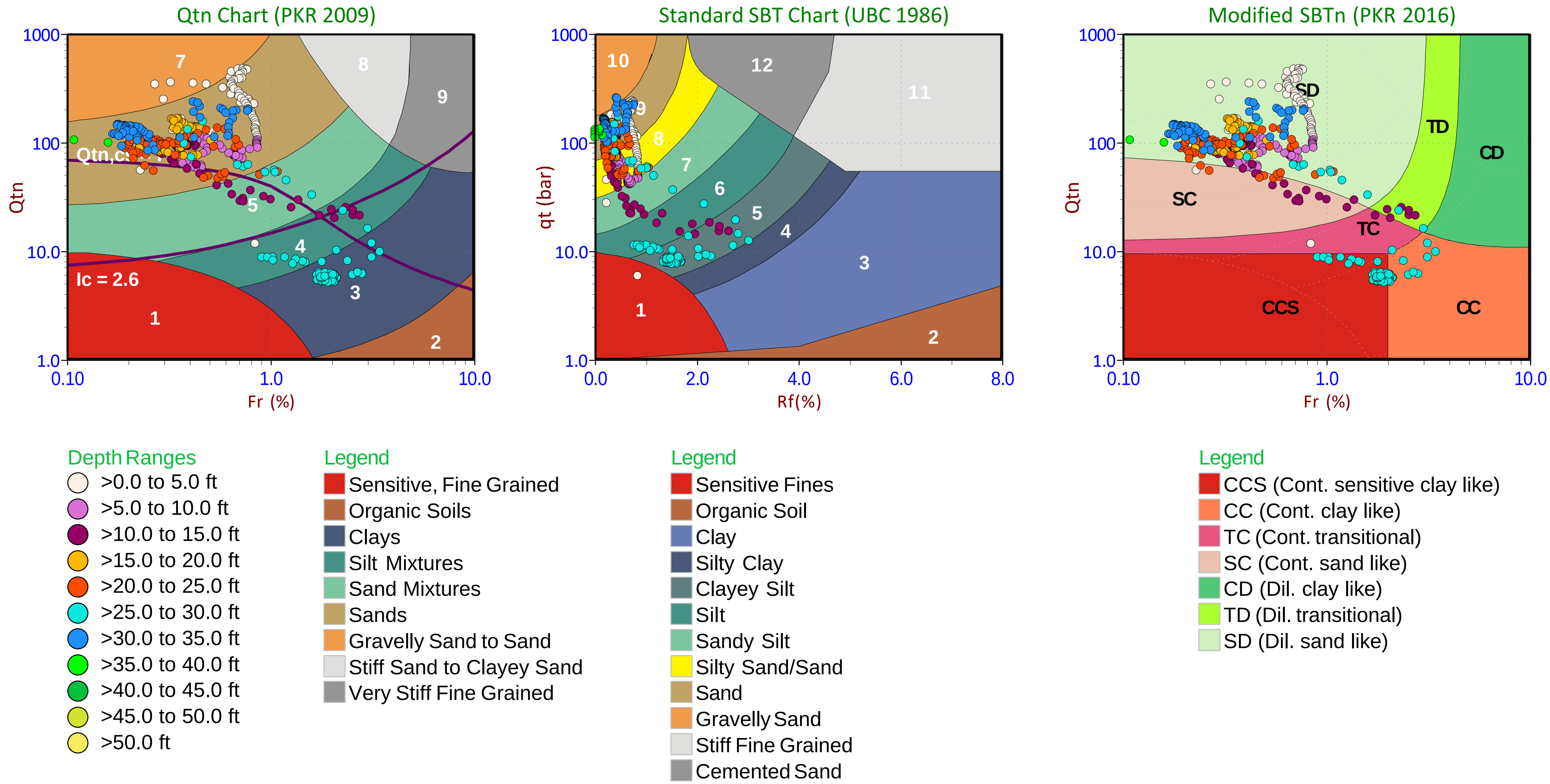
Legend
- 🟥 CCS (Cont. sensitive clay like)
- 🟧 CC (Cont. clay like)
- ■ TC (Cont. transitional)
- ■ SC (Cont. sand like)
- 🟩 CD (Dil. clay like)
- 🟩 TD (Dil. transitional)
- ■ SD (Dil. sand like)

CONETEC

Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 09:49
Site: Gonzales Industrial WWTP

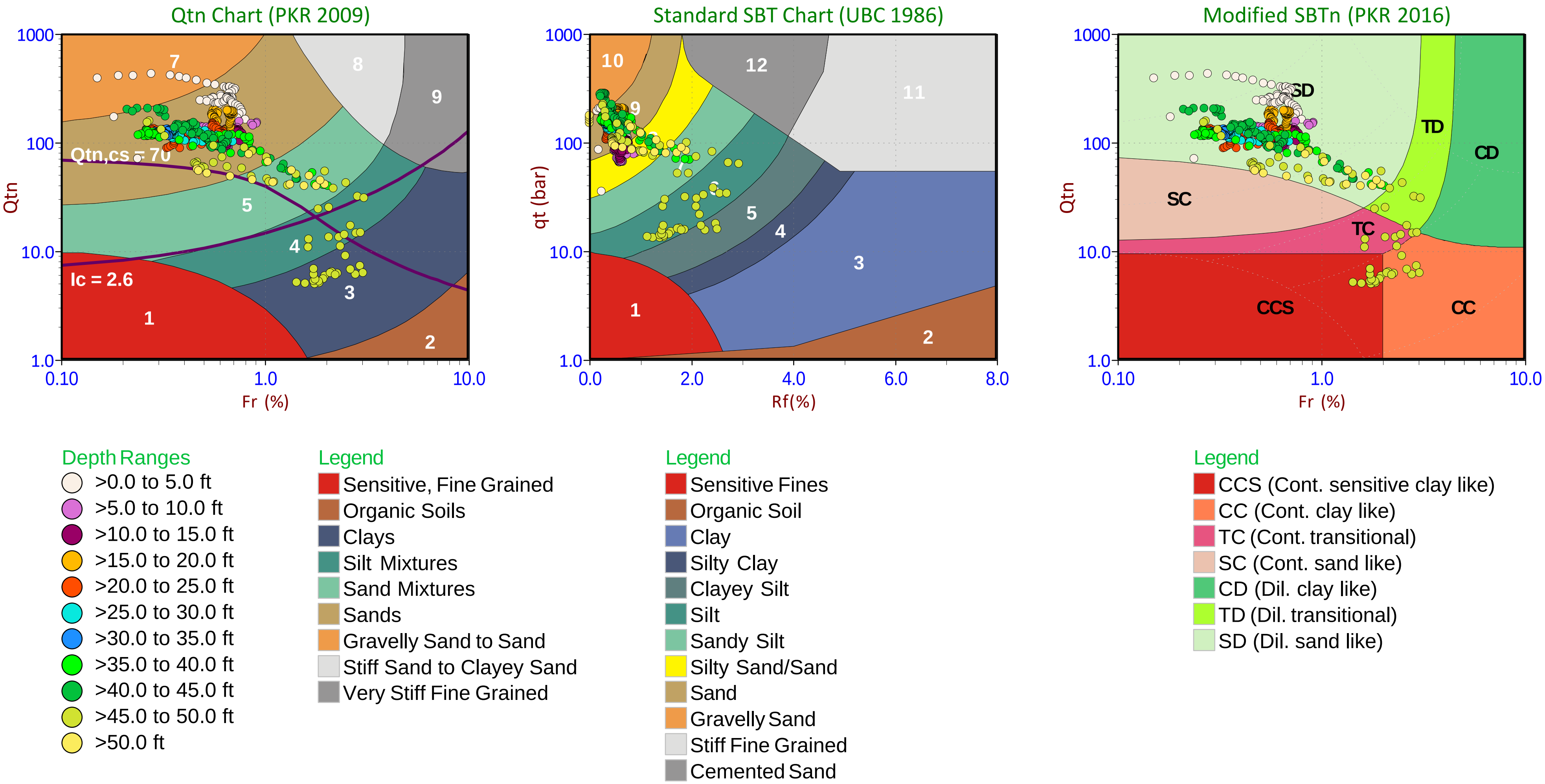
Sounding: CPT-02
Cone: 443:T1500F15U500



Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 10:35
Site: Gonzales Industrial WWTP

Sounding: CPT-03
Cone: 443:T1500F15U500

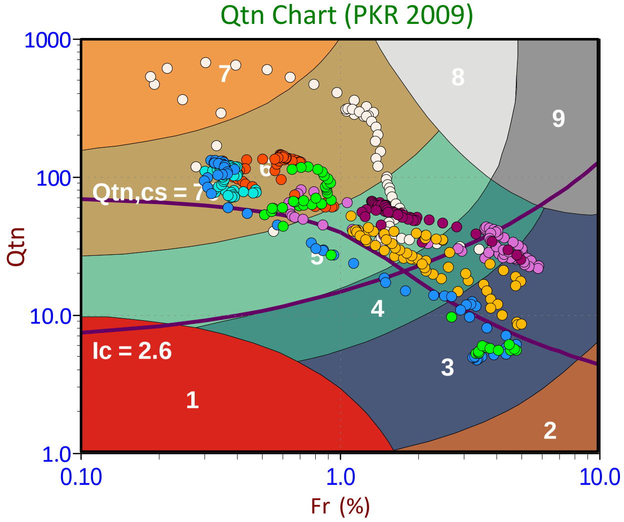


CONETEC

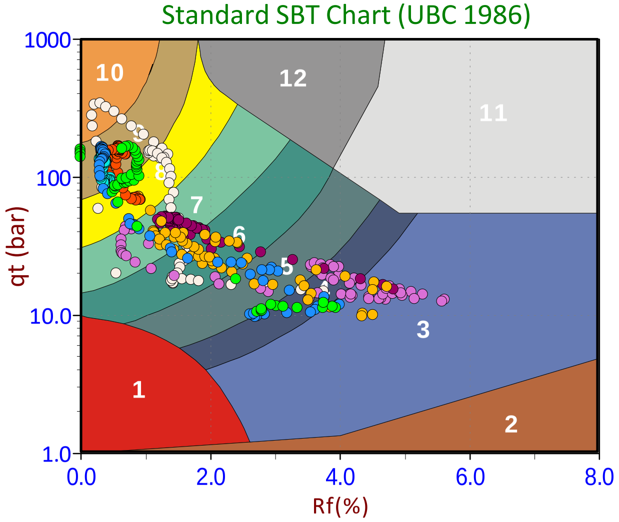
Pacific Crest Engineering

Job No: 19-56179
Date: 2019-11-13 11:29
Site: Gonzales Industrial WWTP

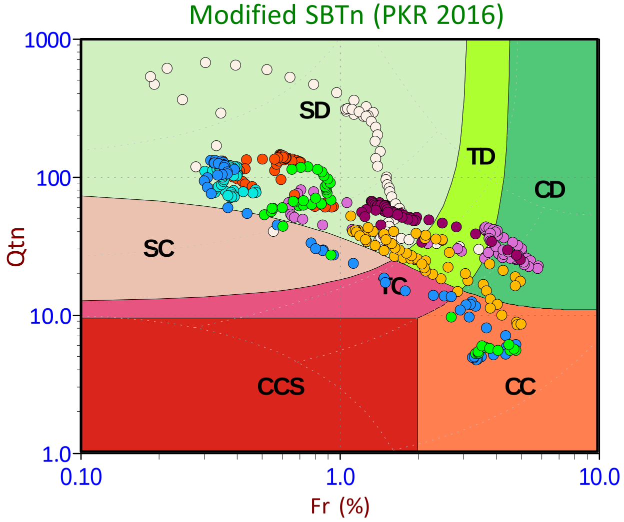
Sounding: CPT-04
Cone: 443:T1500F15U500



Qtn Chart (PKR 2009)



Standard SBT Chart (UBC 1986)



Modified SBTn (PKR 2016)

Depth Ranges
- ○ >0.0 to 5.0 ft
- ● >5.0 to 10.0 ft
- ● >10.0 to 15.0 ft
- ● >15.0 to 20.0 ft
- ● >20.0 to 25.0 ft
- ● >25.0 to 30.0 ft
- ● >30.0 to 35.0 ft
- ● >35.0 to 40.0 ft
- ● >40.0 to 45.0 ft
- ● >45.0 to 50.0 ft
- ● >50.0 ft

Legend
- ■ Sensitive, Fine Grained
- ■ Organic Soils
- ■ Clays
- ■ Silt Mixtures
- ■ Sand Mixtures
- ■ Sands
- ■ Gravelly Sand to Sand
- ■ Stiff Sand to Clayey Sand
- ■ Very Stiff Fine Grained

Legend
- ■ Sensitive Fines
- ■ Organic Soil
- ■ Clay
- ■ Silty Clay
- ■ Clayey Silt
- ■ Silt
- ■ Sandy Silt
- ■ Silty Sand/Sand
- ■ Sand
- ■ Gravelly Sand
- ■ Stiff Fine Grained
- ■ Cemented Sand

Legend
- ■ CCS (Cont. sensitive clay like)
- ■ CC (Cont. clay like)
- ■ TC (Cont. transitional)
- ■ SC (Cont. sand like)
- ■ CD (Dil. clay like)
- ■ TD (Dil. transitional)
- ■ SD (Dil. sand like)

Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Job No: 19-56179
Client: Pacific Crest Engineering
Project: Gonzales Industrial WWTP
Start Date: 13-Nov-2019
End Date: 13-Nov-2019

CPTu PORE PRESSURE DISSIPATION SUMMARY

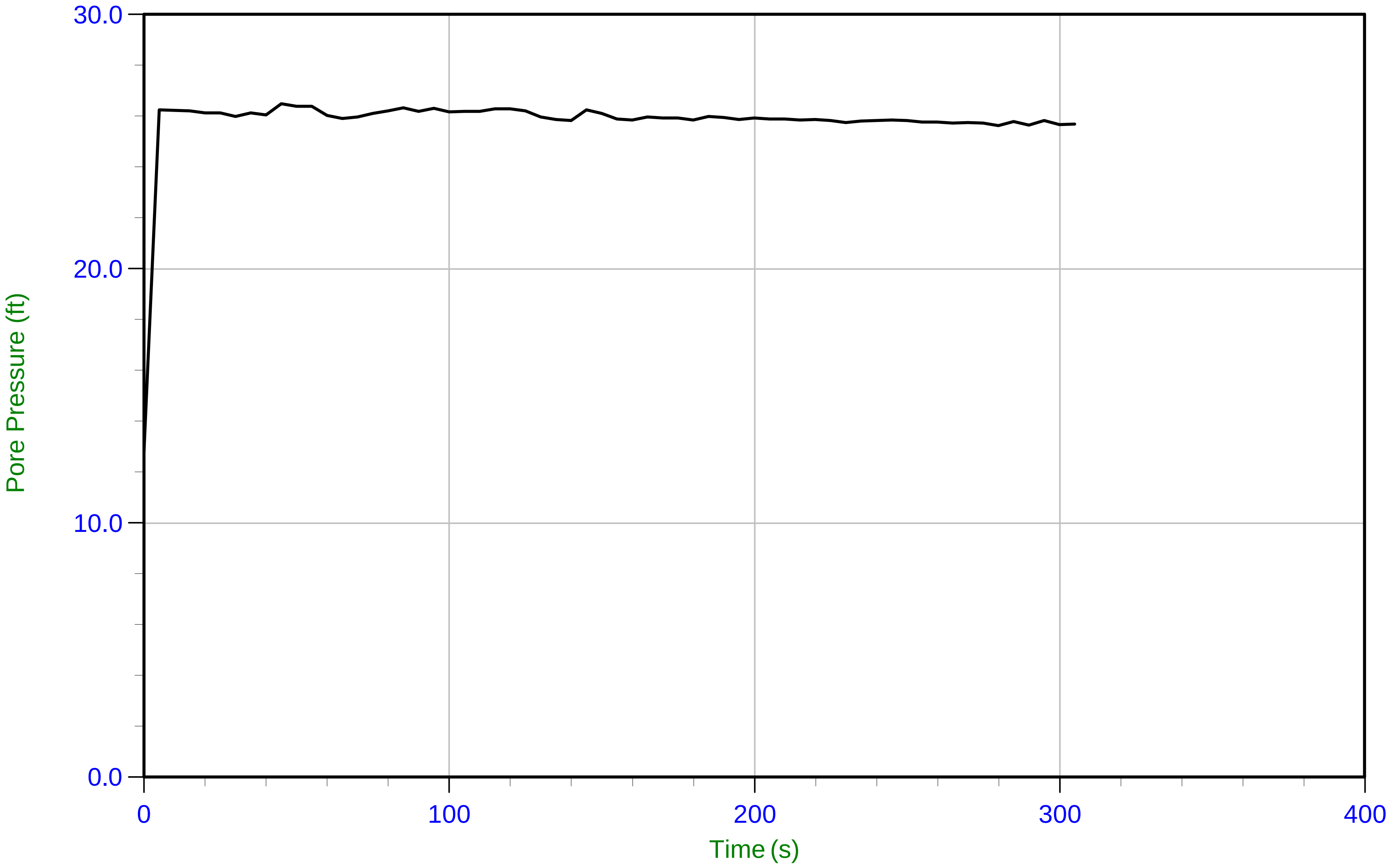
Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (ft)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)
CPT-01	19-56179_CP01	15	305	45.69	25.7	20.0
CPT-01	19-56179_CP01	15	295	51.75	30.5	21.3
CPT-02	19-56179_CP02	15	405	30.35	19.0	11.4
CPT-03	19-56179_CP03	15	440	44.37	21.3	23.1
CPT-04	19-56179_CP04	15	435	37.24	14.5	22.8

CONETEC

Pacific Crest Engineering

Job No: 19-56179
Date: 11/13/2019 08:52
Site: Gonzales Industrial WWTP

Sounding: CPT-01
Cone: 443:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 19-56179_CP01.PPF
Depth: 13.925 m / 45.685 ft
Duration: 305.0 s

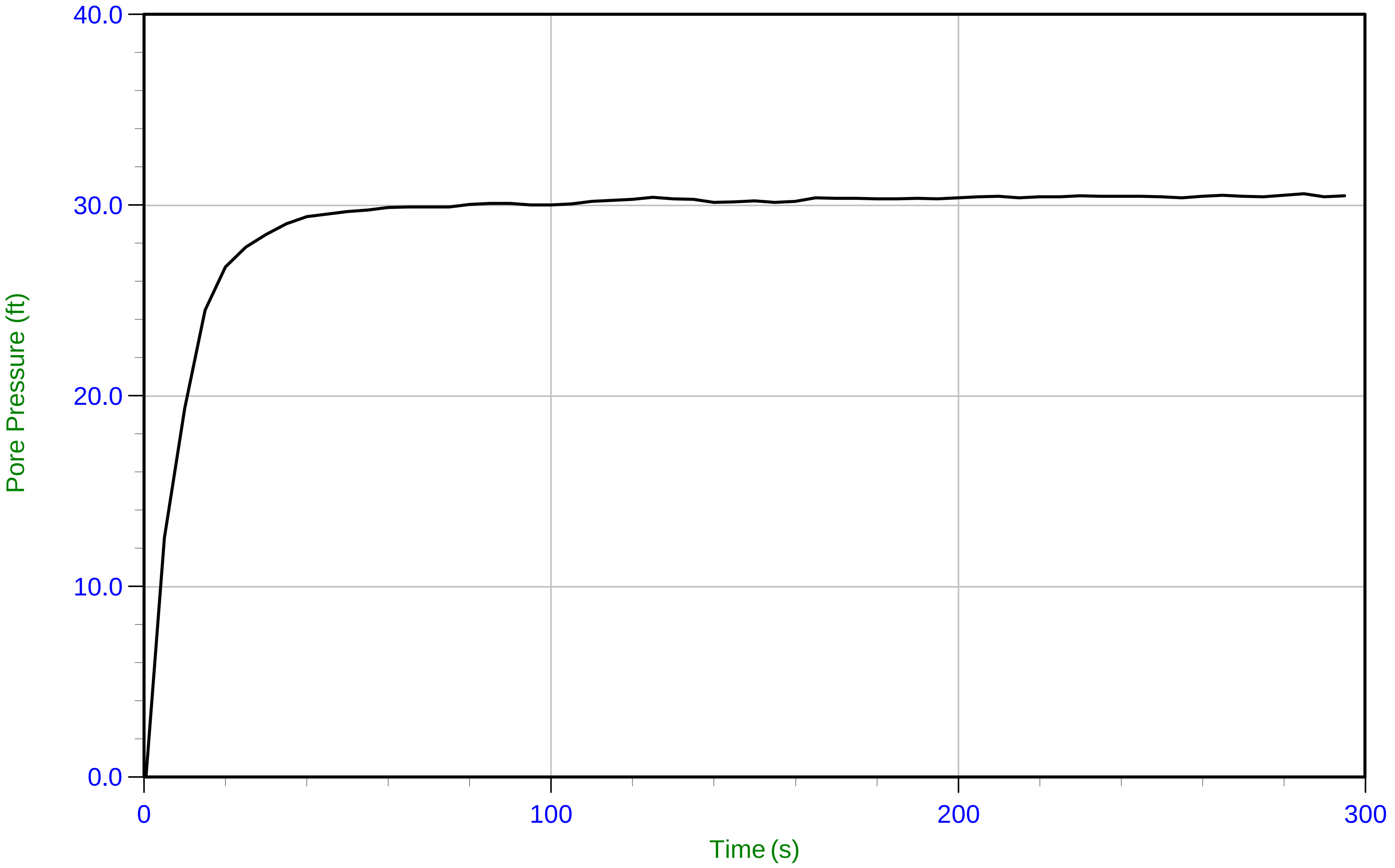
u Min: 12.8 ft
u Max: 26.5 ft
u Final: 25.7 ft

WT: 6.101 m / 20.017 ft
Ueq: 25.7 ft

Pacific Crest Engineering

Job No: 19-56179
Date: 11/13/2019 08:52
Site: Gonzales Industrial WWTP

Sounding: CPT-01
Cone: 443:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 19-56179_CP01.PPF
Depth: 15.775 m / 51.755 ft
Duration: 295.0 s

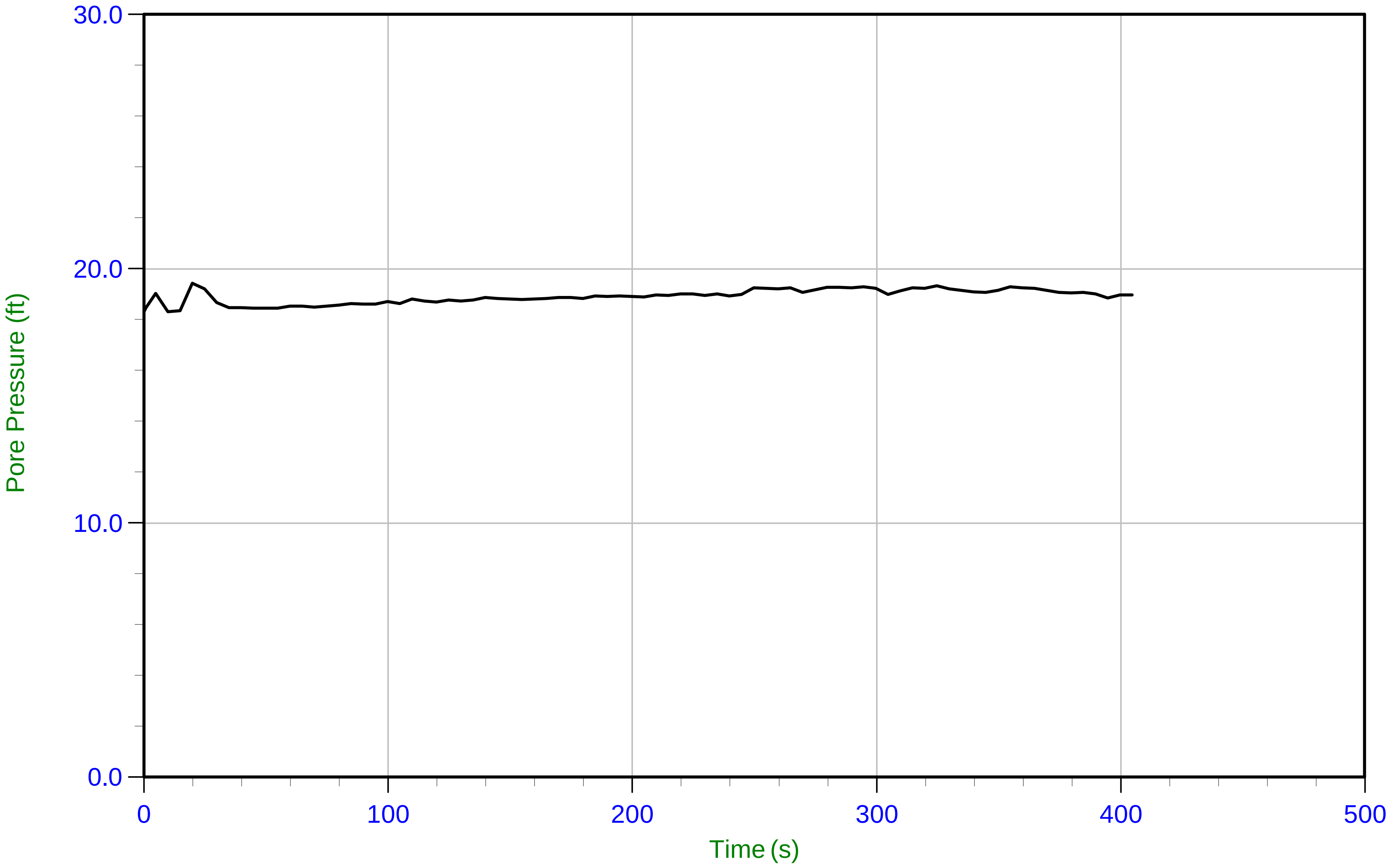
u Min: -1.3 ft
u Max: 30.6 ft
u Final: 30.5 ft

WT: 6.482 m / 21.267 ft
Ueq: 30.5 ft

Pacific Crest Engineering

Job No: 19-56179
Date: 11/13/2019 09:49
Site: Gonzales Industrial WWTP

Sounding: CPT-02
Cone: 443:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 19-56179_CP02.PPF
Depth: 9.250 m / 30.347 ft
Duration: 405.0 s

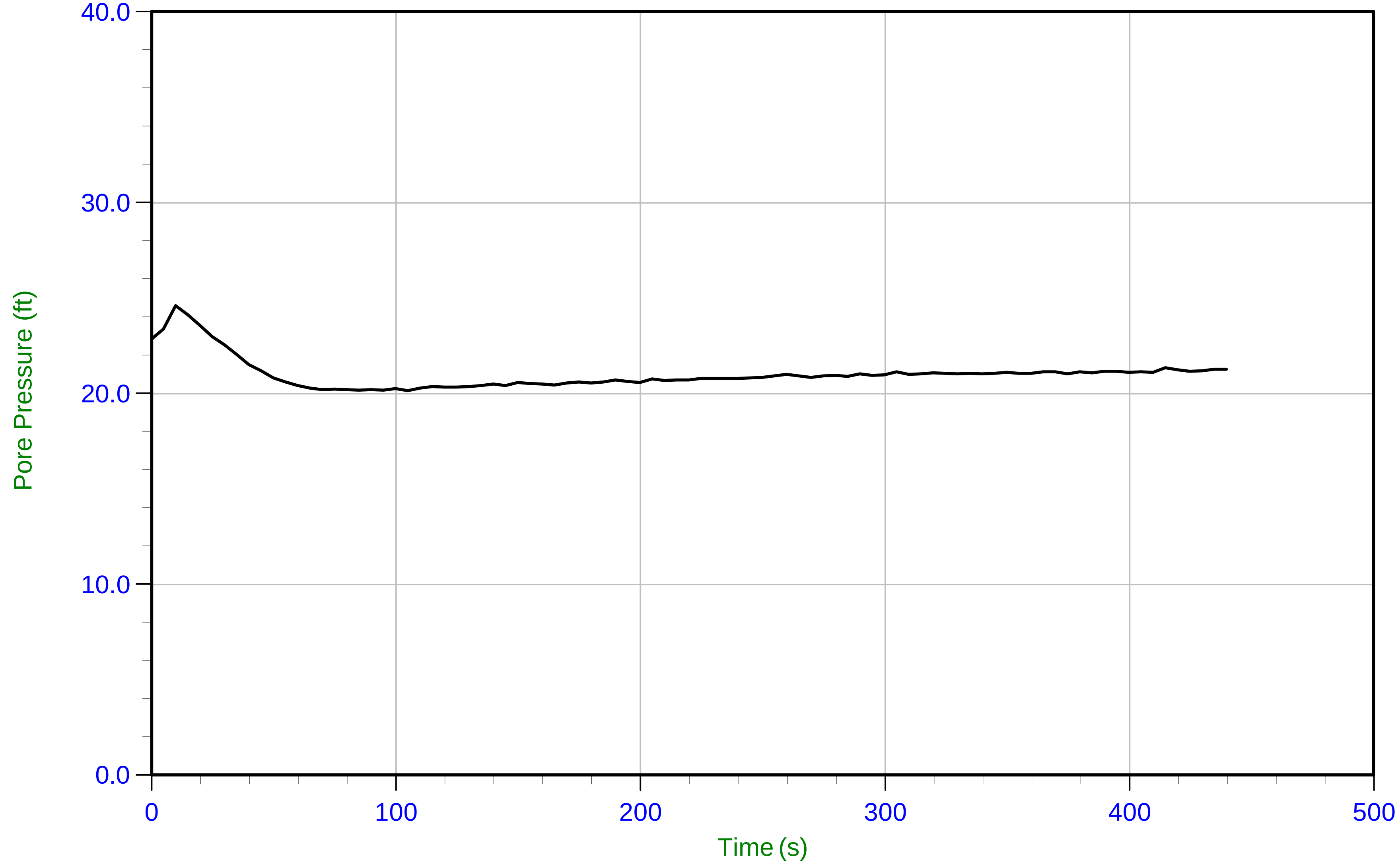
u Min: -15.3 ft
u Max: 19.4 ft
u Final: 19.0 ft

WT: 3.465 m / 11.367 ft
Ueq: 19.0 ft

Pacific Crest Engineering

Job No: 19-56179
Date: 11/13/2019 10:35
Site: Gonzales Industrial WWTP

Sounding: CPT-03
Cone: 443:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 19-56179_CP03.PPF
Depth: 13.525 m / 44.373 ft
Duration: 440.0 s

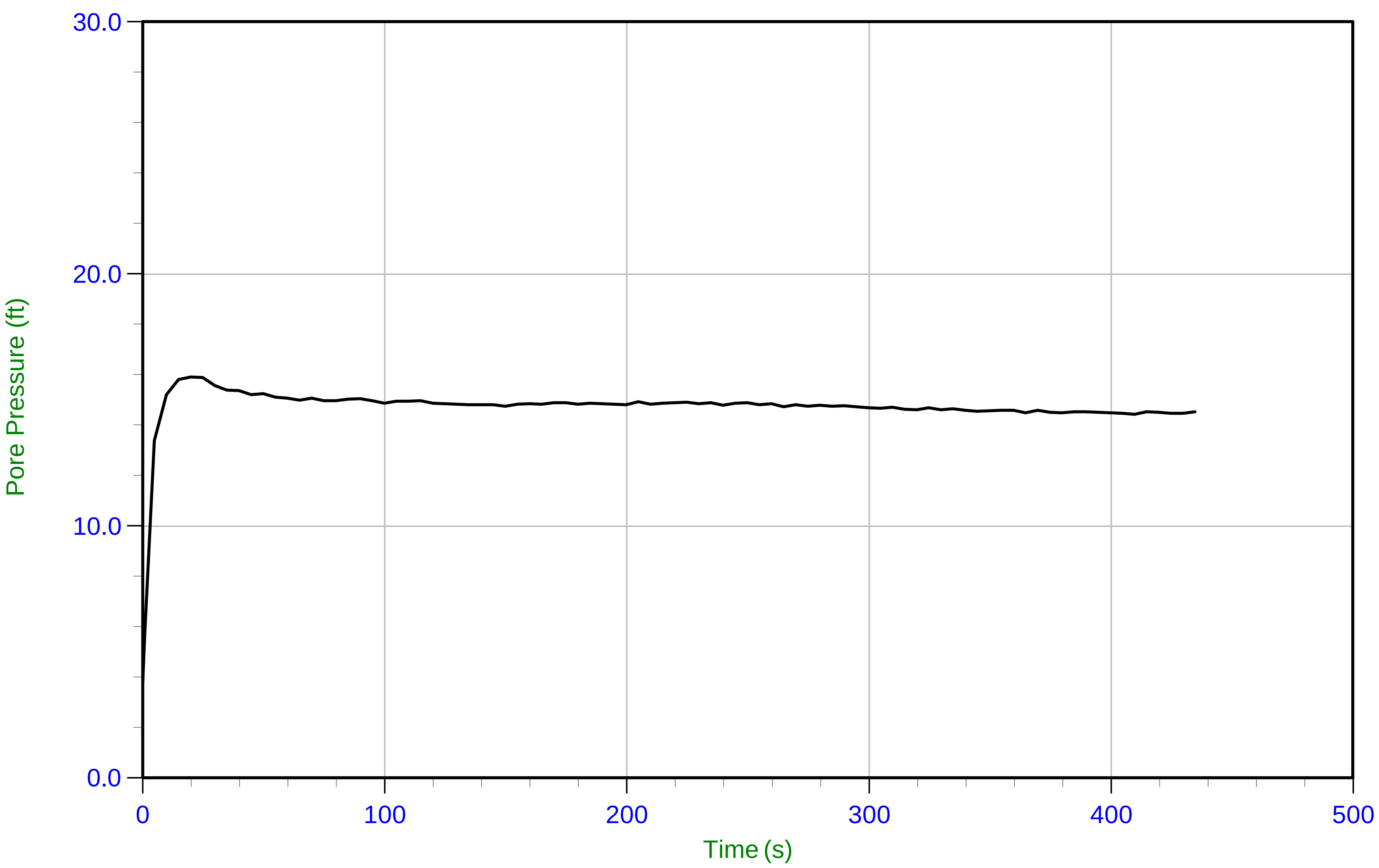
u Min: 20.2 ft
u Max: 24.6 ft
u Final: 21.3 ft

WT: 7.041 m / 23.099 ft
Ueq: 21.3 ft

Pacific Crest Engineering

Job No: 19-56179
Date: 11/13/2019 11:29
Site: Gonzales Industrial WWTP

Sounding: CPT-04
Cone: 443:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 19-56179_CP04.PPF
Depth: 11.350 m / 37.237 ft
Duration: 435.0 s

u Min: 3.8 ft
u Max: 15.9 ft
u Final: 14.5 ft

WT: 6.937 m / 22.757 ft
Ueq: 14.5 ft

APPENDIX C

Logs of Test Borings – 2005 Study

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 1(04)

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1 2 3 4	1-1 M		Yellowish brown Sandy SILT, sand is very fine grained, damp, firm	ML	7	NP	91.5	6.1	25% Passing #200 Sieve
5 6 7 8	1-2 M		Yellowish to olive brown Sandy SILT, sand is very fine grained, micaceous, damp, stiff		9		90.6	25.2	C= 1310 psf Ø= 17°
9 10 11 12	1-3 M		Olive brown Clayey Sandy SILT, sand is medium to very fine grained, moist, stiff	ML	9		92.7	25.6	90% Passing #200 Sieve Qu=2450 psf
13 14 15 16 17 18	1-4 M		Grey mottled with brown Sandy SILT, sand is very fine grained, micaceous, damp, stiff	ML	14		93.2	23.9	67% Passing #200 Sieve
19 20 21 22	1-5 M		Grey CLAY with very fine grained micaceous sand, moist, stiff	CL	12	24	76.3	38.8	97% Passing #200 Sieve
23 24			▼						

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** New Grit Separator and Pond Expansion Gonzales, California	Figure No. 4 Project No. 04108 Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 1(04)

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				MH					
25	1-6 M		Grey SILT with very fine grained micacoues Sand and random gravels to 1", moist, stiff		14		84.8	33.1	74% Passing #200 Sieve
26									
27									
28									
29									
30	1-7 M		Grey SILT with sand, sand is very fine grained, moist, stiff						
31			Olive brown Silty SAND, sand is medium to very fine grained, sub-angular, moist, medium dense	SM	11		95.4	27.8	25% Passing #200 Sieve
32									
33			Auger pushing through soils from 31 1/2 to 38 feet.						
34									
35									
36									
37									
38									
39									
40	1-8 M		Grey Silty SAND, Sand is well graded, sub angular, saturated, medium dense	SW	19		114.2	17.1	4% Passing #200 Sieve
41									
42									
43									
44									
45			Boring Terminated at 45'						
46									
47									
48									

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LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 2(04)

Depth (feet)	Sample No . and Type	Sym bol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				SW					
1	2-1 M		Light yellowish brown SAND, Sand is medium to very fine grained, sub-angular, damp, medium dense		13		92.7	4.6	3.7% passing #200 sieve
2									
3									
4									
5	2-2 M		Light yellowish brown SAND, Sand is medium to very fine grained, sub-angular, damp, loose		7		90.6	4.5	
6									
7									
8									
9									
10	2-3 M		Light yellowish brown SAND, Sand is medium to very fine grained, sub-angular, damp, loose		10		97.1	6.2	
11									
12									
13									
14									
15	2-4 M		Light yellowish brown SAND, Sand is medium to very fine grained, sub-angular, damp, medium dense		27		111.3	5.0	
16									
17			▼						
18									
19									
20	2-5 M		Greyish brown SAND with some gravel, Sand is medium to very fine grained, sub-angular, saturated, medium dense		11		101.0	22.2	
21									
22			Boring Terminated at 21 1/2'						
23									
24									

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 6
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 3

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				ML					
1									
2	3-1 M		Brown Clayey Sandy SILT, Sand is fine grained, moist, very stiff		23	NP	97.7	7.6	
3									
4				SW					
5	3-2 M		Light yellowish brown SAND, Sand is medium to very fine grained, damp, medium dense		13		95.0	3.8	
6									
7									
8									
9									
10	3-3 M		Light yellowish brown SAND with gravel, Sand is well graded, sub-angular, gravels are to 1/2", sub-angular, moist and loose		10		91.4	7.2	
11									
12				SM					
13									
14									
15	3-4 M		Grey Silty SAND, Sand is medium dense to fine grained, sub-angular, moist, medium dense		23		92.0	25.1	
16									
17									
18									
19									
20	3-5 M		Grey Silty SAND with gravel, Sand is well graded, sub-angular, gravels are to 1/2", saturated, dense		32		107.7	18.1	
21									
22									
23									
24									

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 7
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 3

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				SM					
25									
26									
27									
28									
29	3-6 B		Grey Silty SAND with gravel, gravels are to 1", Sands are well graded, sub-angular, saturated						
30			Boring Terminated at 30'						
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 8
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 4

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				MC					
1	4-1 M		Yellowish brown Sandy SILT, Sand is very fine grained, micaceous, damp, stiff		9		90.5	21.6	
2									
3				SW					
4									
5	4-2 M		Light yellowish brown SAND, Sand is medium to fine grained, sub-angular, damp, loose		10		94.0	17.7	
6									
7									
8									
9									
10	4-3 M		Light yellowish brown SAND, Sand is medium to fine grained, sub-angular, damp, medium dense		13		91.1	7.7	
11									
12									
13									
14									
15									
16									
17									
18									
19									
20	4-4 M		Light yellowish brown SAND, Sand is medium to fine grained, sub-angular, damp, medium dense		27		105.3	18.3	
21									
22			Boring Terminated at 21 1/2'						
23									
24									

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 9
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 5

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	5-1 M		Brown Sandy SILT, sand is fine to very fine grained, damp, stiff	ML	12			15.9	58.6% passing #200 sieve
5	5-1 M		Light yellowish brown SAND, sand is medium to very fine grained, damp, medium dense	SW	13		97.3	7.2	
10	5-3 M		Light yellowish brown SAND, sand is medium to very fine grained, damp, loose		8		84.4	7.8	
			▼						
15	5-4 M		Brownish grey SAND with some Clay, sand is well graded, sub-angular, moist, loose	SP	6		80.5	21.4	
24			Greyish Brown Silty SAND						

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LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 5

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25 26	5-6 T		Greyish brown Silty SAND with grey clay lenses, sand is well graded, sub-angular, moist, loose	SM	7			22.7	
27			Boring Terminated at 26 1/2'						
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 11
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 6

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				ML					
1									
2	6-1 M		Brown Sandy SILT, sand is very fine grained, micaceous, moist, stiff		9		94.8	23.1	
3									
4									
5	6-2 M		Brown Sandy SILT with clay lenses, sand is very fine grained, micaceous, moist, firm		7		88.0	28.8	
6									
7									
8									
9				CH					
10	6-3 M		Brown mottled with grey Silty CLAY, moist, stiff		11	26	83.0	36.7	Qu=2750 psf
11									
12									
13									
14									
15	6-4 M		Brown mottled with grey Silty CLAY, moist, firm		7		73.0	45.1	
16									
17									
18									
19				ML					
20	6-5 M		Brown Sandy SILT, sand is fine to very fine grained, saturated, stiff		9		89.5	29.6	
21									
22			▼						
23									
24									

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LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 6

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			Brown Sandy SILT, moist, stiff,	ML					
25									
26									
27									
28									
29				CL					
30	6-6 T		Brownish Grey Silty CLAY, very moist, firm		8			38.6	
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 13
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 7

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	7-1 M		Brown Silty SAND, sand is medium to fine grained, sub-angular, moist, medium dense	SM	29		110.8	9.1	32.5% Passing #200 Sieve
2									
3									
4				SW					
5	7-1 M		Light yellowish brown SAND, sand is medium to fine grained, sub-angular, damp, medium dense		15		96.1	9.1	
6									
7									
8									
9									
10	7-1 M		Light yellowish brown SAND, sand is well graded, sub-angular, damp, medium dense		16		92.8	4.1	
11									
12									
13									
14									
15			Boring Terminated at 15'						
16									
17									
18									
19									
20									
21									
22									
23									
24									

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Log of Test Borings
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Gonzales, California

Figure No. 14
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 8

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
				SW					
1	8-1 M		Light Yellowish brown SAND, sand is medium to fine grained, sub-angular, moist, medium dense		18		92.1	10.4	
2									
3									
4									
5	8-2 T		Light Yellowish brown SAND, sand is medium to fine grained, sub-angular, moist, loose		8			6.1	
6									
7									
8									
9									
10	8-3 T		Light Yellowish brown SAND, sand is medium to fine grained, sub-angular, moist, medium dense		24			6.6	
11									
12									
13									
14									
15			Boring Termianted at 15'						
16									
17									
18									
19									
20									
21									
22									
23									
24									

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LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 9

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
0				SM					
1	9-1 T		Brown Silty SAND, sand is finegrained, moist, loose		7			12.7	39.8% passing #200 sieve
3				SW					
5	9-2 T		Yellowish brown sand, sand is medium to fine grained, sub-angular, damp, medium dense		11			4.6	
10	9-3 T		Yellowish brown SAND, Sand is medium to fine grained, damp, loose		10			7.7	
15			Boring Terminated at 15'						

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 16
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 10

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
2	10-1 T		Brown SILT with Sand, sand is very fine grained, micaceous, moist, firm	ML	7			23.7	
5	10-2 T		Light brown SAND with grey clay lenses, sand is medium to fine grained, sub-angularm moist, loose	SC	7			14.6	
10	10-3 T		Light yellowish brown SAND, sand is medium to very fine grained, sub-angular, moist, loose	SW	10			4.1	
15			Boring Terminated at 15'						

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 17
Project No. 04108
Date: 02/11/05

LOGGED BY MMZ DATE DRILLED 12/17/04 BORING DIAMETER 6" BORING NO. 11

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1 2 3	11-1 T		Light yellowish brown SAND, sand is medium to fine grained, moist, sub-angular, medium dense	SW	12			6.2	32.5% Passing #200 Sieve
4 5	11-1 T		Brown Sandy SILT, sand is very fine grained, micaceous, very moist, stiff	ML					
6 7 8			Light yellowish brown SAND with Silt, sand is well graded, sub-angular, moist, loose	SM	10			29.3	
9 10 11 12 13 14	11-1 T		Light yellowish brown SAND, sand is well graded, sub-angular, damp, loose	SW	8			3.5	
15 16 17 18 19 20 21 22 23 24			Boring Terminated at 15'						

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Log of Test Borings
New Grit Separator and Pond Expansion
Gonzales, California

Figure No. 18
Project No. 04108
Date: 02/11/05

APPENDIX D

Results of Quantitative Liquefaction Analysis

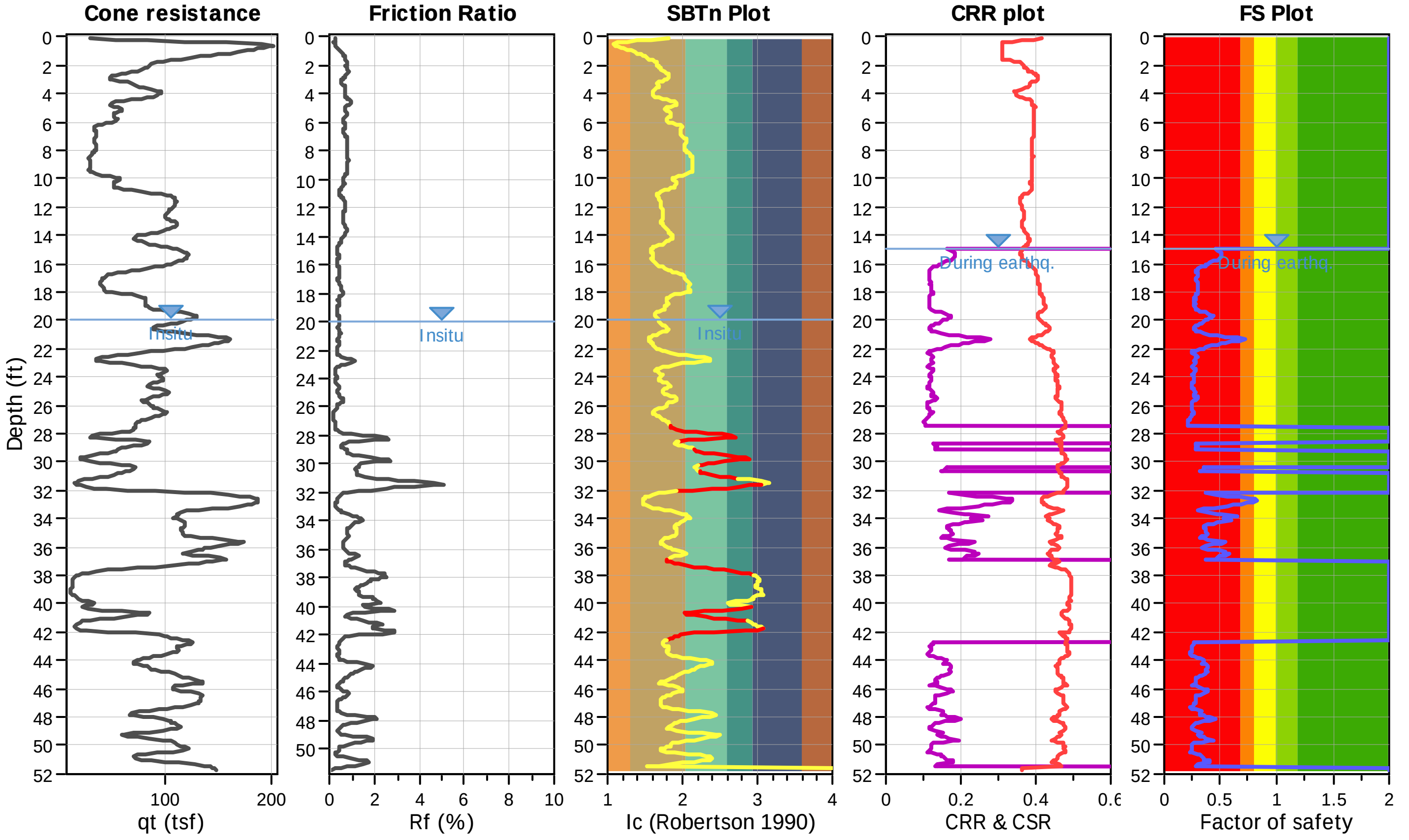
LIQUEFACTION ANALYSIS REPORT

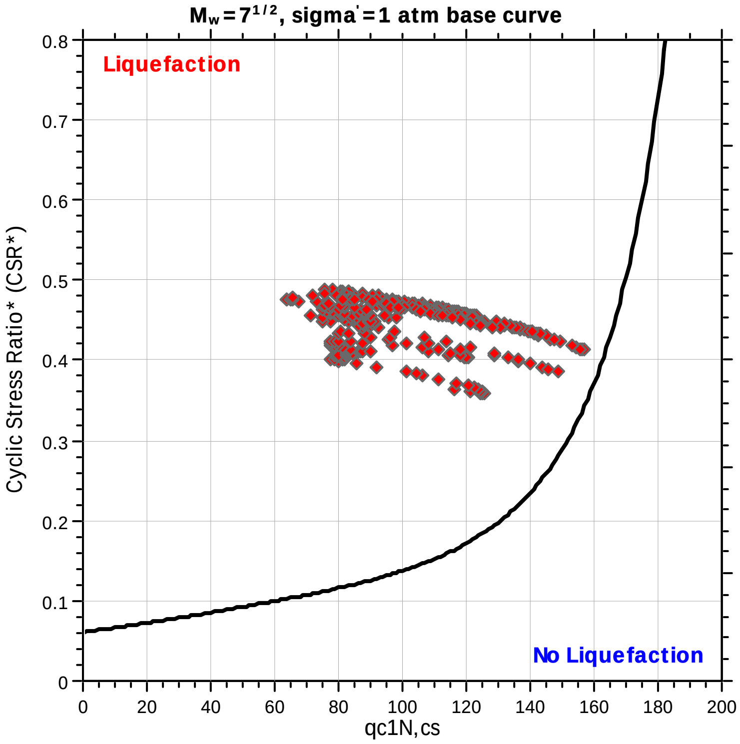
Project title : Gonzales IWW Treatment Plant **Location :**

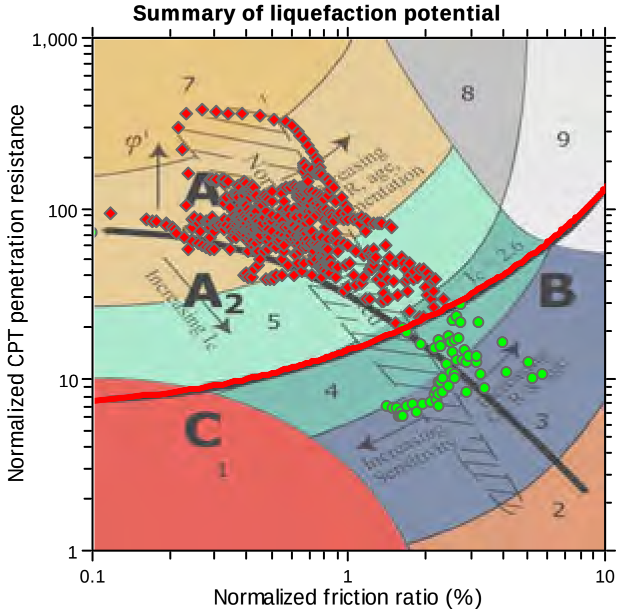
CPT file : CPT 1

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	20.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	6.64	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	No	MSF method:	Method

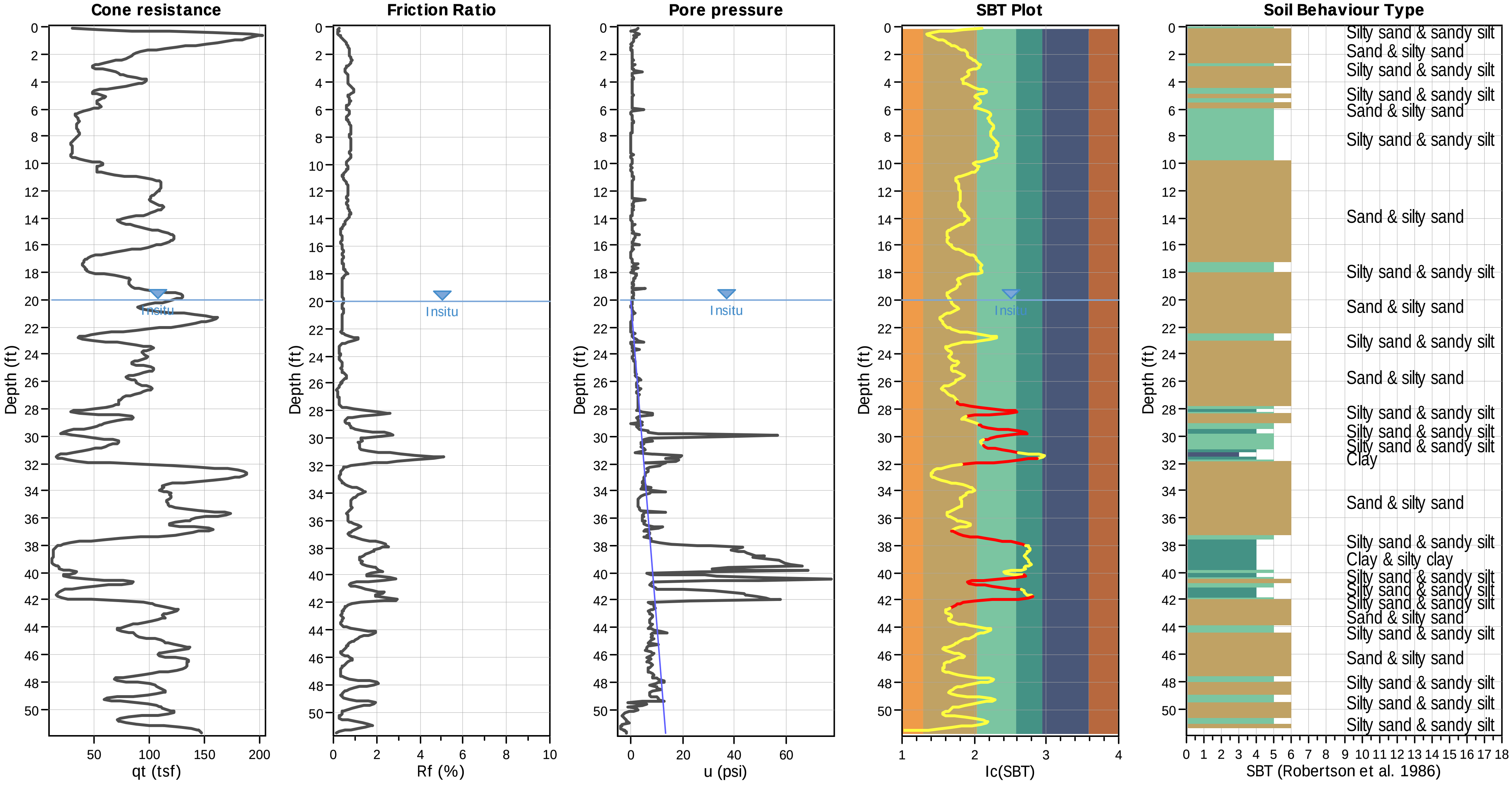

Cone resistance
Friction Ratio
SBTn Plot
CRR plot
FS Plot


$M_w = 7^{1/2}$, sigma' = 1 atm base curve


Summary of liquefaction potential

Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



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Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
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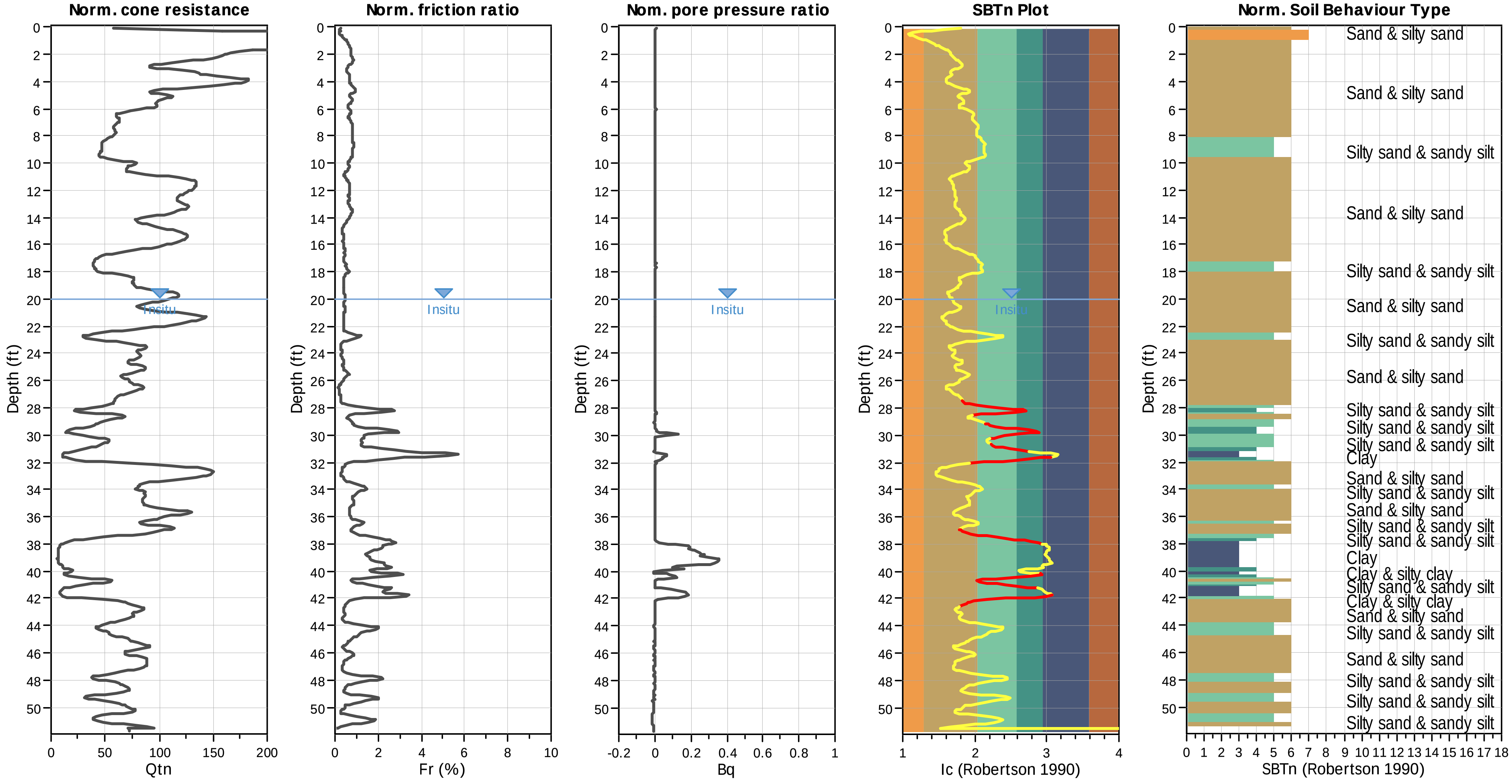
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬛ 8. Very stiff sand to
🟦 3. Clay to silty clay	🟨 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

CPT basic interpretation plots (normalized)



Input parameters and analysis data

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Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
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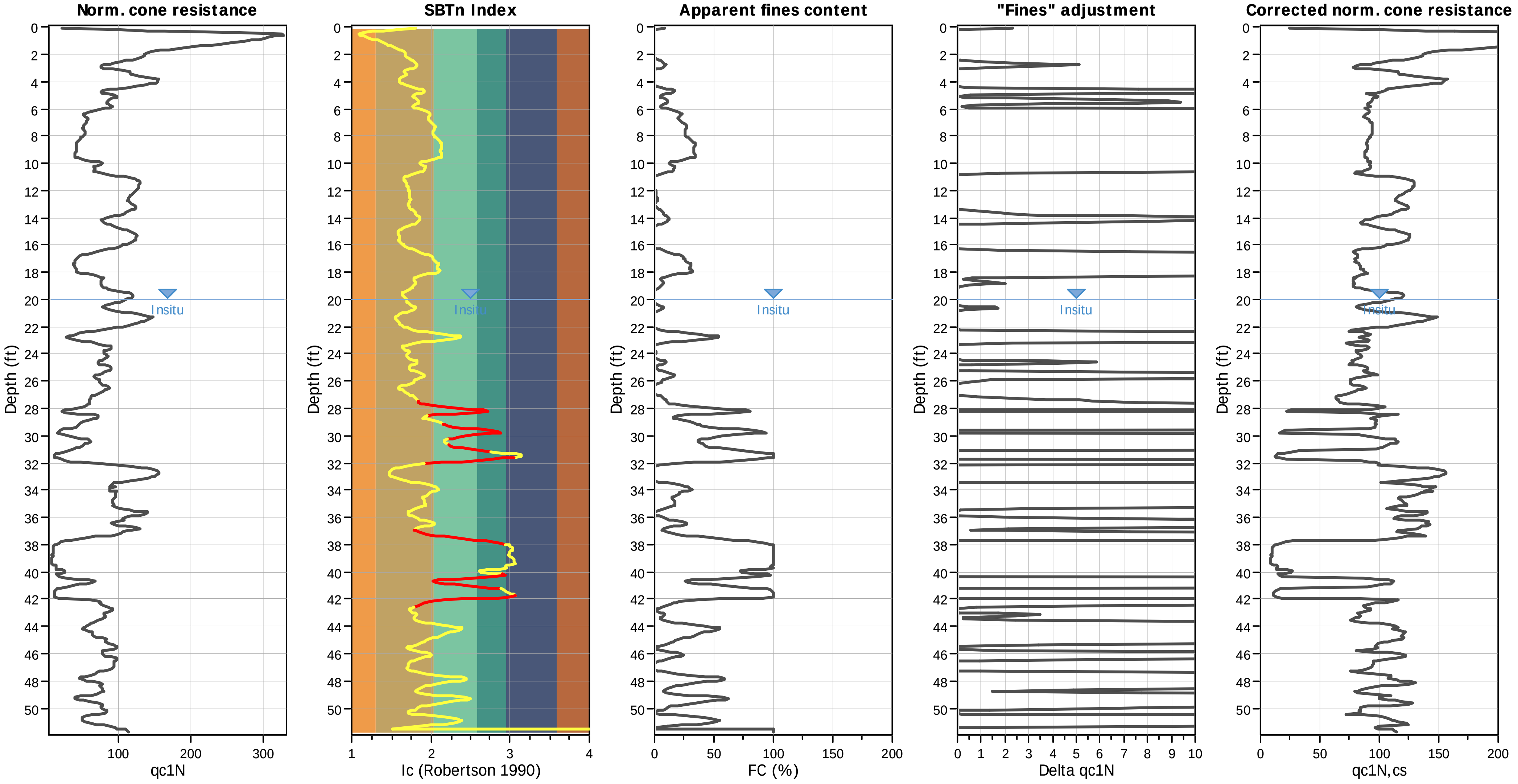
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

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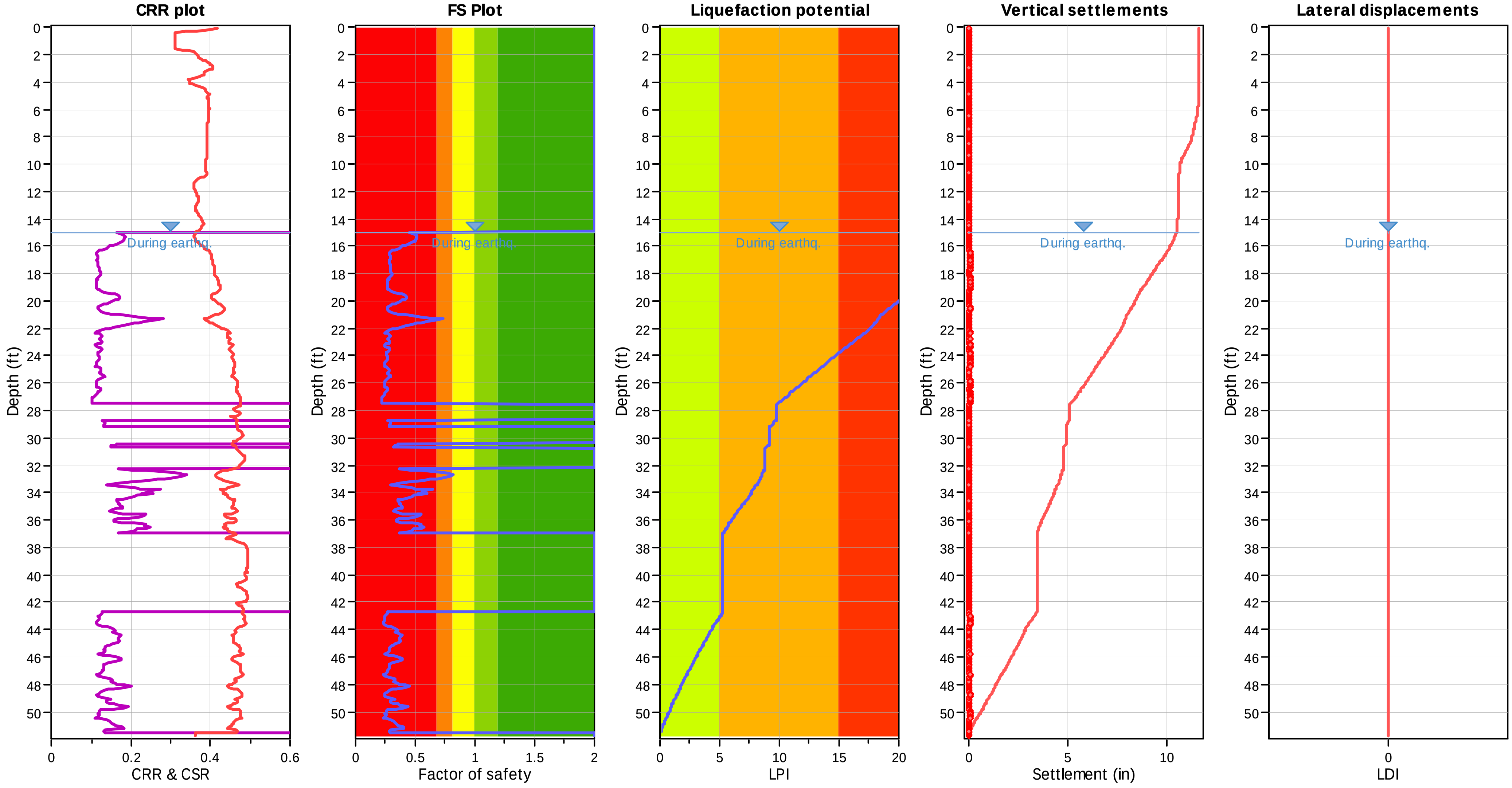
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

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Fines correction method: B&I (2014)
Points to test: Based on Ic value
Earthquake magnitude M_w: 6.64
Peak ground acceleration: 0.66
Depth to water table (insitu): 20.00 ft

Depth to GWT (erthq.): 15.00 ft
Average results interval: 3
Ic cut-off value: 2.60
Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

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Transition detect. applied: Yes
K_σ applied: No
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Limit depth applied: No
Limit depth: N/A

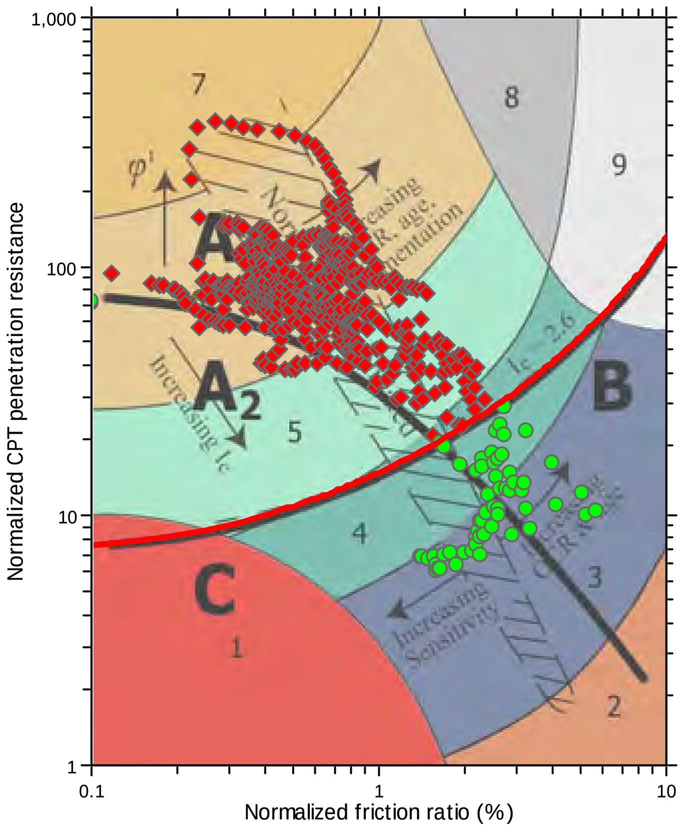
F.S. color scheme

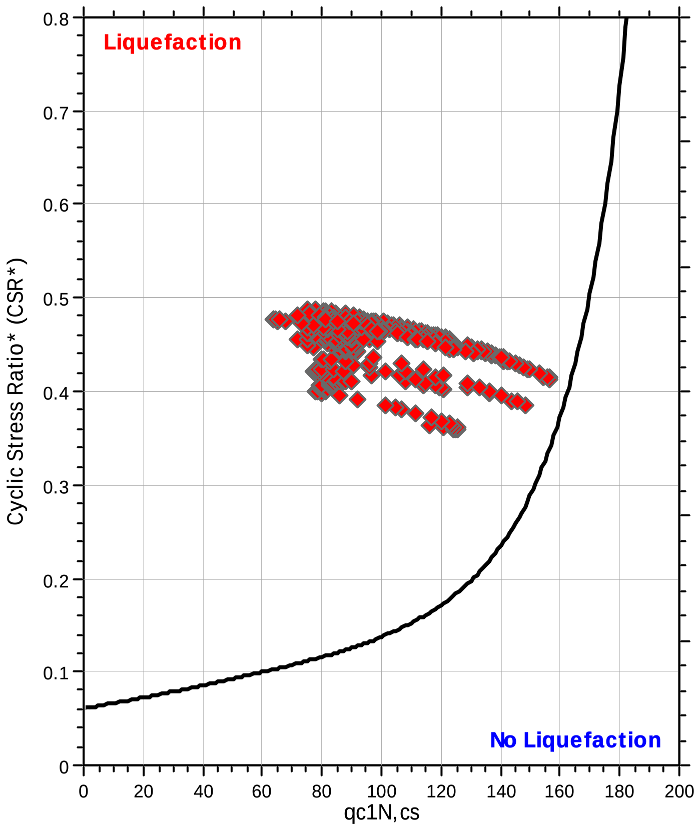
- 🟥 Almost certain it will liquefy
- 🟧 Very likely to liquefy
- 🟨 Liquefaction and no liq. are equally likely
- 🟩 Unlike to liquefy
- 🟩 Almost certain it will not liquefy

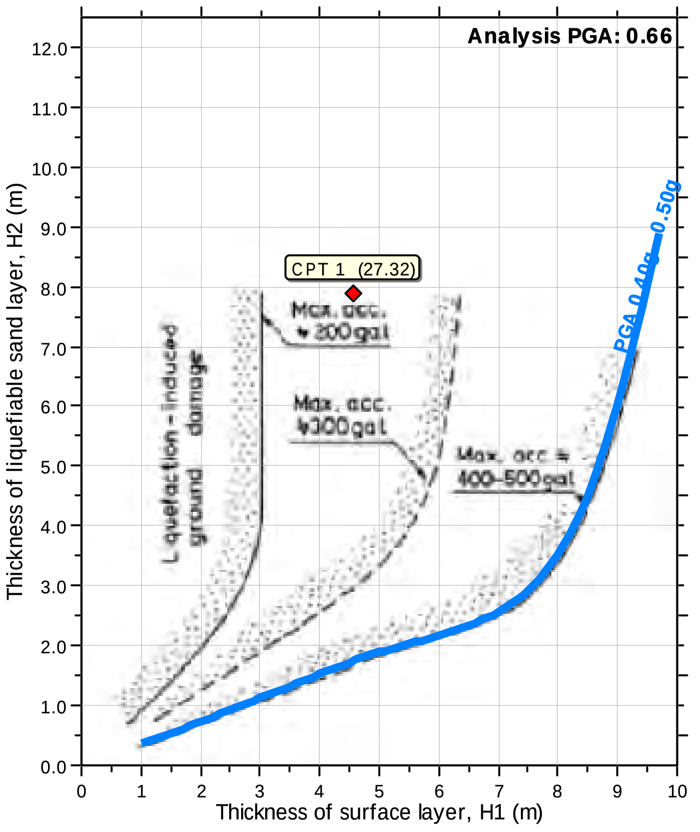
LPI color scheme

- 🟥 Very high risk
- 🟧 High risk
- 🟨 Low risk

Liquefaction analysis summary plots







Input parameters and analysis data

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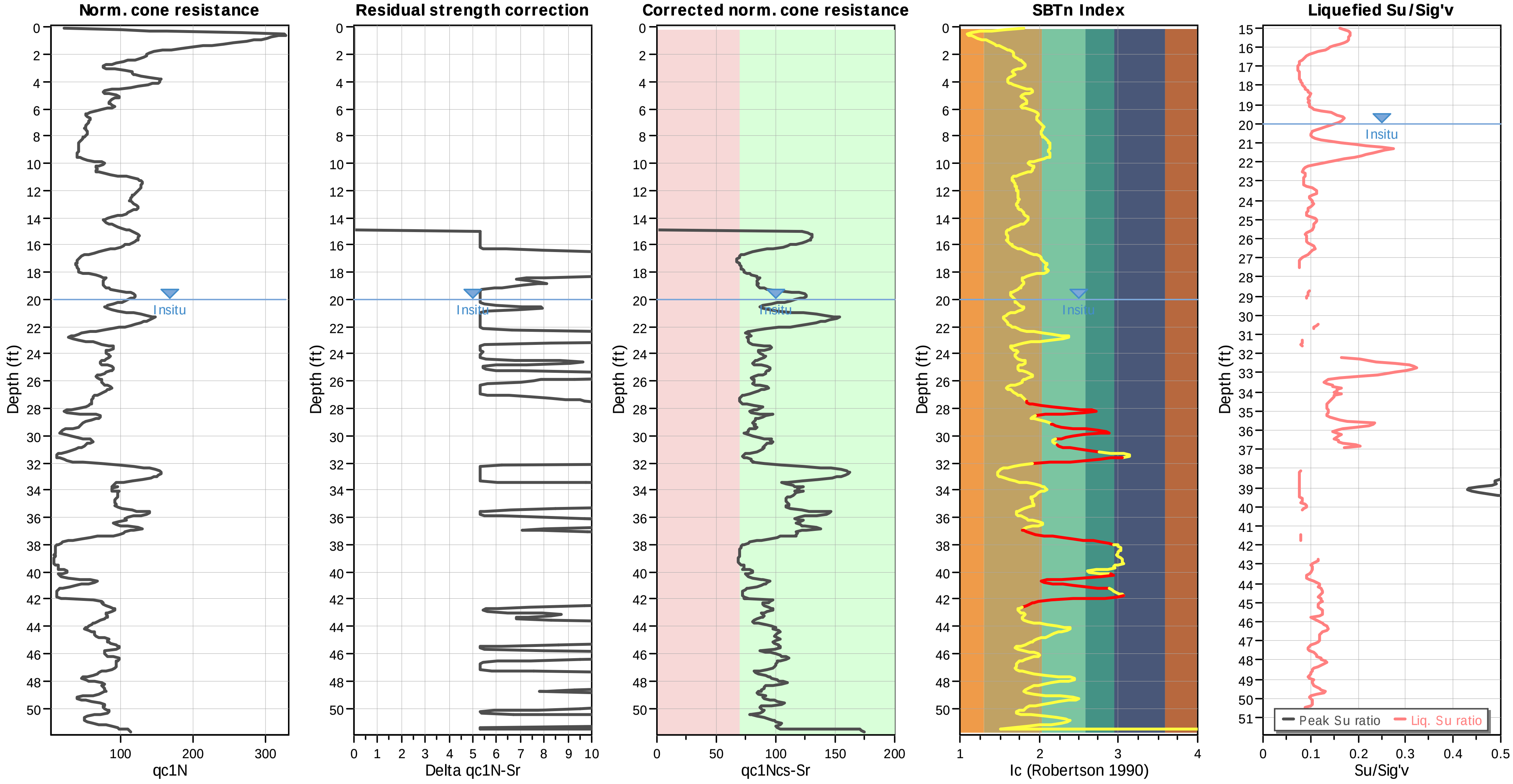
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Idriss & Boulanger (2008))



Input parameters and analysis data

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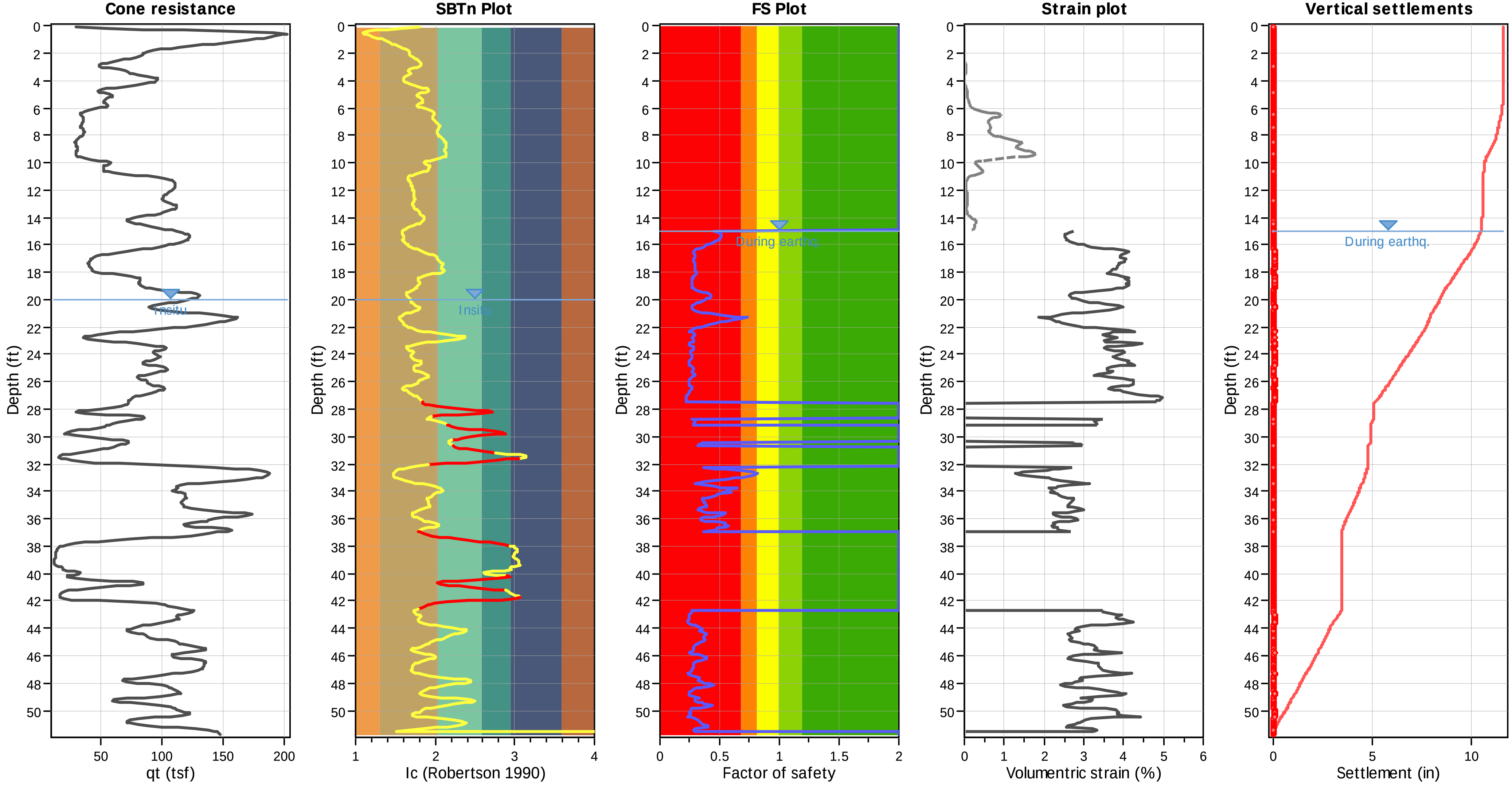
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

LIQUEFACTION ANALYSIS REPORT

Project title : Gonzales IWW Treatment Plant **Location :**

CPT file : CPT - 3

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	23.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
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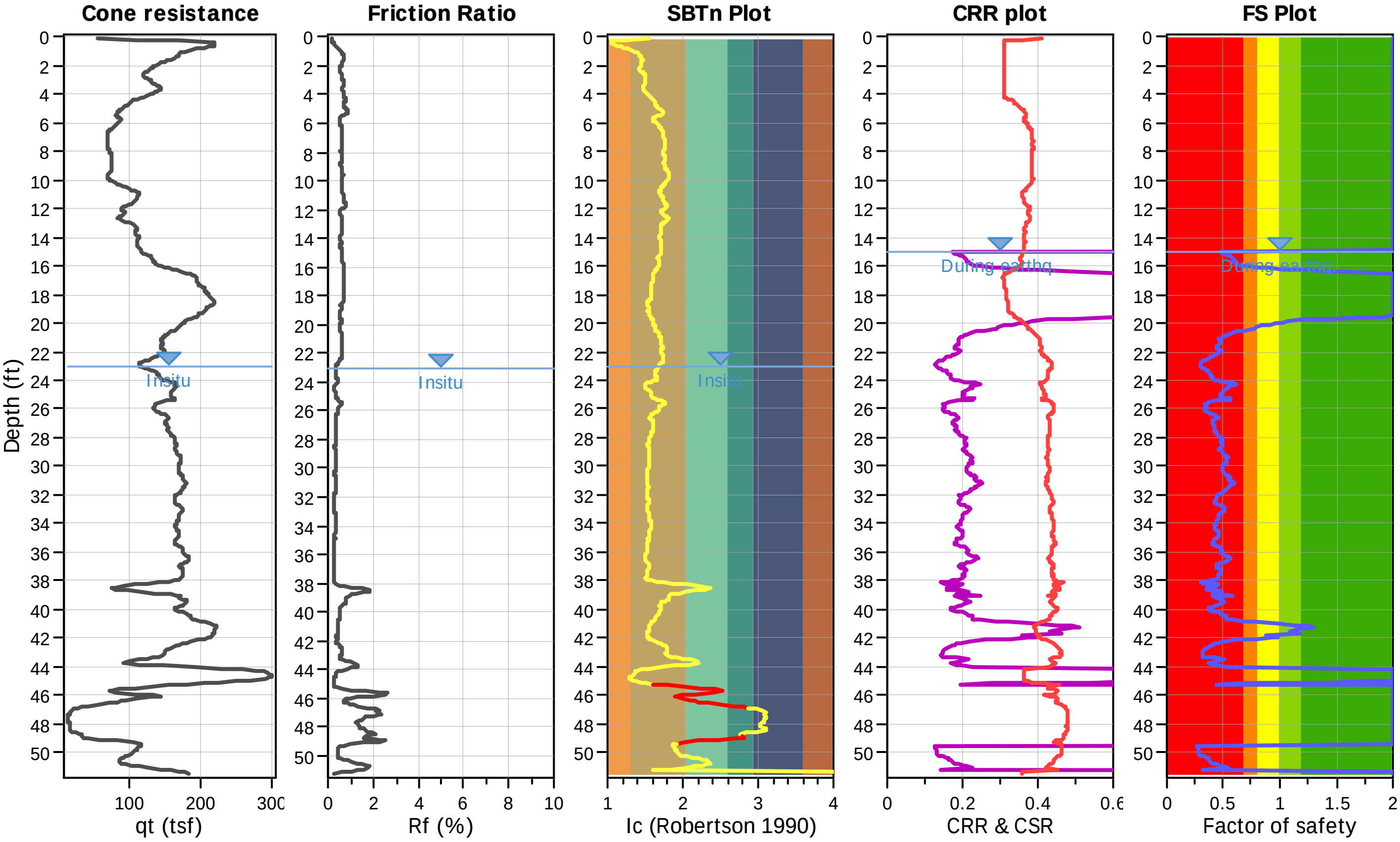

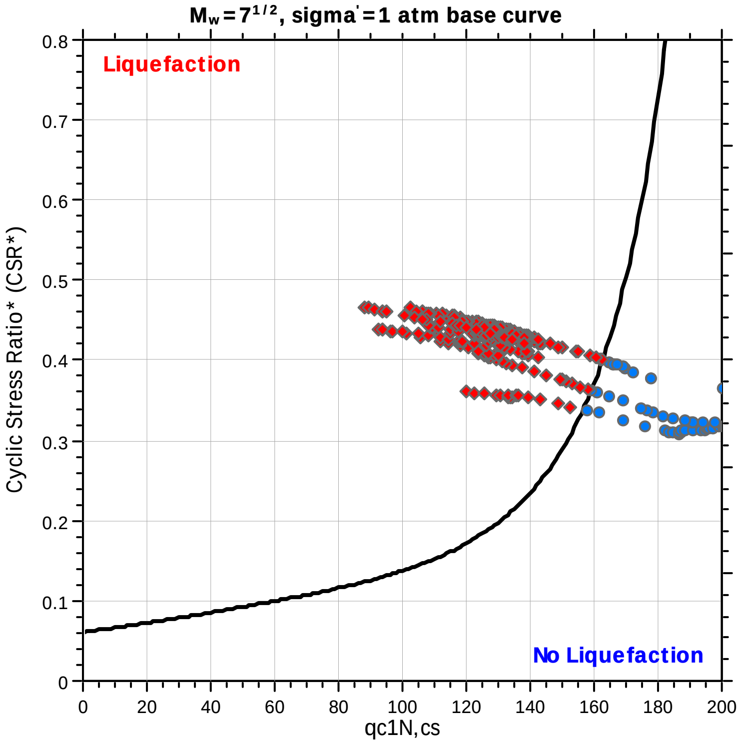

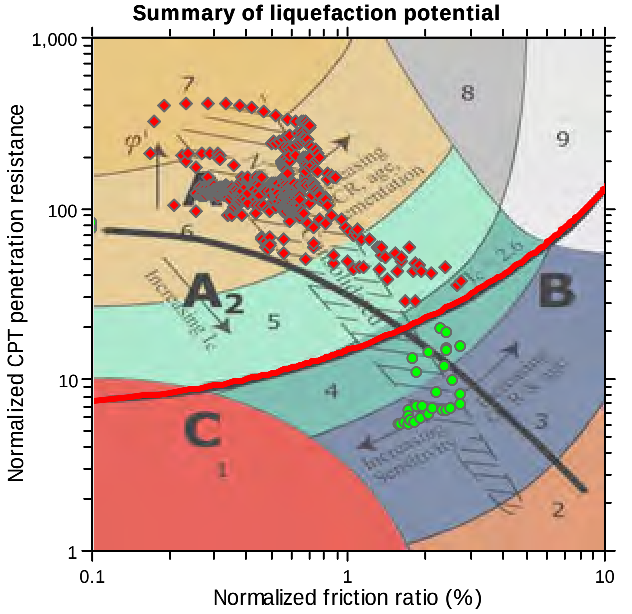

Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
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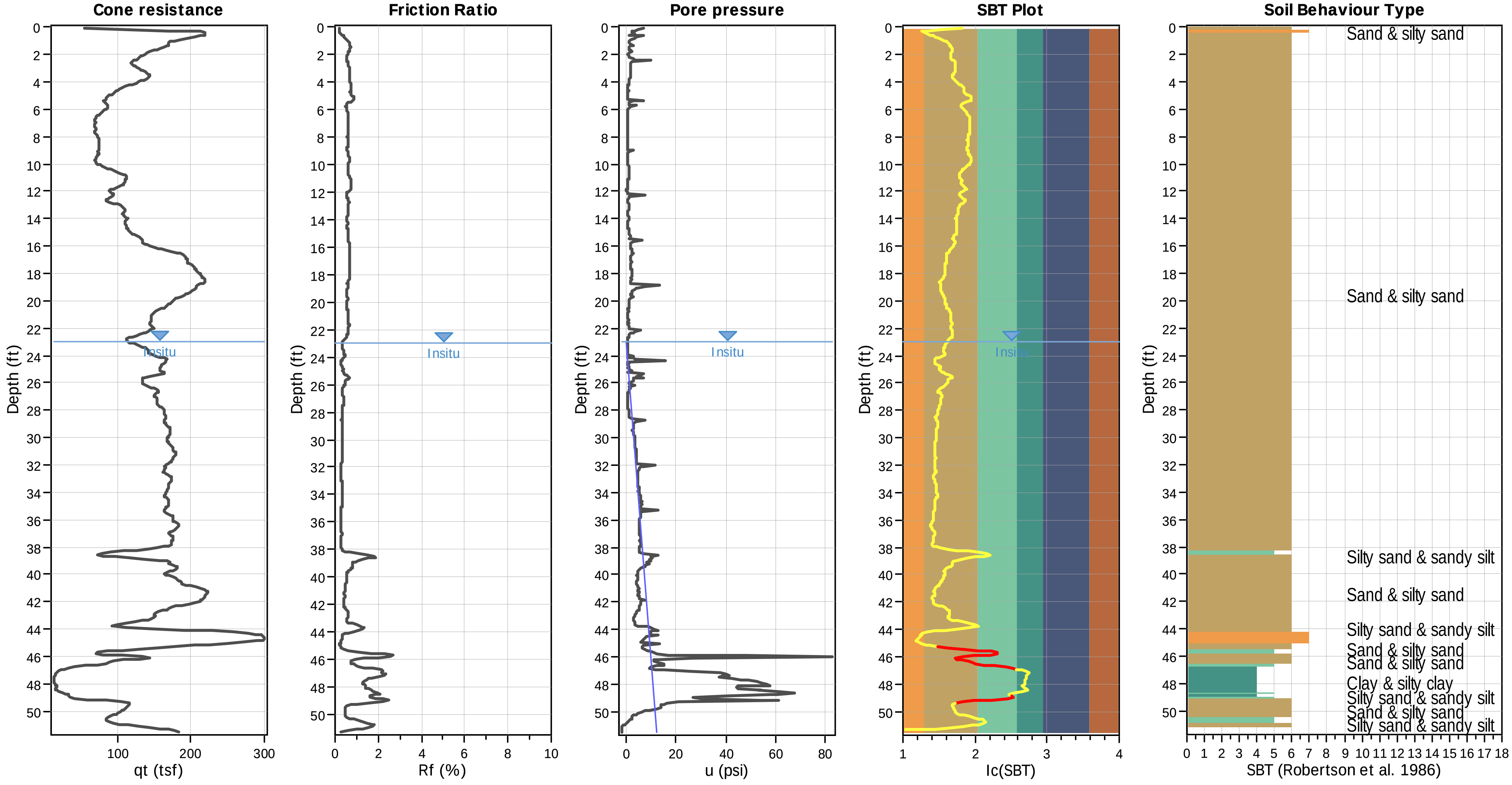
CPT basic interpretation plots



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Fines correction method: B&I (2014)
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Depth to GWT (erthq.): 15.00 ft
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Use fill: No
Fill height: N/A

Fill weight: N/A
Transition detect. applied: Yes
K_σ applied: No
Clay like behavior applied: Sands only
Limit depth applied: No
Limit depth: N/A

SBT legend

🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
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🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravely sand to sand
⬜ 8. Very stiff sand to
⬜ 9. Very stiff fine grained

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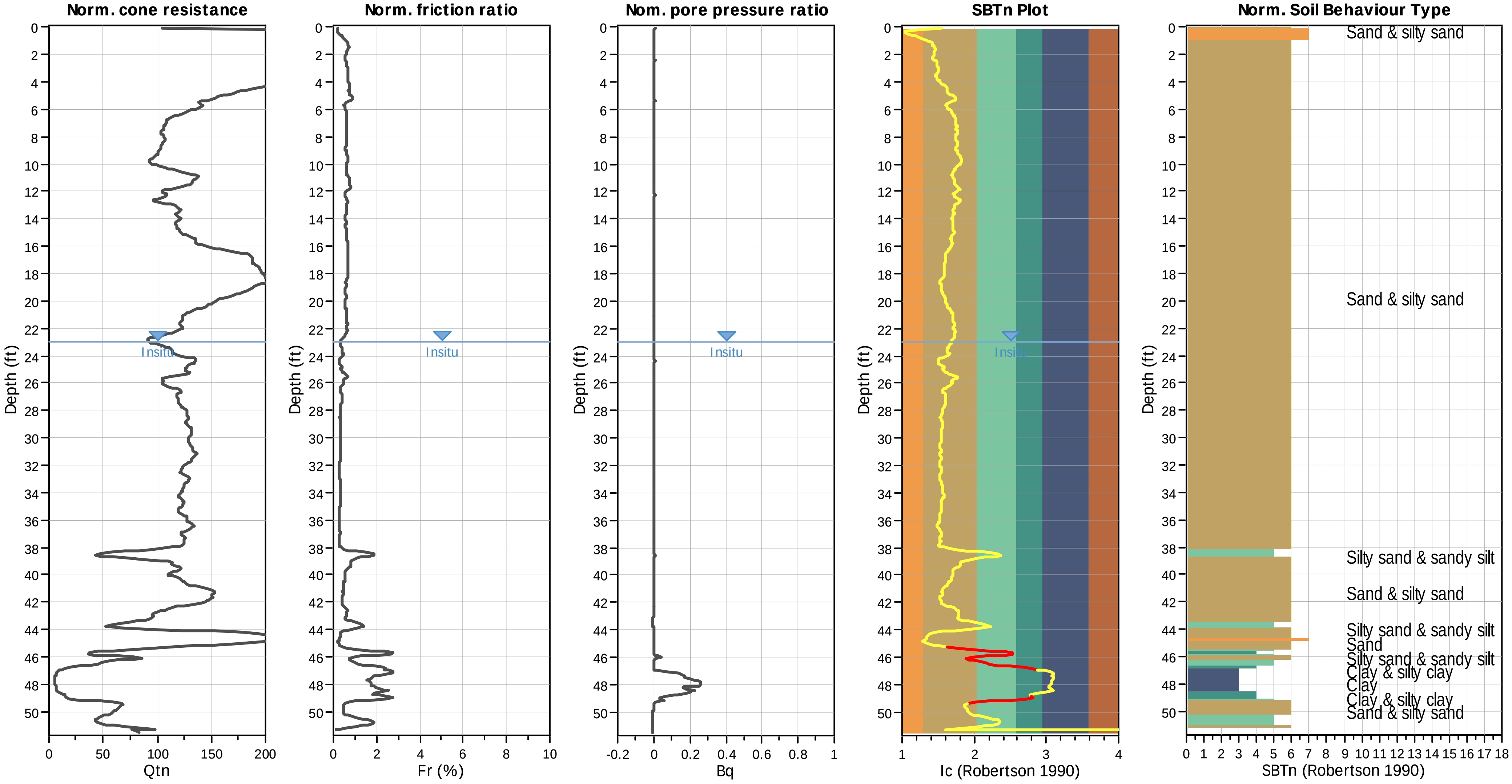
CPT basic interpretation plots (normalized)



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Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
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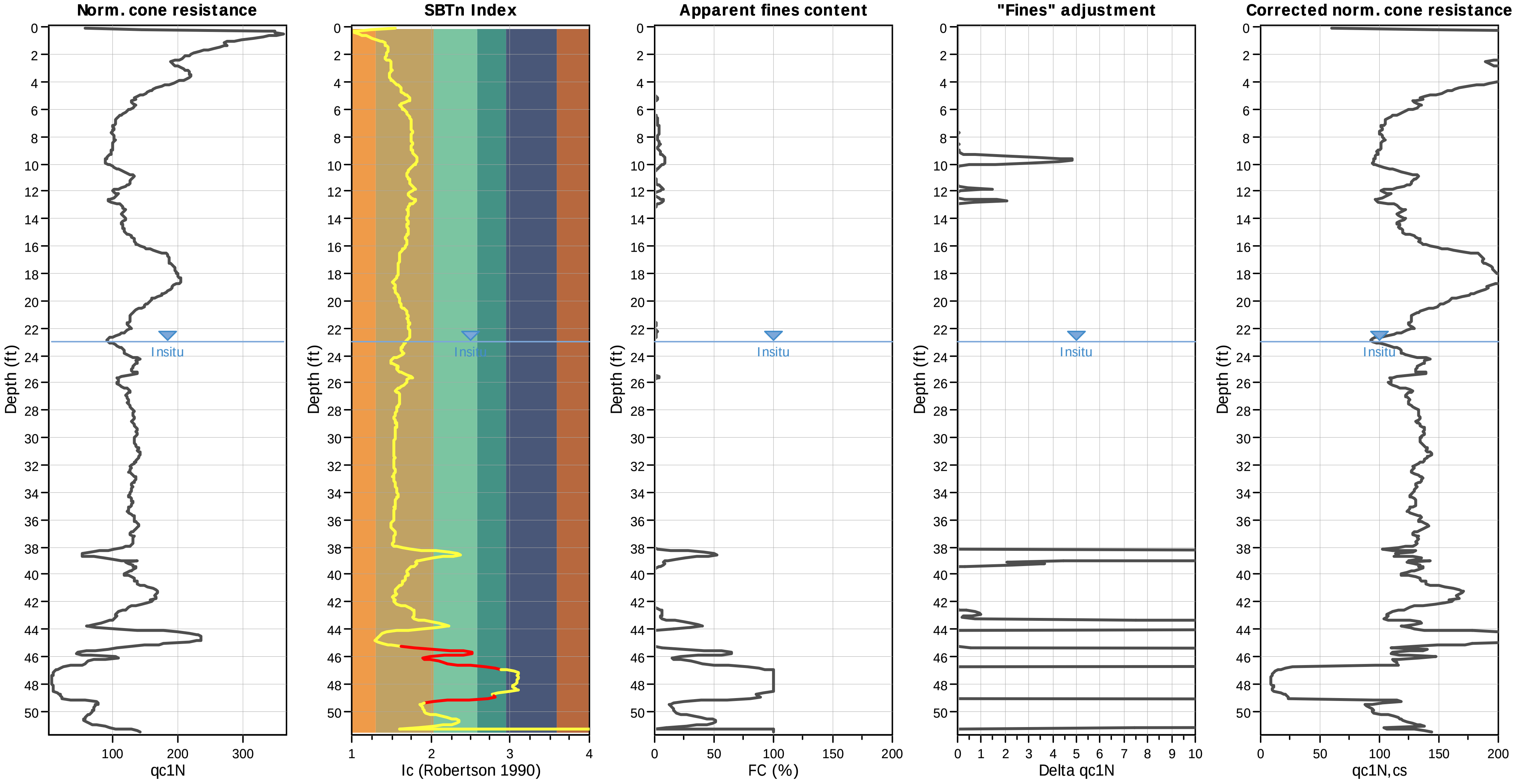
Liquefaction analysis overall plots (intermediate results)



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Earthquake magnitude M_w:	6.64	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	No
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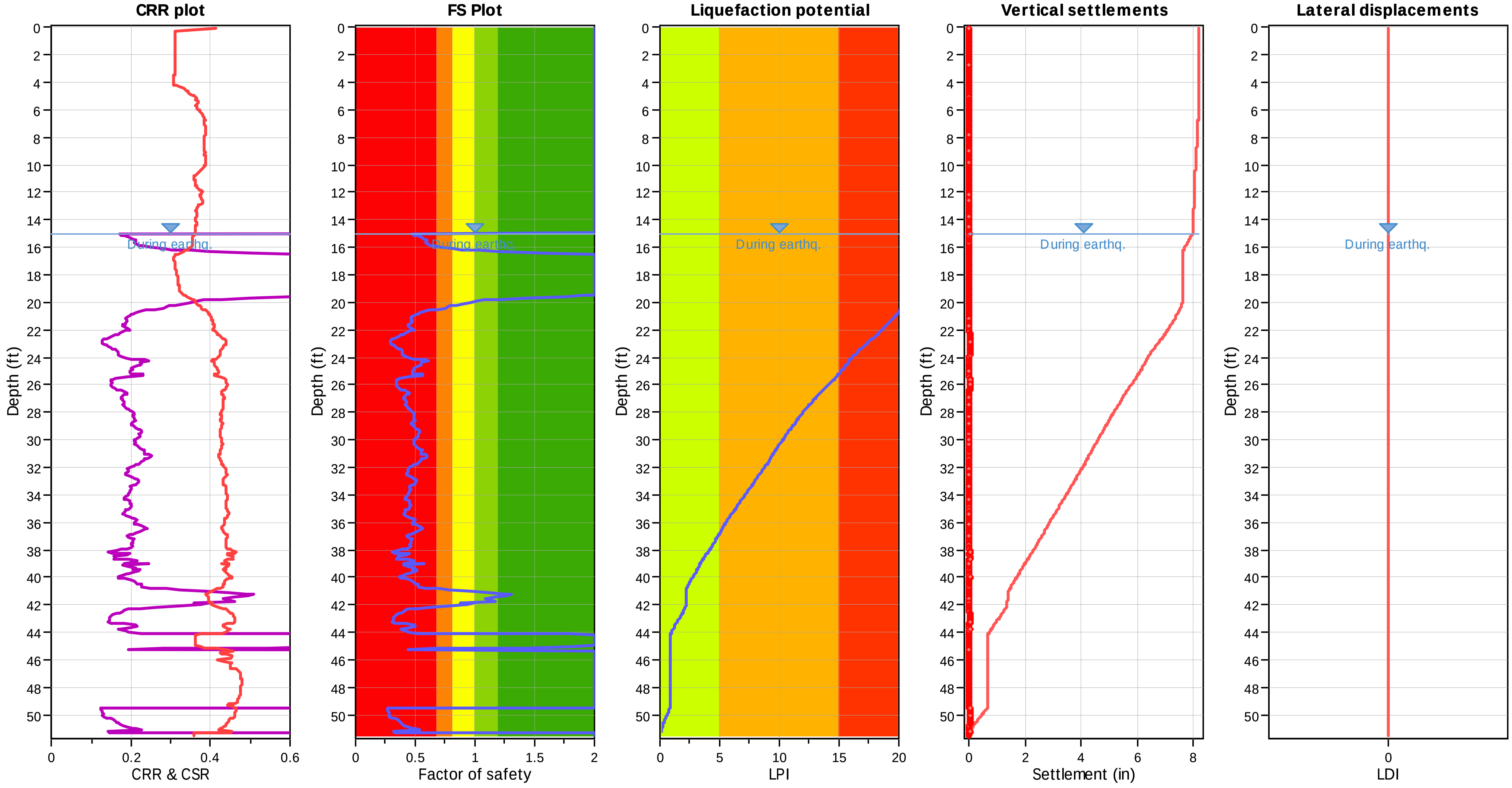
Liquefaction analysis overall plots



Input parameters and analysis data

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Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

Fill weight: N/A
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K_σ applied: No
Clay like behavior applied: Sands only
Limit depth applied: No
Limit depth: N/A

F.S. color scheme

- 🟥 Almost certain it will liquefy
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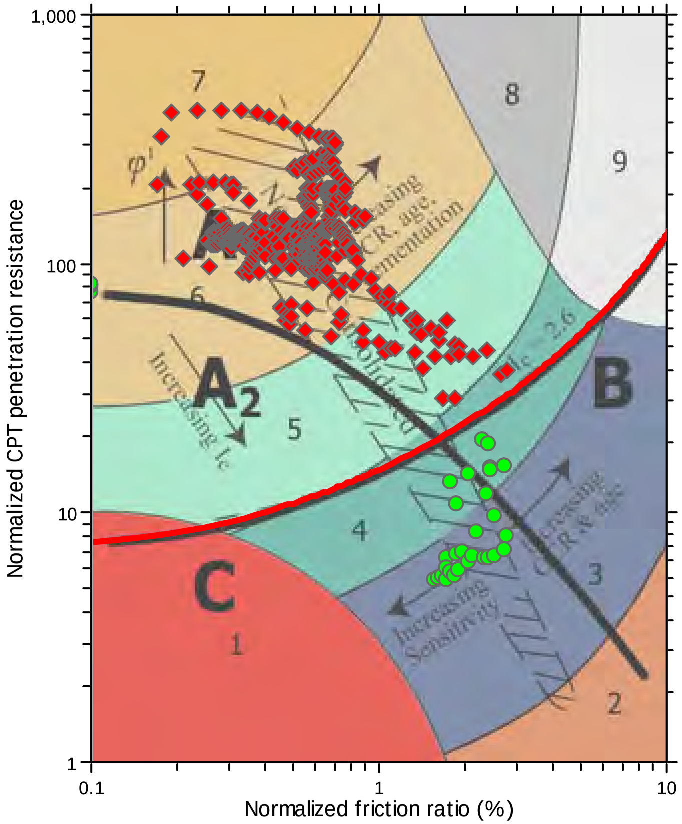
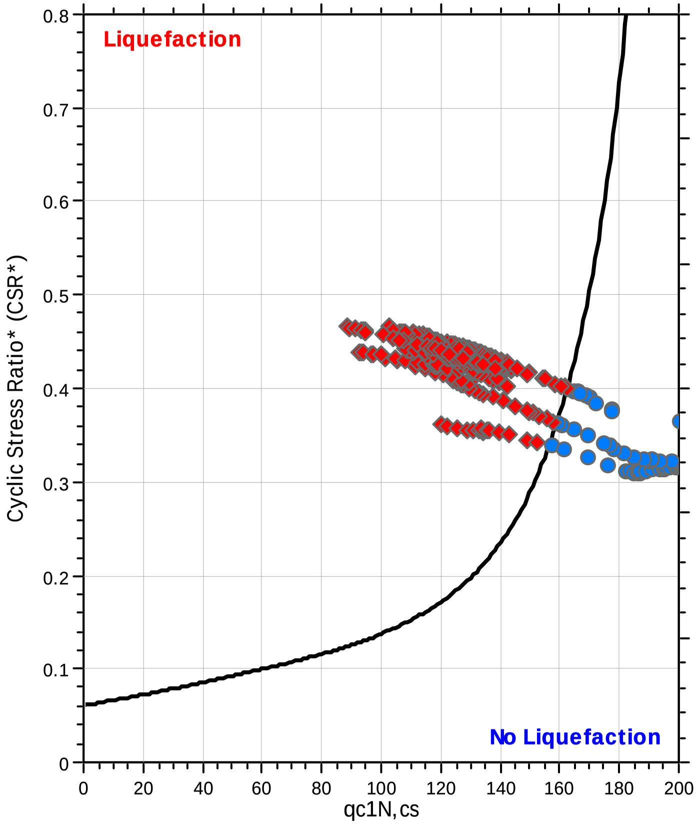
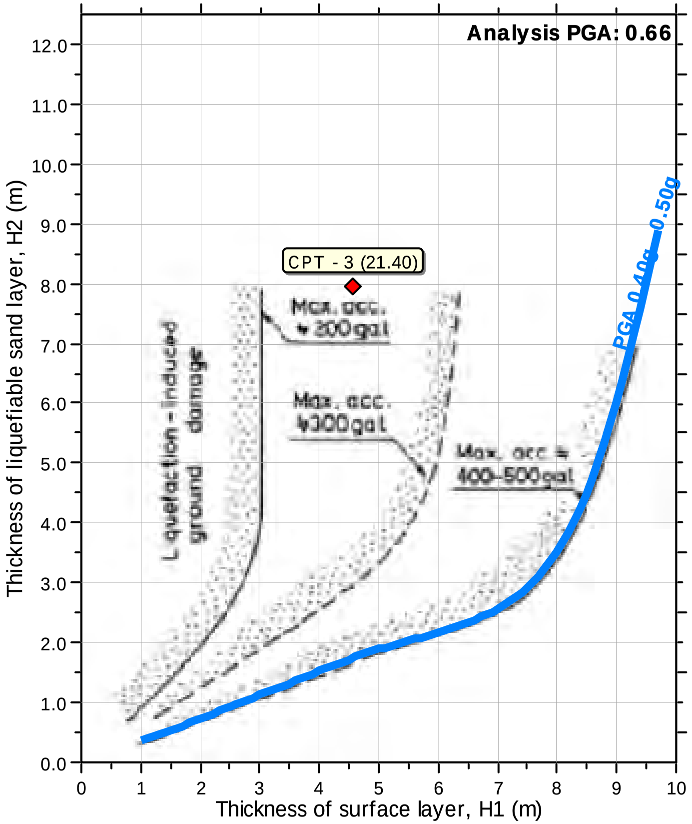
Liquefaction analysis summary plots







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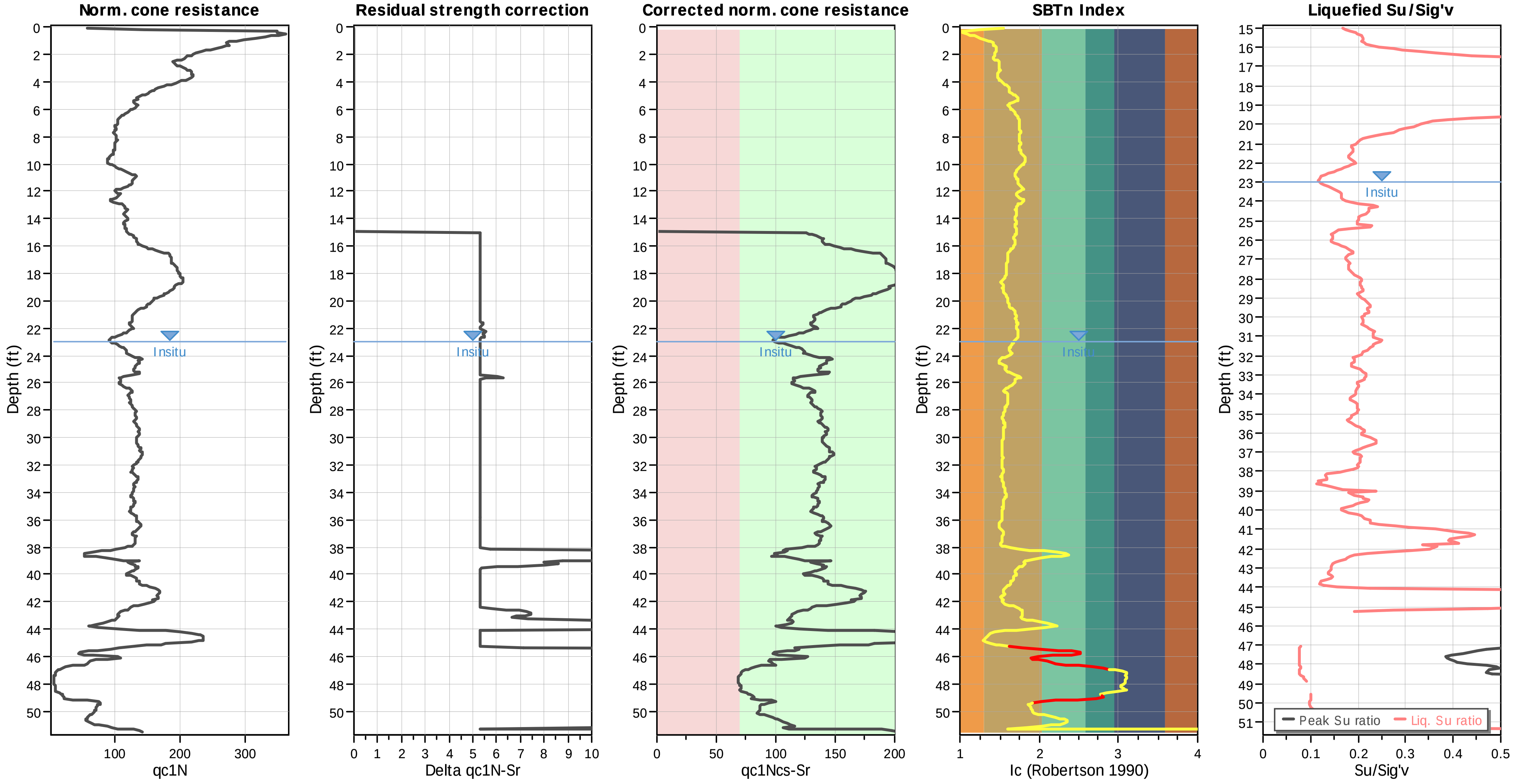

Input parameters and analysis data

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Points to test: Based on Ic value
Earthquake magnitude M_w: 6.64
Peak ground acceleration: 0.66
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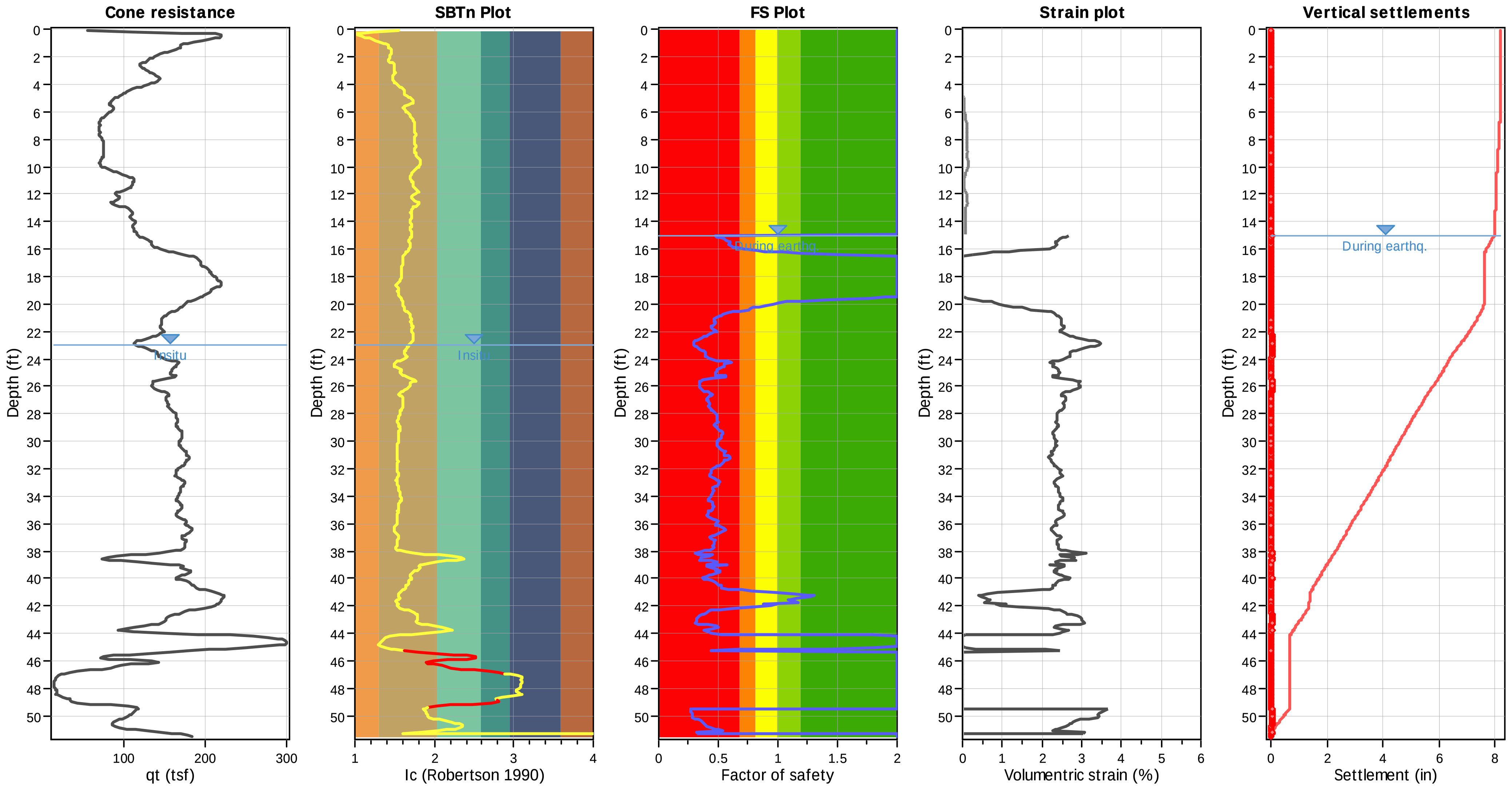
Estimation of post-earthquake settlements



Abbreviations

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I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

DRAFT

City of Gonzales Wastewater Treatment Plant Hydrogeological Study

Prepared for:

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MAY 2019

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Table of Contents

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APPENDICES

FIGURES

TABLES

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1 Introduction

1.1 Purpose

This report addresses a request by the Central Coast Regional Water Quality Control Board (the Board) dated February 13, 2019 following their inspection of the City of Gonzales' (City) wastewater treatment plant (WWTP) on November 16, 2018 to revise and finalize the draft Long-Term Wastewater Management Plan (LWMP) by May 30, 2019. The Board requested that the LWMP include a hydrogeological study evaluating groundwater quality and the direction of groundwater flow to ensure the discharge of waste is in compliance with groundwater specifications stated in Order R3-2006-0005 (Order), Waste Discharge Requirements for City of Gonzales Wastewater Treatment Plant adopted March 24, 2006 (CCRWQCB 2006). The compliance groundwater specifications in the Order are:

- *"The discharge shall not cause nitrate concentrations in groundwater downgradient of the disposal area to exceed 10 milligrams per liter (mg/L) nitrate as nitrogen."*
- *"The discharge shall not cause a significant increase in chemical, mineral, or organic constituent concentrations in underlying groundwater, as determined by comparison of samples collected from wells located upgradient and downgradient of the disposal area."*
- *"Effluent discharge to percolation ponds or infiltrations basins shall not cause underlying groundwater to exceed…" the limits posted in the Central Coast Basin Plan for the 180 Foot Aquifer subbasin in the Salinas Valley Basin.*
- *"The discharge shall not cause concentrations of chemicals and radionuclides in ground water to exceed limits set forth in Title 22, Chapter 15, Articles 4 and 5 of the California Code of Regulations."*

The following sections provide a description of the study site, an overview of the existing groundwater monitoring well network configuration, an evaluation of historical groundwater level, groundwater quality, WWTP flow, WWTP effluent, precipitation, and streamflow data, and recommendations to improve the City of Gonzales' WWTP groundwater monitoring program.

1.2 Background

1.2.1 Location and Description of Study Site

The City of Gonzales WWTP is located approximately 2 miles southwest of the City of Gonzales in Monterey County, California. The WWTP is located off Short Road and consists of approximately 80 acres on Assessor's Parcel Numbers (APNs) 216-032-011, 216-032-001, and 223-011-028. The WWTP plant includes a 1-acre emergency over flow pond, six 2-acre facultative lagoons, two 5-acre polishing ponds, and three 6-acre rapid infiltration disposal basins (Figure 1). The WWTP receives both domestic and industrial wastewater, and is designed and permitted to treat 1.3 million gallons per day (MGD) (CCRWQCB 2019). Currently, the plant receives approximately 1.1 MGD wastewater, with industrial wastewater accounting for about 40% of the daily flow (CCRWQCB 2019).

The Board inspected the City of Gonzales WWTP on November 16, 2018. The Board's letter states that during the inspection, Board staff "observed anoxic odors and highly turbid discolored (grey) water at Ponds 1, 2, 3, and 4… that indicate treatment in the first four treatment ponds in inhibited or disrupted." The Board's letter goes on to state that “Furthermore, with comprised treatment, the City is potentially violating the Order’s Groundwater Specifications B.4, B.5, B.6, and B.7. The conditions observed by Central Coast Water Board Staff indicate the City may be discharging waste that does not comply with the Order and that the discharge of this waste could affect waters of the state” (CCRWQCB 2019).

1.2.2 Wastewater Treatment Plant Effluent and Groundwater Quality

The Waste Discharge Requirements (Order R3-2006-0005) outlines groundwater quality regulations the WWTP shall comply with in Order section B.4–B.7. The constituents for which concentrations in groundwater limits have been established include total dissolved solids, sodium, chloride, sulfate, boron, and nitrate (CCRWQCB 2006). Dudek compiled water quality data of the WWTP effluent from the City’s Discharge Self-Monitoring Reports from 2008 to 2019. Concentrations of these constituents in WWTP effluent and Ponds 7 and 8 have historically been below their respective limits, with the exception of nitrate measured at 13.5 mg/L in the effluent in February 2010 and 15.8 mg/L in Pond 8 in June 2015. No other constituents in the effluent or Ponds 7 and 8 were detected above the limits established in Order R3-2006-0005.

Nitrate concentrations in groundwater have been detected above the limit set forth in the Order in 33 (15%) of the 215 groundwater quality samples collected from 2008 to 2019. Nitrate concentrations detected above the groundwater limit have ranged from 10.1 mg/L to 56.7 mg/L. Boron and chloride have been detected in 1 (0.5%) and 3 (1%), respectively, of the 212 groundwater quality samples collected from 2008 to 2019. Boron and chloride have been detected at maximum concentrations of 0.65 mg/L and 292 mg/L, respectively. Further discussion of groundwater quality is included in Section 4.3.

1.2.3 Existing Groundwater Monitoring Well Network

The WWTP has six existing groundwater monitoring wells on the facility property to measure groundwater levels and groundwater quality. Two monitoring wells, MW-5 and MW-6, are located near the treatment ponds, and four monitoring wells, MW-1, MW-2, MW-3 and MW-4, are located near the disposal fields (Figure 1). Based on information obtained from the City, wells MW-1, MW-2, and MW-3 were installed in the mid-1990s and wells MW-4, MW-5, and MW-6 were installed in the 2000s. Well completion logs were unavailable to confirm the date of installations and construction details such as screened interval, diameter, and total depth.

Dudek conducted a site inspection of the wells on March 25, 2019. The casing material of all six monitoring wells is polyvinyl chloride (PVC) and ranged in diameter from 2-inches to 4-inches. The wells did not have a reference point identified. Dudek marked each well with a reference point for purposes of measuring water elevations against a surveyed elevation and location by filing a notch in the PVC casing and marking with a black sharpie. The total depths of the wells ranged from approximately 25.8 feet to 65.7 feet below land surface. The latitude and longitude, elevation, diameter, total depth, and depth-to-water for the six WWTP monitoring wells are presented in Table 1.

Table 1. Existing Monitoring Wells Location and Construction Details

Well Name	Latitude	Longitude	Well Elevation (feet)	Well Diameter (inches)	Total Well Depth (feet btoc)	Depth-to-Water (feet btoc)	Groundwater Elevation (feet)
MW-1	36.492736	-121.480190	111.87[a]	4	65.7	19.61	92.26
MW-2	36.491667	-121.481762	109.65[a]	4	39.6	8.49	101.16

Table 1. Existing Monitoring Wells Location and Construction Details

Well Name	Latitude	Longitude	Well Elevation (feet)	Well Diameter (inches)	Total Well Depth (feet btoc)	Depth-to-Water (feet btoc)	Groundwater Elevation (feet)
MW-3	36.492610	-121.485452	107.14[a]	3	48.3	13.87	93.27
MW-4	36.494094	-121.482757	109.00[b]	2	27.1	11.25	97.75
MW-5	36.490948	-121.475771	112.00[b]	2	25.8	18.17	93.83
MW-6	36.489137	-121.475130	114.00[b]	2	28.3	11.67	102.33

Source: C+D Consulting Engineers 2001.

Notes: Total depth and depth-to-water well measurements were made by Dudek on March 25, 2019; btoc = below top of well casing.

[a] Elevation from C+D Consulting Engineers 2001.

[b] Elevation estimated from Google Earth 2019.

2 Data Collection

Groundwater level, groundwater quality, WWTP flow, WWTP effluent, precipitation, and streamflow data were collected and analyzed to evaluate spatial and temporal trends in groundwater level and quality, and to characterize groundwater flow and potential influences by rainfall and stream flow. Findings were used to identify potential locations for new monitoring wells to and to evaluate potential impacts of WWTP operations on groundwater quality.

The primary source of groundwater level, groundwater quality, WWTP flow, and WWTP effluent data for this report was from quarterly and annual Discharger Self-Monitoring Reports submitted by the City from September 2008 to March 2019. Discharger Self-Monitoring Reports submitted to the Board prior to September 2008 are available for review in person at the Board office located in San Luis Obispo, California, but are not included in this report. Field sampling and chain-of-custody forms for the time period from March 2017 to December 2018 were supplied by the City for review. Depth-to-water and total well depth measurements at each existing monitoring well were made by Dudek on March 25, 2019. Historical groundwater level and quality data from 1997 to 2001 for monitoring wells MW-1, MW-2, and MW-3 were obtained from *City of Gonzales Monterey County, California Wastewater Treatment Plant Monitoring Well Study* prepared by C+D Consulting Engineers in August 2001 (C+D Consulting Engineers 2001). Groundwater level and quality data were used to calculate the hydraulic gradient (magnitude and direction) and to identify water quality trends beneath the site. Tabulated groundwater level and quality data are presented in Appendix A, and calculated hydraulic gradient data are provided in Appendix B.

Precipitation data were obtained from the National Oceanic and Atmospheric Administration's (NOAA) Climate Data Online tool. Historical rainfall data from June 1930 to April 2019 were downloaded from two rainfall gaging stations at the Salinas Airport (No. USW00023233) and Salinas Number 2 (No. USC00047668) weather stations, located approximately 14 miles and 16.5 miles northwest of the WWTP, respectively (NOAA 2019a, 2019b). Streamflow data from October 1968 to March 2019 were obtained from the U.S. Geological Survey (USGS) National Water Information System Web Interface for the Soledad (No. 11151700) and Chualar (No. 11152300) gaging stations, located approximately 10 miles upstream and 5.5 miles downstream of the WWTP, respectively (USGS 2019a, 2019b).

3 Precipitation and Streamflow

Precipitation and streamflow data from the two weather stations and stream gages were compiled and analyzed to identify climatic trends in the project area. Data recoded over the past 10 years are summarized by water year in Table 2.

According to historical precipitation data recorded over a 10-year period from 2008 to 2018, the average annual water year precipitation for Salinas, California ranges from 11.37 inches per year at Salinas Airport Station to 13.59 inches per year at Salinas No. 2 Station, with approximately 95% of precipitation occurring between the months of October and April. Annual water year precipitation totals recorded over the past 10 years vary from year to year with 2014 being the driest year on average and 2017 being the wettest year on average.

According to historical streamflow data recorded over a 10-year period from 2008 to 2018, the average annual water year stream discharge recorded at the Soledad Station is 126,599.29 acre-feet (AF) and at the Chualar Station is 126,154.20 AF. Similar to the variation observed in annual water year precipitation totals, annual stream discharge recorded over the past 10 years varies from year to year with no flow recorded at either stream gage in 2015 and over 400,000 AF of flow recorded at the Chualar Station in 2011 and 2017.

Table 2. Water Year Total Salinas, CA Precipitation and Salinas River Streamflow

Water Year Ending	Salinas Airport Station Rainfall (inches)	Salinas No. 2 Station Rainfall (inches)	Soledad Stream Gage Flow (AF)	Chualar Stream Gage Flow (AF)
2008	8.88	11.45	138,878.98	111,634.39
2009	11.36	12.83	57,258.35	28,294.77
2010	16.93	19.43	171,630.33	236,860.34
2011	15.55	–	327,358.61	455,654.22
2012	10.36	8.53	101,794.71	47,804.59
2013	9.03	10.08	104,251.28	52,649.20
2014	5.87	7.97	7,608.02	19,69.17
2015	9.94	13.08	0.00	0.00
2016	13.47	18.15	0.00	430.33
2017	16.49	20.78	362,515.74	404,939.96
2018	7.16	–	121,296.22	47,459.27
Average	**11.37**	**13.59**	**126,599.29**	**126,154.20**

Source: NOAA 2019a; NOAA 2019b; USGS 2019a; USGS 2019b.
Notes: AF = acre-feet; dash (–) indicates data are not available.

Historical precipitation and streamflow data indicates that the amount of precipitation recorded at the Salinas weather stations does not always correlate with stream discharge measured at the Soledad and Chualar gaging stations, as evidenced by the 2015 and 2016 water years. Salinas River stream flows along the reach from the Soledad Gaging Station to the Chualar Gaging Station are influenced by releases from Lake San Antonio and Lake Nacimiento. Both reservoirs release to the Salinas River approximately 55 miles upstream and south of the WWTP.

4 Evaluation of Groundwater Level and Quality Trends

4.1 Groundwater Elevations

Historical depth-to-water data from March 1997 to March 2019 for the six monitoring wells located at the WWTP were obtained from the City. The depths-to-water measured at wells MW-1, MW-2, and MW-3 from 1997 to 2015 ranged from approximately 3.75 feet to 30 feet below land surface (Figure 2). A marked decrease of approximately 19 to 43 feet in groundwater levels was observed at wells MW-1, MW-2, and MW-3 from September 2015 to December 2016, while wells MW-4, MW-5, and MW-6 were observed "dry". Water levels rebounded after December 2016 to levels ranging from 13 feet to 30 feet bgs. The reason for the marked declines observed from 2015 to 2017 are not known, but no stream flow was measured at the Soledad and Chualar gaging stations in 2015, and little flow was measured at the Chualar Gaging station in 2016, which may be the reason for the marked declines in groundwater levels and dry conditions observed at the six monitoring wells. Depth-to-water data from August 2001 to September 2008 was not obtained from the City, but is available at the Board offices in San Luis Obispo, California.

The depths-to-water were converted to groundwater elevations based on land surface elevations surveyed at wells MW-1, MW-2, and MW-3, and approximated for wells MW-4, MW-5, and MW-6 using Google Earth. Groundwater elevations ranged from 59.57 feet at well MW-1 to 111.58 feet at well MW-6 (Figure 3).

Monitoring well groundwater elevation data for an approximate 10-year period from September 2008 to March 2019 were plotted with mean daily streamflow measured at the Chualar Gaging Station and WWTP flow discharged to the ponds over the same time period to characterize potential influences on groundwater levels beneath the WWTP (Figure 4). It does not appear that WWTP flow discharged to the ponds influenced monitoring well groundwater elevations. However, it does appear that increases in stream flow in the Salinas River influenced groundwater levels as indicated by the spikes in monitoring well groundwater elevations following flow events. The relationship between streamflow and groundwater elevation is particularly clear in February 2017 and March 2019 when groundwater elevations increased by 26 feet and 15 feet, respectively (Figure 4). Tabulated groundwater level data are provided in Appendix A.

4.2 Hydraulic Gradient

The hydraulic gradient beneath the WWTP was calculated using groundwater elevation data at monitoring wells MW-1, MW-2, and MW-3 from March 1997 to March 2019 (tabulated hydraulic gradient data are provided in Appendix B). These three wells were selected to calculate the hydraulic gradient because they are the deepest monitoring wells and have the most complete measurement records (i.e., wells MW-4, MW-5, and MW-6 are shallow and thus periodically dry), and because survey data (e.g. reference point elevations and locations) were available for the wells (see C+D Consulting Engineers 2001).

The calculated direction of the groundwater gradient beneath the WWTP from March 1997 to March 2019 ranged from near due north (1.15 degrees) to near due south (183.76 degrees). The linear directional mean of the hydraulic gradient was 358.47 degrees with a standard deviation of 58.05 degrees and a 95% confidence interval of 16.09

degrees (Figure 5). The linear directional mean of the dataset was calculated in ArcGIS using the "Linear Directional Mean" tool, which calculates the average angle of a set of vectors with a single origin. The magnitude of the groundwater gradient beneath the WWTP from March 1997 to March 2019 ranged from 0.0001 feet/feet to 0.0513 feet/feet for an average of 0.0189 feet/feet.

In addition to evaluating the average hydraulic gradient, the mean direction and magnitude for the months of March and December (winter) were compared to that of June and September (summer) to identify potential seasonal trends. The mean direction and magnitude for winter months was 350.31 degrees and 0.0190 feet/feet, respectively, compared to 4.17 degrees and 0.0188 feet/feet, respectively, during the summer months, for a difference in direction of 13.86 degrees between wet and dry months. The hydraulic gradient has historically been slightly northwest during the wet season and slightly northeast during the dry season. The same analysis was performed with the 2015–2016 groundwater level data removed. The linear directional mean of the groundwater gradient with those data removed was 356.66 degrees and the magnitude was 0.0154 feet/feet, which is within the 95% confidence interval for the entire dataset. Because there is not a significant difference in the mean direction and magnitude of the groundwater gradient with or without the 2015–2016 data, the mean direction and magnitude for the entire dataset were used in proposing locations for additional monitoring wells as described in Section 5.2.

4.3 Water Quality

Available historical water quality data for the six monitoring wells from March 1997 to March 2019 were evaluated to identify potential impacts of WWTP operations on local groundwater quality (tabulated groundwater quality data are provided in Appendix A). In general, the concentrations of constituents detected in groundwater were highest in monitoring wells MW-1, MW-2, MW-4, and MW-5 located downgradient of the WWTP, and the lowest concentrations were detected in wells MW-3 and MW-6 located upgradient of the WWTP (Figure 6). Nitrate concentrations exceeding the limit established in Order R3-2006-0005 of 10 milligrams per liter (mg/L) for the Salinas Valley 180 foot Aquifer were detected in all of the monitoring wells, with the exception of MW-2. Nitrate concentrations ranged from 10.1 mg/L at MW-3 to 56.7 mg/L at MW-4 and MW-6. In addition, concentrations of boron and chloride were detected in groundwater at maximum concentrations of 0.65 mg/L and 292 mg/L, respectively, levels slightly above the limits established in Order R3-2006-0005 of 0.5 mg/L and 250 mg/L, respectively.

Nitrate concentrations in WWTP effluent and Ponds 7 and 8 were compared to concentrations in groundwater. Nitrate concentrations in WWTP effluent and Ponds 7 and 8 have historically been less than 10 mg/L, with the exception of nitrate measured at up to 13.5 mg/L in the effluent in February 2010 and 15.8 mg/L in Pond 8 in June 2015. The average direction of the hydraulic gradient in 2010 was northeast (33.79 degrees) and the two monitoring wells with nitrate concentrations above 10 mg/L were MW-1 and MW-5 at 21.4 mg/L and 12.2 mg/L, respectively, in June 2010. The average direction of the hydraulic gradient in 2015 was north-northwest (350.97 degrees) and the three wells with nitrate concentrations above 10 mg/L were MW-1 at 10.4 mg/L in September 2015, MW-3 at 10.1 mg/L in December 2015, and MW-4 at 32.5 mg/L in March 2015. However, nitrate concentrations in groundwater have historically exceeded the limit established in Order R3-2006-0005 at times when concentrations in the WWTP effluent and Ponds 7 and 8 have been below 10 mg/L (see water quality data in Appendix A). Nitrate concentrations in groundwater do not appear to directly correlate with WWTP nitrate concentrations.

Potential trends in groundwater quality with respect to changes in Salinas River stream flows and the volume of WWTP flow discharged to the ponds were also evaluated. No apparent relationship exists between stream flow and

WWTP flow discharged to the ponds and groundwater nitrate concentrations. Groundwater nitrate concentrations do not appear to follow any distinct trend, with sporadic spikes during both the wet and dry season and independent of the volume of WWTP water.

5 Recommended Improvements to Groundwater Monitoring Program

5.1 Groundwater Level and Quality Sampling Procedures

The primary source of groundwater level and groundwater quality data for this report was from quarterly and annual Discharger Self-Monitoring Reports submitted to the Board. Additional information was gathered from field sampling and chain-of-custody forms completed by City staff. Review of available data revealed apparent inconsistencies in reported groundwater level measurements, suggesting the absence of a sampling protocol and reporting methodology. Water quality data indicated that sample collection, handling, and preservation procedures could be improved to ensure that samples are representative of the groundwater collected. Specifically, the temperature of water quality samples as reported on chain-of-custody forms submitted to the laboratory historically exceeded the Environmental Protection Agency (EPA) recommended temperature of 4 (±2) degrees Celsius (°C), with measured temperatures upwards of 24°C which could affect water quality results (EPA 2004).

The following guidelines are intended to provide WWTP staff a set of standard operating procedures to follow during groundwater level and quality sampling efforts to ensure that accurate groundwater level measurements are reported and representative water quality samples are collected and submitted for analysis. The monitoring well sampling procedure involves measurement of the water level in the well, purging of the well, and collection of a representative water quality sample from the well using correct laboratory-prepared sample containers. The following provides a general overview of recommended groundwater sampling procedures, which are described in greater detail in Appendix C.

Groundwater Level Measurements

Prior to purging and collecting a groundwater sample from a monitoring well, the static water level and total well depth shall be measured with an electrical sounder to the nearest 0.01 feet. Each well shall be sounded at least twice to the marked and surveyed measuring point to confirm measurement. The depth-to-water measurement, total depth of well, sample location, date, time, and initials of field personnel performing the measurements shall be recorded on a field sampling form.

Groundwater Quality Sampling

The volume of water in the well (i.e., one casing volume in gallons) can be calculated using the radius of the well and height of the water column. Once calculations have been made for well casing volume, a submersible pump shall be used to purge three to five well casing volumes in gallons of water from the well. At standard casing volume increments (e.g., 0.5, 1.0, 2.0 gallons), a representative water sample shall be collected in a clean transfer container and the physical parameters (e.g., pH, electrical conductivity, oxidation-reduction potential, dissolved oxygen, temperature) of the purge water measured with field water quality testing equipment (e.g., multiparameter probe like a YSI Pro Plus Quatro Water Quality Meter) and recorded on a field sampling form (see example in Appendix C). The multiparameter probe needs to calibrated per the methodology described by the manufacturer before every groundwater sampling event. The calibration procedure needs to be documented on a dedicated multiparamter prober calibration sheet (see example in Appendix C). Purging shall continue until the range between readings of the physical parameters are within 0.1 pH units, plus or minus 10% of full scale reading for electrical conductivity, and plus or minus 1° Celsius, or until a maximum of five well casing volumes have been purged from the well (EPA 2004).

When the physical parameters have stabilized according to the previously specified quality control criteria, a water quality sample shall be collected and preserved on ice in accordance with EPA sample collection, handling, and preservation procedures appropriate for each analytical method (EPA 2004). A Chain-of-Custody form shall be completed at the time of sample collection and maintained through completion of laboratory analysis to document and guarantee accurate sample identification. All sampling equipment shall be decontaminated prior to sampling another monitoring well by triple rinsing with deionized water, or with an Alconox solution or an approved solvent (e.g., acetone, methanol, isopropyl alcohol) if organic contamination is suspected (EPA 2004).

5.2 Existing Monitoring Well Improvements

Based on observations made during Dudek's March 25, 2019 site visit and analysis of groundwater quality trends beneath the WWTP, the following existing monitoring well improvements are recommended.

During the site visit, it was observed that the well casings of monitoring wells MW-3, MW-4, MW-5, and MW-6 are all located several inches below land surface (see photographs in Appendix D). Because these wells are located subsurface and the steel well covers to the vaults are not properly sealed, the wellhead configurations are not adequate to prevent water and debris from entering the well casings and thus the potential for contamination is increased. Therefore, it is recommended that the wells be properly sealed and weatherproofed by securely installing expandable PVC pipe plugs on each well, installing rubber gaskets between the steel well covers and conductor casings, and securing the steel well covers with bolts. This will decrease the potential for surface water (i.e., runoff) to enter the wells and ensure the longevity of the monitoring wells.

During the site visit, Dudek marked a reference point location for the measurement of groundwater levels at each existing monitoring well by filing a notch in the north side of the PVC casing and marking with a black sharpie. It is recommended that these marked locations, in addition to the top of the steel conductor casings and land surface immediately adjacent to each well, be surveyed by a licensed surveyor to the nearest 0.01 feet. This will allow WWTP staff to make consistent groundwater level measurements that can easily be converted to groundwater elevations.

5.3 Installation of New Monitoring Wells

The installation of two new monitoring wells is recommended to enhance the characterization of groundwater conditions beneath the WWTP. Two locations are proposed based on results of the hydraulic gradient analysis, observations made by Dudek during the site visit, and the layout of the proposed industrial wastewater treatment plant. The two locations selected include an upgradient location (MW-7) located approximately 718 feet south (azimuth of 160.78 degrees) of the center of the WWTP disposal fields at latitude 36.490865 and longitude -121.481304, and a downgradient location (MW-8) located approximately 1,290 feet north (azimuth of 15.54 degrees) of the center of the WWTP disposal fields at latitude 36.496148 and longitude -121.48122 (Figure 7). Additionally, it is recommended that the new wells be constructed based on the following specifications: 1) 45 feet total depth below land surface, 2) 2-inch diameter, and 3) perforated casing from approximately 20 to 40 feet below land surface based on lithology encountered when installing the wells.

The installation of the proposed new monitoring wells as described would enhance the characterization of groundwater conditions beneath the WWTP and enable the City to come in to compliance with Order R3-2006-0005.

6 Conclusion

This hydrogeological study was conducted to evaluate groundwater quality and the direction of groundwater flow beneath the City of Gonzales' wastewater treatment plant to ensure the discharge of waste is in compliance with groundwater specifications stated in Order R3-2006-0005. Historical groundwater level, groundwater quality, WWTP flow, WWTP effluent, precipitation, and streamflow data were collected and analyzed to characterize groundwater conditions beneath the WWTP. Findings were used to evaluate potential impacts of WWTP operations on groundwater quality, develop recommendations for improvements to the City's groundwater level and quality sampling procedures, and identify potential locations for new monitoring wells. The following provides a summary of study findings:

- Depths-to-water range from approximately 1.75 feet to 52.3 feet below land surface.
- The linear directional mean of the groundwater gradient is 358.47 degrees with a standard deviation of 58.05 degrees and a 95% confidence interval of 16.09 degrees. The magnitude of the groundwater gradient ranges from 0.0001 feet/feet to 0.0513 feet/feet for an average gradient of 0.0189 feet/feet.
- Nitrate concentrations in WWTP effluent and Ponds 7 and 8 have historically been less than 10 mg/L, with the exception of nitrate measured at up to 13.5 mg/L in the effluent in February 2010 and 15.8 mg/L in Pond 8 in June 2015.
- Nitrate concentrations exceeding 10 mg/L (limit established in Order R3-2006-0005) have been detected in all of the monitoring wells, with the exception of MW-2. Nitrate concentrations exceeding the limit have ranged from 10.1 mg/L at MW-3 to 56.7 mg/L at MW-4 and MW-6.
- Groundwater nitrate concentrations do not appear to correlate with nitrate concentrations in WWTP water.
- The City's groundwater sampling program can be improved to ensure that accurate groundwater level measurements are reported and representative water quality samples are collected and submitted for analysis.
- It is recommended that existing monitoring well improvements be made to decrease the potential for surface water to enter the wells and ensure the longevity of the monitoring wells.
- It is recommended to install two new monitoring wells, one upgradient and one downgradient of the ponds based on the mean hydraulic gradient, to enhance the characterization of groundwater conditions beneath the WWTP.

7 References

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8 List of Preparers

This hydrogeological study report was prepared by Dudek hydrogeologists Steven Stuart (PE) and Devin Pritchard-Peterson.

SOURCE: ESRI; Bing Maps; County of Monterey

FIGURE 1

Project Site and Existing Groundwater Monitoring Well Locations

City of Gonzales Wastewater Treatment Plant Hydrogeological Study

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Figure 2. Monitoring Well Depths-to-Water March 1997 to March 2019

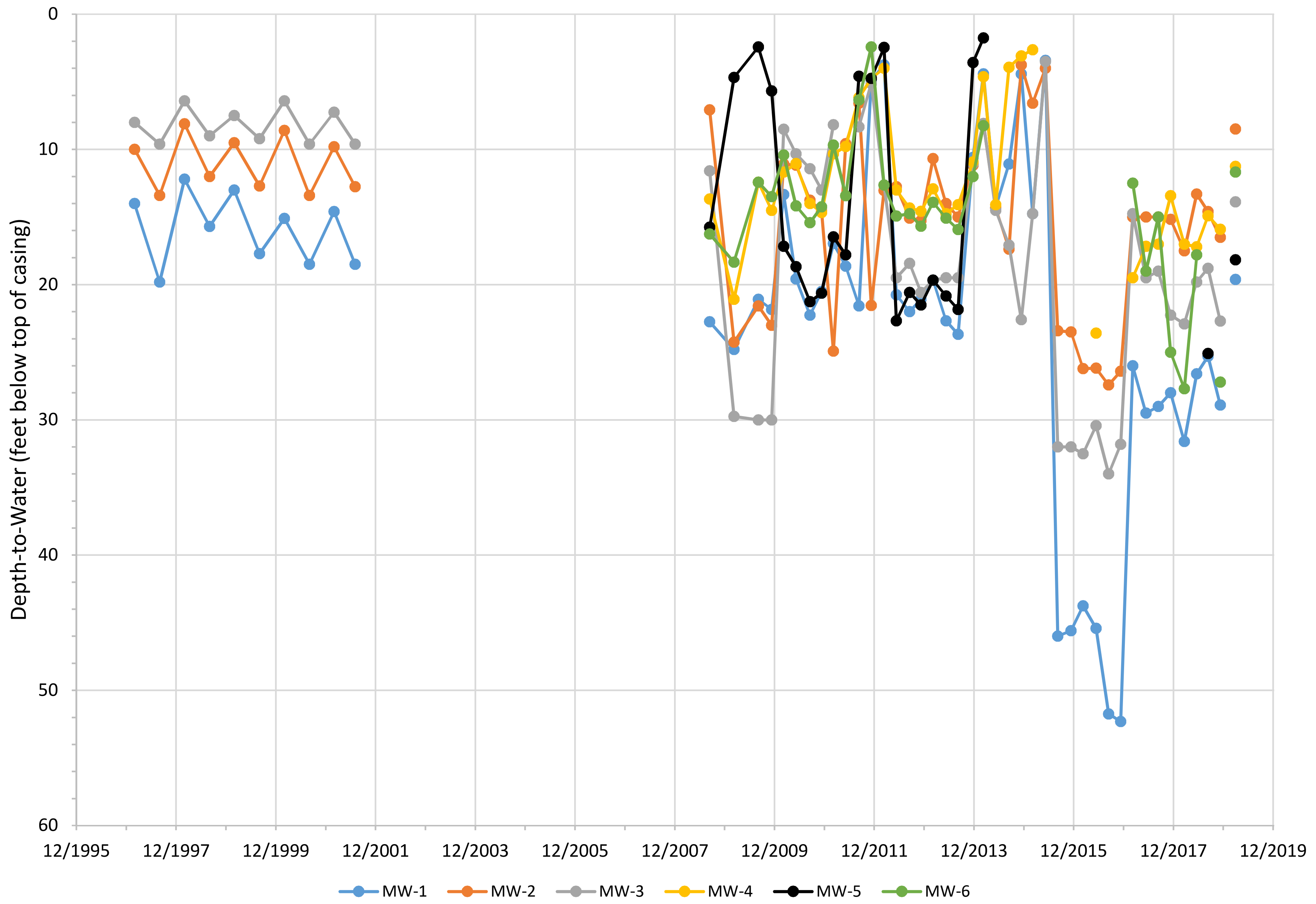

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Figure 3. Monitoring Well Groundwater Elevations March 1997 to March 2019

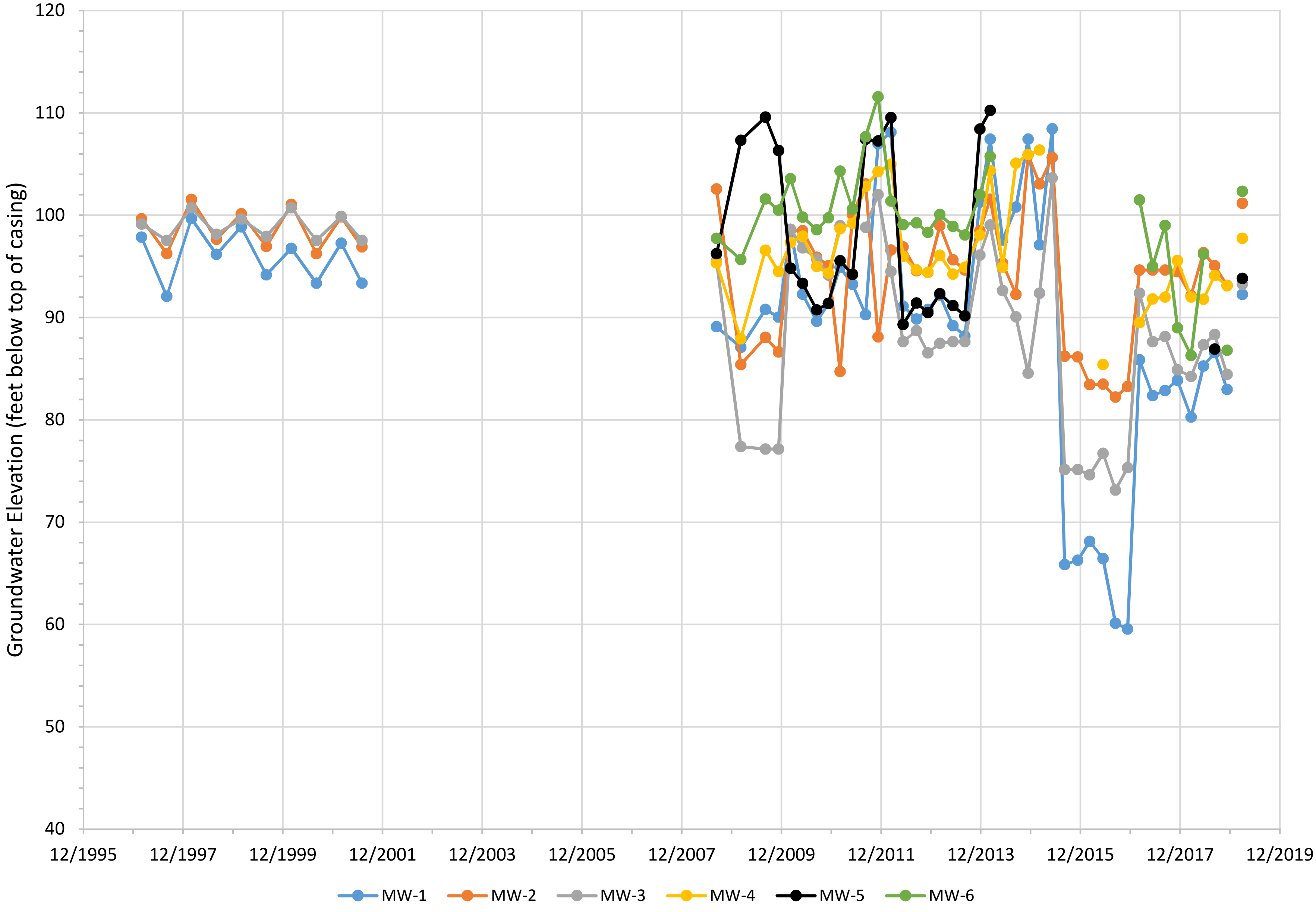

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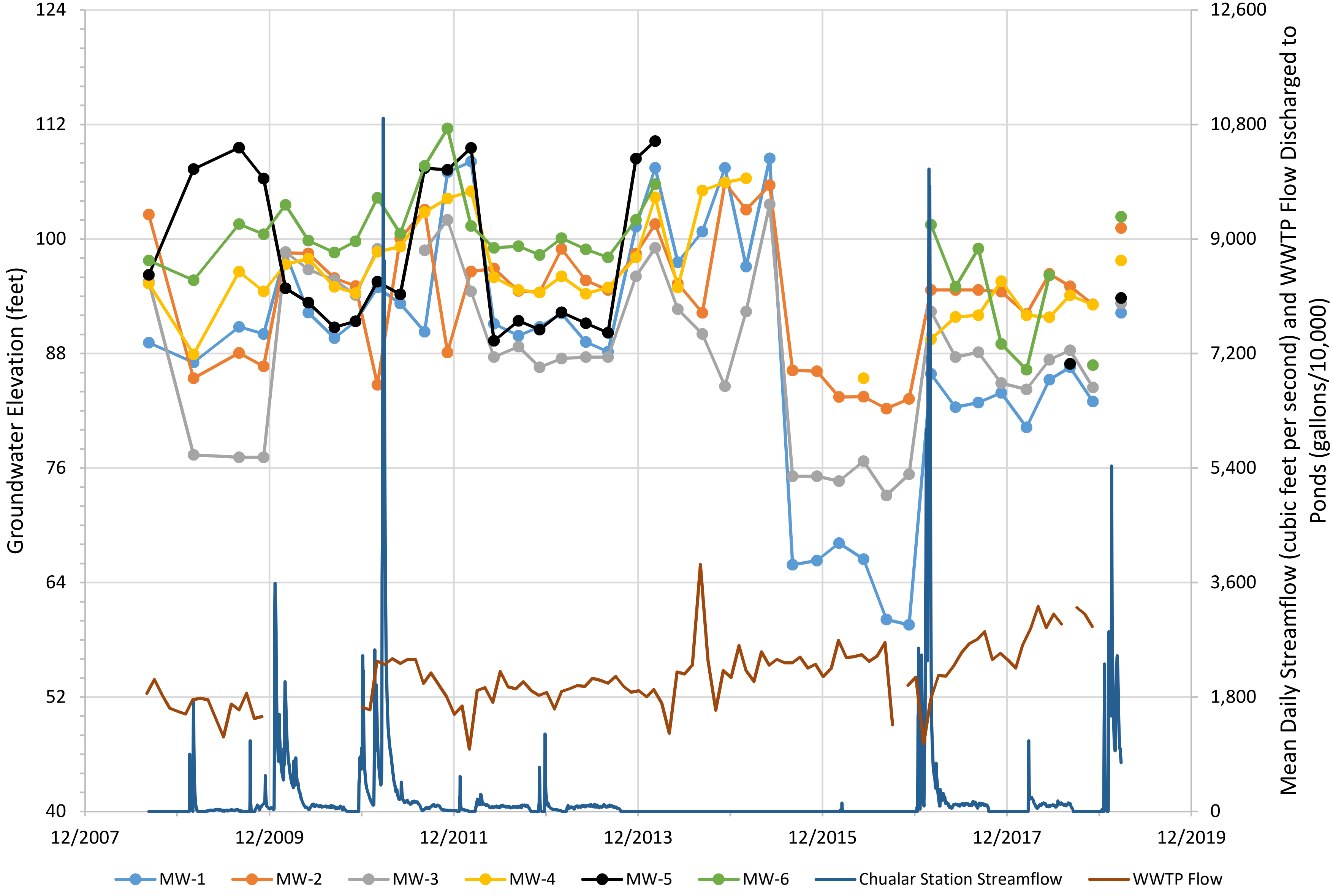
Figure 4. Monitoring Well Groundwater Elevations, Salinas River Streamflow, and WWTP Flow September 2008 to March 2019



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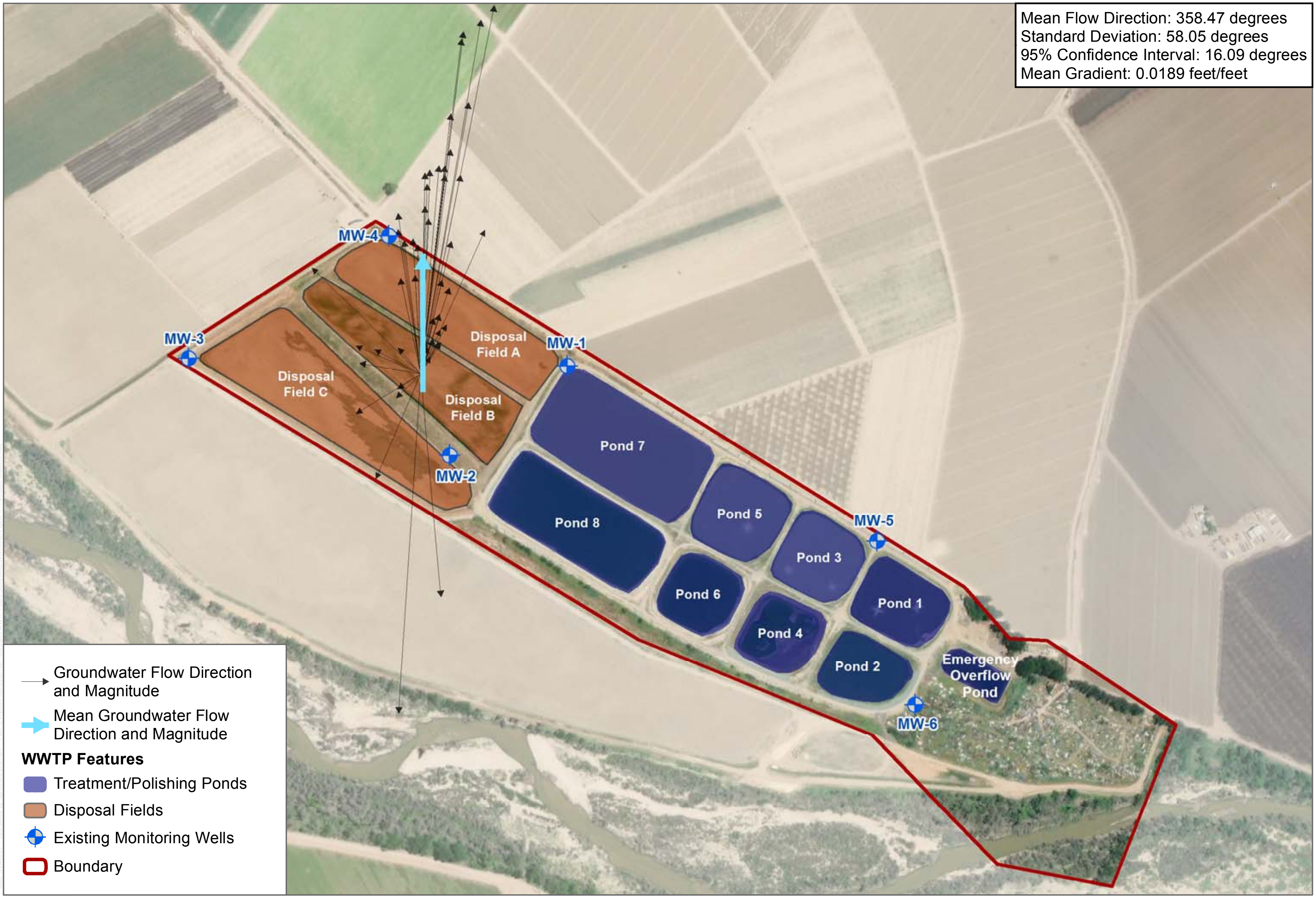

SOURCE: ESRI; Bing Maps; County of Monterey; City of Gonzales

NOTE: Historical groundwater level data used to calculate the hydraulic gradient were collected by City of Gonzales staff, with the exception of measurements made by Dudek on March 25, 2019.

FIGURE 5

Hydraulic Gradient

City of Gonzales Wastewater Treatment Plant Hydrogeological Study

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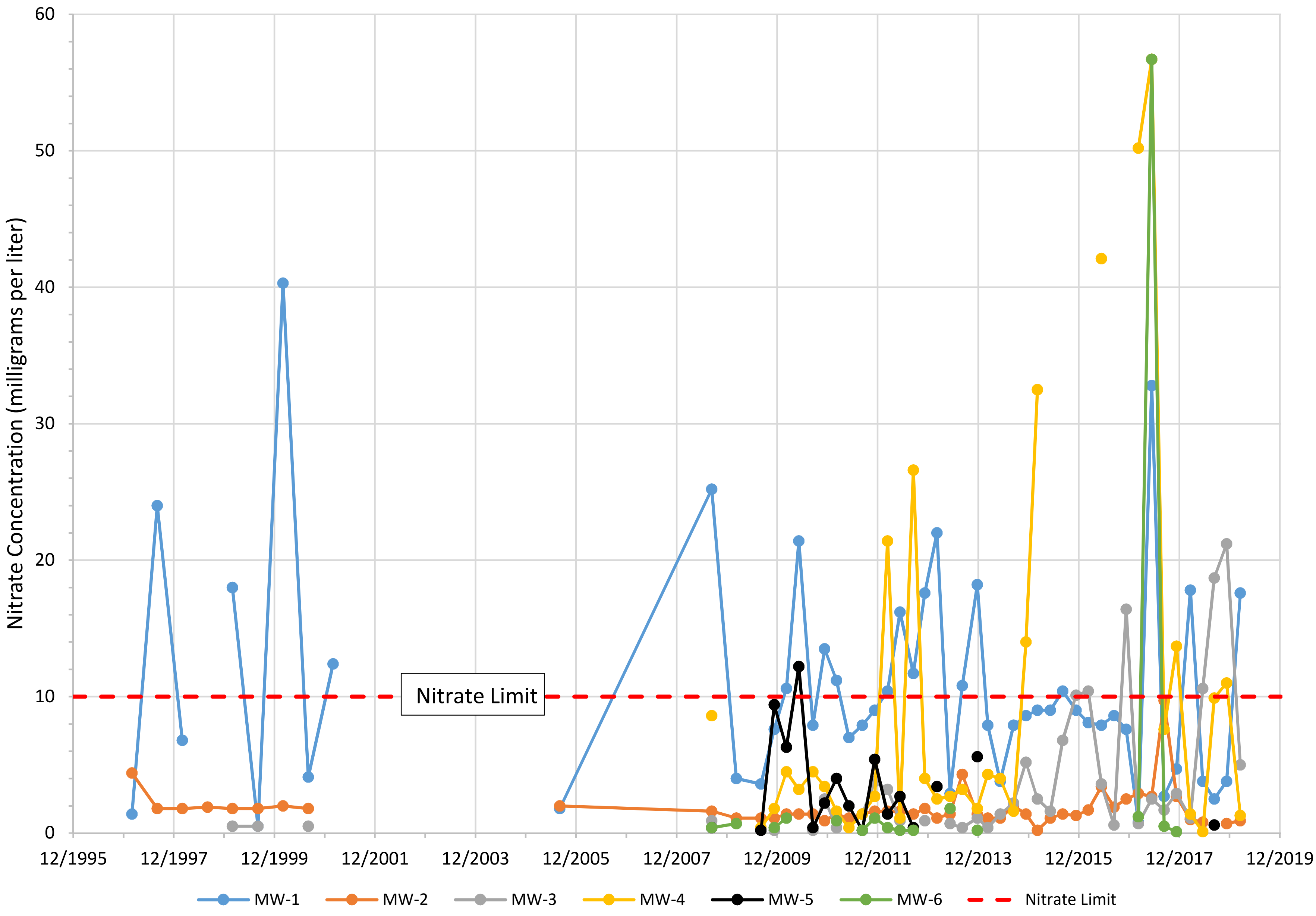
Figure 6. Monitoring Well Nitrate Concentrations March 1997 to March 2019



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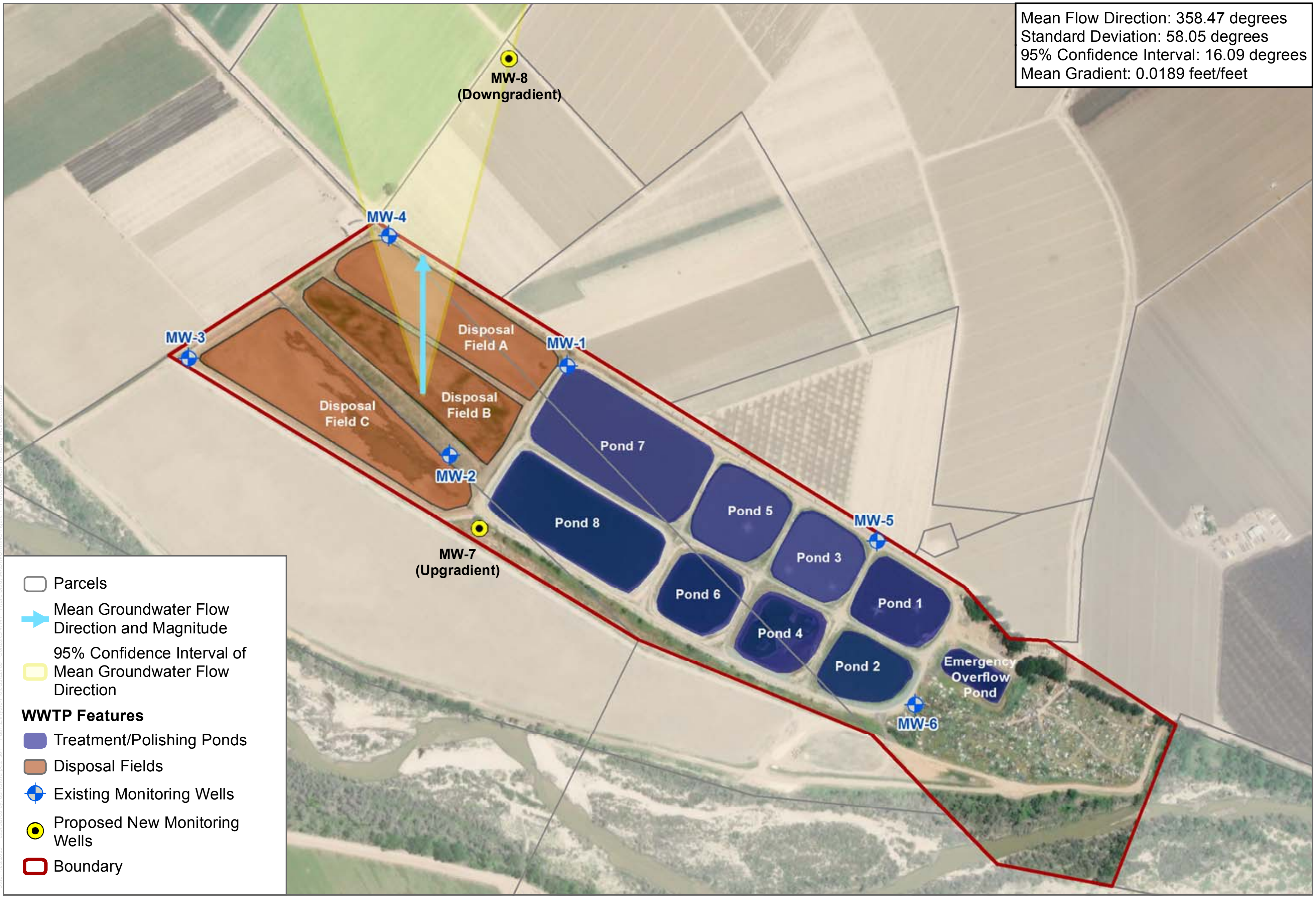

SOURCE: ESRI; Bing Maps; County of Monterey

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0 500 1,000
Feet

FIGURE 7

Proposed New Groundwater Monitoring Well Locations

City of Gonzales Wastewater Treatment Plant Hydrogeological Study

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Appendix A

Groundwater Level and Quality Data

Date	Depth to Water	Groundwater Elevation	pH	TDS	Na	CL	S04	B	NIT	NO3	TKN	TN
Constituent Limits (mg/L): TDS=1500, Na=250, CL=250, S04=600, B=0.5, NO3 (as N)=10												
MW-1												
3/1/1997	14.00	97.87	–	1070	140	*250*	74	0.45	–	1.4	–	–
9/1/1997	19.80	92.07	–	1040	175	235	87	0.48	–	*24.0*	–	–
3/1/1998	12.20	99.67	–	840	150	105	78	0.36	–	6.8	–	–
9/1/1998	15.70	96.17	–	970	170	180	76	0.43	–	–	–	–
3/1/1999	13.00	98.87	–	915	135	135	86	0.47	–	*18.0*	–	–
9/1/1999	17.70	94.17	–	990	160	170	62	0.47	–	0.5	–	–
3/1/2000	15.10	96.77	–	1128	183	197	126	*0.65*	–	*40.3*	–	–
9/1/2000	18.50	93.37	–	888	157	224	60	*0.57*	–	4.1	–	–
3/1/2001	14.60	97.27	–	1044	188	196	144	*0.63*	–	*12.4*	–	–
8/1/2001	18.50	93.37	–	822	–	–	–	–	–	–	–	–
9/1/2005	–	–	–	816	158	*250*	51	*0.51*	–	1.8	–	–
9/9/2008	22.75	89.12	7.2	925	199	*259*	141	0.29	0.06	*25.2*	5.4	30.7
3/5/2009	24.79	87.08	6.9	888	189	234	164	0.29	–	4.0	1.2	5.2
9/1/2009	21.08	90.79	–	940	172	236	161	0.33	–	3.6	–	–
12/7/2009	21.83	90.04	6.8	1000	221	*274*	154	0.35	0.02	7.6	–	7.6
3/4/2010	13.33	98.54	6.9	1020	182	240	84	0.49	–	*10.6*	0.6	11.2
6/2/2010	19.58	92.29	7.1	852	138	174	137	0.32	–	*21.4*	0.8	22.2
9/13/2010	22.25	89.62	6.5	715	141	182	101	0.25	–	7.9	1.2	9.1
12/6/2010	20.50	91.37	6.6	770	153	162	139	0.29	–	*13.5*	0.8	14.3
3/3/2011	16.96	94.91	7.1	915	169	184	126	0.31	–	*11.2*	1.0	12.2
6/1/2011	18.63	93.24	7.0	675	120	127	120	0.26	–	7.0	0.9	7.9
9/6/2011	21.58	90.29	6.7	730	108	164	125	0.32	–	7.9	2.0	9.9
12/5/2011	4.88	106.99	6.7	730	138	174	64	0.30	–	9.0	0.8	9.8
3/8/2012	3.75	108.12	6.8	790	134	160	94	0.31	–	*10.4*	2.6	13
6/6/2012	20.75	91.12	6.9	815	147	161	125	0.31	–	*16.2*	1.7	17.9
9/11/2012	22.00	89.87	6.8	745	132	186	92	0.26	–	*11.7*	1.9	13.6
12/4/2012	21.08	90.79	6.6	725	126	158	116	0.12	–	*17.6*	1.5	19.1
3/1/2013	19.67	92.20	–	940	146	160	133	0.23	–	*22.0*	–	–
6/5/2013	22.67	89.20	6.6	740	152	168	141	0.21	–	2.9	1.2	4.1
9/1/2013	23.67	88.20	–	795	149	201	128	0.10	–	*10.8*	–	–
12/20/2013	10.58	101.29	6.8	845	162	182	147	0.40	–	*18.2*	1.4	19.6
3/6/2014	4.42	107.45	6.8	705	153	192	83	0.28	–	7.9	1.2	9.1
6/4/2014	14.29	97.58	6.9	715	154	148	146	*148*	–	3.8	0.6	4.4
9/9/2014	11.08	100.79	7.1	810	151	174	166	0.32	–	7.9	1.7	9.6
12/8/2014	4.42	107.45	7.0	835	164	168	164	0.41	–	8.6	1.9	10.5
3/1/2015	14.75	97.12	–	870	156	165	156	0.31	–	9.0	–	–
6/3/2015	3.42	108.45	6.8	865	161	166	154	0.30	–	9.0	1.5	10.5
9/1/2015	46.00	65.87	–	870	144	169	152	0.32	–	*10.4*	–	–
12/7/2015	45.58	66.29	7.0	855	151	167	147	0.31	–	9.0	–	9.0
3/3/2016	43.75	68.12	7.1	865	150	162	145	0.35	–	8.1	–	8.1
6/8/2016	45.42	66.45	6.8	835	151	165	141	0.29	–	7.9	–	7.9

Date	Depth to Water	Groundwater Elevation	pH	TDS	Na	CL	S04	B	NIT	NO3	TKN	TN
Constituent Limits (mg/L): TDS=1500, Na=250, CL=250, S04=600, B=0.5, NO3 (as N)=10												
9/7/2016	51.75	60.12	6.9	865	152	171	154	0.31	–	8.6	–	8.6
12/5/2016	52.30	59.57	6.9	860	146	166	140	0.34	–	7.6	1.8	9.4
3/2/2017	26.00	85.87	6.9	915	158	178	127	0.33	–	0.8	–	0.8
6/7/2017	29.50	82.37	6.8	810	181	161	87	0.30	0.62	*32.8*	–	33.4
9/6/2017	29.00	82.87	8.1	735	136	148	109	0.30	–	2.7	–	2.7
12/5/2017	28.00	83.87	6.7	780	143	188	106	0.27	–	4.7	1.4	6.1
3/15/2018	31.60	80.27	6.8	1085	159	197	127	0.31	–	*17.8*	11.0	28.8
6/14/2018	26.60	85.27	6.6	650	121	167	41	0.27	–	3.8	1.0	4.8
9/4/2018	25.30	86.57	6.5	845	192	217	147	0.43	–	2.5	1.9	4.4
12/3/2018	28.90	82.97	6.5	855	157	201	125	0.26	–	3.8	2.4	6.2
3/13/2019	–	–	6.6	895	164	156	66	0.30	–	*17.6*	–	17.6
3/25/2019	19.61	92.26	–	–	–	–	–	–	–	–	–	–
MW-2												
3/1/1997	10.00	99.65	–	730	110	140	87	0.38	–	4.4	–	–
9/1/1997	13.40	96.25	–	715	130	130	80	0.37	–	1.8	–	–
3/1/1998	8.10	101.55	–	840	150	170	75	0.37	–	1.8	–	–
9/1/1998	12.00	97.65	–	805	145	165	76	0.38	–	1.9	–	–
3/1/1999	9.50	100.15	–	760	120	155	79	0.34	–	1.8	–	–
9/1/1999	12.70	96.95	–	750	140	140	69	0.32	–	1.8	–	–
3/1/2000	8.60	101.05	–	580	108	103	83	0.35	–	2.0	–	–
9/1/2000	13.40	96.25	–	612	110	108	87	0.46	–	1.8	–	–
3/1/2001	9.80	99.85	–	628	114	125	85	0.35	–	–	–	–
8/1/2001	12.75	96.90	–	672	–	–	–	–	–	–	–	–
9/1/2005	–	–	–	748	134	199	97	*0.52*	–	2.0	–	–
9/9/2008	7.08	102.57	7.9	800	152	210	85	0.27	–	1.6	1.2	2.8
3/5/2009	24.25	85.40	7.7	820	164	200	108	0.40	–	1.1	0.6	1.7
9/1/2009	21.58	88.07	–	815	151	179	104	0.30	–	1.1	–	–
12/7/2009	23.00	86.65	8.4	810	180	184	111	0.29	–	1.1	0.6	1.7
3/4/2010	11.08	98.57	7.6	815	160	190	115	0.30	–	1.4	0.4	1.8
6/2/2010	11.17	98.48	7.8	828	150	191	122	0.32	–	1.4	0.7	2.1
9/13/2010	13.75	95.90	7.9	800	150	177	113	0.29	–	1.4	1.4	2.8
12/6/2010	14.58	95.07	7.7	775	144	169	112	0.27	0.41	0.9	2.1	3.4
3/3/2011	24.92	84.73	7.7	795	150	178	126	0.28	–	1.4	1.7	3.1
6/1/2011	9.58	100.07	7.5	770	149	171	127	0.30	–	1.1	1.2	2.3
9/6/2011	6.58	103.07	7.8	770	143	178	124	0.28	–	1.4	0.8	2.2
12/5/2011	21.54	88.11	7.7	795	149	174	124	0.32	–	1.6	–	1.6
3/8/2012	13.04	96.61	8.0	800	143	171	122	0.27	–	1.6	1.5	2.1
6/6/2012	12.75	96.90	7.9	790	145	177	130	0.29	–	1.6	1.7	3.3
9/11/2012	15.08	94.57	7.8	795	144	175	130	0.25	–	1.4	0.8	2.2
12/4/2012	15.25	94.40	7.2	675	123	148	109	0.11	0.07	1.8	1.6	3.5
3/1/2013	10.67	98.98	–	780	139	163	131	0.21	–	1.1	–	–
6/5/2013	14.00	95.65	7.5	755	150	156	130	0.20	–	1.4	0.5	1.9

Date	Depth to Water	Groundwater Elevation	pH	TDS	Na	CL	S04	B	NIT	NO3	TKN	TN
Constituent Limits (mg/L): TDS=1500, Na=250, CL=250, S04=600, B=0.5, NO3 (as N)=10												
9/1/2013	15.00	94.65	–	795	142	165	133	0.10	–	4.3	–	–
12/20/2013	11.17	98.48	7.9	765	150	158	138	0.35	–	1.4	1.0	2.4
3/6/2014	8.08	101.57	8.1	775	149	159	132	0.32	–	1.1	–	1.1
6/4/2014	14.33	95.32	7.5	785	149	155	132	0.36	–	1.1	0.8	1.9
9/9/2014	17.38	92.27	7.8	790	158	191	577	0.35	–	2.0	1.4	3.4
12/8/2014	3.75	105.90	8.1	785	169	166	141	0.35	–	1.4	2.9	4.3
3/1/2015	6.58	103.07	–	795	165	162	138	0.10	–	0.2	–	–
6/3/2015	4.00	105.65	7.9	795	159	159	138	0.28	–	1.1	1.1	2.2
9/1/2015	23.42	86.23	–	795	149	163	141	0.29	–	1.4	–	–
12/7/2015	23.50	86.15	8.1	675	130	139	115	0.30	–	1.3	–	1.3
3/3/2016	26.21	83.44	8.0	775	144	153	132	0.32	–	1.7	–	1.7
6/8/2016	26.17	83.48	7.7	675	125	130	111	0.26	–	3.4	–	3.4
9/7/2016	27.42	82.23	8.0	760	144	157	145	0.32	–	1.9	–	1.9
12/5/2016	26.40	83.25	7.9	765	139	152	133	0.38	–	2.5	–	2.5
3/2/2017	15.00	94.65	7.6	720	131	143	127	0.31	–	2.9	–	2.9
6/7/2017	15.00	94.65	7.3	735	135	145	109	0.30	–	2.7	–	2.7
9/6/2017	15.00	94.65	6.7	850	182	216	78	0.34	–	9.7	–	9.7
12/5/2017	15.17	94.48	8.2	740	125	147	107	0.31	–	2.7	–	2.7
3/15/2018	17.50	92.15	7.5	860	150	153	93	0.32	–	1.0	6.3	7.3
6/14/2018	13.30	96.35	7.0	890	133	163	72	0.27	–	0.8	2.0	2.8
9/4/2018	14.60	95.05	7.3	853	138	172	81	0.27	–	–	11.0	11.0
12/3/2018	16.50	93.15	7.1	800	122	166	85	0.22	–	0.7	3.2	3.9
3/13/2019	–	–	7.0	905	121	160	116	0.30	0.1	0.9	3.1	4.1
3/25/2019	8.49	101.16	–	–	–	–	–	–	–	–	–	–
MW-3												
3/1/1997	8.00	99.14	–	460	29	21	94	0.19	–	–	–	–
9/1/1997	9.60	97.54	–	430	31	25	96	0.20	–	–	–	–
3/1/1998	6.40	100.74	–	420	30	25	97	0.16	–	–	–	–
9/1/1998	9.00	98.14	–	625	39	38	155	0.28	–	–	–	–
3/1/1999	7.50	99.64	–	430	29	24	105	0.21	–	0.5	–	–
9/1/1999	9.20	97.94	–	480	32	26	100	0.17	–	0.5	–	–
3/1/2000	6.40	100.74	–	496	35	26	121	0.26	–	–	–	–
9/1/2000	9.60	97.54	–	582	36	34	185	*0.64*	–	0.5	–	–
3/1/2001	7.25	99.89	–	448	32	24	120	0.27	–	–	–	–
8/1/2001	9.60	97.54	–	524	–	–	–	–	–	–	–	–
9/1/2005	–	–	–	496	32	38	132	0.42	–	–	–	–
9/9/2008	11.58	95.56	7.8	410	39	34	110	0.23	–	0.9	2.2	3.1
3/5/2009	29.75	77.39	7.5	428	38	29	118	0.30	–	–	0.6	0.6
9/1/2009	30	77.14	–	365	27	18	80	0.29	–	–	–	–
12/7/2009	30	77.14	7.3	355	32	20	84	0.29	–	0.2	0.5	0.7
3/4/2010	8.5	98.64	7.4	325	27	15	72	0.32	–	–	0.6	0.6
6/2/2010	10.33	96.81	7.5	308	23	14	66	0.28	–	–	0.5	0.5

Date	Depth to Water	Groundwater Elevation	pH	TDS	Na	CL	S04	B	NIT	NO3	TKN	TN
Constituent Limits (mg/L): TDS=1500, Na=250, CL=250, S04=600, B=0.5, NO3 (as N)=10												
9/13/2010	11.42	95.72	7.5	315	25	14	63	0.22	–	0.2	1.0	1.2
12/6/2010	13	94.14	7.1	310	23	14	60	0.21	–	2.5	0.9	3.4
3/3/2011	8.17	98.97	7.6	310	27	17	66	0.24	–	0.4	1.6	2.0
9/6/2011	8.33	98.81	7	435	28	26	110	0.30	–	1.4	1.3	2.7
12/5/2011	5.13	102.01	6.4	430	29	23	102	0.28	–	3.8	1.1	4.9
3/8/2012	12.63	94.51	6.9	515	38	27	126	0.26	–	3.2	2.8	5.0
6/6/2012	19.5	87.64	7.2	500	34	29	134	0.29	–	0.9	1.5	2.4
9/11/2012	18.42	88.72	7	490	33	28	129	0.22	–	–	0.5	0.5
12/4/2012	20.58	86.56	5.8	115	3.8	4	5	0.08	–	0.9	2.4	3.3
3/1/2013	19.67	87.47	–	310	18	14	68	0.18	–	–	–	–
6/5/2013	19.5	87.64	6.9	410	30	20	87	0.20	–	0.7	0.6	1.3
9/1/2013	19.5	87.64	–	415	27	23	86	0.09	–	0.4	–	–
12/20/2013	11.04	96.1	6.9	410	36	24	90	0.19	–	1.1	0.7	1.8
3/6/2014	8.08	99.06	7.3	405	30	22	81	0.22	–	0.4	1.2	1.6
6/4/2014	14.5	92.64	7.3	440	32	23	96	0.21	–	1.4	0.7	2.1
9/9/2014	17.08	90.06	7.3	575	37	39	154	0.16	–	2.2	2.7	4.9
12/8/2014	22.58	84.56	7.3	575	41	36	147	0.16	–	5.2	2.4	7.6
3/1/2015	14.75	92.39	–	525	41	31	133	0.22	–	2.5	–	–
6/3/2015	3.50	103.64	7.3	585	40	34	158	0.16		1.6	1.8	3.4
9/1/2015	32.00	75.14	–	780	44	46	213	0.25	–	6.8	–	–
12/7/2015	32.00	75.14	7.3	765	46	42	202	0.26	–	*10.1*	–	10.1
3/3/2016	32.50	74.64	7.4	935	82	153	123	0.22	–	*10.4*	–	10.4
6/8/2016	30.42	76.72	7.1	765	48	51	239	0.20	–	3.6	–	3.6
9/7/2016	34.00	73.14	7.5	740	44	51	259	0.19	–	0.6	–	0.6
12/5/2016	31.80	75.34	7.2	1050	61	166	169	0.28	0.11	*16.4*	–	16.5
3/2/2017	14.75	92.39	7.2	530	31	16	186	0.16	–	0.7	1.5	2.2
6/7/2017	19.50	87.64	7.4	675	42	28	226	0.23	–	2.5	–	2.5
9/6/2017	19.00	88.14	7.3	575	44	24	182	0.22	–	1.7	–	1.7
12/5/2017	22.25	84.89	7.3	520	33	20	148	0.24	–	2.9	–	2.9
3/15/2018	22.90	84.24	7.3	615	40	30	183	0.21	–	1.1	7.1	8.2
6/14/2018	19.80	87.34	7	765	45	35	248	0.20	0.06	*10.6*	–	10.7
9/4/2018	18.80	88.34	7.3	930	50	56	308	0.15	0.05	*18.7*	–	18.8
12/3/2018	22.70	84.44	6.9	990	50	58	309	0.22	–	*21.2*	8.10	29.3
3/13/2019	–	–	7.4	940	53	90	266	0.22	–	5.0	–	5.0
3/25/2019	13.87	93.27	–	–	–	–	–	–	–	–	–	–
MW-4												
9/9/2008	13.67	95.33	7.5	1035	195	292	177	0.22	0.06	8.6	14.0	22.7
3/5/2009	21.08	87.92	7.3	396	71	73	55	0.29	–	–	3.8	3.8
9/1/2009	12.42	96.58	–	805	173	204	154	0.42	–	0.4	–	–
12/7/2009	14.50	94.50	7.7	890	204	232	169	0.35	0.01	1.8	1.4	3.2
3/4/2010	11.67	97.33	7.1	270	41	51	35	0.23	0.09	4.5	1.8	6.4
6/2/2010	11.04	97.96	7.5	504	104	125	74	0.30	–	3.2	1.1	4.3

Date	Depth to Water	Groundwater Elevation	pH	TDS	Na	CL	S04	B	NIT	NO3	TKN	TN
Constituent Limits (mg/L): TDS=1500, Na=250, CL=250, S04=600, B=0.5, NO3 (as N)=10												
9/13/2010	14.00	95.00	7.6	525	108	125	78	0.25	–	4.5	2.0	6.5
12/6/2010	14.67	94.33	7.4	610	118	136	97	0.29	–	3.4	2.9	6.3
3/3/2011	10.33	98.67	7.5	835	158	166	164	0.27	–	1.6	3.9	5.5
6/1/2011	9.79	99.21	7.6	695	146	132	140	0.29	–	0.4	1.8	2.2
9/6/2011	6.17	102.83	7.5	695	132	135	138	0.36	–	1.4	2.1	3.5
12/5/2011	4.75	104.25	7.4	710	133	146	146	0.34	–	2.7	0.7	3.4
3/8/2012	4.00	105.00	7.3	890	122	155	152	0.25	–	*21.4*	13.7	35.1
6/6/2012	13.00	96.00	7.2	735	134	151	138	0.29	–	1.1	3.7	4.8
9/11/2012	14.33	94.67	7.3	1005	136	171	163	0.28	–	*26.6*	5.3	32.4
12/4/2012	14.58	94.42	6.9	815	146	188	167	0.16	–	4.0	1.6	5.6
3/1/2013	12.92	96.08	–	155	17	25	17	0.19	–	2.5	–	–
6/5/2013	14.75	94.25	6.8	260	42	53	38	0.19	–	2.7	2.3	5.0
9/1/2013	14.08	94.92	–	430	69	84	70	0.12	–	3.2	–	–
12/20/2013	10.92	98.08	7.3	710	133	140	137	0.32	–	1.8	1.3	3.1
3/6/2014	4.63	104.37	7.3	780	148	155	150	0.28	–	4.3	1.4	6.1
6/4/2014	14.08	94.92	7.2	840	152	150	184	0.32	–	4.0	3.3	7.3
9/9/2014	3.92	105.08	7.0	1435	191	170	146	0.36	–	1.6	14.8	16.4
12/8/2014	3.08	105.92	7.1	1087	191	205	319	0.39	0.08	*14.0*	48.2	62.3
3/1/2015	2.63	106.37	–	930	218	155	172	0.46	–	*32.5*	–	–
6/8/2016	23.58	85.42	7.0	1190	175	160	146	0.30	–	*42.1*	2.0	44.1
3/2/2017	19.50	89.50	6.8	945	85	48	108	0.27	–	*50.2*	–	50.2
6/7/2017	17.17	91.83	7.1	1145	136	125	112	0.33	–	*56.7*	–	56.7
9/6/2017	17.00	92.00	6.8	845	144	188	86	0.41	–	7.6	3.6	11.2
12/5/2017	13.42	95.58	7.0	900	145	198	116	0.32	–	*13.7*	–	13.7
3/15/2018	17.00	92.00	6.8	770	117	176	96	0.26	–	1.4	10.0	11.4
6/14/2018	17.20	91.80	7.5	560	23	9.6	81	0.19	–	0.1	–	0.1
9/4/2018	14.90	94.10	6.9	820	145	169	57	0.21	0.18	9.9	–	10.1
12/3/2018	15.90	93.10	6.7	935	145	212	153	0.29	0.13	*11.0*	5.3	16.4
3/13/2019	–	–	6.5	780	144	169	33	0.3	0.06	1.3	1.2	2.6
3/25/2019	11.25	97.75	–	–	–	–	–	–	–	–	–	–
MW-5												
9/9/2008	15.75	96.25	7.3	1140	164	211	160	0.26	0.07	0.4	13.0	13.5
3/5/2009	4.67	107.33	7.0	952	164	219	34	0.28	0.04	–	20.6	20.6
9/1/2009	2.42	109.58	–	890	130	167	13	0.29	–	0.2	–	–
12/7/2009	5.67	106.33	6.9	1090	172	185	66	0.32	0.03	9.4	8.4	17.8
3/4/2010	17.17	94.83	6.9	715	127	126	15	0.44	0.22	6.3	13.2	19.7
6/2/2010	18.67	93.33	7.1	1036	158	216	35	0.28	0.36	*12.2*	14.7	27.3
9/13/2010	21.25	90.75	7.0	890	150	143	14	0.30	0.09	0.4	17.9	18.3
12/6/2010	20.63	91.37	7.0	775	139	137	16	0.27	–	2.2	30.5	32.7
3/3/2011	16.46	95.54	7.3	695	129	111	42	0.30	0.09	4.0	22.8	26.9
6/1/2011	17.79	94.21	7.0	635	118	91	25	0.28	–	2.0	23.8	25.8
9/6/2011	4.58	107.42	7.1	815	145	124	17	0.27	–	0.2	33.0	33.2

Date	Depth to Water	Groundwater Elevation	pH	TDS	Na	CL	SO4	B	NIT	NO3	TKN	TN
Constituent Limits (mg/L): TDS=1500, Na=250, CL=250, SO4=600, B=0.5, NO3 (as N)=10												
12/5/2011	4.75	107.25	7.0	725	130	116	7	0.22	–	5.4	28.2	33.6
3/8/2012	2.46	109.54	7.1	715	126	114	6	0.27	–	1.4	30.6	32.0
6/6/2012	22.67	89.33	7.1	835	141	135	19	0.28	–	2.7	40.1	42.8
9/11/2012	20.58	91.42	7.0	825	132	147	6	0.29	–	0.4	38.8	39.2
12/4/2012	21.50	90.50	6.8	835	119	148	7	0.21	0.06	–	40.3	40.4
3/1/2013	19.67	92.33	–	675	93	110	16	0.24	–	3.4	–	–
6/5/2013	20.83	91.17	6.9	930	132	154	82	0.21	–	–	38.6	39.6
9/1/2013	21.83	90.17	–	995	121	160	111	0.10	–	–	–	–
12/20/2013	3.58	108.42	7.0	1110	123	169	123	0.39	0.53	5.6	15.6	21.7
3/6/2014	1.75	110.25	–	–	–	–	–	–	–	–	–	–
9/4/2018	25.08	86.92	6.9	1040	132	166	31	0.30	–	0.6	33.0	33.6
3/13/2019	–	–	6.8	845	114	127	9	0.27	–	–	17.0	17.0
3/25/2019	18.17	93.83	–	–	–	–	–	–	–	–	–	–
MW-6												
9/9/2008	16.25	97.75	7.7	300	27	22	63	0.24	0.09	0.4	6.8	7.3
3/5/2009	18.33	95.67	7.6	316	29	16	61	0.32	0.02	0.7	3.3	40.0
9/1/2009	12.42	101.58	–	295	24	12	46	0.28	–	–	–	–
12/7/2009	13.50	100.50	7.6	290	23	12	48	0.31	–	0.4	1.8	2.2
3/4/2010	10.42	103.58	7.3	325	20	19	61	0.31	–	1.1	1.4	2.5
6/2/2010	14.17	99.83	7.5	316	18	20	61	0.31	–	–	0.9	0.9
9/13/2010	15.42	98.58	7.8	355	20	22	64	0.20	–	–	1.2	1.2
12/6/2010	14.25	99.75	7.7	300	17	17	55	0.21	–	–	1.4	1.4
3/3/2011	9.67	104.33	7.7	355	26	26	83	0.25	–	0.9	3.2	4.1
6/1/2011	13.42	100.58	7.5	360	27	26	80	0.26	–	–	1.4	1.4
9/6/2011	6.33	107.67	7.7	330	20	21	76	0.26	–	0.2	0.8	1.0
12/5/2011	2.42	111.58	7.9	350	19	21	77	0.23	–	1.1	0.7	1.8
3/8/2012	12.63	101.37	7.6	335	24	20	69	0.27	–	0.4	2.5	2.9
6/6/2012	14.92	99.08	7.7	365	25	74	0.29	–	–	0.2	2.1	2.3
9/11/2012	14.75	99.25	7.7	365	26	24	88	0.21	–	0.2	1.4	1.6
12/4/2012	15.67	98.33	6.8	270	28	14	51	0.12	–	–	0.9	0.9
3/1/2013	13.92	100.08	–	285	26	14	54	0.23	–	–	–	–
6/5/2013	15.08	98.92	7.5	425	29	38	109	0.18	–	1.8	2.5	4.3
9/1/2013	15.92	98.08	–	385	22	16	74	0.08	–	–	–	–
12/20/2013	12.00	102.00	7.7	355	30	17	74	0.18	–	0.2	2.3	2.5
3/6/2014	8.25	105.75	7.6	335	29	16	71	0.14	–	–	0.8	0.8
3/2/2017	12.50	101.50	7.2	290	26	10	46	0.13	–	1.2	–	1.2
6/7/2017	19.00	95.00	7.3	305	21	125	111	0.16	–	56.7	–	56.7
9/6/2017	15.00	99.00	7.4	345	21	15	58	0.19	–	0.5	–	0.5
12/5/2017	25.00	89.00	7.5	330	21	15	53	0.19	–	0.1	1.1	1.2
3/15/2018	27.70	86.30	–	–	–	–	–	–	–	–	–	–
6/14/2018	17.80	96.20	–	–	–	–	–	–	–	–	–	–
12/3/2018	27.20	86.80	–	–	–	–	–	–	–	–	–	–

Date	Depth to Water	Groundwater Elevation	pH	TDS	Na	CL	SO4	B	NIT	NO3	TKN	TN
Constituent Limits (mg/L): TDS=1500, Na=250, CL=250, SO4=600, B=0.5, NO3 (as N)=10												
3/13/2019	–	–	7	350	22	17	41	0.22	–	–	–	–
3/25/2019	11.67	102.33	–	–	–	–	–	–	–	–	–	–

Source: City of Gonzales; C+D Consulting Engineers 2001.

Notes: TDS=total dissolved solids; Na=sodium; CL=chloride; SO4=sulfate; B=boron; NIT=nitrite; NO3 (as N)=nitrate; TKN=total kjeldahl nitrogen; TN=total nitrogen; groundwater levels/elevations in feet below top of casing; water quality constituents in milligrams per liter (mg/L); bold and italic values in highlighted cells indicate constituent above groundwater limit set forth in Order; dash (–) indicates constituent not detected or data not available.

Appendix B

Calculated Hydraulic Gradient Data

Date	Groundwater Gradient (feet/feet)	Direction from North (degrees)	Groundwater Elevation of Wells Included in Calculation (feet)		
			MW-1	MW-2	MW-3
3/1/1997	0.0038	12.26	97.90	99.65	99.14
9/1/1997	0.0076	27.67	92.10	96.25	97.54
3/1/1998	0.0042	9.27	99.70	101.55	100.74
9/1/1998	0.0027	28.35	96.20	97.65	98.14
3/1/1999	0.0028	9.92	98.90	100.15	99.64
9/1/1999	0.0050	29.12	94.20	96.95	97.94
3/1/2000	0.0086	17.22	96.80	101.05	100.74
9/1/2000	0.0051	32.01	93.40	96.25	97.54
3/1/2001	0.0050	19.44	97.30	99.85	99.89
8/1/2001	0.0066	23.94	93.37	96.90	97.54
9/9/2008	0.0309	7.53	89.12	102.57	95.56
3/5/2009	0.0071	298.43	87.08	85.40	77.39
9/1/2009	0.0096	293.51	90.79	88.07	77.14
12/7/2009	0.0085	279.86	90.04	86.65	77.14
3/4/2010	0.0001	91.18	98.54	98.57	98.64
6/2/2010	0.0131	12.63	92.29	98.48	96.81
9/13/2010	0.0124	18.31	89.62	95.90	95.72
12/6/2010	0.0078	13.03	91.37	95.07	94.14
3/3/2011	0.0305	174.85	94.91	84.73	98.97
9/6/2011	0.0277	11.26	90.29	103.07	98.81
12/5/2011	0.0463	183.76	106.99	88.11	102.01
3/8/2012	0.0215	23.98	108.12	96.61	94.51
6/6/2012	0.0184	352.75	91.12	96.90	87.64
9/11/2012	0.0135	356.62	89.87	94.57	88.72
12/4/2012	0.0133	347.96	90.79	94.40	86.56
3/1/2013	0.0221	351.84	92.20	98.98	87.47
6/5/2013	0.0185	356.65	89.20	95.65	87.64
9/1/2013	0.0176	358.60	88.20	94.65	87.64
12/20/2013	0.0047	225.63	101.29	98.48	96.10
3/6/2014	0.0104	238.66	107.45	101.57	99.06
6/4/2014	0.0038	237.78	97.58	95.32	92.64
9/9/2014	0.0156	203.20	100.79	92.27	90.06
12/8/2014	0.0207	314.26	107.45	105.90	84.56
3/1/2015	0.0199	350.96	97.12	103.07	92.39
6/3/2015	0.0047	318.93	108.45	105.65	103.64
9/1/2015	0.0471	7.09	65.87	86.23	75.14
12/7/2015	0.0460	6.91	66.29	86.15	75.14
3/3/2016	0.0357	6.55	68.12	83.44	74.64
6/8/2016	0.0376	9.95	66.45	83.48	76.72
9/7/2016	0.0490	9.66	60.12	82.23	73.14
12/5/2016	0.0513	11.25	59.57	83.25	75.34
3/2/2017	0.0186	12.90	85.87	94.65	92.39
6/7/2017	0.0286	6.61	82.37	94.65	87.64
9/6/2017	0.0273	6.94	82.87	94.65	88.14
12/5/2017	0.0274	1.15	83.87	94.48	84.89

Date	Groundwater Gradient (feet/feet)	Direction from North (degrees)	Groundwater Elevation of Wells Included in Calculation (feet)		
			MW-1	MW-2	MW-3
3/15/2018	0.0285	4.94	80.27	92.15	84.24
6/14/2018	0.0279	2.53	85.27	96.35	87.34
9/4/2018	0.0212	2.87	86.57	95.05	88.34
12/3/2018	0.0259	1.88	82.97	93.15	84.44
3/25/2019	0.0229	1.41	92.26	101.16	93.27
Average	0.0189	358.47			

Appendix C

Groundwater Sampling Procedures and Field Forms

U.S.EPA REGION 9 LABORATORY

RICHMOND, CALIFORNIA

FIELD SAMPLING GUIDANCE DOCUMENT #1220

GROUNDWATER WELL SAMPLING

TABLE OF CONTENTS

1.0 SCOPE AND APPLICATION

The objective of this Standard Operating Procedure (SOP) is to provide general reference information on sampling of groundwater wells. This guideline is primarily concerned with the collection of water samples from the saturated zone of the subsurface. Every effort must be made to ensure that the sample is representative of the particular zone of water being sampled. These procedures are designed to be used in conjunction with analyses for the most common types of groundwater contaminants (e.g., volatile and semi-volatile compounds, pesticides, metals, biological parameters).

2.0 METHOD SUMMARY

Prior to sampling a monitoring well, the well must be purged. This may be done with a number of instruments. The most common of these are (in order of importance): submersible pump, non-gas contact bladder pump, inertia pump and bailer. Traditionally, it was required that a minimum of three well volumes should be purged; however, research has shown that by monitoring parameters, such as pH, conductivity, dissolved oxygen, oxidation-reduction potential, temperature, and turbidity, during the purging process, it is possible to determine when the static water has been purged. Often, stability is reached before three well volumes have been purged, thereby reducing the volume of waste to be disposed. If, on the other hand, after three well volumes have been removed, the chemical parameters have not stabilized according to the above criteria, additional well volumes must be removed. If the parameters have not stabilized within five volumes, it is at the discretion of the project leader whether or not to collect a sample or to continue purging. A field log record must be kept of the actual volume of water purged from the well along with the criteria used for determining when an adequate purge volume has been achieved.

All equipment must be decontaminated prior to use and between wells. Once purging is completed and the correct laboratory-cleaned sample containers have been prepared, sampling may proceed. Sampling may be conducted with any of the above instruments, and need not be the same as the device used for purging. Bailers may be used to collect samples after purging has been completed with pumps. However bailers are discouraged at purging devices since this equipment is most likely to disturb the groundwater system. Care should be taken when choosing the sampling device, as some (materials and pressure) will affect the integrity of the sample. Sampling equipment must also be decontaminated. Sampling should occur in a progression from the least to most contaminated well, if this information is known.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The type of analysis for each sample collected determines the type of bottle, preservative, holding time, and filtering requirements. Samples should be collected directly from the sampling device into appropriate laboratory-cleaned containers. Check that a Teflon liner is present in the cap, if required. Attach a sample identification label. Complete a field data sheet, a chain of custody form and record all pertinent data in the site logbook.

Samples shall be appropriately preserved, labeled, logged, and placed in a cooler to be maintained at 4ºC. Samples must be shipped well before the holding time is over and ideally should be shipped with 24 hours of sample collection. It is imperative that these samples be shipped or delivered daily to the analytical laboratory in order to maximize the time available for the laboratory to perform the analysis. The bottles should be shipped with adequate packing and cooling (EPA prefers double-bagged wet ice) to ensure that they arrive intact.

Certain conditions may require special handling techniques. For example, treatment of a sample for volatile organic compounds (VOCs) with ascorbic acid preservative is required if there is residual chlorine in the water (such as public water supply) that could cause free radical formation and change the identity of the original contaminants. However, ascorbic acid should not be used if chlorine is not present in the water. Special requirements must be determined prior to conducting fieldwork.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

The primary goal of groundwater sampling is to obtain a representative sample of the ground water body. Analysis can be compromised by field personnel in two primary ways: (1) taking an unrepresentative sample, or (2) by incorrect handling of the sample. There are numerous ways of introducing foreign contaminants into a sample, and these must be avoided by following strict sampling procedures performed by trained field personnel or in consultation with such personnel.

Filtration of groundwater (Section 7.5), which is typically performed in the field, it may be an addition source of contamination.

5.0 EQUIPMENT/APPARATUS

5.1 General Equipment

Monitoring equipment and supplies used during sampling includes the following:

- water level indicator
  - electric sounder
  - steel tape
  - transducer
  - reflection sounder
  - air line
- depth sounder
- appropriate keys for well cap locks
- steel brush
- HNU or OVA (whichever is most appropriate)
- logbook
- calculator
- field data sheets
- chain of custody forms
- forms and seals
- sample containers
- engineer's rule
- sharp knife (locking blade)
- tool box (include at least: screwdrivers, pliers, hacksaw, hammer, flashlight, adjustable wrench)
- leather work gloves
- appropriate health and safety gear
- 5-gallon pail
- plastic sheeting
- shipping containers
- packing materials
- bolt cutters
- zip-type plastic bags
- containers for evacuation of liquids
- decontamination solutions
- tap water
- non-phosphate soap
- several brushes
- pails or tubs
- aluminum foil
- garden sprayer
- preservatives
- distilled or deionized water

5.2 Submersible Pump

- pump(s)
- generator (110, 120, or 240 volt) or 12-volt batter if inaccessible to field vehicle
- 1-inch black PVC coil pipe -- enough to dedicate to each well
- hose clamps
- safety cable
- toolbox supplement
  - pipe wrenches, 2
  - wire strippers
  - electrical tape
  - heat shrink
  - hose connectors
  - Teflon tape
- winch or pulley
- gasoline for generator
- flow meter with gate valve
- 1-inch nipples and various plumbing (i.e., pipe connectors)

5.3 Non-Gas Contact Bladder Pump

- non-gas contact bladder pump
- compressor or nitrogen gas tank
- batteries and charger
- Teflon tubing -- enough to dedicate to each well
- Swagelock fitting
- toolbox supplements -- same as submersible pump

5.4 Inertia Pump

- pump assembly (WaTerra pump, piston pump)
- 5-gallon bucket

5.5 Suction Pump

- pump
- black coil tubing -- enough to dedicate to each well
- gasoline -- if required
- toolbox
- plumbing fittings
- flow meter with gate valve

5.6 Bailer

- clean decontaminated bailer(s) of appropriate size (to fill the well casing) and material
- nylon line, enough to dedicate to each well
- Teflon-coated bailer wire
- sharp knife
- aluminum foil (to wrap clean bailers)
- 5-gallon bucket

5.7 Filtration equipment

- 0.45 µm filters
- filtration appartus, vacuum or pressure

5.8 Additional Comments and Precautions

Samplers and evacuation equipment (bladders, pumps, bailers, tubing, etc.) should be limited to those made with stainless steel, Teflon, and glass in areas where concentrations are expected to be at or near the detection limit. Many pumps are made of materials, such as brass, plastic, rubber, or other elastomer products which may cause chemical interferences with the sample. The tendency of organics to leach into and out of many materials make the selection of materials critical for trace analyses. The use of plastics, such as PVC or polyethylene, should be avoided when analyzing for organics; Teflon® is preferred. However, PVC may be used for evacuation equipment, as it will not come in contact with the sample. Ideally, pumps “dedicated” for each well are used for sample collection; however, practical issues often provide few alternatives so samplers resort to using one or two pumps and decontaminating them between wells.

Because of the problems associated with most pumps (see Table 2 below), only three devices are recommended to be used to collect ground water samples from most wells. These are the peristaltic pump/vacuum jug assembly, a stainless steel and Teflon® bladder pump, and a closed-top, Teflon® bailer. It is recognized that there are situations, such as industrial or municipal supply wells or private residential wells, where a well may be equipped with a dedicated pump from which a sample would not normally be collected. Discretion should always be used in obtaining a sample.

Table 2: Advantages and Disadvantages of Various Groundwater Sampling Devices

Device	Advantages	Disadvantages
Submersible Pump	- Portable; can be used on an unlimited number of wells - Relatively high pumping rate (dependent on depth and size of pump) - Generally very reliable: does not require priming	- Potential for effects on analysis of trace organics - Heavy and cumbersome, particularly in deeper wells - Expensive - Power source needed - Susceptible to damage from silt or sediment - Impractical in low yielding or shallow wells
Non-Gas Contact Bladder Pump	- Maintains integrity of sample - Easy to use	- Difficult to clean although dedicated tubing and bladder may be used - Only useful to approximately 100 feet in depth - Supply of gas for operation (bottled gas and/or compressor) is difficult to obtain and is cumbersome
Inertia Pump	- Portable, inexpensive and readily available - Rapid method for purging shallow wells	- Only useful to approx. 70 ft. Or less - May be time consuming to use - Labor intensive - Wa Terra pump is only effective in 2 inch diameter wells
Suction Pump	- Portable, inexpensive, and readily available	- Only useful to approximately 25 feet or less in depth - Vacuum can cause loss of dissolved gases and volatile organics - Pump must be primed and vacuum is often difficult to maintain - May cause pH modification
Bailer	- Minimal out gassing of volatile organics while sample is in bailer- The only practical limitations are size and materials - No power source needed - Portable - Inexpensive: it can be dedicated and hung in a well reducing the chances of cross-contamination - Readily available - Rapid, simple method for removing small volumes of purge water	- Time consuming, especially for large wells - Transfer of sample may cause aeration

6.0 REAGENTS

Reagents will be utilized for preservation of samples and for decontamination of sampling equipment. The preservation required is specified by the analysis to be performed. Decontamination solutions are specified in SOP #02, Sampling Equipment Decontamination.

7.0 PROCEDURES

7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and which equipment and supplies are needed.
2. Obtain necessary sampling and monitoring equipment.
3. Decontaminate or preclean equipment, and ensure that it is in working order.
4. Prepare scheduling and coordinate with staff, clients, and regulatory agency, if appropriate.
5. Perform a general site survey prior to site entry in accordance with the site-specific health and safety plan.
6. Identify and mark all sampling locations.

7.2 Field Preparation

1. Start at the least contaminated well, if known.
2. Lay plastic sheeting around the well to minimize likelihood of contamination of equipment from soil adjacent to the well.
3. Remove locking well cap, note location time of day, and date in the field notebook or an appropriate log form.
4. Remove well casing cap.
5. Screen headspace of well with an appropriate monitoring instrument to determine the presence of volatile organic compounds and record in site logbook.
6. Lower water level measuring device or equivalent (i.e., permanently installed transducers or air line) into well until water surface is encountered.
7. Measure distance from water surface to reference measuring point on well casing or protective barrier post and record in site logbook. Alternatively, if there is no reference point, note that water level measurement is from top of steel casing, top of PVC riser pipe, from ground surface, or some other position on the well head.
8. Measure total depth of well (do this at least twice to confirm measurement) and record in site logbook or on log form.
9. Calculate the volume of water in the well and the volume to be purged using the calculations in Section 7.3.1.

10. Select the appropriate purging and sampling equipment.

7.3 Evacuation of Static Water (Purging)

7.3.1 Purging and Purge Adequacy

Monitoring for defining a contaminant plume requires a representative sample of a small volume of the aquifer. These circumstances require that the well be pumped enough to remove the stagnant water but not enough to induce flow from other areas. Generally, three well volumes are considered effective, or calculations can be made to determine, on the basis of the aquifer parameters and well dimensions, the appropriate volume to remove prior to sampling.

Purging is the process of removing stagnant water from a monitoring well, prior to sampling, causing its replacement by ground water from the adjacent formation, which is representative of actual aquifer conditions. Most often purging is completed immediately prior to sample collection although it is acceptable to purge and then collect samples within 24 hours.

During purging, water level measurements may be taken regularly at 15- to 30-second intervals. This data may be used to compute aquifer transmissivity and other hydraulic characteristics.

In order to determine when a well has been adequately purged, field investigators should:

1. monitor the pH, specific conductance, dissolved oxygen, oxidation-reduction potential, temperature, and turbidity of the ground water removed during purging;
2. observe and record the volume of water removed.

The amount of water standing in the water column (water inside the well riser and screen) needs be estimated prior to initiating the purge. To do this, three measurements are measured and recorded: the diameter of the well, the water level and total depth of the well. Specific methodology for obtaining these measurements is found below. Once this information is obtained, the volume of water to be purged can be determined using one of several methods.

To determine well volume, use the equations below or refer to Table 1.

Well volume = nr^2h (cf) [Equation 1]

where:

n = pi
r = radius of monitoring well (feet)
h = height of the water column (feet). [This may be determined by subtracting the depth to water from the total depth of the well as measured from the same reference point.]
cf = conversion (gal/ft^3) = 7.48 gal/ft^3 [In this equation, 7.48 gal/ft^3 is the necessary conversion factor]

Monitoring wells are typically 2, 3, 4, or 6 inches in diameter. If you know the diameter of the monitoring well, there are a number of standard conversion factors which can be used to simplify the equation above.

The volume, in gallons per linear foot, for various standard monitoring well diameters can be calculated as follows:

$v = nr^2 \quad (cf)$ [Equation 2]

where:

v = volume in gallons per linear foot
n = pi
r = radius of monitoring well (feet)
cf = conversion factor (7.48 gal/ft^3)

For a 2-inch diameter well, the volume in gallons per linear foot can be calculated as follows:

$$\begin{aligned} v &= nr2\ (cf) \qquad \text{[Equation 2]} \\ &= 3.14\ (1/12\ \text{ft})^2\ 7.48\ \text{gal/ft}^2 \\ &= 0.1632\ \text{gal/ft} \end{aligned}$$

Remember that if you have a 2-inch diameter well, you must convert this to the radius in feet to be able to use the equation. See Table 1 to confirm your calculated answer.

Alternatively, the volume may be determined using a casing volume per foot factor for the appropriate diameter well, similar to that in the following table (Table 1) The water level is subtracted from the total depth, providing the length of the water column. This length is multiplied by the factor in the Table 1 which corresponds to the appropriate well diameter, providing the amount of water, in gallons, contained in the well. Other acceptable methods include the use of nomographs or other equations or formulae.

With respect to the ground water chemistry, an adequate purge is achieved when the pH, specific conductance, and temperature of the ground water have stabilized and the turbidity has either stabilized or is below 10 Nephelometric Turbidity Units (NTU). Ten NTU is the (maximum) goal for most ground water sampling objectives. This is twice the Primary Drinking Water standard of 5 NTU. Stabilization occurs when: pH measurements remain constant within 0.1 Standard Unit (SU); conductivity, dissolved oxygen and redox potential vary no more that 10 percent; and the temperature is constant for at least three consecutive readings. There are no criteria establishing how many sets of measurements are adequate for the determination of stability. If the calculated purge volume is small, the measurements should be taken frequently to provide a sufficient number of measurements to evaluate stability. If the purge volume is large, measurements taken every 15 minutes may be sufficient.

With respect to volume, an adequate purge is normally achieved when three to five times the volume of standing water in the well has been removed. The field notes should reflect the single well volume calculations or determinations, according to one of the above methods, and a reference to the appropriate multiplication of that volume, i.e., a minimum three well volumes, clearly identified as a purge volume goal.

If, after three well volumes have been removed, the chemical parameters have not stabilized according to the above criteria, additional well volumes may be removed. If the parameters have not stabilized within five volumes, it is at the discretion of the project leader whether or not to collect a sample or to continue purging. The total purge volume and conditions of sampling should be noted in the field log.

The amount of flushing a well receives prior to sample collection depends on the intent of the monitoring program as well as the hydrogeologic conditions. Programs where overall quality determination of water resources are involved may require long pumping periods to obtain a sample that is representative of a large volume of that aquifer. The pumped volume can be determined prior to sampling so that the sample is a composite of known volume of the aquifer, or the well can be pumped until the stabilization of parameters such as temperature, electrical conductance, or pH has occurred.

TABLE 1
WELL CASING DIAMETER vs. VOLUME

WELL CASING DIAMETER (inches) vs. VOLUME (gals.)/FEET of WATER	
CASING	GALLONS/FT
1	0.041
2	0.163
3	0.367
4	0.653
5	1.02
6	1.469
7	1.999
8	2.611
9	3.305
10	4.08
11	4.934
12	5.875

7.3.2 Excessive Pumping

Attempts should be made to avoid purging wells to dryness. This can be accomplished, for example, by slowing the purge rate. If a well is pumped dry, it may result in the sample being comprised partially of water contained in the sand pack, which may be reflective, at least in part, of initial, stagnant conditions. In addition, as water re-enters an evacuated well, it may cascade down the sand pack or the well screen, stripping volatile organic constituents that may be present and/or introducing soil fines into the water column. It is particularly important that wells be sampled as soon as possible after purging. If adequate volume is available, the well must be sampled immediately. If not, sampling should occur as soon as adequate volume has recovered (or within 24 hours).

A nonrepresentative sample can also result from excessive pre-pumping of the monitoring well. Stratification of the leachate concentration in the groundwater formation may occur, or heavier-than-water compounds may sink to the lower portions of the aquifer. Excessive pumping can dilute or increase the contaminant concentrations from what is representative of the sampling point of interest.

7.3.3 Purging When Well Becomes Dry

In some situations, even with slow purge rates, a well may be pumped or bailed dry (evacuated). In these situations, this generally constitutes an adequate purge and the well can be sampled following sufficient recovery (enough volume to allow filling of all sample containers). It is not necessary that the well be evacuated three times before it is sampled; rather the groundwater chemistry must be consistent. That is, a minimum of four measurements (from pH, specific conductance, dissolved oxygen, redox potential, temperature, and turbidity) must be monitored during collection of the sample from the recovered volume, as the measurements of record for the sampling event.

7.3.4 Purging Devices

The following well evacuation devices are most commonly used. Other evacuation devices are available, but have been omitted in this discussion due to their limited use.

7.3.4.1 Submersible Pump

Submersible pumps are generally constructed of plastic, rubber, and metal parts which may affect the analysis of samples for certain trace organics and inorganics. As a consequence, submersible pumps may not be appropriate for investigations requiring analyses of samples for trace contaminants. However, they are still useful for pre-sample purging. However, the pump must have a check valve to prevent water in the pump and the pipe from rushing back into the well.

Submersible pumps generally use one of two types of power supplies, either electric or compressed gas. Electric pumps can be powered by a 12-volt DC rechargeable battery, or a 110- or 220-volt AC power supply. Those units powered by compressed gas normally use a small electric compressor which also needs a 12-volt DC or 110-volt AC power. They may also utilize compressed gas from bottles. Pumps differ according to the depth and diameter of the monitoring wells.

1. Determine the volume of water to be purged as described in Section 7.3.1.
2. Lay plastic sheeting around the well to prevent contamination of pumps, hoses or lines with foreign materials.
3. Assemble pump, hoses and safety cable, and lower the pump into the well. Make sure the pump is deep enough so that purging does not evacuate all the water. (Running the pump without water may cause damage.)
5. Attach power supply, and purge well until specified volume of water has been evacuated (or until field parameters, such as temperature, pH, conductivity, etc.,have stabilized). Do not allow the pump to run dry. If the pumping rate exceeds the well recharge rate, lower the pump further into the well, and continue pumping.
6. Collect and dispose of purge waters as specified in the site-specific project plan.

7.3.4.2 Non-Contact Gas Bladder Pump

For this procedure, an all stainless-steel and Teflon Middleburg-squeeze bladder pump (e.g., IEA, TIMCO, Well Wizard, Geoguard, and others) is used to provide the least amount of material interference to the sample. Water comes into contact with the inside of the bladder (Teflon) and the sample tubing, also Teflon, that may be dedicated to each well. Some wells may have permanently installed bladder pumps (i.e., Well Wizard, Geoguard), that may be used to sample for all parameters.

1. Assemble Teflon tubing, pump and charged control box.
2. Determine the volume of water to be purged as described in Section 7.3.1.
3. Lay plastic sheeting around the well to prevent contamination of pumps, hoses or lines with foreign materials.
4. Assemble pump, hoses and safety cable, and loer the pump into the well. Make sure the pump is deep enough so that purging does not evacuate all the water. (Running the pump without water may cause damage.)

5. Attach power supply, and purge well until specified volume of water has been evacuated (or until field parameters, such as temperature, pH, conductivity, etc.,have stabilized). Do not allow the pump to run dry. If the pumping rate exceeds the well recharge rate, lower the pump further into the well, and continue pumping.
6. Collect and dispose of purge waters as specified in the site-specific project plan.
7. Be sure to adjust flow rate to prevent violent jolting of the hose as sample is drawn in.

7.3.4.3 Inertia Pump

Inertia pumps, such as the WaTerra pump and piston pump, are manually operated. They are appropriate to use when wells are too deep to bail by hand, but are not inaccessible enough to warrant an automatic (submersible, etc.) pump. These pumps are made of plastic and may be either decontaminated or discarded, after use.

1. Determine the volume of water to be purged as described in Section 7.3.1
2. Lay plastic sheeting around the well to prevent contamination of pumps or hoses with foreign materials.
3. Assemble pump, and lower to the appropriate depth in the well.
4. Begin pumping manually, discharging water into a 5-gallon bucket (or other graduated vessel). Purge until specified volume of water has been evacuated (or until field parameters such as temperature, pH, conductivity, etc. have stabilized).
5. Collect and dispose of purge waters as specified in the site-specific project plan.

7.3.4.4 Suction Pump

There are many different types of suction pumps. They include: centrifugal, peristaltic and diaphragm. Diaphragm pumps can be used for well evacuation at a fast pumping rate and sampling at a low pumping rate. The peristaltic pump is a low-volume pump that uses roller to squeeze the flexible tubing, thereby creating suction. This tubing can be dedicated to a well to prevent cross-contamination. Peristaltic pumps, however, require a power source.

1. Assemble the pump, tubing, and power source, if necessary.
2. Determine the volume of water to be purged as described in Section 7.3.1.
3. Lay plastic sheeting around the well to prevent contamination of pumps, hoses or lines with foreign materials.

4. Assemble pump, hoses and safety cable, and loer the pump into the well. Make sure the pump is deep enough so that purging does not evacuate all the water. (Running the pump without water may cause damage.)
5. Attach power supply, and purge well until specified volume of water has been evacuated (or until field parameters, such as temperature, pH, conductivity, etc.,have stabilized). Do not allow the pump to run dry. If the pumping rate exceeds the well recharge rate, lower the pump further into the well, and continue pumping.
6. Collect and dispose of purge waters as specified in the site-specific project plan.

7.3.4.5 Bailer

Bailers are the simplest purging device used and have many advantages. They generally consist of a rigid length of tube, usually with a ball check-valve at the bottom. A line is used to lower the bailer into the well and retrieve a volume of water. The three most common types of bailer are PVC, Teflon, and stainless steel.

This manual method of purging is best suited to shallow or narrow diameter wells. For deep, larger diameter wells which require evacuation of large volumes of water, other mechanical devices may be more appropriate.

Bailing equipment includes a clean decontaminated bailer, Teflon or nylon line, a sharp knife, and plastic sheeting.

1. Determine the volume of water to be purged as described in Section7.3.1.
2. Lay plastic sheeting around the well to prevent contamination of the bailer line with foreign materials.
3. Attach the line to the bailer and lower until the bailer is completely submerged.
4. Pull bailer out ensuring that the line either falls onto a clean area of plastic sheeting or never touches the ground.
5 Empty the bailer into a pail until full to determine the number of bails necessary to achieve the required purge volume.
6. Thereafter, pour the water into a container and dispose of purge waters as specified in the site-specific project plan.

7.4 Sampling

Sample withdrawal methods require the use of pumps, compressed air, bailers, and samplers. Ideally, purging and sample withdrawal equipment should be completely inert, economical to use, easily cleaned, sterilized, reusable, able to operate at remote sites in the absence of power resources, and capable of delivering variable rates for sample collection.

There are several factors to take into consideration when choosing a sampling device. Care should be taken when reviewing the advantages or disadvantages of any one device. It may be appropriate to use a different device to sample than that which was used to purge. The most common example of this is the use of a submersible pump to purge and a bailer to sample.

7.4.1 Bailer

The positive-displacement volatile sampling bailer (by GPI) is perhaps the most appropriate for collection of water samples for volatile analysis. Other bailer types (messenger, bottom fill, etc.) Are less desirable, but may be mandated by cost and site conditions. Generally, bailers can provide an acceptable sample, providing that sampling personnel use extra care in the collection process.

1. Surround the monitoring ell with clean plastic sheeting.
2. Attach a line to the bailer. If a bailer was used for urging, the same bailer and line may be used for sampling.
3. Lower the bailer slowly and gently into the well, taking care not to shake the casing sides or to splash the bailer into the water. Stop lowering at a point adjacent to the screen.
4. Allow bailer to fill and then slowly and gently retrieve the bailer from the well, avoiding contact with the casing, so as not to knock flakes of rust or other foreign materials into the bailer.
5. Remove the cap from the sample container and place it on the plastic sheet or in a location where it will not become contaminated. See Section 7.7 for special considerations on VOC samples.
6 Begin pouring slowly from the bailer.
7. Filter and preserve samples as required by sampling plan.
8. Cap the sample container tightly and place pre-labeled sample container in a carrier.
9. Replace the well cap.
10. Log all samples in the site logbook and on field data sheets and label all samples.
11. Package samples and complete necessary paperwork.
12. Transport sample to decontamination zone (if necessary) to prepare it for transport to analytical laboratory.

7.4.2 Submersible Pump

Although it is recommended that samples not be collected with a submersible pump due to the reasons stated in Section 4.0, there are some situations where they may be used.

1. Allow the monitoring well to recharge after purging, keeping the pump just above the screened area.
2. Attach gate valve to hose (if not already fitted), and reduce flow of water to a manageable sampling rate.
3. Assemble the appropriate bottles.
4. If no gate valve is available, run the water down the side of a clean jar and fill the sample bottles from the jar.
5. Cap the sample container tightly and place pre-labeled sample container in a carrier.
6. Replace the well cap.
7. Log all samples in the site logbook and on the field data sheets and label all samples.
8. Package samples and complete necessary paperwork.
9. Transport sample to decontamination zone (if necessary) for preparation for transport to analytical laboratory.
10. Upon completion, remove pump and assembly and full decontaminate prior to setting into the next sample well. Dedicate the tubing to the hole.

7.4.3 Non-Gas Contact Bladder Pump

The use of a non-gas contact positive displacement bladder pump is often mandated by the use of dedicated pumps installed in wells. These pumps are also suitable for shallow (less than 100 feet) wells. They are somewhat difficult to clean, but may be used with dedicated sample tubing to avoid cleaning. These pumps require a power supply and a compressed gas supply (or compressor). They may be operated at variable flow and pressure rates making them ideal for both purging and sampling.

Non-gas contact positive displacement pumps cause the least amount of alteration in sample integrity as compared to other sample retrieval methods.

1. Allow well to recharge after purging.
2. Assemble the appropriate bottles.
3. Turn pump on, increase the cycle time and reduce the pressure to the minimum that will allow the sample to come to the surface.
4. Cap the sample container tightly and place relabeled sample container in a carrier.

5. Replace the well cap.
6. Log all samples in the site logbook and on field data sheets and label all samples.
7. Package samples and complete necessary paperwork.
8. Transport sample to staging area for preparation for transport to analytical laboratory.
9. On completion, remove the tubing from the well and either replace the Teflon tubing and bladder with new dedicated tubing and bladder or rigorously decontaminate the existing materials.
10. Collect non-filtered samples directly from the outlet tubing into the sample bottle.
11. For filtered samples, connect the pump outlet tubing directly to the filter unit. The pump pressure should remain decreased so that the pressure build-up on the filter does not blow out the pump bladder or displace the filter. For the Geotech barrel filter, no actual connections are necessary, so this is not a concern.

7.4.4 Suction Pump

In view of the limitations of suction pumps, they are not recommended for sampling purposes.

7.4.5 Inertia Pump

Inertia pumps may be used to collect samples. It is more common, however, to purge with these pumps and sample with a bailer.

1. Following well evacuation, allow the well to recharge.
2. Assemble the appropriate bottles.
3. Since these pumps are manually operated, the flow rate may be regulated by the sampler. The sample may be discharged from the pump outlet directly into the appropriate sample container.
4. Cap the sample container tightly and place pre-labeled sample container in a carrier.
5. Replace the well cap.
6. Log all samples in the site logbook and on field data sheets and label all samples.
7. Package samples and complete necessary paperwork.
8. Transport sample to staging area for preparation for transport to analytical laboratory.
9. Upon completion, remove pump and decontaminate or discard, as appropriate.

7.5 Filtering

Groundwater samples to be analyzed for metals require filtering. The definition of total metals is an unfiltered sample and dissolved metals is a 0.45 um filtered smple. For samples that require filtering, such as samples which will be analyzed for total and dissolved metals, the filter must be decontaminated prior to use and between uses. Filters work by two methods. A barrel filter such as the "Geotech" filter works with a bicycle ump, which is used to build up positive pressure in the chamber containing the sample. The sample is then forced through the filter paper (minimum size 0.45 um) into a jar placed underneath. The barrel itself is filled manually from the bailer or directly via the hose of the sampling pump. The pressure must be maintained up to 30 psi by periodic pumping.

A vacuum type filter involves two chambers, the upper chamber contains the sample and a filter (minimum size 0.45 um) divides the chambers. Using a hand pump or a Gillian type pump, air is withdrawn from the lower chamber, creating a vacuum and thus causing the sample to move through the filter into the lower chamber where it is drained into a sample jar. Repeated pumping may be required to train all the sample into the lower chamber. If preservation of the sample is necessary, this should be done after filtering.

7.6 Post Operation

After all samples are collected and preserved, the sampling equipment should be decontaminated prior to sampling another well. This will prevent cross-contamination of equipment and monitoring wells between locations.

1. Decontaminate all equipment.
2. Replace sampling equipment in storage containers.
3. Prepare and transport water samples to the laboratory. Check sample documentation and make sure samples are properly packed for shipment.

7.7 Special Considerations for Volatile Organic Compound (VOC) Sampling

The proper collection of a sample for volatile organics requires minimal disturbance of the sample to limit volatilization and therefore a loss of volatiles from the sample.

Sample retrieval systems suitable for the valid collection of volatile organic samples are: positive displacement bladder pumps, gear driven submersible pumps, syringe samplers and bailers. Field conditions and other constraints will limit the choice of appropriate systems. The focus of concern must be to provide a valid sample for analysis, one which has been subjected to the least amount of turbulence possible.

The following procedures should be followed:

1. Open the vial, set cap in a clean place, and collect the sample during the middle of the cycle. When collecting duplicates, collect both samples at the same time.
2. Fill the vial to just overflowing. Do not rinse the vial, nor excessively overfill it. There should be a convex meniscus on the top of the vial.
3. Check that the cap has not been contaminated from splashing and carefully cap the vial. Place the cap directly over the top and screw down firmly. Do not over tighten and break the cap.
4. Invert the vial and tap gently. Observe vial for at least 10 seconds. If an air bubble appears, discard the sample and begin again. It is imperative that no entrapped air is in the sample vial.
5. Immediately place the vial in the protective foam sleeve and place into the cooler, oriented so that it is lying on its side, not straight up.
6. The holding time for VOCs is 7 days. If preserved with HCl to a $pH < 2$, the holding time is 14 days. Samples should be shipped or delivered to the laboratory daily so as not to exceed the holding time. Ensure that the samples remain at 4^0C, but do not allow them to freeze.

8.0 QUALITY ASSURANCE/QUALITY CONTROL

There are no specific quality assurance activities which apply to the implementation of these procedures, However, the following general QA procedures apply:

- All data must be documented on field data sheets or within site logbooks.

- All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation and they must be documented.

- Field duplicates and equipment or field blanks should be collected along with the samples at a frequency of one for every ten samples.

9.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA and specific health and safety procedures. More specifically, depending upon the site-specific contaminants, various protective programs must be implemented prior to sampling the first well. The site health and safety plan should be reviewed with specific emphasis placed on the protection program planned for the well sampling tasks. Standard safe operating practices should be followed such as minimizing contact with potential contaminants in both the vapor phase and liquid matrix through the use of respirators and disposable clothing.

For volatile organic contaminants:

- Avoid breathing constituents venting from the well.
- Pre-survey the well head-space with an FID/PID prior to sampling.
- If monitoring results indicate organic constituents, sampling activities may be conducted in Level C protection. At a minimum, skin protection will be afforded by disposable protective clothing.

Physical hazards associated with well sampling are:

- Lifting injuries associated with pump and bailer retrieval; moving equipment.
- Use of pocket knives for cutting discharge hose.
- Heat/cold stress as a result of exposure to extreme temperatures (may be heightened by protective clothing).
- Slip, trip, fall conditions as a result of pump discharge.
- Restricted mobility due to the wearing of protective clothing.

WATER-LEVEL MEASUREMENT FIELD FORM

General Information

Well ID: ______________________________ Equipment ID: _________________________

Date: ________________________________ Personnel: ____________________________

Water Level Data

Time				
Hold				
Tape Correction				
WL below MP				
MP Correction				
WL below LSD				

Measured by: ____________________

Comments:*____

____

____

*Comments should include quality concerns and site conditions/observations

---

Final Measurement for Sampling Report: ______________

Time: __________________

WATER-LEVEL MEASUREMENT PROCEDURE

1. Check circuitry of electrical tape before lowering the probe into the well by dipping probe into tap water.
2. Make all readings using the same indicator for consistency (light intensity or sound).
3. Lower electrode probe slowly into the well until the indicator shows that the circuit is closed and contact with the water surface is made. Place the nail of the index finger on the insulated wire at the MP (Measuring Point) and read the depth to water.
4. Record time of measurement. Record depth to water in the row "Hold". If the tape has been repaired and spliced or has a calibration correction, subtract the "Tape Correction" value from the "Hold" value and record the difference in the row "WL below MP".
5. Record MP correction length on the "MP Correction" row. Subtract the MP correction from the true "WL below MP" to get depth to water below LSD (Land-Surface Datum). MP correction is positive if MP is above land surface and negative if below. Record level in WL below LSD.
6. Pull the tape up and make a check measurement by repeating steps 3 through 5. Record the check measurement in column 2. If check measurement does not agree with the original measurement within 0.01 foot, continue to make measurements until the reason of lack of agreement is determined or the results are shown to be reliable. If more than two measurements are made, use best judgment to select measurement most representative of field conditions. Complete "Final Measurement for MBMP".
7. Disinfect and rinse that part of tape that was submerged below water. Dry tape and rewind.

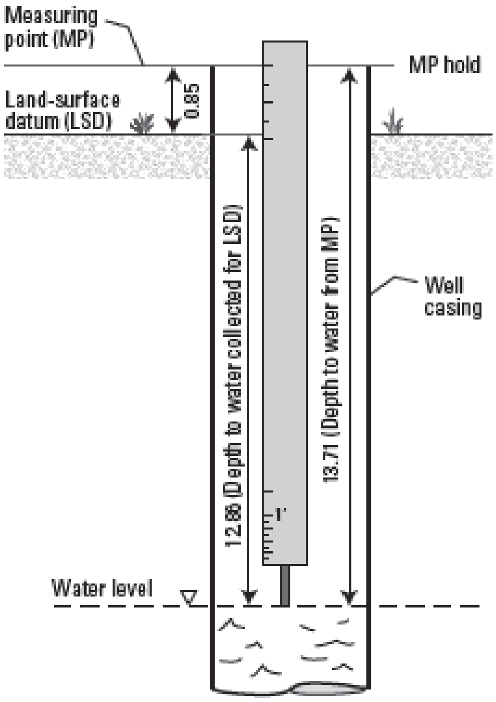

Figure 1. Reference diagram of well for appropriate water-level data collection.

WATER QUALITY MEASUREMENT FIELD FORM

Date: ____________________

Sampler Name: _______________________________

Well Information

Well ID: __________________________

WQ Meter (Make/Model): ________________________ Serial Number (last 3 digits) __________

WL Sounder (Make/Model): ____________________ Serial Number (last 3 digits) __________

Static Depth to Water: ____________ Time: ___________________

Total Depth Well: ________________ Casing Diameter: ________

Casing Volume: __________________

Water Quality Field Measurement Details

Were you able to collect a water quality sample? YES NO

Sample Collection Time: __________________________

If no, why? ____

Sample Collection Method: ____

Lab Name: ________________________ Sample Group: _________________________

Water Quality Field Parameters (please enter in the units of measurement as they appear on the meter)

Time (24 hour)	Depth to Water (feet)	Gallons Purged	Pumping Rate (GPM)	Temp (C)	Cond (EC) (uS/cm)	pH (pH units)	DO (mg/L)

Total Volume Purged: ____

WATER QUALITY MEASUREMENT FIELD FORM

Date: ________________________

Well ID: ____________________________

Sampler Initials: _____________________

Time (24 hour)	Depth to Water (feet)	Gallons Purged	Pumping Rate (GPM)	Temp (C)	Cond (EC) (uS/cm)	pH (pH units)	DO (mg/L)

WATER QUALITY MEASUREMENT EXAMPLE

Date: 3/25/2019

Sampler Name: John P

Well Information

Well ID: MW-4

WQ Meter (Make/Model): YSI Pro

Serial Number (last 3 digits) 568

WL Sounder (Make/Model): Solinst 101

Serial Number (last 3 digits) 241

Static Depth to Water: 11.25 ft

Time: 14:15

Total Depth Well: 27.10 ft

Casing Diameter: 2-inch

Casing Volume: πr^2h(cf)= (3.14)(0.0833 ft)^2(15.85 ft)(7.48 gal/ft^3) = 2.58 gal

Water Quality Field Measurement Details

Were you able to collect a water quality sample? [✓ YES] NO

Sample Collection Time: 14:52

If no, why?

Sample Collection Method: Low flow submersible pump

Lab Name: Monterey County Consolidated Chemisty Lab

Sample Group: John P

Water Quality Field Parameters (please enter in the units of measurement as they appear on the meter)

Time (24 hour)	Depth to Water (feet)	Gallons Purged	Pumping Rate (GPM)	Temp (C)	Cond (EC) (uS/cm)	pH (pH units)	DO (mg/L)
14:20	11.25	0	N/A	N/A	N/A	N/A	N/A
14:25	11.39	1.5	0.3	20.1	400	7.0	12
14:30	11.45	3.0	0.3	20.4	431	7.1	11
14:35	11.47	4.5	0.3	20.3	425	7.0	11
14:40	11.38	6.0	0.3	20.7	429	6.9	10
14:45	11.36	7.5	0.3	21.0	422	7.0	11
14:50	11.36	9.0	0.3	20.6	415	7.0	12

Total Volume Purged: 9.0 gallons

CALIBRATION FORM

Project Name: ______________________

Personnel: ______________________

Notes: ______________________

____

Signature: ______________________

Date of Calibration: ______________________

Location: ______________________

Weather Conditions: ______________________

Parameter Sensor: ______________________

Instrument Type: ______________________

Model: ______________________

Parameters / Field Measurements								General Description of Standards
		pH	Temp.	Electrical Conductivity (µS/cm)	Temp.	ORP (mV)	Temp.	calibration solution, supplier, expiration date
Standard Solution Values	1	4.0						
	2	7.0						
	3	10.0						
Pre-calibration Readings for Each Standard	1							
	2							
	3							
Post-calibration Readings for Each Standard	1							
	2							
	3							

Appendix D

Photographic Log of Monitoring Wells

Figure 1. Monitoring well MW-1.

Figure 2. Monitoring well MW-1 close-up.

Figure 3. Monitoring well MW-1 overview.

Figure 4. Monitoring well MW-2.

Figure 5. Monitoring well MW-2 close-up.

Figure 6. Monitoring well MW-2 overview.

Figure 7. Monitoring well MW-3 close-up.

Figure 8. Monitoring well MW-3 overview.

Figure 9. Monitoring well MW-4.

Figure 10. Monitoring well MW-4 close-up.

Figure 11. Monitoring well MW-4 overview.

Figure 12. Monitoring well MW-5.

Figure 13. Monitoring well MW-5 close-up.

Figure 14. Monitoring well MW-5 overview.

Figure 15. Monitoring well MW-6.

Figure 16. Monitoring well MW-6 close-up.

Figure 17. Monitoring well MW-6 overview.

CITY OF GONZALES
INDUSTRIAL WASTEWATER RECYCLING FACILITY

DRAFT

PRELIMINARY ENGINEERING REPORT

PREPARED BY:

WALLACE GROUP

DATE:

FEBRUARY 2020

CERTIFICATION

In accordance with the provisions of Section 6735 of the Business and Professions Code of the State of California, this report was prepared by or under the direction of the following Civil Engineers, licensed in the State of California:

ENGINEER IN RESPONSIBLE CHARGE:

Shannon Jessica, PE C75578 expiration: 06/30/2020 **Date**

Steven G. Tanaka, PE C49779 expiration: 09/30/2020 **Date**

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List of Acronyms and Abbreviations

AAF	Average Annual Flow
ADD	Average Daily Demand
ADF	Average Daily Flow
ADWF	Average Dry Weather Flow
AF	Acre-Feet
AFY	Acre-Feet per Year
aSAR	Adjusted Sodium Adsorption Ratio
Avg	Average
BOD (BOD$_5$)	Biological Oxygen Demand (5-Day)
BVWSD	Buena Vista Water Storage District
CBOD	Carbonaceous Biochemical Oxygen Demand
CCR	Consumer Confidence Report
CEQA	California Environmental Quality Act
CIMIS	California Irrigation Management Information System
City	City of Taft
COG	Council of Governments
CPO	Chief Plant Operator
DDW	Division of Drinking Water
DHS	Department of Health Services
DWR	Department of Water Resources
EC	Electroconductivity
EIT	Engineering In Training
ENR	Engineering News Record
FPS	Feet per Second

FRM	Fluid Resource Management
ft	Feet
GIS	Geographic Information System
GPCD	Gallons Per Capita Per Day
GPD	Gallons Per Day
GPM	Gallons Per Minute
GSA	Groundwater Sustainability Agency
GW	Groundwater
HCF	Hundred Cubic Feet
HGL	Hydraulic Grade Line
HP	Horsepower
HS	High School
in	Inches
JPA	Joint Exercise of Powers Agreement
KCWA	Kern County Water Agency
kW	Kilowatt
lb	Pound(s)
LF	Linear Feet
LS	Lump Sum
Max	Maximum
MCL	Maximum Contaminant Level
MDD	Maximum Daily Demand
MDDWF	Maximum Day Dry Weather Flow
mg/L	Milligrams per Liter
MG	Million Gallons
MGD	Million Gallons Per Day
min	Minute, Minimum
MOU	Memorandum of Understanding
MPN	Most Probable Number
MSL	Mean Sea Level
NA	Not Available
ND	Not Detected
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
O&M(Manual)	Operations and Maintenance
P.E.	Professional Engineer
PER	Preliminary Engineering Report
PG&E	Pacific Gas & Electric Company
PHD	Peak Hour Demand
PLC	Programmable Logic Controller
PS	Pump Station
RW	Recycled Water
RWP	Recycled Water Policy
RWD	Report of Waste Discharge
RWQCB	Regional Water Quality Control Board
SAR	Sodium Adsorption Ratio
SD	School District

SCADA	Supervisory Control and Data Acquisition
SF	Square foot
SGMA	Sustainable Groundwater Management Act
SWP	State Water Project
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TSS	Total Suspended Solids
USDA	United States Department of Agriculture
USDOE	United States Department of Energy
UWMP	Urban Water Management Plan
WDR	Waste Discharge Requirements
WRF	Water Recycling Facility
WRFP	Water Recycling Funding Program
WSCD	West Side Cemetery District
WSRPD	West Side Recreation & Park District
WW	Wastewater
WWTP	Wastewater Treatment Plant
w/	With

Chapter 1:
INTRODUCTION

The City of Gonzales (City), with financial assistance from local industrial facilities, will be constructing a new industrial wastewater recycling facility (IWRF) immediately adjacent to the City's existing municipal wastewater treatment plant (WWTP). The City's municipal WWTP has been under duress the past several years due to significant flow and organic loads discharged to the WWTP by local industrial dischargers. This Preliminary Engineering Report (PER) presents the recommended IWRF that the City will implement to serve industrial wastewater flows in the Gonzales area. This new facility will alleviate the current overage of flow and organic loading to the municipal WWTP, which should allow the City's municipal WWTP to adequately handle domestic wastewater flows from the City.

BACKGROUND AND DESCRIPTION OF STAKEHOLDERS

This section describes the various key stakeholders involved with this PER. Key stakeholders include the City of Gonzales, and various industrial dischargers that will discharge wastewater to a new industrial wastewater recycling facility (IWRF).

City of Gonzales

The City of Gonzales is a small incorporated City located in Monterey County, California, approximately 16 miles southeast of the City of Salinas. The City of Gonzales is in the Salinas Valley, the heart of the "salad bowl" of the nation. The City's residents are predominantly local farmers that grow produce in this region. The City owns and operates an existing wastewater treatment plant (WWTP), currently permitted at 1.3 million gallons per day (MGD) capacity (maximum month flow). With a population of around 8,440, and an assumed per capita wastewater flow of 60 gallons per capita per day (gpcd)[1], it is estimated the domestic component of wastewater flow is around 0.5 MGD (current average daily flow is ~1 MGD), which means that approximately half of the entire plant flow is from industrial sources. In recent years, the City's plant has received wastewater flows approaching this flow limitation and exceeding the plant's organic loading capability. This current plant loading condition is caused by a group of industrial dischargers, and predominantly by two existing industrial facilities (Taylor Farms, Mann Packing). This condition has caused the WWTP to be marginal with respect to maintaining compliance with the waste discharge requirements (WDRs) and is the premise for providing a separate industrial wastewater recycling facility (IWRF).

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[1] Typical unit flow factors for municipalities in California, and specifically including City of Greenfield (Wallace Group, Wastewater Collection System Master Plan, 2016), considered a highly comparable City to Gonzales.

Industrial Dischargers

The City is in the process of developing a Pretreatment Program, that will include development and implementation of permitting for existing identified industrial dischargers. The location of existing Industrial dischargers situated in the Gonzales Agricultural Business Industrial Park (GAIBP) are shown in Figure 1-1 and include:

- Jackpot Harvesting
- Taylor Farms
- Mann Packing
- Pure Pacific Organics
- Growers Express
- Dole Food Company
- Green Valley Farm Supply

Taylor Farms. Taylor Farms operates a processing and packaging facility at 100 Puente Del Monte. The facility generates industrial wastewater during washing of produce, cleaning equipment, and washing floors. Based on past water usage records, it was estimated that the facility used an average of 158,400 gpd (October 2013 through September 2014) with a maximum month (wastewater) flow of 185,600 gpd. Current metering data suggests Taylor Farms is now discharging approximately 500,000 gpd or more, to the City's municipal plant.

Mann Packing. Mann Packing (recently acquired by Del Monte) operates a processing and packaging facility at 180 Katherine Street. The facility generates industrial wastewater during washing of produce, cleaning equipment, and washing floors. Domestic and industrial wastewater are plumbed separately to facilitate monitoring and future bifurcation of the waste streams. According to City staff, no pretreatment is provided for process wastewater. Based on past water usage records the facility used an average of 52,900 gpd (October 2013 through September 2014) with a maximum month (wastewater) flow of 61,000 gpd. Current estimates of near-term future wastewater flows are 350,000 gpd.

OBJECTIVES

The objectives of this PER include:

- Identify and recommend a new IWRF to serve the City's industrial wastewater facilities, with a Phase 1 design capacity of 1.25 MGD.
- Define probable waste discharge requirements for the new IWRF
- Develop 30% conceptual design for a recommended IWRF that will meet the probable waste discharge requirements. Compare the recommended IWRF alternative to other available advanced treatment technologies.
- Submit the Report of Waste Discharge (ROWD) for the recommended IWRF, in compliance with the Porter Cologne Water Quality Act, and the Regional Board Region 3 requirements.
- Provide conceptual layout of the new IWRF facilities, and required trunk sewer to convey industrial wastewater to the IWRF.
- Provide preliminary design recommendations, including conceptual costs for the new IWRF

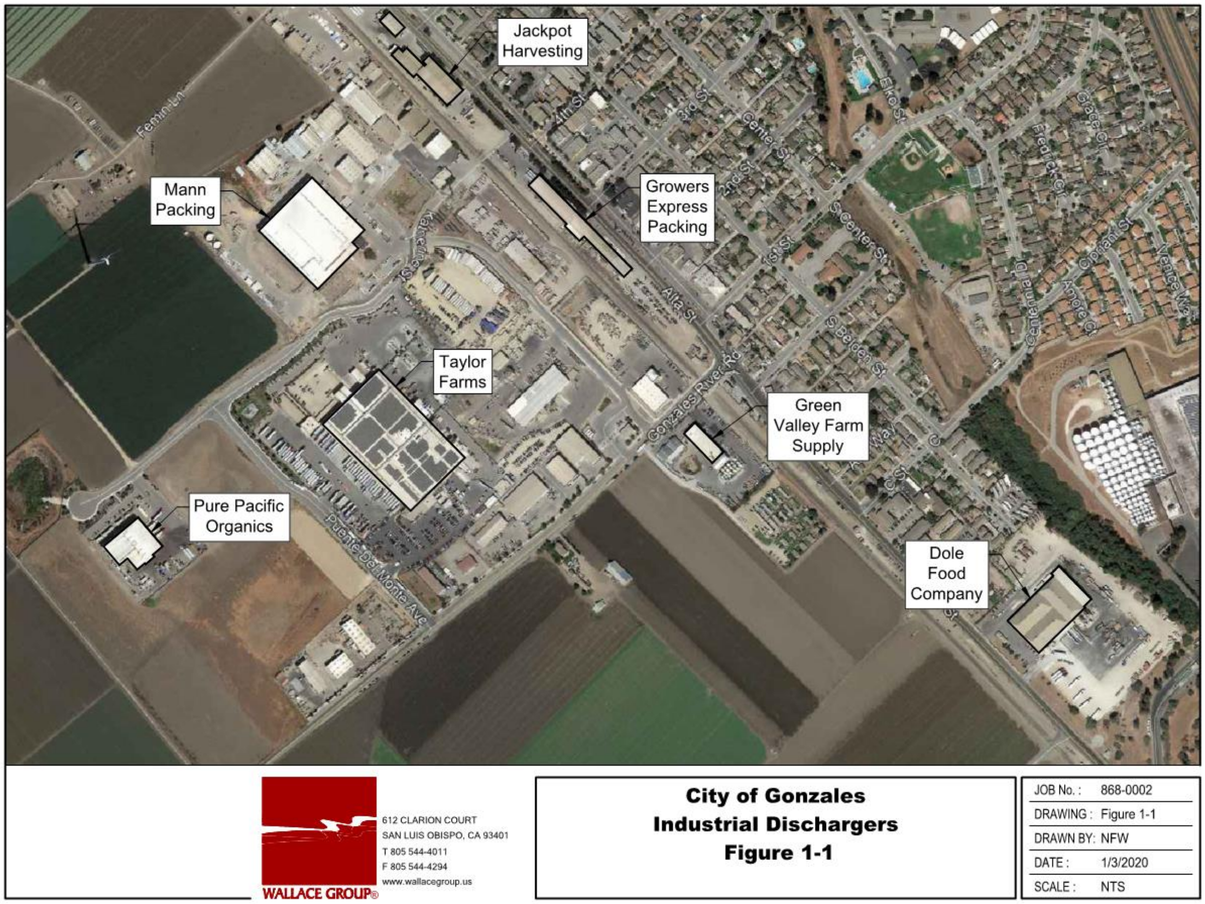


Figure 1-1. City of Gonzales Industrial Dischargers

ACKNOWLEDGMENTS

Wallace Group thanks and gratefully acknowledges the following for their efforts, involvement, input and assistance in preparing this Recycled Water Project Report:

- Patrick Dobbins, PE, City Public Works Director
- Tiffany Twisselmann, Public Works Supervisor
- Phillip Giori, PE, Dudek
- Taylor Farms

Wallace Group Staff

The following Wallace Group key team members were involved in the preparation of this Recycled Water Project Report:

- Shannon Jessica, P.E., Senior Civil Engineer, Project Manager
- Nate Whitacre, E.I.T., Associate Engineer/Project Engineer
- Steven G. Tanaka, P.E., Principal Civil Engineer
- Robert Miller, P.E., Principal Engineer

Chapter 2:
PROJECT AREA CHARACTERISTICS

This Chapter describes the Project Area characteristics related to the City's proposed IWRF to serve the industrial wastewater facilities in and around City of Gonzales. Information on local climate, hydrologic features and groundwater information was derived and referenced from various prior technical reports, the City's General Plan (updated 2018), and other documents. The City's local water supply characteristics and municipal wastewater characteristics are presented in Chapter 3.

PROJECT AREA

The City limits and sphere of influence are shown on Figure 2-1 . The Project area involves the City limits with respect to the municipal wastewater component that will discharge to the City's existing WWTP now, and in the future. The existing industrial wastewater facilities that will be served by this new IWRF are also shown on Figure 2-1. These facilities are within the Gonzales Agricultural Business Industrial Park (GABIP) in the western portion of the City.

LAND USE AND POPULATION

This section describes land use and population within the City of Gonzales, based on the City's 2018 adopted General Plan, coupled with the Association of Monterey Bay Area Government (AMBAG) 2018 Regional Growth Forecast.

The City limits, and the location of the City's municipal WWTP are shown on Figure 2-1. The City provides municipal wastewater service to approximately 8,440 residents within the existing City limits, encompassing a 1,211 acre (1.9 square mile) area.

City of Gonzales General Plan

The City's General Plan dated January 2011 was recently updated June 2018. Over the past 13 years, the City added approximately 600 acres of land into its incorporated area, of which approximate 200 acres has been dedicated to industrial use west of Alta Street. Other details of the General Plan are not germane to the focus of this preliminary engineering report.

Land Use and Zoning. The City limits and the municipal WWTP service area are one in the same. The City boundary however is not contiguous with the WWTP, which is located approximately 1.5 miles to the west. The WWTP is physically located immediately adjacent to the Salinas River on City property (which is not contiguous with the main City limits. The City's General Plan land use map was referenced, with the City Boundary overlain on this land use map, and is included as Figure 2-1. As indicated earlier, in recent years the City has added approximately 200 acres of industrially-zoned lands to the City limits. This land includes the 75-acre Gonzales Agricultural Business Industrial Park (GABIP) discussed in further detail in this Chapter.

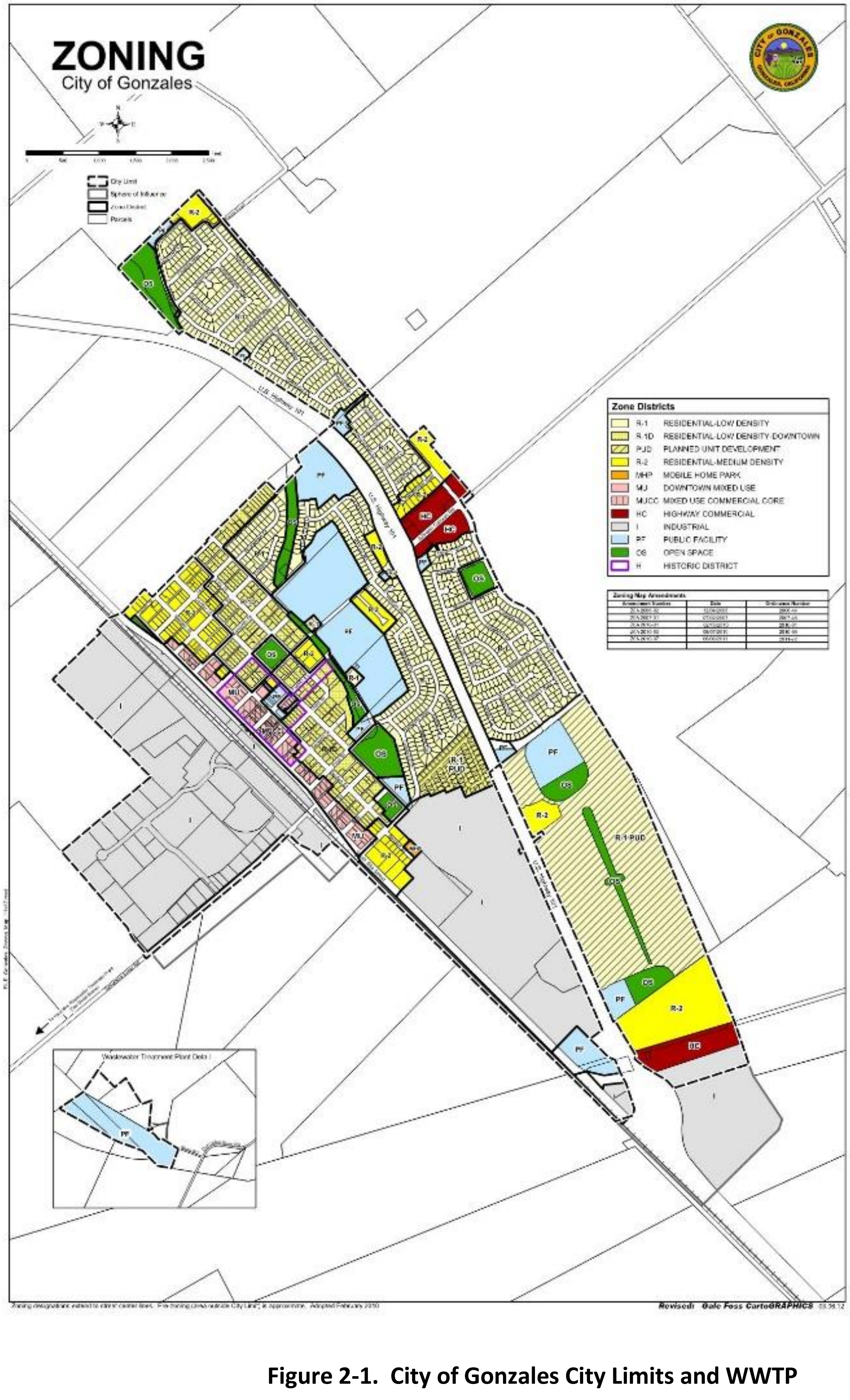


Figure 2-1. City of Gonzales City Limits and WWTP

Population Projections. As mentioned above, the Project Area and municipal WWTP service area are the same. Recent City planning data suggests the City will grow to a population of 24,000 by Year 2035 (Dudek, August 2018). However, the AMBAG 2018 Regional Growth Forecast projects a population of 15,942 in Year 2035, and 18,756 by Year 2040 (Table 8, Sub-regional Population Forecast), much lower than projected by information provided by the City. Based on a future City population of around 19,000, and an estimated per capita wastewater flow of 60 gallons per capita per day (gpcd), the City's wastewater plant capacity of 1.3 MGD could theoretically serve the City through Year 2040 build-out wastewater flows (~1.14 MGD), assuming the plant is maintained in good condition (and updated WDRs do not impose new effluent standards that are not attainable by the current WWTP). The significance of this is that with industrial wastewater flows diverted to the IWRF, the City's municipal WWTP should not see wastewater flows above their current permitted discharge limit of 1.3 MGD in the next 20 years. However, as noted in other studies (MKN, 2016), the City's existing 21" diameter trunk sewer is at or nearing hydraulic capacity based on peak hour flow conditions, to maintain a d/D of 0.75 or less. The limiting flow, expressed in terms of average daily flow (ADF) conditions, is 0.74 MGD (this ADF is currently being exceeded).

Industrial/Commercial Facilities To Be Served by New IWRF

The City is home to the GABIP, which is a 75- acre area bounded by South Alta Road to the east, Gonzales River Road to the south, and agricultural land to the north and west. It hosts several agricultural processing businesses, and an additional 25 acres are planned to be added in the near future (Dudek, 2018). The businesses in the GABIP are a main source of increased wastewater flows, and the City is aware of additional business interest in the GABIP.

During construction of the park a separate industrial wastewater collection system was installed to allow this waste stream to be separated from the domestic waste stream. The industrial wastewater collection system ends near the intersection of Katherine Street and Puente Del Monte Avenue and this reach is not currently in use. The City has an existing 20 foot wide sewer easement extending from this intersection to the northwest. It is envisioned that all industrial wastewater flow will be diverted through this sewer, and from this point, the new IWRF dedicated gravity sewer will extend to the new IWRF.

Existing Industrial Wastewater Facilities. As indicated in Chapter 1, there are 7 existing industrial dischargers to the municipal WWTP at this time. The two major facilities are Taylor Farms, and Mann Packing. Discharges from industrial facilities have significantly increased in recent years, most notably from Taylor Farms. All of the identified industrial dischargers receive metered City of Gonzales potable water as their process water supply.

Future Industrial/Commercial Developments. It is envisioned that future industrial wastewater flows will collectively exceed 1.25 MGD, and thus a Phase 2 expansion to 2.5 MGD is expected in the future. The timing of when Phase 2 improvements may be needed is not certain.

LOCAL CLIMATE

The climate of this area of the Salinas Valley is semi-arid, and average rainfall is 15 inches annually. On average, there are 261 sunny days per year in Gonzales. The City of Gonzales is at 135 feet above mean sea level. Gonzales gets precipitation, on average, 60 days per year. The average maximum temperature in the City for the month of July is 70 degrees Fahrenheit, and for the month of January, 41 degrees Fahrenheit.

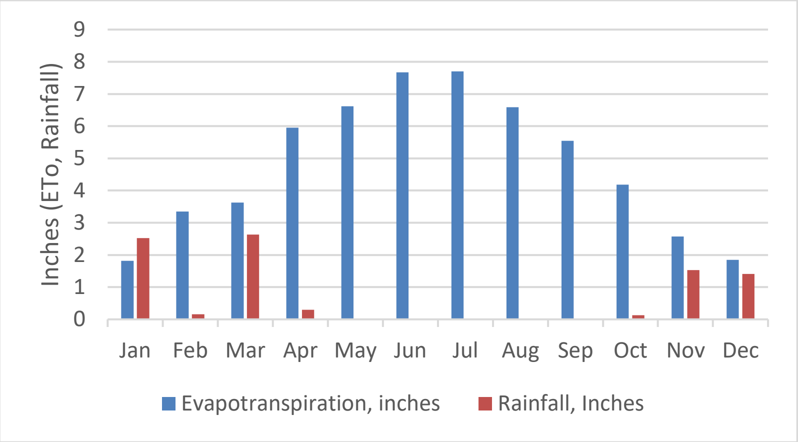


Figure 2-2. Year 2018 Evapotranspiration and Rainfall (Weather Station 252 Soledad)

Figure 2-2 depicts the distribution of rainfall and evapotranspiration for the calendar year 2018. The closest California Irrigation Management Information System (CIMIS) weather station, Station 252 Soledad, was used to prepare this chart; it is noted that this weather station had data dating back only to Year 2016.

Chapter 3:
WASTEWATER FACILITY SETTING

This Chapter describes the hydrogeologic setting in the area of the proposed IWRF, including surface water and groundwater setting, and potable water quality in the City of Gonzales.

HYDROLOGIC FEATURES

This section presents information on the hydrogeologic setting of the City's municipal WWTP and planned site for the IWRF, including surface water and groundwater resources. The Basin Plan states a number of water quality objectives for the various water bodies throughout Region 3. A summary of surface and groundwater quality objectives in the vicinity of City of Gonzales is presented in Table 3-1.

Table 3-1. Summary of Basin Plan Objectives for Surface and Groundwater Quality

Water Body	Parameter, mg/L					
	TDS	**Cl**	**SO_4**	**B**	**Na**	**N[1]**
Surface Water[2]	600	80	125	0.2	70	NA[4]
180-ft Aquifer[3]	1500	250	600	0.5	250	1.0

[1] Measured as Nitrogen

[2] As listed for Salinas River (Above Spreckels), Table 3-5 of the Basin Plan

[3] As listed for Salinas Valley, 180 foot Aquifer

[4] Not listed/not available

Surface Water

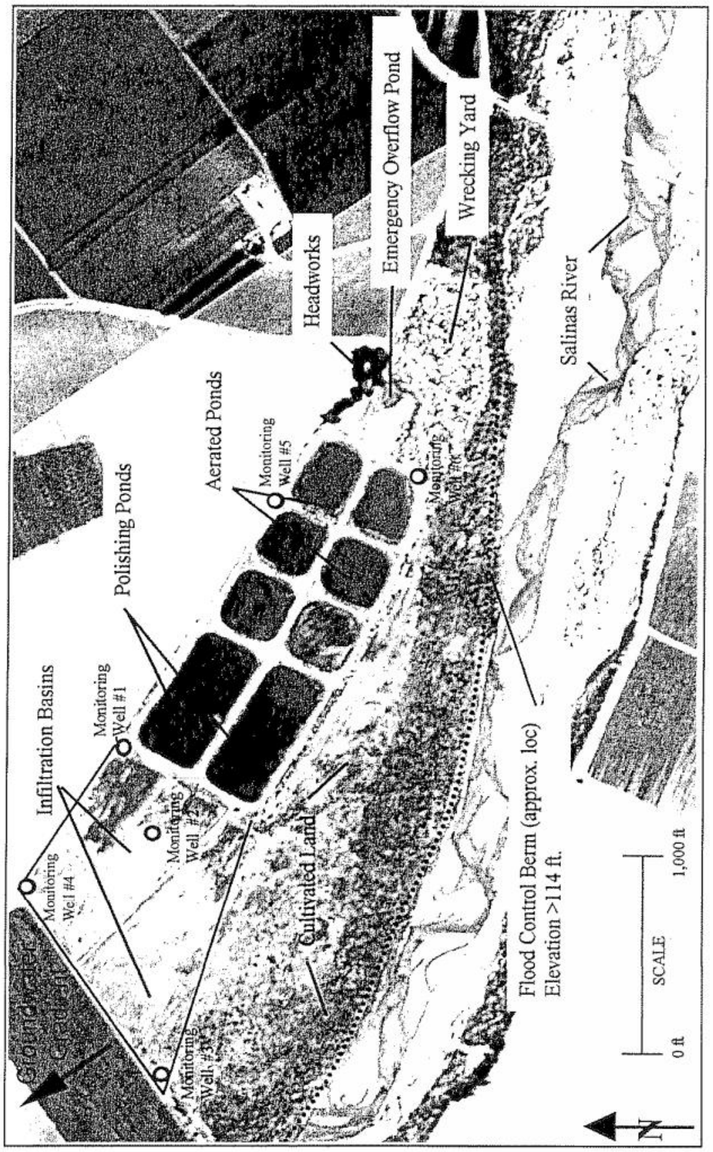
Figure 3-1 depicts the City's municipal WWTP in relation to the Salinas River, and the existing effluent GW monitoring well network. The IWRF will be situated north of the existing municipal WWTP and the Salinas River. The portion of the Salinas river adjacent to the existing WWTP is part of Hydrologic Planning Area 309.20 (Chualar HA). Beneficial uses of the river in this reach are many, and include municipal, agricultural, industrial process, groundwater recharge, recreational 1 (water contact) and 2 (non-contact), cold and warm water habitat, recreation, migration, rare and endangered species habitat, commercial fishing. Table 3-1 provides the surface water quality objectives extracted from the basin plan.

California Regional Water Quality Control Board
Central Coast Region

City of Gonzales Wastewater Treatment Plant

Order No. R3-2006-0005

Facility Map



Attachment 2

Figure 3-1. Municipal WWTP, Salinas River, Effluent GW Monitoring Well Network

Groundwater

This section presents information on local groundwater supplies including the local hydrogeology, groundwater levels, groundwater wells, groundwater quality and monitoring.

The City of Gonzales is within the Salinas Valley Groundwater basin, situated in the pressure subarea as shown in the Basin Plan Appendix A-32, DWR Groundwater Basin 3-4.01. The pressure sub basin is characterized by a shallow aquifer with multiple aquifers and aquitards beneath it, specifically the Pressure 180-foot Aquifer followed by the Pressure 400-foot Aquifer. Groundwater flow in the basin is generally in a northwestern direction up the valley towards Monterey Bay up to Chualar. North of Chualar, groundwater flows in a northeast direction towards the City of Salinas. The flow to the eastern side of the City of Salinas is especially pronounced in August during the time of seasonal peak groundwater pumping. Based on a hydrogeological study conduct by Dudek in 2019, groundwater flow in the vicinity of the municipal WWTP varies based on the time of year. During the dry season the hydraulic gradients is slightly to the northwest, and during the wet season it is slightly to the northeast.

Groundwater Quality. Groundwater quality from the municipal WWTP monitoring wells was analyzed by Dudek in a hydrogeological study in 2019. This study concluded that nitrate concentrations exceed the 10 mg/L basin plan objective (nitrate-N) for all monitoring wells, with values ranging from 10.1 mg/L at MW-3 to 56.7 mg/L at MW-4 and MW-6. Additionally, boron and chloride were detected in the groundwater with maximum concentrations of 0.65 mg/L and 292 mg/L respectively. These levels also exceed basin plan objectives listed in Table 3-1. The study concluded that in general, the concentrations of constituents detected in groundwater were highest in the downgradient monitoring wells (MW-1, MW-2, MW-4 and MW-5), and lowest in the upgradient monitoring wells (MW-3 and MW-6).

Groundwater Gradient/Flow Direction. As previously discussed, groundwater beneath the City's existing WWTP flows in a northwesterly to northeasterly direction along the Salinas River, as shown on Figure 3-1. The groundwater monitoring well network is arranged with one upstream monitoring well (MW-6), and five downstream monitoring wells (MWs 1-5). In general, GW monitoring results do show localized impacts to underlying GW in the area of the municipal WWTP. In addition, a composting facility immediately south (between the WWTP and the River) could potentially be contributing to localized GW impacts in this area also.

Table 3-2 provides a summary of groundwater quality in and around the existing municipal WWTP effluent percolation ponds, based on the City's existing network of effluent groundwater monitoring wells.

Table 3-2. Groundwater Quality Summary – Municipal WWTP Effluent Monitoring Wells

Constituent[1, 2]	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6
Nitrate-N	11	2	6.3	19	0.8	10[3], 0.44[4]
Total Nitrogen	13	4	8.0	20	24	18[3], 6.4[4]
TDS	865	794	762	883	980	333
Cl	176	160	67	155	165	30
SO_4	114	107	202	95	25	62
Sodium	154	140	49	137	124	20
Boron	0.3	0.3	0.2	0.3	0.3	0.2

[1] Expressed in mg/L unless otherwise noted.

[2] All values are averaged based on data from 2015 to present.

[3] June 7, 2017 value (56.7 mg/L) believed to be an erroneous sample, elevating average to levels shown.

[4] Average excluding the June 7, 2017 sample (see footnote 3 above).

Potable Water Supply

This section presents information on the City's municipal water supply. The City's water supply comes from seven (7) local groundwater wells; there is no surface water supply that serves the City's potable water demands. Groundwater used for the City's potable water supply is of relatively good quality and is characterized by moderate concentrations of minerals and total dissolved solids with relatively low concentrations of salts and nitrates. Trace amounts of radioactive nuclides and boron can be found in the groundwater due to naturally occurring sources. Hexavalent Chromium is also present in groundwater ranging from 2.8 – 3.0 ppb.

Table 3-3. Summary of City of Gonzales Potable Water Quality (from Year 2018 CCR)

Constituent	Units	MCL (State)[a]	PHG[b]	Average Value
Primary Drinking Water Standards				
Chromium	ug/L	4	100	0.3
Hexavalent Chromium	ug/L	10	0.02	3.0[1]
Fluoride	mg/L[d]	2.0	1.0	0.21
Nitrate (as N)	mg/L	10	10	3.2
Copper[e]	mg/L	1.3	0.3	0[f]
Lead[e]	mg/L	0.015	0.2	0[f]
Secondary Drinking Water Standards				
Odor	Odor units	3	N/A	1
Color	NTU[g]	15	N/A	2
Chloride	mg/L	500	N/A	32
Iron	ug/L	300	N/A	<30
Manganese	ug/L	50	N/A	<20
Sulfate	mg/L	500	N/A	106
TDS	mg/L	1,000	N/A	422
Specific Conductance	uS/cm[h]	1,600	N/A	614
Other				
Hardness	mg/L[i]	None	None	222
Sodium	mg/L	None	None	36

[a] State maximum contaminant level

[b] Public Health Goal

[c] micrograms per liter

[d] milligrams per liter

[e] Samples taken from distribution system

[f] Number of samples exceeding standard

[g] Nephelometric turbidity units

[h] microsiemens per centimeter

[i] expressed as calcium carbonate ($CaCO_3$)

Chapter 4:
EXISTING CITY OF GONZALES WASTEWATER FACILITIES

This chapter describes the City's existing municipal wastewater treatment plant (WWTP), which currently accepts wastewater from the Gonzales Area Industrial Business Park (GAIBP) located south west of the City. Industrial wastewater flow and strength are both significant factors contributing to the current performance issues seen at the municipal WWTP. This chapter provides a brief summary of the existing municipal WWTP including design capacity, unit process design criteria, effluent disposal system, and a summary of the current waste discharge requirements and challenges seen at the WWTP.

MUNICIPAL WWTP

The WWTP was originally constructed in the 1950s as a series of six facultative treatment ponds with two polishing ponds prior to disposal fields. The six facultative ponds were originally designed to operate in parallel. Over the years various improvements were made to the facility, including the addition of a surface aerator to each facultative pond for odor control. In 2001, waste discharge requirements (WDRs) were issued by the Central Coast Regional Water Quality Control Board (Regional Board) allowing the WWTP to operate with a permitted design capacity (based on monthly average daily flow) of 0.763 MGD. In 2005, the WWTP was upgraded as part of a phased approach based on the need to meet anticipated population growth for the City of Gonzales. Phase I upgrades were detailed in a 2005 engineering report by Creegan + D' Angelo (C &D) and implemented later that year. WWTP Phase I upgrades included converting the facultative ponds to operate as two sets of three ponds in series. Additionally, more surface aerators were added to the treatment ponds and the existing aerators were upgraded, new headworks facilities (including a grit removal system, new headworks screen, grinders, flow measuring weir, and influent pump station) were installed. After the upgrades were completed, new WDRs were issued in 2006 allowing a monthly average daily flow of 1.3 MGD.

Over the last four years, effluent water quality from the WWTP has declined, specifically effluent biochemical oxygen demand (BOD_5) and total suspended solids (TSS) have increased. In addition to effluent water quality concerns, influent wastewater flows are projected to reach plant and collection system capacity in the next 2-4 years. To address these concerns, the City of Gonzales has worked with engineers to provide recommendations on improving effluent quality and preparing updated capacity studies including a wastewater treatment plant master Plan, and long term waste management plan. These past reports are summarized in chapter 1 of the City of Gonzales Long Term Waste Management Plan (LTWMP). Based on these reports, the most likely cause of poor effluent water quality is the accumulation of sludge in the facultative treatment lagoons, which in turn increases short-circuiting in the treatment ponds due to reduced hydraulic/biologic retention time. In addition, certain chemical constituents in the industrial wastewater (e.g., chlorine) are limiting the effectiveness of the WWTP's biological treatment capability.

As an alternative to upgrading the WWTP, the City analyzed installing a new conveyance system to send raw wastewater to other nearby treatment facilities (Constellation Winery, Monterey One Water regional water recycling facility). Based on correspondence between the City, the Regional Board, Dudek and Wallace Group, it has been decided that the most cost effective solution to municipal WWTP capacity constraints is to construct a new Industrial Wastewater Recycling Facility (IWRF) and conveyance system. This would include a new 21" trunk sewer that would convey industrial wastewater from the Gonzales Agricultural Business Industrial Park (GABIP) to the new IWRF. Industrial wastewater accounts for approximately 60% of the existing flow to the municipal WWTP; therefore, by diverting industrial wastewater flow to a new facility, it would alleviate the capacity constraints of the existing treatment plant and hydraulic capacity limitations of the existing sewer trunk.

Even with the proposed construction of a new IWRF and collection system, it is anticipated that the existing WWTP will have to be upgraded to meet new discharge requirements set forth by the Regional Board. Upgrades to the existing municipal WWTP infrastructure are outside the scope of this report, however, because industrial wastewater will be diverted from the existing WWTP to a new IWRF, it is important to understand existing flows and wastewater characteristics at the municipal WWTP.

The existing WWTP consists of the following major components:

- Influent Headworks (Manual bar screen, grit removal system and Parshall Flume)
- One (1) Emergency Overflow Basin
- One (1) Influent Pump Station
- Six (6) Facultative Lagoons (Ponds 1, 2, 3, 4, 5, and 6)
- Two (2) Polishing Ponds (Ponds 7 & 8)
- Three (3) Rapid Infiltration Basins (3 basins, 7 acres each)
- Six (6) Effluent Groundwater Monitoring Wells (MW-1, MW-2, MW-3, MW-4, MW-5, MW-6)

City Collection System. The City's WWTP is served by a collection system consisting of gravity sewers, lift stations, and force mains. The existing collection system consists of vitrified clay pipe (VCP), PVC, and PVC force main pipes ranging in diameter from 6 to 21 inches. The trunk sewer extending to the City WWTP is 21-inch diameter, and has a limiting capacity (based on peak hour flow) of 7.9 MGD (expressed as average daily flow). As mentioned previously in this PER, this trunk sewer is currently at capacity with respect to peak hour flow, and capacity criteria of d/D of 0.75.

Municipal WWTP Process Overview and Design Criteria

The existing WWTP is designed for 1.0 MGD of average daily flow (ADF), and 1.3 MGD maximum month flow (MMF). The facility is permitted under Regional Board Order Number R3-2006-0005, dated March 7th, 2006. The existing flow and organic loading criteria for the WWTP are summarized in Table 4-1 and includes a summary of current plant loading (with contributions from the industrial facilities). The WWTP design criteria by unit process is summarized in Table 4-2. A process flow diagram is presented as Figure 4-1.

Table 4-1. Gonzales WWTP Design Capacity Criteria

Parameter	Design Criteria	Current Plant Loading
ADF, Maximum Month, MGD	1.0	0.97[1]
Maximum Month Flow (MMF), MGD	1.3	0.85[2]
Peak Hourly Flow, MGD	3.7[2]	2.74[2]
Influent BOD_5, mg/L (lb/day)	250 (2,711)	334[3] (3,040[4])

NOTEs:
1. ADF from 2018 WWTP Monitoring Data
2. City of Gonzales Wastewater Treatment Plant Capacity Study: Draft. MKN. June 2016
3. Yearly average concentration from 2018 WWTP influent composite samples
4. Yearly average loading from 2018 WWTP influent composite samples

Table 4-2. Gonzales WWTP Process Criteria

Process	Criteria	Total
Facultative Lagoons	Number	4
	Area, Acres	2.5 (each)
	Loading, lb/acre/day	98.7
	Loading, lb/Day (total)	987
	Number Aerators & HP	6 @ 7.5 hp each, 4 @ 15 hp each
Polishing Ponds	Number	2
	Area, Acres	5.5 (each)
Rapid Infiltration Basins	Number	3
	Area, Acres	7 (each)
	Application Rate, inch/day	Not Available
	Application Rate, MGD	Not Available

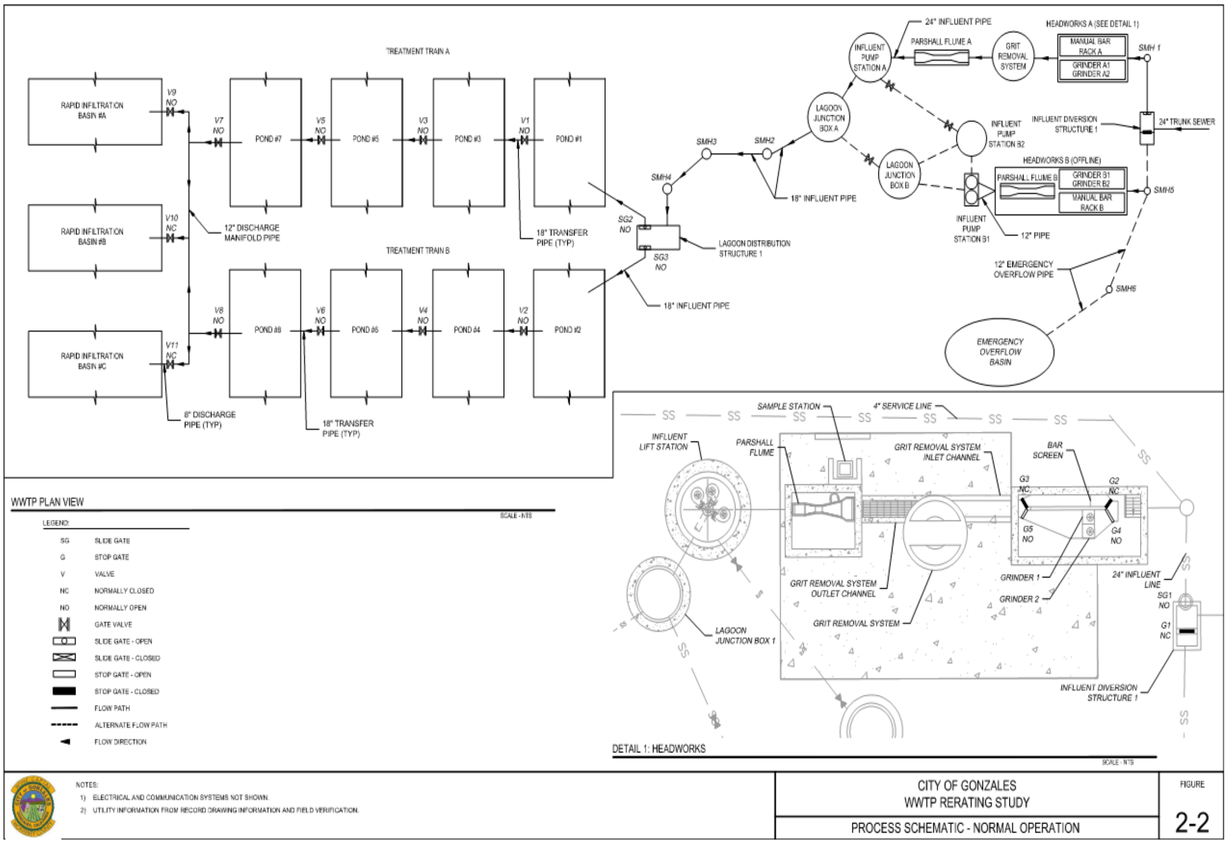


Figure 4-1. WWTP Process Flow Diagram, MKN WWTP Capacity Study *Draft*, 2016.

MUNICIPAL WWTP WASTE DISCHARGE REQUIREMENTS

The waste discharge from the WWTP is presently governed by Waste Discharge Requirements (WDRs) Order No. R3-2006-0005, adopted March 24, 2006. This permit is included in its entirety in Appendix C. It is anticipated that the City's WDRs will be updated and re-issued by the Regional Board, at some point in time in the near future.

Key aspects of the City's WDRs are summarized as follows:

- **It is noted that there are no specific effluent treatment standards imposed in these WDRs.**
- Current plant capacity is 1.3 MGD, based on Phase 1 (referenced in Finding 8 of the WDRs) completion. Prior to the Phase 1 completion, the City's plant was rated at 0.763 MGD.
- Specification B.1, wastewater flows shall not exceed 1.3 MGD (daily flow averaged over one month).
- Specification B.2, effluent discharged shall have a pH between 6.5 and 8.3.
- Specification B.3, effluent shall not be discharged within 100 feet of any existing water supply well or surface water.
- Specification B.4, effluent disposal operations shall not cause downgradient monitoring wells to exceed 10 mg/L nitrate (as N).
- Specification B.5, effluent disposal operations shall not cause downgradient monitoring wells to see "significant increases" in mineral quality.
- Specification B.6, effluent discharged to the percolation ponds shall not cause underlying groundwater to exceed the limits stated in Table 4-3.
- Specification B.8, treatment ponds shall have a freeboard of at least 2 feet at all times.
- Specification B.11, effluent disposal ponds shall be alternated to permit emptying for maintenance purposes.
- Specification B.12, infiltration basins shall be maintained at least annually.
- Specification B.15, all storm water contacting domestic wastewater shall be contained on site.
- Specification B.16, best management practices shall be implemented to minimize the inflow and infiltration of storm water into the facility.
- Specification B.17, Discharger shall maintain ongoing salts management program (with intent of reducing mass loading of salts in treated effluent) to a level that will ensure compliance with effluent limitations and will not negatively impact beneficial uses of the groundwater.
- Specification B.18, Discharger shall consider all sources for salt reduction, and including the applicability of AB 334 (ban on water softeners).
- Specification B.19, the salt management plan shall also consider hydraulic retention and evaporation at the WWTP as part of the overall salt management plan.
- Provision C.6, Discharger shall submit a Long-term wastewater management plan (LTWMP) to the Board by March 1, 2008. This LTWMP report, prepared by Dudek, was submitted to the Regional Board on August 29, 2018, and an addendum (Phasing Plan) was included on October 23, 2018. After reviewing the Revised Draft LTWMP, the Regional Board staff inspected the City's WWTP on November 16, 2018

Table 4-3. Specification B.6 Groundwater Quality Limitations

Constituent	Maximum[a]
TDS	1,500
Sodium	250
Chloride	250
Sulfate	600
Boron	0.5
Nitrate (as N)	10

[a]Units in milligrams per liter (mg/L).

and prepared their February 20, 2019 "Requirements and Response to Long Term Wastewater Management Plan and Addendum". Notably, the RWQCB required the City to proceed with a compliance work plan and a revised LTWMP that was due May 30, 2019.The Regional Board provided a response letter dated February 20, 2019.

Key aspects of the WDR monitoring requirements are as follows:

Influent wastewater monitoring:

- Daily flow metering, maximum daily flow metered, and mean daily flow (calculated).
- Monthly composite samples for BOD5, TSS, settleable solids, nitrite (as N), nitrate (as N), total Kjeldahl nitrogen (as N), total nitrogen (as N).
- Quarterly composite samples for TDS, sodium, chloride, sulfate, boron
- Groundwater monitoring is also required of the upgradient and downgradient wells on a monthly basis, for WG depth, pH, TDS, sodium, chloride, boron, sulfate, nitrate, nitrate, TKN and total Nitrogen.

Effluent monitoring (discharged to infiltration basins):

- Annual grab sample for heavy metals.
- Once every 5 years, grab sample for volatile organics and pesticides.
- Monthly grab samples for pH, BOD5, TSS, settleable solids, nitrate, nitrate, TKN and total Nitrogen
- Quarterly grab samples for TDS, sodium, chloride, boron, sulfate

Solids/biosolids monitoring:

- Quarterly, report "summary of activities" on biosolids handling.
- Representative samples during transport/removal, for moisture content, nitrate (as N), pH, oils and grease, heavy metals
- At least once every 5 years prior to transport or disposal, pesticides, organic lead and PCBs.

Recent History of the City of Gonzales Municipal WWTP

In January 2018 the City began discussions with the Regional Board to determine what requirements are necessary to expand treatment capacity at the Municipal WWTP. The city engaged Dudek Consulting to prepare a Draft Long Term Wastewater Management Plan (LTWMP). The Draft LTWMP was submitted to the Regional Board in May 2018. A Revised Draft LTWMP was submitted to the RWQCB on August 29, 2018 and was further revised by the City in October 2018 to add a Phasing Plan. After reviewing the Revised Draft LTWMP, the Regional Board staff inspected the City's WWTP on November 16, 2018 and prepared their February 20, 2019 "Requirements and Response to Long Term Wastewater Management Plan and Addendum". Notably, the RWQCB required the City to proceed with a compliance work plan and a revised LTWMP that is due May 30, 2019.

The RWQCB determined from their facility investigation that the City is potentially violating Standard Provisions and Reporting Requirements for multiple sections of the Waste Discharge Requirements and Groundwater Specifications. As a result, the Regional Board required the City to immediately proceed with a number of tasks and submit a technical report (Compliance Work Plan) and future LTWMP update that addresses the items outlined in the Regional Board letter. Germane to this PER, one of the City's required actions include steps to develop a pretreatment program. The City is to identify industrial dischargers contributing to the wastewater treatment system, evaluate water quality from industrial discharges, identify immediate actions industrial dischargers can take to reduce their chlorine load and/or moderate extreme pH values or address other pollutants potentially inhibiting or disrupting the treatment process, and develop, adopt, and enforce a local pretreatment program as required by Standard Provisions A.8. Other action items related to the municipal WWTP can be referenced in the City's Compliance Work Plan and LTWMP updated reports.

Past quarterly monitoring reports from the municipal WWTP show that there have been no WDR violations in at least two years. However, as discussed in previous sections, effluent water quality from the WWTP has declined over the past 4 years, specifically BOD and TSS. Dissolved oxygen (DO) in all of the municipal WWTP ponds is less than 1 mg/L, indicating poor pond performance. This PER addresses the need to divert all industrial wastewater flows from the municipal WWTP, to a new IWRF.

MUNICIPAL WWTP FLOW AND ORGANIC LOADING

This section describes the current municipal wastewater flow and organic loading to the municipal WWTP, which includes wastewater influence from the existing industrial wastewater facilities. Following this Section, the proposed IWRF flow and organic loading parameters are presented.

Municipal WWTP Flow Characteristics

Wastewater flow characteristics are critical in understanding plant hydraulics and the capability of the treatment plant to handle existing and future flows, particularly peak hour wet weather flows.

Definitions. In order to understand the various flow parameters to be discussed, it is important to clearly define the various flow parameters addressed in this report. Defined flow terms are summarized in the following paragraphs, including discussion of how flow values were derived for the City of Gonzales.

Average Daily Flow (ADF) or Annual Average Flow (AAF) is the average daily wastewater flow over the course of a year and was obtained by averaging the mean monthly flows conveyed to the WWTP through the course of a year.

Average Dry Weather (ADWF) and Wet Weather (AWWF) Flows are the average of daily flow rates during wet and dry weather months respectively. Based on historical rainfall data for the Gonzales area, wet weather months are assumed to be October through April.

Maximum Month Flow (MMF) or Average Day Maximum Month Flow (ADMMF) is the average daily flow received at the WWTP over the course of the peak month. This flow is used to report WWTP flows to the Regional Water Quality Control Board.

Peak Day Flow (PDF) is the maximum daily flow rate experience at the WWTP. Used to design or evaluate hydraulic retention times for certain treatment processes.

Peak Hour Flow (PHF) is the maximum one-hour flow experience by the system. PHF is typically used for sizing the collection system piping, pump stations, flow meters, interceptors, and headworks systems.

Table 4-4 provides a history of the flow values at the municipal WWTP. Figure 4-2 graphically shows the annual average flow for the past 5 years.

Table 4-4. Current Municipal WWTP Flowrates

Flow Parameter	Flow Rate (MGD)						
	January 2006-December 2008[1]	2013[2]	2014[2]	2015[2]	January-March 2016[2]	2017[3]	2018[4]/ 2019[5]
Average Daily Flow (ADF)	0.58	0.64	0.71	0.74	0.77	0.78	0.97/1.03
Average Wet Weather Flow (AWWF)	0.53	0.61	0.68	0.73	0.82	N/A	N/A
Average Dry Weather Flow (ADWF)	0.63	0.66	0.75	0.75	0.70	N/A	N/A
Maximum Month Flow (MMF)	0.72	0.69	0.78	0.79	0.85	N/A	N/A
Peak Day Flow (PDF)	0.88	0.95	0.93	0.99	0.97	1.087	1.584/ 1.767
Peak Hour Flow (PHF)	1.75	N/A	N/A	N/A	2.74	N/A	N/A

[1] *City of Gonzales Wastewater System Conceptual Plan: Draft. AECOM. September 2011.*

[2] *City of Gonzales Wastewater Treatment Plant Capacity Study: Draft. MKN. June 2016.*

[3] *Discharge Self-Monitoring Reports: Central Coast RWQCB. 2017.*

[4] *Discharge Self-Monitoring Reports: Central Coast RWQCB. 2018.*

[5] *Discharge Self-Monitoring Reports: Central Coast RWQCB. 2019. (Q1-Q3)*

Figure 4-4 is a 5-year historic summary of annual average flow (AAF) to the WWTP.

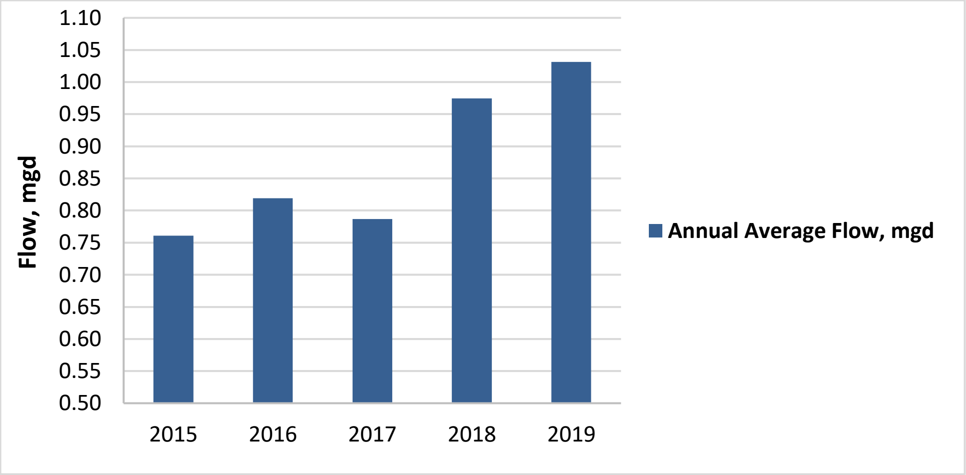


Figure 4-2. Annual Average Influent Wastewater Flows to WWTP

Table 4-4 and Figure 4-2 show average annual wastewater flows to the municipal WWTP have been increasing over the past 5 years with significant increases in flow in 2018 and 2019. This flow increase is mainly due to the industrial dischargers, specifically Taylor . ADWF is higher than AWWF due to agricultural operations and industrial discharge during dry months. One exception to AWWF being higher than ADWF is the partial data set from 2016, which only accounts for flows from January to March.

Figure 4-3 is a summary of the monthly flow trends to the WWTP. It is estimated that the industrial discharges accounts for approximately 0.6 MGD year-round. The combined flow from the industrial discharges and domestic waste remains relative constant throughout the year.

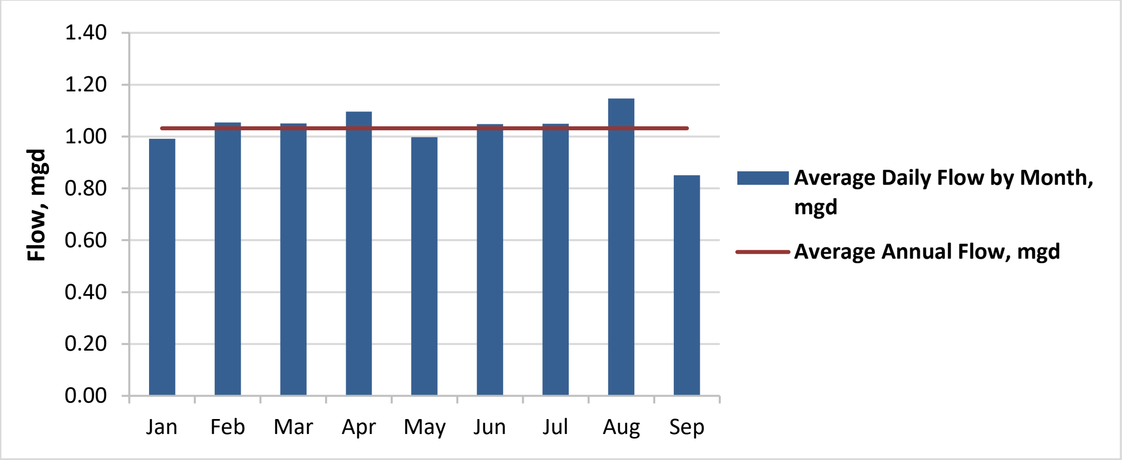


Figure 4-3. 2019 Monthly Influent Wastewater Flows, Gonzales WWTP

Municipal WWTP Organic Loading Characteristics

This section presents a review of the influent WWTP organic loading. The influent samples taken were 24-hour composite samples at the WWTP headworks.

Figure 4-4 is summary of average BOD concentration, loading, and design loading over the past five years for the municipal WWTP.

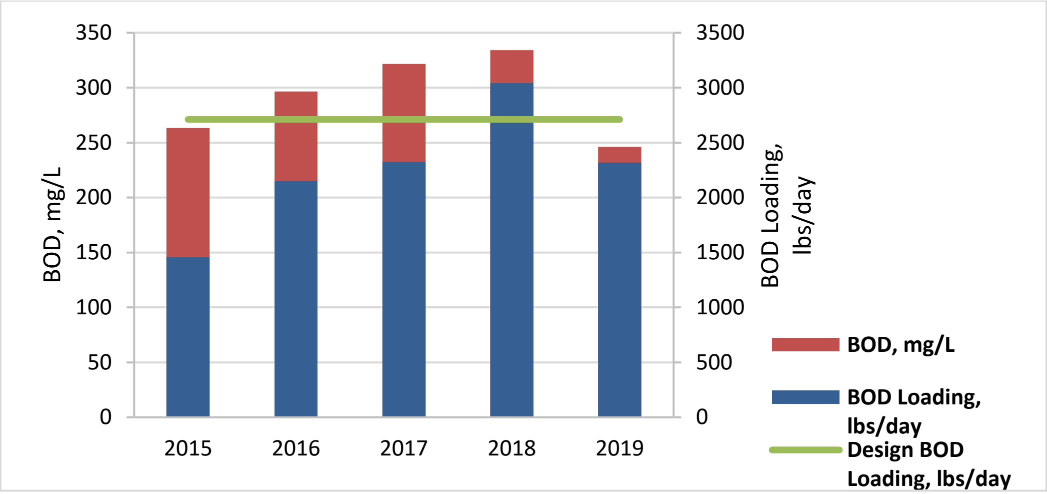


Figure 4-4. Organic Loading to WWTP

As shown in Figure 4-4, the combination of increased flows and BOD concentrations have resulted in the existing WWTP reaching its design BOD loading capacity (of 2,711 lb BOD_5/day). Based on correspondence with City and recent growth of the GAIBP, increased flow is most likely due to the industrial dischargers. With a current City population of approximately 8,400, the domestic component of wastewater flow is likely around 0.5 to 0.6 MGD (based on 60 to 75 gpcd). Furthermore, based on organic loading in Year 2018 (~3,000 lb/day BOD), this is demand equivalent to a population of around 15,000 people, again reinforcing the fact that the WWTP is receiving flows and loading at or above its original design capacity. Wastewater flow from the industrial dischargers is characterized by higher influent BOD concentrations compared to domestic wastewater and correlates to the increased BOD concentrations seen in the WWTP influent samples. It is estimated that Taylor farms produces and average daily wastewater flow of 0.6 MGD which accounts for approximately 60% of the total wastewater flow to the municipal WWTP.

Other Parameters

The Influent waste is high in TDS, nitrogen, and disinfectant by products. Because the municipal WWTP is not designed to remove TDS and nitrogen, these constituents have the potential to adversely affect effluent quality and adversely impact groundwater. As previously discussed in chapter 3, localized impacts on groundwater quality have been observed by comparing the upgradient and downgradient monitoring wells in the vicinity of the WWTP. Based on grab samples taken from Taylor farms effluent, increased concentrations of the above constituents are most likely due to the vegetable cleaning and processing at the facility. The next section discusses industrial wastewater characteristics, quality and strength in greater detail.

Industrial Wastewater Flow and Quality

The WWTP currently receives industrial waste from seven facilities at the GAIBP, with three main dischargers; Taylor Farms, Mann Packing (Dole) and Pure Pacific Organics. All three facilities are vegetable processing and distribution centers that produce industrial wastewater from their vegetable washing, cleaning, and processing. Taylor farms is the largest industrial discharger, currently producing 0.5-0.6 MGD of wastewater. Mann Packing, recently acquired by Dole, is the second largest discharger. Past wastewater flow data from Mann Packing shows the facility produces approximately 0.35 MGD of industrial wastewater. Based on discussions with the between the City and Dole, the wastewater flow from the Dole facility is not projected to change after the acquisition. No flow or wastewater data is available for Pure Pacific Organics, however, based on the small size of the facility this is expected to have minimal impact on the design waste strength and loading.

Waste characteristics were not available for the majority of the industrial discharges; however, a 24-hour composite sample from Taylor Farms was received for samples taken in January 2020. Based on the volume and nature of waste produced by Taylor farms, it is assumed that effluent wastewater samples from Taylor farms are representative combined wastewater streams from all the industrial discharges. However, in light of the recent waste strength of the Taylor Farms sample, the new IWRF is not being designed to treat such high strength waste; furthermore, the TDS and nitrogen levels are also very high and would warrant careful consideration as to potential impacts at the new IWRF. Table 4-5 provides a summary of Taylor Farm's effluent wastewater characteristics.

Table 4-5. 2019 Taylor Farms Effluent Waste Characteristics

Parameter[1]	Average Concentration	January 2020 Sample
pH (pH Units)	6.43	---
BOD_5	678	1,000
TSS	187	250
TDS	1728	2,140
FDS	493	---
Total Nitrogen	59	196
Ammonia	1.1	9.3
TKN	124	190
Nitrate (NO_3)	41	5.6[2]
Sulfate	99	---
Sodium	71	---
Chloride	68	---

[1] All values expressed in milligrams per liter (mg/L) unless otherwise specified.

[2] Nitrate-Nitrogen reported. This value would be approximately 25 mg/L nitrates.

FDS=fixed dissolved solids

TDS=total dissolved solids

TSS=total suspended solids

BOD_5=biochemical oxygen demand (5-day)

TKN=total Kjeldahl Nitrogen

Industrial Wastewater Design Flow and Strength

The IWRF is designed to be installed in a phased approach with Phase I having wastewater treatment capacity of 1.25 MGD (ADMMF). As the wastewater flows and number of industrial discharges in the GABIP increase, phase II of the IWRF will be brough online with a treatment capacity to 2.5 MGD (ADMMF). Design flow was determined by using the current maximum discharge rate from Taylor Farms of 600,000 gpd and a projected discharge rate of 350,000 gpd for the Dole facility. An additional projected flow of 350,000 gpd was added to this total to account for future growth of the GABIP for a total of 1.25 MGD. Taylor farms was used to determine the design waste strength and characteristics for the IWRF. Taylor farms is largest industrial discharger in the GAIBP, comprising more than 60% of the current wastewater loading and flow. Future wastewater from industrial discharges in the GAIBP is assumed to have similar characteristics to Taylor Farms.

Design Wastewater Flows. Table 4-6 provides a summary of the design flows for the IWRF.

Table 4-6. Gonzales IWRF Design Wastewater Flow

Parameter	Existing Flow	Design Criteria (Phase I)	Design Criteria (Phase II)
ADMMF, MGD	0.6	1.25	2.5
PHF, MGD	NA	5.0	10.0

NOTES:
ADMMF= Average day, maximum month flow
PHF= Peak hourly flow (calculated using a peaking factor of 4)
MGD= million gallons per day

A peaking factor of 4 was assumed when calculating PHF. Based on the nature of the waste (industrial), it is difficult to determine a peaking factor for existing and future flows. Instead, the proposed pond design for the IWRF (chapter 6) uses flow equalization basins to prevent shock loading to the ponds due to variations in industrial wastewater flow and strength. It is also expected that there will be some dampening of peak flows from the industrial facilities as wastewater travels the nearly 2 miles to the headworks of the IWRF. The influent lift station will also be equipped with pumps on variable frequency drives to match influent flow, thus reducing cyclic flows typically seen from a single-speed pump lift station.

Design Quality/Strength. As part of the new IWRF, design criteria must be developed for the treatment facilities, to define biological treatment requirements (aeration). Table 4-6 provides a summary of proposed design wastewater influent waste strength. The influent TDS limitation is based on ensuring the effluent meets or exceeds the water quality objectives stated in the Basin Plan (1,500 mg/L TDS for the 180-foot aquifer).

Table 4-7. Gonzales IWRF Design Wastewater Strength

Parameter	Design Criteria (Phase I)	Design Criteria (Phase II)
Influent BOD_5, mg/L (lb/day)	600(6,255)[a]	600(12,510)[a]
Influent TSS, mg/L (lb/day)	600(6,255)[a]	600(12,510)[a]
Influent Total Nitrogen (mg/L)	40	40
Influent TDS (mg/L)	1,000	1,000

NOTES:
[a]Based on ADMMF design flow
MGD= million gallons per day
BOD_5=biochemical oxygen demand
TSS=total suspended solids
TDS=total dissolved solids

Design wastewater strength was determined based consideration of current available data, wastewater samples taken from Taylor farms, Basin Plan Water Quality Objectives, and adjusted based on anticipated pre-treatment objectives to be established by the City. Specifically, industrial dischargers will be responsible for pre-treating their waste to remove levels of biological oxygen demand and volatile compounds harmful to plant biology (chlorine, perchlorate, trihalomethanes, and halo acetic acids). Additionally, industrial discharges will be responsible for source control and best management practices involving the use of sanitation products in order to limit influent total nitrogen to less than 40 mg/L and TDS less than 1,000 mg/L.

Chapter 5:
IWRF PROBABLE WASTE DISCHARGE REQUIREMENTS

This chapter discusses the regulatory environment for the proposed IWRF, building upon the existing municipal WWTP WDRs, and what the IWRF WDRs are likely to be.

PORTER COLOGNE WATER QUALITY ACT

The State Water Resources Control Board and nine State Regional Water Quality Control Boards, operate under the authority of the California Porter Cologne Water Quality Act of 1969. Regional Board jurisdiction is divided into nine regions throughout the State, based on area watersheds and basins. In the case of the City of Gonzales, the central coast (Region 3) Regional Board regulates waste discharges in this region.

Region 3 Water Quality Control Board, Basin Plan

Each of the nine Regional Boards prepares a water quality control plan, referred to as the Basin Plan, for their respective water sheds. This Basin Plan establishes water quality objectives for surface and ground waters in the region, to establish policies and goals for protection of the beneficial uses of such area waters. This section discusses the Basin Plan, the purpose of the Basin Plan to protect waters of the State within the Region 3 Basin, in the area of the City of Gonzales.

State Board Policies. Over the years, the State has issued a number of policies related to protection and management of waters of the State. Two specific policies germane to the City of Gonzales are as follows: 1) Policy with Respect to Water Reclamation in California; and 2) Anti-Degradation Policy. The water reclamation policy encourages that all water resources of the State be put to beneficial reuse to the fullest extent practicable, and that Regional Boards encourage such reuse. At a minimum, Regional Boards will require Dischargers to conduct feasibility studies to identify any practical reuse options to recycle wastewater. Regional Boards also will encourage and recommend funding for water recycling projects that meet certain criteria. The anti-degradation policy states that where water quality is better than those objectives established in the Basin Plan, such quality of waters shall be maintained.

PROBABLE WASTE DISCHARGE REQUIREMENTS FOR IWRF

This section presents of summary of meetings and discussions with Regional Board staff regarding the new IWRF, an overview of the Fruit & Vegetable Order, and a summary of probable waste discharge requirements for the new IWRF.

Meetings With Regional Board Staff. On December 17, 2019, Wallace Group met with the Regional Board to discuss the proposed IWRF and probable waste discharge requirements for this new facility. Present at this meeting were:

- Wallace Group: Shannon Peterson, Steve Tanaka, Nate Whitacre
- Regional Board: Kristina Olmos, Jennifer Epp, and Thea Tryon

The following summarizes key discussion points:

- The City's pre-treatment program was discussed in general, and Board staff is in general conformance with how the City is developing and handling this program. It will be key to define pre-treatment standards and limits to ensure the quality of effluent wastewater treated at the IWRF protects the beneficial uses of local surface and groundwater.
- Regional Board staff are in favor of using the General Waste Discharge Order No. R3-2004-0066 (hereinafter referred to as the "fruit and veg order" as a means of regulating this new facility. Board staff advised Wallace Group that this Order is in the process of being updated; however, the timeline for update of this Order is not certain. Given that there will be multiple industrial facilities discharging waste to this facility, Board staff will review this consideration with Counsel as to the validity of using this General Order in lieu of an individual set of prescribed Waste Discharge Requirements.
- It is certain the effluent from the new IWRF will need to meet an effluent limitation of 10 mg/L nitrate-nitrogen or less. Board staff intends to require effluent limitations on all discharges, to protect local Waters of the State, consistent with the water quality objectives stated in the Basin Plan. The new IWRF, even if regulated by the existing or updated fruit and veg order, should expect effluent limitations consistent with these stated water quality objectives. The nitrate-N water quality objective for the 180-foot aquifer in the immediate area of the new IWRF stands at 1 mg/L which would be very difficult to achieve for any treatment process alternative. In addition to the groundwater quality objectives, the Regional Board will consider that plant effluent meet all other drinking water standards.
- New wastewater treatment facilities should strive to meet the best water quality attainable with current technology (best available technology), balanced with technical and cost feasibility. The ROWD and engineering report prepared should address the various treatment technologies, including merits and constraints, including overall costs.
- Board staff would like to see the City address water recycling as part of the new IWRF. Wallace Group indicated that the City will address water recycling at a later time, as their immediate goal is to facilitate construction of the new IWRF in the near-term, in part to alleviate flow and organic loading at the municipal plant (from industrial dischargers) which is currently under duress. The new IWRF will accommodate provisions and a footprint to add necessary components for an anticipated recycled water program in the future, but the details of such improvements will be deferred to a later time. There was also discussion about the fact that rapid infiltration in of itself will enhance water reuse by recharging the local aquifer. Rapid infiltration would be a preferred disposal/effluent discharge method as compared to spray irrigation or ponding which may concentrate salts and lose a significant amount of water to evaporation.

Based on this meeting, it is expected that the Regional Board will require the IWRF be designed with the Basin Plan Water Quality Objectives in mind. The expected effluent limitations would be the same as the Basin Plan groundwater quality objectives in Table 3-1, with careful consideration of achieving an effluent nitrate-nitrogen effluent limitation of 10 mg/L or less. Achieving a 1 mg/L nitrate-nitrogen limitation (to match the water quality objective for nitrogen in the 180-foot aquifer) may be prohibitive, and Chapter 6 will address the viability of meeting these water quality objectives. In addition, effluent should also be expected to meet all other federal and state drinking water standards.

Fruit and Vegetable Order

The current fruit and veg order (R3-2004-0066) contains discharge provisions and limitations that would be expected to be included in the IWRF WDRs, even if this General Order is updated. Consistent with federal antibacksliding guidelines, it is not expected that any current provision in the fruit & veg order would become less stringent. The following should be considered as part of the design for the IWRF:

- Provision C.8. Fruit and veg wastewater shall not have an organic loading rate that exceeds 100 pounds of BOD5 per acre per day (30-day average). This criteria should be used in conjunction with federal secondary effluent standards (see Table 5-1), to determine how much land should be set aside for effluent disposal. For example, if the total IWRF discharge is 1.0 MGD, and the effluent BOD5 achieved is 45 mg/L, the effluent BOD5 discharge to land results in 375 pounds per day. Thus, to limit the discharge to 100 lb/day/acre, a minimum of 3.75 acres of active effluent percolation land would be required to comply with this provision. Accounting for resting cycles, maintenance, rainfall and inclement weather, and other buffers, this standard can be used as a basis for determining an appropriate amount of land needed for effluent disposal of treated fruit and veg wastewater. Based on expected infiltration rates required for rapid infiltration, it is expected a significantly larger amount of land will be required, and thus the effluent disposal area should have ample area to more than meet this requirement.
- Provision D.8, Subsurface soil absorption systems shall be designed in accordance with Section VIII.D.3 of the Basin Plan (Steve, look this up and see what it says……).
- Groundwater Limitation 16. The discharge shall not cause local groundwater concentrations to exceed 10 mg/L Nitrate (as N).
- Operation Specification 22. Minimum pond freeboard shall be 2.0 feet. This would apply to all treatment ponds. For effluent disposal areas, this would apply should the design be based on ponding, percolating and evaporating effluent. For a rapid infiltration disposal method, the disposal field should not pond any water within a reasonable time frame following application (24 hours).
- Operation Specification 24. Dissolved oxygen in ponds (in the upper one foot) shall be 1 mg/L or greater at all times.
- Wastewater Recycling/Re-Use Specification 34. Land application of fruit and veg wastewater shall be managed to prevent ponding, runoff and erosion.

Probable Waste Discharge Requirements for New IRWF. Table 5-1 summarizes the anticipated effluent quality parameters for the Gonzales IWRF.

Table 5-1. Probable WDRs for Gonzales IWRF

Parameter[1]	Effluent Limitation[2]
BOD_5(mg/L; lbs/acre/day)	45[3] , 100[4]
TSS (mg/L; lb/acre/day)	45[3] , 100[4]
Boron	0.5
Chlorides	250
TDS	1,500
pH (pH Units)	6.5 – 8.3[4]
Sodium	250
Nitrate as N	10
Sulfate	600
Other Constituents	Primary and Secondary Drinking Water Standards[5]

[1] All units expressed in mg/L unless otherwise indicated.

[2] Basin Plan water quality objective for groundwater, unless otherwise indicated.

[3] Secondary treatment standards for facilities such as pond systems, that are "equivalent to secondary treatment standards", EPA NPDES Permit Writers' Manual, USEPA, September 2010. If other than a pond system is proposed, BOD and TSS limitations may be more stringent than listed.

[4] Fruit & Veg Order No. R3-2004-0066. Note, for BOD_5, current limitations are expressed in pounds per acre per day.

[5] Effluent discharged from new IWRF should meet all other federal and state drinking water standards.

Chapter 6:
IWRF ALTERNATIVES ANALYSIS

This chapter presents the project alternatives analysis for the Gonzales IWRF. The alternatives considered include:

1. No Project Alternative. This alternative would continue the current program of the City of Gonzales accepting and treating industrial wastewater at its municipal plant.
2. New Industrial Wastewater Treatment Facility (IWRF) adjacent to the City's existing WWTP:
   a. Enhanced Deep-Aeration Aerated Pond System (ADS or equal)
   b. Enhanced Deep-Aeration Aerated Pond System (ADS or equal) with Nutrient Removal Technology
   c. Note: All above treatment options will consider similar effluent percolation/disposal options.

In addition to the above alternatives, a brief review of advanced technology, such as a membrane bioreactor (MBR) will be discussed. Such advanced technology for the City's IWRF is not warranted in consideration of probable waste discharge requirements; however, a comparison and review of this process technology will be presented.

ALTERNATIVE NO. 1 - NO PROJECT ALTERNATIVE

The No Project Alternative would utilize the existing City of Gonzales WWTP (as it exists presently) to treat combined domestic and industrial wastewater flows, as is presently done. The No Project Alternative is not a viable alternative, given the current condition of the municipal WWTP, and the fact that current wastewater flows and organic loading are in excess of the current design capacity of the WWTP. The City cannot continue to operate the existing WWTP with industrial wastewater contributions, without creating on-going risk of plant violations and subsequent enforcement actions by the Regional Board.

ALTERNATIVE NO. 2 – ENHANCED DEEP-OPERATION AERATED POND SYSTEM

This alternative analyzes an Air Diffusion Systems (ADS) enhanced, deep-operated pond system. Nitrogen removal technology will also be considered as part of this alternative review, for future Phase 2. This alternative for nitrogen removal will be a Denitrification woodchip wetland.

The nitrogen removal component will be evaluated as part of potential future needs, depending on upcoming regulatory changes.

Alternative No. 2 Process Description

This Alternative No. 2 IWRF alternative involves separating all industrial wastewater flows from the City, and treating the industrial flow in a separate treatment facility. This option allows the City's existing municipal WWTP to receive and treat predominantly domestic wastewater at the WWTP, significantly reducing the organic loading and flow conditions on the WWTP. This new IWRF will effectively alleviate current plant loading conditions, allowing the City's WWTP to operate more comfortably within the current WDRs and eliminating the threat of WDR violations currently being seen at the WWTP. This PDR addresses specifically this Alternative No. 2 IWRF; any provisions for improvements at the City's WWTP will be addressed in a separate technical report.

The proposed treatment system for the IWRF is a deep-aerated pond system, that efficiently transfers oxygen to biological treatment ponds, allowing the IWRF effluent to achieve treatment standards prescribed in the Regional Board's Fruit and Vegetable Order. As with most pond systems, the IWRF will require additional process infrastructure to meter, screen, and pump influent wastewater, and manage/dispose of treated industrial effluent via percolation beds. The proposed deep aerated pond system will include the following components:

- Influent lift station
- Influent flow metering and screening
- Flow equalization (EQ) basins
- Deep-aerated process treatment ponds
- Denitrification Woodchip Wetland (future Phase 2 only)
- Effluent rapid percolation beds

The proposed IWRF will be designed initially for a Phase 1 average day maximum month flow (ADMMF) of 1.25 MGD, with provisions to accommodate a phase 2, 2.50 MGD ADMMF IWRF. A schematic process flow diagram is presented in Figure 6-1.

The process treatment ponds will be arranged in a manner that allow for settling, biological oxidation, internal sludge digestion, and odor control through multi-staged cells. The flow path is designed in such a way that wastewater takes the longest travel path between ponds to minimize short circuiting and maximize treatment results. Both the EQ basins and process treatment ponds will operate in series. In addition, the plant will be laid out to accommodate nutrient removal (using a denitrification woodchip wetland or other alternative) in future phases of the Project. If the demand for recycled water increases in the future, the facility could be retrofitted with an effluent membrane filter and disinfection equipment to meet Title 22 water quality requirements. In this scenario, the percolation ponds would remain in place to provide wet weather disposal when recycled water use is prohibited. A proposed layout of the IWRF is presented in Figure 6-2

The IWRF process components are described in the following subsections.

<u>Influent Lift Station</u>: The new trunk sewer will arrive at the IWRF headworks at a depth of approximately 12 to 14 feet (design by others). Thus, an influent lift station will be required to pump wastewater to the EQ basins. The new lift station will be designed as a duplex submersible lift station, designed for 1.25 MGD ADMMF, and sized to handle a peak hour flow (PHF) of 6 MGD. The wetwell will be sized such that the pumps can be upgraded and/or replaced in the future to accommodate a 2.5 MGD ADMMF, with corresponding PHF of 10 MGD. The lift station will pump influent to the plant headworks, discharging to the screenings device and the influent metering device (Parshall Flume).

<u>Influent Screening</u>. Following the Parshall Flume, the raw influent will pass through a course mechanically cleaned screen to remove trash and other non-putrescible debris. The headworks will be designed with dual channels, one equipped with a course mechanically cleaned screen, and one channel with a manual bar screen to bypass the mechanically cleaned screening device. Screenings will be discharged to a dumpster for off-site disposal to a municipal landfill. It is recommended that each channel cross section be sized at 1.5 sf to ensure

an approach velocity of 1.25 - 3 ft/s. This will minimize solids and grit deposited in the channel while keeping velocity low enough to prevent pass-through of debris at peak flow rates. Keeping the approach velocity in this range may require an additional channel and screen for phase II to keep approach velocities less than 3 ft/s during peak hour flow (10 MGD).

Parshall Flume. The Parshall flume is a fixed hydraulic structure that accelerates flow through a contraction of both the parallel sidewalls and a drop in the floor at the flume throat. Under free-flow conditions the depth of water at a specified location upstream of the flume throat can be converted to a rate of flow. This measuring device is a common and reliable means of measuring flow for wastewater applications. The Parshall Flume will be sized based on the ability to measure influent flow across the range of Phase 1 and Phase 2 flow conditions. Based on review of low to high flow conditions for both phases, the recommended Parshall throat size is 12 inches. This would allow for accurate measurement of flows ranging from 0.08 - 10.3 MGD (0.12-16 cfs).

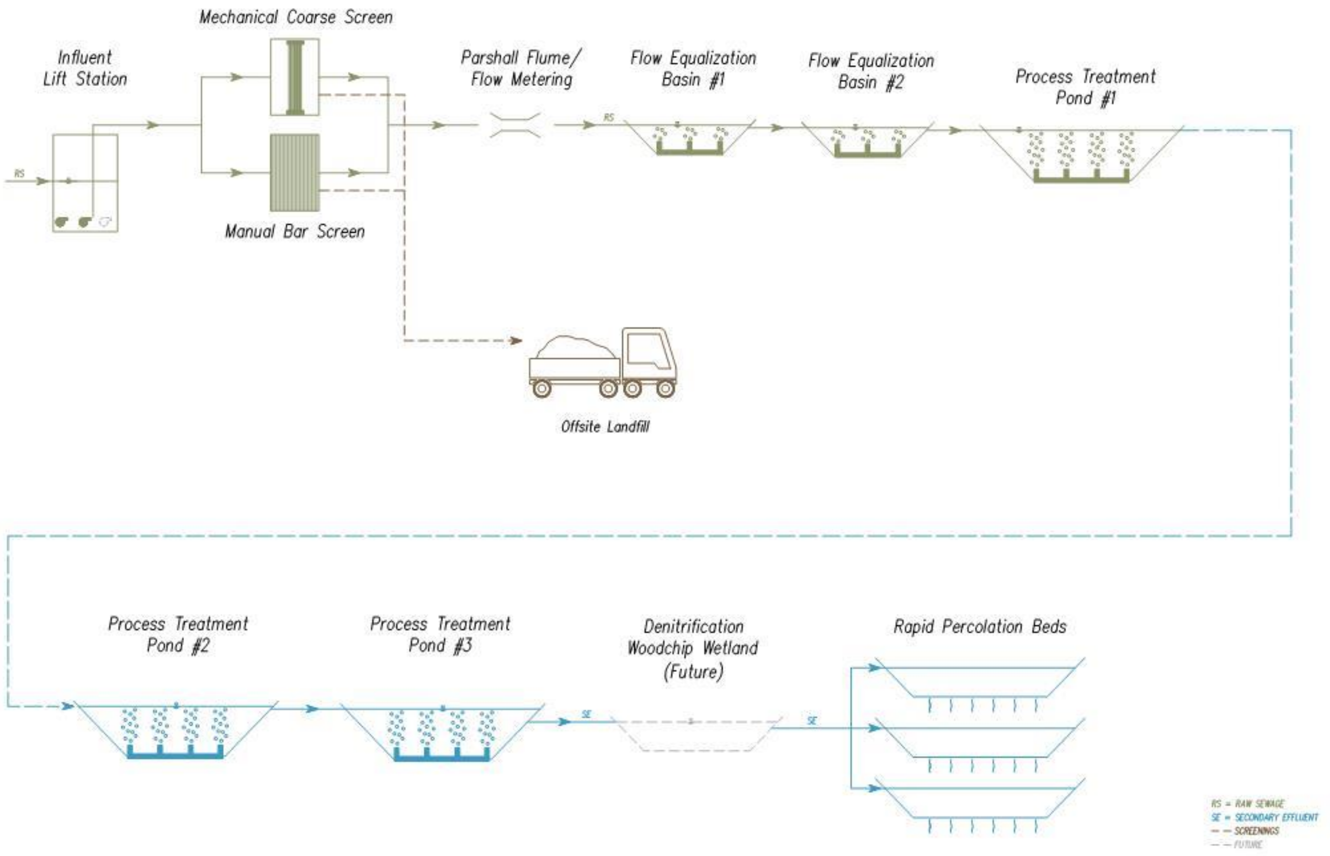
Flow Equalization. Following the screenings process, wastewater will enter a 2-stage flow equalization basin. The flow equalization basins will serve to buffer the flow to the ponds system and prevent shock loading the process treatment ponds. The flow equalization basins will be operated in series and aerobic conditions will be maintained using sub surface diffused aeration. [

Deep-operated Aerated Ponds. Deep-operated aerated pond systems introduce oxygen into wastewater using sub surface diffusers to allow for aerobic wastewater treatment. Specifically, this technology uses deep subsurface fine-bubble aeration to maintain the bottom oxygen level and allow aerobic organisms to thrive in the nutrient rich benthic zone. This is accomplished using high efficiency sub-subsurface fine bubble diffusers rather than surface aerators. Diffusers are installed in a floating grid layout in a deep pond (15-30ft). Deep ponds allow for more contact time for oxygen to dissolve in the water column as the air rises to the surface, providing for more efficient oxygen transfer compared to surface aerated pond systems. Diffuser sizing is based on pounds of oxygen required to biologically break down BOD, TSS and ammonia to meet design effluent limits. Proper aerator placement is important to provide optimal oxygenation and mixing while preventing turbulence and re-suspension of bottom sludge and sediments.

Effluent Percolation Beds. Treated effluent will be disposed of in rapid percolation beds. The percolation beds will be designed to accommodate rapid infiltration (applied effluent percolate within 24 hours, no ponding of effluent will be allowed). Sufficient land will be provided to allow cycling and rotation of the percolation beds, drying and disking of the percolation beds prior to the next cycle of effluent application. A separate section in this Chapter describes effluent percolation and the water balanced prepared to design and specify land requirements for effluent percolation.

Solids Management. Screenings from the influent mechanical screen and manual bar screen will be transferred to a dumpster for offsite disposal. Accumulated biosolids and sludge will settle out in equalization basins and process treatment ponds and will be periodically removed by dredging. It is recommended that the flow equalization basins and process treatment ponds be dredged every 20 years to ensure adequate treatment volume and hydraulic retention time for biological treatment. Sludge dewatering would be accomplished by a contractor with portable dewatering equipment, or by air drying on site.

Design Criteria for ADS System. The design criteria for the Alternative No. 2 IWRF is included in Table 6-1.



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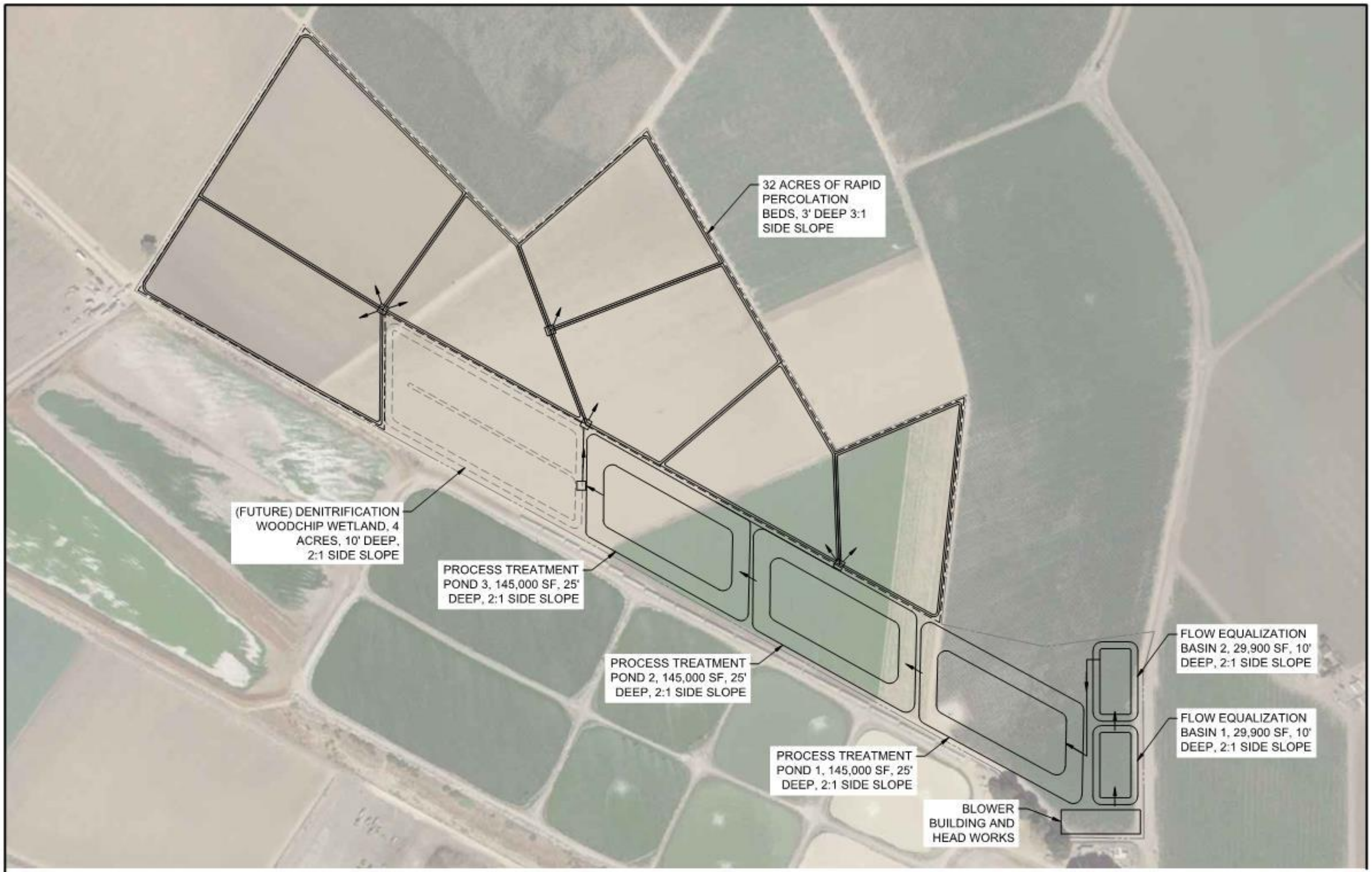
City of Gonzales
IWRF Process Flow Diagram
ADS POND SYSTEM
Figure 6-1

JOB No. :	868-0002
DRAWING :	Figure 6-1
DRAWN BY:	NFW
DATE :	2/11/2020
SCALE :	NTS



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City of Gonzales
IWRF LAYOUT
ADS PONDS & WOODCHIP WETLAND
Figure 6-2

JOB No.: 868-0002
DRAWING: Figure 6-2
DRAWN BY: NFW
DATE: 2/11/2020
SCALE: NTS

Table 6-1. IWRF Design Criteria – Deep Aerated Pond System

PROCESS AREA	DESCRIPTION, DESIGN CRITERIA UNIT	VALUE (PHASE I /PHASE II)
INFLUENT LIFT STATION		
WET WELL	DIAMETER, FT	12
	WETWELL DEPTH, FT	20
	OPERATING BAND	12
PUMPS	NUMBER OF PUMPS	2/3
	MODE OF OPERATION	SIMPLEX/DUPLEX
	CAPACITY, GPM (EACH)	6500
	TDH, FT	25
INFLUENT SCREENING		
MECHANICAL COARSE SCREEN	BAR SPACING	2
	CHANNEL CROSS SECTIONAL AREA, SF	1.5
	APPROACH VELOCITY, FT/S	1.5-3.0
MANUAL BAR SCREEN	BAR SPACING, IN	2
	CHANNEL CROSS SECTIONAL AREA, SF	1.5
	APPROACH VELOCITY, FT/S	1.5-3.0
INFLUENT FLOW METERING		
PARSHALL FLUME	THROAT SIZE, IN	12
FLOW EQUALIZATION BASINS		
FLOW EQUALIZATION BASINS	NUMBER	2
	SIZE (EACH), AC	0.69
	VOLUME (EACH), MG	2.19
	DEPTH, FT	20
	SIDE SLOPE (X/Y)	2:1
	FLOW THROUGH BASIN, MGD	1.25/2.5
	ADS DISK MODULES (EACH)	38/74
PROCESS TREATMENT PONDS		
PROCESS TREATMENT PONDS	NUMBER	3
	SIZE (EACH), AC	3.32
	VOLUME (EACH), MG	15.15
	DEPTH, FT	20
	SIDE SLOPE (X/Y)	2:1
	FLOW THROUGH POND, MGD	1.25/2.5
	POND 1 ADS DISK MODULES	108/222
	POND 2 ADS DISK MODULES	38/74
	POND 3 ADS DISK MODULES	38/74

Table 6-1. IWRF Design Criteria – Deep Aerated Pond System

PROCESS AREA	DESCRIPTION, DESIGN CRITERIA UNIT	VALUE (PHASE I/PHASE II)
RAPID PERCOLATION BEDS		
PERCOLATION BEDS	NUMBER	7
	AREA (TOTAL), AC	32
	DEPTH, FT	3
	SIDE SLOPE (X/Y)	3:1
	MIN FREEBOARD, FT	2
	APPLICATION RATE, IN/DAY	4
	APPLICATION RATE, MGD	1.25/2.5
BLOWER BUILDING		
BLOWERS	BLOWERS, NO	2/3
	FLOW, EACH, SCFM	2500

PROCESS TREATMENT PONDS		
PARAMETER	**DESIGN INFLUENT VALUE (PHASE I/PHASE II)**	**DESIGN EFFLUENT VALUE (PHASE I/PHASE II)**
BOD, mg/L	600	100/100
TSS, mg/L	600	100/100
TOTAL NITROGEN, mg/L	40	10/10
PERCOLATION BEDS		
PARAMETER	**DESIGN LOADING (PHASE I)**	**DESIGN LOADING (PHASE II)**
BOD Limitation (Fruit & Veg. Order), lbs/acre-day	100	100
BOD Loading, lbs/acre-day	33	65

Alternative No. 2 Pros and Cons.

Pros:

- Meets requirements for the Fruit & Vegetable Order (100 lb/acre-day) at reasonable cost.
- Nitrification/denitrification process will likely achieve 10 mg/L nitrate-N value during summer months.
- Relatively simple process operation (aeration diffusers only)
- Efficient oxygen transfer technology (fine bubble diffusers at lower depth)
- Reasonable initial capital cost

Cons:

- May require nutrient removal in future phases
- Will require long-term GW monitoring
- Large land requirements
- Requires periodic dredging and removal of sludge from the process ponds

Alternative No. 2 Capital and O&M Costs.

The capital and operation & maintenance (O&M) costs were developed for this alternative. Capital costs are expressed in January 2020 dollars corresponding to the Engineering News Record (ENR) Index of 11392. This index can be used as a basis for projecting future costs to the midpoint of construction. Total capital costs would be expected to increase by one to three percent as the Project moves forward over time.

Capital Costs. Capital costs include the influent lift station, headworks (flow metering, screening), flow EQ basins and aeration ponds, effluent rapid percolation beds (31 acres), site work, yard piping, electrical, and other costs, but do exclude the cost of the new dedicated gravity trunk sewer. Capital costs are summarized in Table 6-2.

Table 6-2. Capital Costs – Deep Aerated Pond System

Item/Description	Opinion of Probable Cost
Influent Lift Station	$500,000
EQ Basins 1 and 2	$1,500,000
Aeration Ponds 1, 2 and 3	$4,000,000
Effluent Rapid Percolation Beds (32 acres)	$1,500,000
Yard Piping Improvements	$500,000
Electrical and Instrumentation	$250,000
Mobilization/Demobilization/Startup	$250,000
Subtotal: Estimated Project Cost	**$8,500,000**
Contingency @15%	$1,275,000
Construction Administration@7.5%	$637,500
Opinion of Probable Cost	**$10,412,500**

O&M Costs. Operation and maintenance (O&M) costs for this alternative include operations staff/labor, energy and chemicals (if any), laboratory/sampling costs, sludge management and disposal costs, maintenance and equipment repairs. For this conceptual report, the following assumptions were used in preparing O&M costs:

- Power costs, $0.22/kW-hr. (horsepower requirements were based on vendor-provided calculations of aeration/oxygen requirements for the treatment process)
- Sludge disposal cost at ~$1,000/dry ton (includes cost for dredging, dewatering, disposal)
- Laboratory and Sampling costs, estimated at $3,000/month
- Groundwater monitoring (sampling included in laboratory costs above), $2,500 quarterly or $10,000 annually.

Estimates were also provided for annual equipment maintenance and repairs, in the range of $30,000 annually. This may include such costs as maintaining, servicing and replacing plant equipment such as aeration diffusers, blowers, headworks/screenings device, wetwell/influent pumps, and other equipment, and including period servicing of diversion boxes and slide gates. At this level of development of a preliminary design report, detailed O&M costs are difficult to derive. The O&M costs for this alternative are summarized in Table 6-3.

Table 6-3. O&M Costs – Deep Aerated Pond System

Item/Description		Opinion of Probable Cost
Operations Contract	$	100,000
Energy Cost (Aeration Ponds+EQ+Lift Station)	$	431,307
Laboratory/Sampling	$	36,000
Sludge Disposal	$	120,000
GW Monitoring Program	$	10,000
Maintenance	$	30,000
Subtotal: Estimated O&M Cost	**$**	**727,307**
Contingency @10%	$	72,731
Total Estimated Annual O&M Cost	**$**	**800,038**

Life Cycle Costs. Using a 5% discount factor at 20 years (12.462), life cycle costs were estimated, and are included in Table 6-4.

Table 6-4. Life Cycle Costs – Deep Aerated Pond System

Item/Description	Opinion of Probable Cost	
Annual O&M Cost	$	800,038
Present Worth, Annual O&M[a]	$	9,970,075
Present Worth, WWTP Improvements	$	10,412,500
Total Life Cycle Cost, $	**$**	**20,382,575**

[a] Based on 5%, 20 year factor, 12.462.

ALTERNATIVE NO. 3 – MEMBRANE BIOREACTOR (MBR) PLANT

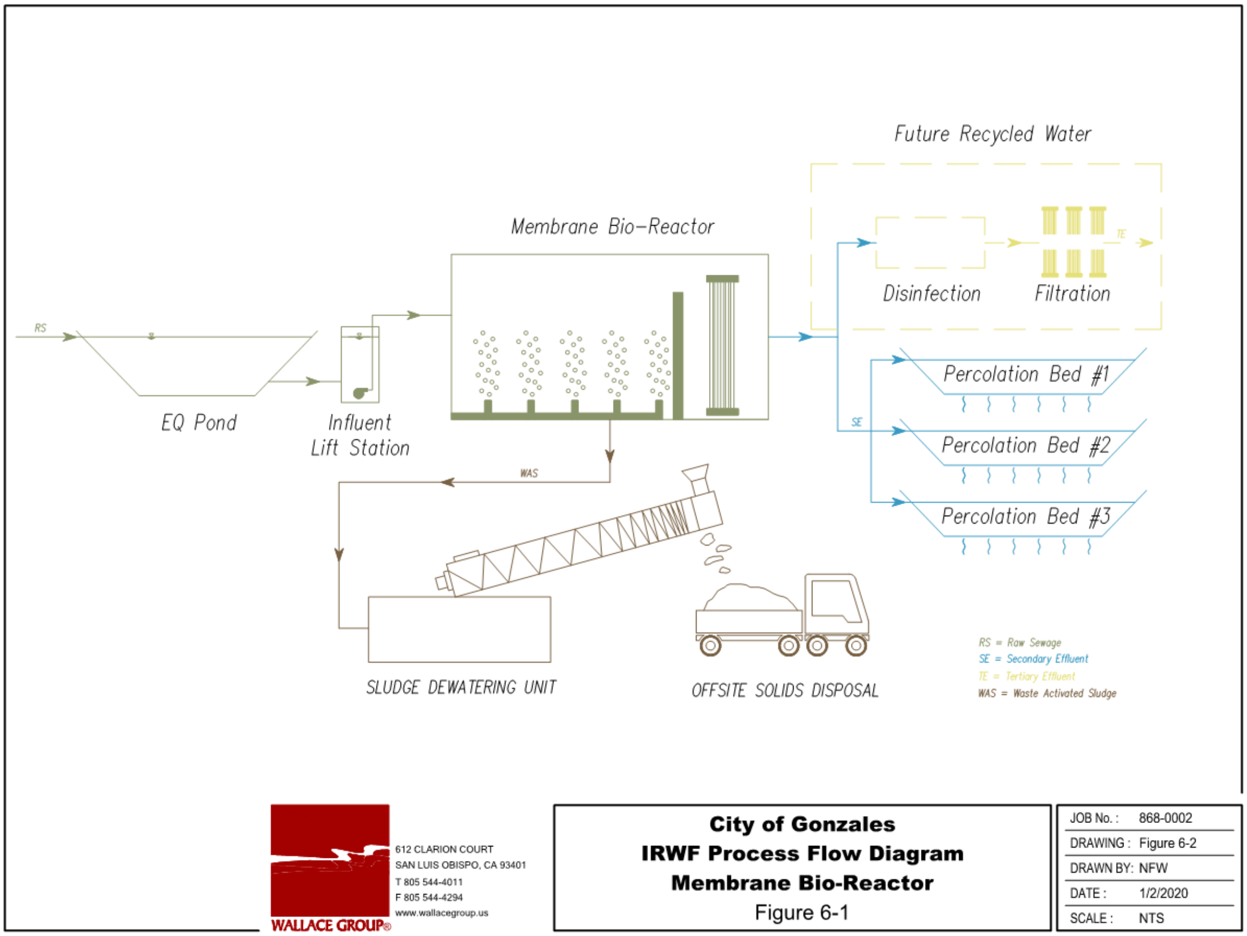
Based on Chapter 5, and the findings presented with regards to probable waste discharge requirements for the City of Gonzales IWRF, advanced treatment using a mechanical treatment system is not warranted for this Phase 1 IWRF. This alternative is presented to indicate what higher treatment technology is available for wastewater treatment, should future WDRs require such degree of treatment. This alternative analyzes treating industrial wastewater with a MBR plant, and discharging treated effluent in a similar fashion as described for Alternative No. 2. Treated effluent from an MBR plant is expected to have BOD and TSS concentrations less than 30 mg/L and total nitrogen less than 10 mg/L. The MBR plant considered as part of this alternative is a modular package, skid-mounted pre-engineered plant, and will include provisions to easily accommodate California Title 22 ”tertiary 2.2” recycled water quality in the future.

Alternative No. 3 Process Description.

The general raw influent wastewater flow would be similar to Alternative No. 2 in that an influent lift station will be required to lift raw wastewater into the MBR plant. Industrial wastewater from the collection system will be pumped into the MBR plant, and metered as it enters the plant using a [magnetic flow meter on the influent force main] before being mechanically screened. The MBR headworks will utilize a self-cleaning auger screen mounted on top of an EQ chamber on the MBR Skid. Screened solids will be discharged into an incorporated bagger and screened effluent will flow by gravity to the EQ chamber. The EQ chamber is divided into a stilling and storage chamber. The stilling chamber allows heavy grit, sand and other debris to settle prior to flowing by gravity to the storage portion of the equalization chamber.

Screened influent will then be transferred to an anoxic chamber and mixed with return activated sludge (RAS) prior to entering the aeration chamber by gravity. Three aeration chambers, suppling air with high efficiency diffusers, will be used to sufficiently mix and oxidize the wastewater. Aeration diffusers will be placed in a grid across the entire chamber floor to ensure adequate mixing and prevent solids from accumulating on the floor. Flow from the aeration chamber will enter the membrane chamber by gravity. An air lift pump will return mixed liquor (RAS) to the anoxic chamber, where nitrified RAS will mix with raw influent wastewater (carbon source) in an anoxic environment, and denitrify wastewater by converting nitrates to nitrogen gas which will be expelled to the atmosphere.

In the membrane chamber aerated effluent will permeate through a membrane cassette. Permeate will be drawn through the membrane modules to an effluent clearwell and discharged to the percolation beds. The MBR skid will include room for additional tertiary treatment, including disinfection and filtration to meet tertiary recycled water requirements.



City of Gonzales
IRWF Process Flow Diagram
Membrane Bio-Reactor
Figure 6-1

Biosolids will be dewatered in a dewatering press, and then will be transported to a facility for composting or disposal.

Alternative No. 3 Pros and Cons.

The following summarizes pros and cons with considering an MBR facility for the Gonzales IWRF:

Pros:

- Treats to a high degree of effluent quality, capable of achieving tertiary Title 22 recycled water.
- Nitrification/denitrification process will reliably meet effluent nitrogen to expected future levels (10 mg/L total nitrogen or less).
- Small footprint
- Modularity, ease of future expansion when required

Cons:

- High energy consumption/carbon footprint
- High initial Capital Cost
- Treats wastewater to quality beyond that required for permitting
- Complexity of operation
- Requires higher classification of certified operators to operate plant
- Complex mechanical equipment maintenance
- Long-term extensive mechanical equipment replacement costs
- Requires daily management of biosolids/sludge from the process

Alternative No. 3 Capital and O&M Costs.

Conceptual capital costs were developed for an MBR Plant at 1.25 MGD capacity. Based on this estimate, an equivalent 1.25 MGD MBR plant is more than twice the initial cost of an aerated pond system. Although the MBR plant offers a much higher level of treatment, the initial costs of this plant are high, and not warranted to achieve compliance with probable waste discharge requirements and water quality objectives. The O&M costs for this alternative are comparable to the pond system alternative, given that aeration costs are a function of BOD loading (same for both alternatives), and sludge disposal costs will also be similar.

Capital Costs. Capital costs include the influent lift station, headworks (flow metering, screening), MBR Plant and skid, effluent rapid percolation beds (32 acres), site work, yard piping, electrical, and other costs, but do exclude the cost of the new dedicated gravity trunk sewer. Capital costs are summarized in Table 6-5.

Table 6-5. Capital Costs – MBR Treatment System

Item/Description	Opinion of Probable Cost
MBR Plant (includes site work)	$16,250,000
Influent Lift Station	$500,000
Dewatering Equipment	$1,625,000
Yard Piping Improvements	$312,500
Electrical and Instrumentation	$250,000
Mobilization/Demobilization/Startup	$250,000
Subtotal: Estimated Project Cost	**$19,187,500**
Contingency @15%	$2,878,125
Contract Administration	$959,375
Opinion of Probable Cost	**$23,025,000**

O&M Costs. Operation and maintenance (O&M) costs for this alternative include operations staff/labor, energy and chemicals (if any), laboratory/sampling costs, sludge management and disposal costs, maintenance and equipment repairs. For this conceptual report, the following assumptions were used in preparing O&M costs:

- Power costs, $0.22/kW-hr. (horsepower requirements were assumed to be relatively the same as for the deep pond system)
- Sludge disposal cost at ~$250/dry ton
- Laboratory and Sampling costs, estimated at $2,600/month (excludes GW sampling)

- Groundwater monitoring, $0 (no cost), since the higher level of treatment would not warrant extended GW monitoring.

Estimates were also provided for annual equipment maintenance and repairs, in the range of $75,000 annually. This may include such costs as maintaining, servicing and replacing plant equipment such as membranes, aeration equipment/diffusers, blowers, headworks/screenings device, pumps, valves and piping, wetwell/influent pumps, and other equipment, and including period servicing of diversion boxes and slide gates. At this level of development of a preliminary design report, detailed O&M costs are difficult to derive. A summary of estimated O&M costs is included in Table 6-6.

Table 6-6. O&M Costs – MBR Treatment System

Item/Description	Opinion of Probable Cost
Operations Contract/Staff	$ 150,000
MBR, Energy Cost	$ 431,307
Laboratory/Sampling	$ 32,000
Sludge Disposal	$ 30,000
Maintenance	$ 75,000
Subtotal: Estimated O&M Cost	**$ 718,307**
Contingency @10%	$ 71,831
Total Estimated Annual O&M Cost	**$ 790,138**

Life Cycle Costs. Using a 5% discount factor at 20 years (12.462), life cycle costs were estimated, and are included in Table 6-4.

Table 6-7. Life Cycle Costs
Deep Aerated Pond System

Item/Description	Opinion of Probable Cost
Annual O&M Cost	$ 790,138
Present Worth, Annual O&M[a]	$ 9,846,701
Present Worth, WWTP	$ 23,025,000
Total Life Cycle Cost, $	**$ 32,871,701**

[a] Based on 5%, 20 year factor, 12.462.

RECOMMENDED PROJECT

The recommended IWRF is Alternative No. 2, the deep-aerated pond system. This treatment system is effective and easy to operate, meets the treatment objectives of the fruit & vegetable order, and there is sufficient land to accommodate the Project and meet anticipated future effluent goals. The MBR Alternative No. 3 is more than twice the capital cost, saving the City over $10 Million to initiate the Project. Refer to Table 6-1 and Figure 6-1 for design criteria and schematic layout of the IWRF.

Effluent Disposal – Recommended Project

This section describes requirements and recommendations for effluent disposal, including site and area requirements, water balance, percolative capacity and how the percolation rates were determined.

Water Balance.

A water balance was conducted to determine the land required for adequate effluent disposal capacity. This water balance was used to determine land requirements to accommodate a 1.25 MGD wastewater flow (phase 1). The effluent disposal site design for phase 2 will be identical to phase 1, therefore, it is assumed that the land required for phase II will be roughly the same. The performance of Phase 1 rapid percolation beds will be also the basis for validating Phase 2 area requirements, and/or make recommendations for acquisition of additional effluent disposal lands should it be deemed necessary. Based on these assumptions, this water balance and effluent disposal discussion will focus on phase 1 only.

The water balance for the City of Gonzales IWRF effluent disposal system was calculated using data from the following sources:

- California Irrigation Management Information System (CIMIS) Website, Weather Station 252, Soledad.
- National Oceanographic and Atmospheric Administration (NOAA), Technical Report NWS 34, Mean Monthly, Seasonal, and Annual Pan Evaporation for the United States, December 1982.
- NOAA Atlas 14 Volume 6, Version 2, Soledad Station ID: 04-8338

CIMIS Weather Station 252, Soledad, was referenced as the closest active weather station on the CIMIS web site. Data from this website was taken on evapotranspiration (ETo) and rainfall from 2000 – 2017. Historic pan evaporation data (Soledad area) was taken from NOAA Technical Report NWS 34 and adjusted by a factor of 0.7 to convert pan evaporation to actual estimated evaporation rates. Table 6-8 summarizes this information in tabular format. Table 6-8 shows that the NOAA evaporation rates and CIMIS weather station ETo correlate closely to one another. The NOAA evaporation rates will be used to calculate evaporative losses from the wastewater ponds/disposal area since these rates are more conservative.

Table 6-8. Evapotranspiration, Evaporation and Rainfall Data, Gonzales, CA

	Values Below Express in Inches		
Month	ETo	Rainfall	Evap
Jan	1.7	2.8	1.68
Feb	2.05	4.19	2.09
Mar	3.83	1.61	3.23
Apr	5.46	0.22	4.19
May	6.44	0.26	5.38
Jun	7.41	0	5.73
Jul	7.78	0	6.01
Aug	7.29	0	5.32
Sep	6.23	0	4.60
Oct	5.13	0.01	3.72
Nov	2.71	1.5	2.18
Dec	1.85	1.41	1.57

Rapid Percolation Bed Design Criteria. The phase 1 effluent disposal site is designed to percolate 1.25 MGD and will consist of seven rapid percolation beds, approximately 3-5 acres each for a total of 32 acres of disposal. The number of percolation beds will allow for good rotation of the percolation beds, and drying and disking in between each application. Each infiltration basin will be separated by engineered berms that will withstand wind and erosion, and will be designed with slopes that allow for equipment access to the percolation beds.

Recommended effluent disposal site design criteria are summarized as follows:

- Effluent percolation beds will be laser-leveled, such that effluent is applied in a thin uniform layer, thus maximizing contact with the ground surface.
- Splash blocks will be provided to dissipate energy and minimize localized erosion at the terminal end of effluent discharge pipes, and also to evenly distribute effluent to each disposal area and allow even dispersion across the bottom of the percolation beds.
- Berms surrounding the percolation beds will be engineered with side slopes not to exceed 3:1 to allow for equipment access for bed maintenance and for slope stability.
- Percolation beds will be a minimum of 3 feet deep (top of berm to bottom of bed) to allow for a maximum of 12 inches of effluent application with 2 feet of freeboard at all times.
- Evaporation Rates. For Ponds 1 through 3 (ADS process ponds), evaporation is calculated using the NOAA adjusted evaporation rate (adjusted by 0.7 x Pan Evaporation Rate). Note, however, that for the effluent disposal areas, effluent is designed to rapidly percolate within 12 to 24 hours of application to land; therefore, evaporative losses at effluent disposal areas are assumed to be zero. The evaporative losses from Ponds 1 through 3, and including the EQ basins, are accounted for in the water balance.
- Design Rainfall. The NOAA weather data for the Gonzales area indicates the 100-year storm, for a 30-day interval, is 12.1 inches (range of 10.4 to 14.4 inches), and for a 60-day interval, 16.8 inches (range of 14.4 to 20 inches). For peak month, a value of 14.4 inches was used to

evaluate the water balance at peak month (January). A design peak 30-day rainfall value of 14.4 inches was chosen to be conservative.

- Design Infiltration Rate. 4 inches per day (overall average application rate). Refer to technical data and calculations described later in this chapter.
- Application Depth. To allow for rapid infiltration into the underlying soil, the applied wastewater must percolate into the ground within 24 hours. To ensure this occurs, effluent will be applied at the percolation beds such that no more than 4 inches of water height accumulates across the field, which provides buffer against the maximum design depth of 12 inches.
- Resting Period. Following application and percolation of all effluent, the effluent disposal field shall rest for a 6-day period to allow complete drying between applications, and surface ripping/disking prior to the next application. This resting cycle is also consistent with design criteria (EPA Land Application design recommendations).
- A design safety factor/buffer of 2 is recommended (thus, twice the area calculated is recommended to ensure operational flexibility and ample land for complete rotation of fields). This safety factor is built into the design percolation rate chosen.
- It is expected that the WDRs will not impose restrictions on water application during rainy periods, since the design is for rapid percolation into the ground. However, the water balance accounts for a 100-year storm event (14.4 inches of rain per month) in any given year, in addition to the safety factor of 2 mentioned above.

Percolation Testing. No percolation tests were conducted at the new IWRF site. Based on close proximity to the existing municipal WWTP disposal site, and similar wastewater flows and effluent quality, the rapid percolation beds for the IWRF are designed using the same percolation rates (operationally determined) as the municipal WWTP. Operationally it has been determined that the existing WWTP can effectively percolate 1.0 MGD year round without ponding in the percolation beds. The existing WWTP percolation beds are operated one bed at a time with a rest period between application and drying cycles. The WWTP percolation beds are maintained by surface ripping/disking every 3 months or prior to the next application.

Design Infiltration Rate. A design Infiltration rate of 0.44 ft/day (5.26 in/day) was calculated at the City of Gonzales WWTP using a 1.0 MGD flow and a 7 acre application area. For the winter months, a factor of safety of 2 was applied to the operationally determined infiltration rate resulting in a design infiltration rate of 0.22 ft/day (2.63 in/day). Based on operational data at the WWTP, it is likely that infiltration rate is higher than what is being used for this design. It is recommended that after the construction of phase I of the IWRF, the infiltration rate of the basins be operationally determined, prior to constructing phase II infiltration basins.

Based on the assumption of 32 acres of disposal area, with and percolation rate of 4 in/day, the IWRF should be able percolate phase I flows with a factor of safety of 2.5 – 3.0 and phase 2 flows with a factor of safety of 1.3 - 1.5. As previously stated, this will need to be confirmed based on actual percolation data.

Groundwater Monitoring Program – Recommended Project

The deep-aeration pond system will achieve some nitrogen removal, but year-round will not be able to achieve nitrogen effluent levels consistently below the Basin Plan water quality objective (10 mg/L nitrate-N). Thus, as part of this new IWRF, an expanded groundwater monitoring program is anticipated to be required by the Regional Board. Detailed layout of the proposed groundwater monitoring program was not part of the scope of this PER. However, the following considerations will need to be incorporated into the overall GW monitoring program:

1. Baseline water quality must be established. This may be challenging, given that the new IWRF is immediately adjacent to the municipal WWTP that has been in operation for years. It is known that the existing GW monitoring wells are showing localized impacts to underlying GW from the WWTP. There is also a new composting facility immediately adjacent to the WWTP that has the potential to also impact GW quality.
2. Upgradient Wells. It is envisioned that at least two additional upgradient wells be installed, further upstream and separated from the new IWRF. These two wells may need to be in part, within the wrecking yard property, or further south on agricultural property. Ideal location of these wells may necessitate access easement agreements with local property owners/farmers.
3. Downgradient Wells. Downgradient wells, possibly 4 or more, should be placed in the expected downgradient direction, and also positioned some distance from the IWRF. This will allow “true” downgradient readings, with less water quality interference from the neighboring WWTP.
4. Groundwater Well Survey. The wellheads will need to be surveyed, and GW contour maps prepared on a t least a semi-annual basis, to determine GW gradient across the IWRF and direction of GW flow, which is known to change seasonally.

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